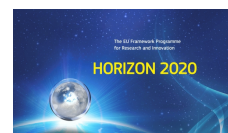


**EUROPEAN COMMISSION**

Executive Agency for Small and Medium-sized Enterprises (EASME)

Director

**GRANT AGREEMENT****NUMBER — 653522 — RESIN**

This **Agreement** ('the Agreement') is **between** the following parties:

**on the one part,**

*the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission')<sup>1</sup>,*

represented for the purposes of signature of this Agreement by Head of Unit, Executive Agency for Small and Medium-sized Enterprises (EASME), H2020 Environment & Resources, Arnoldas MILUKAS,

**and**

**on the other part,**

1. 'the coordinator':

**NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO (TNO)**, 27376655, established in SCHOEMAKERSTRAAT 97 GEBOUW A, DELFT 2628 VK, Netherlands, NL002875718B01, represented for the purposes of signing the Agreement by Leo KUSTERS

and the following other beneficiaries, if they sign their 'Accession Form' (see Annex 3 and Article 56):

2. **FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV (Fraunhofer) EV**, VR4461, established in HANSASTRASSE 27C, MUENCHEN 80686, Germany, DE129515865,

3. **FUNDACION TECNALIA RESEARCH & INNOVATION (TECNALIA)** ES3, F69, established in PARQUE TECNOLOGICO DE MIRAMON PASEO MIKELETEGI 2, DONOSTIA-SAN SEBASTIAN 20009, Spain, ESG48975767,

4. **ICLEI EUROPEAN SECRETARIAT GMBH (ICLEI EUROPASEKRETARIAT GMBH)\* (ICLEI)** GMBH, HRB4188, established in Leopoldring 3, Freiburg 79098, Germany, DE153445986,

5. **EIVP (EIVP)**, 200000693, established in F  nelon 15, Paris 75010, France,

6. **ITTI SP ZOO (ITTI) SP(ZOO)**, 0000186080/630400909, established in RUBIEZ 46, POZNAN 61 612, Poland, PL7811019801,

7. **STICHTING NEDERLANDS NORMALISATIE - INSTITUUT (NEN)** NL6, 41150051, established in VLINDERWEG 6, DELFT 2623 AX, Netherlands, NL002814237B01,

8. **ARCADIS NEDERLAND BV (Arcadis)** BV, 09036504, established in PIET MONDRIAANLAAN 26, AMERSFOORT 3812 GV, Netherlands, NL001830041B01,

<sup>1</sup> Text in *italics* shows the options of the Model Grant Agreement that are applicable to this Agreement.



9. **BC3 BASQUE CENTRE FOR CLIMATE CHANGE - KLIMA ALDAKETA IKERGAIA (BC3)** ES5, ASB140762008, established in ALAMEDA DE URQUIJO 4 4A PLANTA, BILBAO 48008, Spain, ESG95532826,
10. **HLAVNE MESTO SLOVENSKEJ REPUBLIKY BRATISLAVA (Bratislava)**, 00603481, established in PRIMACIALNE NAMESTIE 1, BRATISLAVA 814 99, Slovakia, SK2020372596 ,
11. **THE UNIVERSITY OF MANCHESTER (UNIMAN)**, RC000797 , established in OXFORD ROAD, MANCHESTER M13 9PL, United Kingdom, GB849738956,
12. **UNIVERZITA KOMENSKEHO V BRATISLAVE (UNIBA)**, 00397865, established in SAFARIKOVO NAM 6, Bratislava 1 81499, Slovakia, SK2020845332,
13. **AYUNTAMIENTO DE BILBAO (Bilbao)**, 01480209, established in URIBITARTE 18-4 DCHA, BILBAO 48001, Spain, ESP4802400D,
14. **OLDHAM METROPOLITAN BOROUGH COUNCIL (Manchester)**, established in WEST STREET CIVIC CENTRE, OLDHAM OL1 1UL, United Kingdom, GB149167054,
15. **SIEMENS AKTIENGESELLSCHAFT OESTERREICH (Siemens AT)** AG, FN 60562 M, established in SIEMENSSTRASSE 90, WIEN 1210, Austria, ATU14715405,
16. **SIEMENS AKTIENGESELLSCHAFT (Siemens DE)** AG, HRB6684/CF1431037021, established in WITTELSBACHERPLATZ 2, MUNCHEN 80333, Germany, DE129274202,
17. **UNIRESEARCH BV (Uniresearch)** BV, 27236872, established in Elektronikaweg 16c, DELFT 2628XG, Netherlands, NL810590372B01,

Unless otherwise specified, references to ‘beneficiary’ or ‘beneficiaries’ include the coordinator.

The parties referred to above have agreed to enter into the Agreement under the terms and conditions below.

By signing the Agreement or the Accession Form, the beneficiaries accept the grant and agree to implement it under their own responsibility and in accordance with the Agreement, with all the obligations and conditions it sets out.

The Agreement is composed of:

#### Terms and Conditions

- |         |   |
|---------|---|
| Annex 1 | Description of the action                             |
| Annex 2 | Estimated budget for the action                       |
| Annex 3 | Accession Forms                                       |
| Annex 4 | Model for the financial statements                    |
| Annex 5 | Model for the certificate on the financial statements |
| Annex 6 | Model for the certificate on the methodology          |



# TERMS AND CONDITIONS

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## **CHAPTER 1 GENERAL**

### **ARTICLE 1 — SUBJECT OF THE AGREEMENT**

This Agreement sets out the rights and obligations and the terms and conditions applicable to the grant awarded to the beneficiaries for implementing the action set out in Chapter 2.

## **CHAPTER 2 ACTION**

### **ARTICLE 2 — ACTION TO BE IMPLEMENTED**

The grant is awarded for the action entitled ‘*Climate Resilient Cities and Infrastructures — RESIN*’ (**‘action’**), as described in Annex 1.

### **ARTICLE 3 — DURATION AND STARTING DATE OF THE ACTION**

The duration of the action will be **42 months** as of *01/05/2015* (**‘starting date of the action’**).

### **ARTICLE 4 — ESTIMATED BUDGET AND BUDGET TRANSFERS**

#### **4.1 Estimated budget**

The **‘estimated budget’** for the action is set out in Annex 2.

It contains the estimated eligible costs and the forms of costs, broken down by beneficiary and budget category (see Articles 5, 6).

#### **4.2 Budget transfers**

The estimated budget breakdown indicated in Annex 2 may be adjusted by transfers of amounts between beneficiaries or between budget categories (or both). This does not require an amendment according to Article 55, if the action is implemented as described in Annex 1.

However, the beneficiaries may not add costs relating to subcontracts not provided for in Annex 1, unless such additional subcontracts are approved by an amendment or in accordance with Article 13.

## **CHAPTER 3 GRANT**

### **ARTICLE 5 — GRANT AMOUNT, FORM OF GRANT, REIMBURSEMENT RATES AND FORMS OF COSTS**

#### **5.1 Maximum grant amount**

The **‘maximum grant amount’** is **EUR 7,466,004.50** (seven million four hundred and sixty six thousand four EURO and fifty eurocents).





## 5.2 Form of grant, reimbursement rates and forms of costs

The grant reimburses **100% of the action's eligible costs** (see Article 6) (**'reimbursement of eligible costs grant'**) (see Annex 2).

The estimated eligible costs of the action are EUR **7,466,004.50** (seven million four hundred and sixty six thousand four EURO and fifty eurocents).

Eligible costs (see Article 6) must be declared under the following forms (**'forms of costs'**):

(a) for **direct personnel costs**:

- as actually incurred costs (**'actual costs'**) or
- on the basis of an amount per unit calculated by the beneficiary in accordance with its usual cost accounting practices (**'unit costs'**).

Personnel **costs for SME owners or beneficiaries that are natural persons** not receiving a salary (see Article 6.2, Points A.4 and A.5) must be declared on the basis of the amount per unit set out in Annex 2 (**'unit costs'**);

(b) for **direct costs for subcontracting**: as actually incurred costs (**'actual costs'**);

(c) for **direct costs of providing financial support to third parties**: *not applicable*;

(d) for **other direct costs**: as actually incurred costs (**'actual costs'**);

(e) for **indirect costs**: on the basis of a flat-rate applied as set out in Article 6.2, Point E (**'flat-rate costs'**);

(f) *specific cost category(ies): not applicable*.

## 5.3 Final grant amount — Calculation

The **'final grant amount'** depends on the actual extent to which the action is implemented in accordance with the Agreement's terms and conditions.

This amount is calculated by the *Agency* — when the payment of the balance is made (see Article 21.4) — in the following steps:

Step 1 – Application of the reimbursement rates to the eligible costs

Step 2 – Limit to the maximum grant amount

Step 3 – Reduction due to the no-profit rule

Step 4 – Reduction due to improper implementation or breach of other obligations

### 5.3.1 Step 1 — Application of the reimbursement rates to the eligible costs

The reimbursement rate(s) (see Article 5.2) are applied to the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) declared by the beneficiaries (see Article 20) and approved by the *Agency* (see Article 21).

### 5.3.2 Step 2 — Limit to the maximum grant amount

If the amount obtained following Step 1 is higher than the maximum grant amount set out in Article 5.1, it will be limited to the latter.

### 5.3.3 Step 3 — Reduction due to the no-profit rule

The grant must not produce a profit.

‘**Profit**’ means the surplus of the amount obtained following Steps 1 and 2 plus the action’s total receipts, over the action’s total eligible costs.

The ‘**action’s total eligible costs**’ are the consolidated total eligible costs approved by the *Agency*.

The ‘**action’s total receipts**’ are the consolidated total receipts generated during its duration (see Article 3).

The following are considered **receipts**:

- (a) income generated by the action; if the income is generated from selling equipment or other assets purchased under the Agreement, the receipt is up to the amount declared as eligible under the Agreement;
- (b) financial contributions given by third parties to the beneficiary specifically to be used for the action, and
- (c) in-kind contributions provided by third parties free of charge and specifically to be used for the action, if they have been declared as eligible costs.

The following are however not considered receipts:

- (a) income generated by exploiting the action’s results (see Article 28);
- (b) financial contributions by third parties, if they may be used to cover costs other than the eligible costs (see Article 6);
- (c) financial contributions by third parties with no obligation to repay any amount unused at the end of the period set out in Article 3.

If there is a profit, it will be deducted from the amount obtained following Steps 1 and 2.

### 5.3.4 Step 4 — Reduction due to improper implementation or breach of other obligations — Reduced grant amount — Calculation

If the grant is reduced (see Article 43), the *Agency* will calculate the reduced grant amount by deducting the amount of the reduction (calculated in proportion to the improper implementation of the action or to the seriousness of the breach of obligations in accordance with Article 43.2) from the maximum grant amount set out in Article 5.1.

The final grant amount will be the lower of the following two:



- the amount obtained following Steps 1 to 3 or
- the reduced grant amount following Step 4.

#### 5.4 Revised final grant amount — Calculation

If — after the payment of the balance (in particular, after checks, reviews, audits or investigations; see Article 22) — the *Agency* rejects costs (see Article 42) or reduces the grant (see Article 43), it will calculate the ‘**revised final grant amount**’ for the beneficiary concerned by the findings.

This amount is calculated by the *Agency* on the basis of the findings, as follows:

- in case of **rejection of costs**: by applying the reimbursement rate to the revised eligible costs approved by the *Agency* for the beneficiary concerned;
- in case of **reduction of the grant**: by calculating the concerned beneficiary’s share in the grant amount reduced in proportion to its improper implementation of the action or to the seriousness of its breach of obligations (see Article 43.2).

In case of **rejection of costs and reduction of the grant**, the revised final grant amount for the beneficiary concerned will be the lower of the two amounts above.

### ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS

#### 6.1 General conditions for costs to be eligible

‘**Eligible costs**’ are costs that meet the following criteria:

(a) for **actual costs**:

- (i) they must be actually incurred by the beneficiary;
- (ii) they must be incurred in the period set out in Article 3, with the exception of costs relating to the submission of the periodic report for the last reporting period and the final report (see Article 20);
- (iii) they must be indicated in the estimated budget set out in Annex 2;
- (iv) they must be incurred in connection with the action as described in Annex 1 and necessary for its implementation;
- (v) they must be identifiable and verifiable, in particular recorded in the beneficiary’s accounts in accordance with the accounting standards applicable in the country where the beneficiary is established and with the beneficiary’s usual cost accounting practices;
- (vi) they must comply with the applicable national law on taxes, labour and social security, and
- (vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency;

(b) for **unit costs**:



## (i) they must be calculated as follows:

{amounts per unit set out in Annex 2 or calculated by the beneficiary in accordance with its usual cost accounting practices (see Article 6.2, Point A)

multiplied by

the number of actual units};

## (ii) the number of actual units must comply with the following conditions:

- the units must be actually used or produced in the period set out in Article 3;
- the units must be necessary for implementing the action or produced by it, and
- the number of units must be identifiable and verifiable, in particular supported by records and documentation (see Article 18);

(c) for **flat-rate costs**:

- (i) they must be calculated by applying the flat-rate set out in Annex 2, and
- (ii) the costs (actual costs or unit costs) to which the flat-rate is applied must comply with the conditions for eligibility set out in this Article.

**6.2 Specific conditions for costs to be eligible**

Costs are eligible if they comply with the general conditions (see above) and the specific conditions set out below for each of the following budget categories:

- A. direct personnel costs;
- B. direct costs of subcontracting;
- C. *not applicable*;
- D. other direct costs;
- E. indirect costs;
- F. *not applicable*.

‘Direct costs’ are costs that are directly linked to the action implementation and can therefore be attributed to it directly. They must not include any indirect costs (see Point E below).

‘Indirect costs’ are costs that are not directly linked to the action implementation and therefore cannot be attributed directly to it.

**A. Direct personnel costs****Types of eligible personnel costs**

A.1 **Personnel costs** are eligible, if they are related to personnel working for the beneficiary under an employment contract (or equivalent appointing act) and assigned to the action (**‘costs for employees (or equivalent)’**). They must be limited to salaries (including during parental leave), social security contributions, taxes and other costs included in the **remuneration**, if they arise from national law or the employment contract (or equivalent appointing act).



Beneficiaries that are non-profit legal entities<sup>2</sup> may also declare as personnel costs **additional remuneration** for personnel assigned to the action (including payments on the basis of supplementary contracts regardless of their nature), if:

- (a) it is part of the beneficiary's usual remuneration practices and is paid in a consistent manner whenever the same kind of work or expertise is required;
- (b) the criteria used to calculate the supplementary payments are objective and generally applied by the beneficiary, regardless of the source of funding used.

Additional remuneration for personnel assigned to the action is eligible up to the following amount:

- (a) if the person works full time and exclusively on the action during the full year: up to EUR 8 000;
- (b) if the person works exclusively on the action but not full-time or not for the full year: up to the corresponding pro-rata amount of EUR 8 000, or
- (c) if the person does not work exclusively on the action: up to a pro-rata amount calculated as follows:

{ {EUR 8 000

divided by

the number of annual productive hours (see below)},

multiplied by

the number of hours that the person has worked on the action during the year}.

A.2 The **costs for natural persons working under a direct contract** with the beneficiary other than an employment contract are eligible personnel costs, if:

- (a) the person works under the beneficiary's instructions and, unless otherwise agreed with the beneficiary, on the beneficiary's premises;
- (b) the result of the work carried out belongs to the beneficiary, and
- (c) the costs are not significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

A.3 The **costs of personnel seconded by a third party against payment** are eligible personnel costs, if the conditions in Article 11.1 are met.

<sup>2</sup> For the definition, see Article 2.1(14) of the Rules for Participation Regulation No 1290/2013: '**non-profit legal entity**' means a legal entity which by its legal form is non-profit-making or which has a legal or statutory obligation not to distribute profits to its shareholders or individual members.



**A.4 Costs of owners** of beneficiaries that are small and medium-sized enterprises (**‘SME owners’**) who are working on the action and who do not receive a salary are eligible personnel costs, if they correspond to the amount per unit set out in Annex 2 multiplied by the number of actual hours worked on the action.

**A.5 Costs of ‘beneficiaries that are natural persons’** not receiving a salary are eligible personnel costs, if they correspond to the amount per unit set out in Annex 2 multiplied by the number of actual hours worked on the action.

### **Calculation**

Personnel costs must be calculated by the beneficiaries as follows:

{ {hourly rate  
multiplied by  
the number of actual hours worked on the action},  
plus  
for non-profit legal entities: additional remuneration to personnel assigned to the action under the conditions set out above (Point A.1)}.

The number of actual hours declared for a person must be identifiable and verifiable (see Article 18).

The total number of hours declared in EU or Euratom grants, for a person for a year, cannot be higher than the annual productive hours used for the calculations of the hourly rate. Therefore, the maximum number of hours that can be declared for the grant is:

{the number of annual productive hours for the year (see below)  
minus  
total number of hours declared by the beneficiary for that person in that year for other EU or Euratom grants}.

The **‘hourly rate’** is one of the following:

(a) for personnel costs declared as **actual costs**: the hourly rate is the amount calculated as follows:

{actual annual personnel costs (excluding additional remuneration) for the person  
divided by  
number of annual productive hours}.

The beneficiaries must use the annual personnel costs and the number of annual productive hours for each financial year covered by the reporting period. If a financial year is not closed at the end of the reporting period, the beneficiaries must use the hourly rate of the last closed financial year available.

For the ‘number of annual productive hours’, the beneficiaries may choose one of the following:

(i) ‘fixed number of hours’: 1 720 hours for persons working full time (or corresponding pro-rata for persons not working full time);

- (ii) ‘individual annual productive hours’: the total number of hours worked by the person in the year for the beneficiary, calculated as follows:

{annual workable hours of the person (according to the employment contract, applicable collective labour agreement or national law)

plus

overtime worked

minus

absences (such as sick leave and special leave)}.

‘Annual workable hours’ means the period during which the personnel must be working, at the employer’s disposal and carrying out his/her activity or duties under the employment contract, applicable collective labour agreement or national working time legislation.

If the contract (or applicable collective labour agreement or national working time legislation) does not allow to determine the annual workable hours, this option cannot be used;

- (iii) ‘standard annual productive hours’: the ‘standard number of annual hours’ generally applied by the beneficiary for its personnel in accordance with its usual cost accounting practices. This number must be at least 90% of the ‘standard annual workable hours’.

If there is no applicable reference for the standard annual workable hours, this option cannot be used.

For all options, the actual time spent on **parental leave** by a person assigned to the action may be deducted from the number of annual productive hours;

- (b) for personnel costs declared on the basis of **unit costs**: the hourly rate is one of the following:

- (i) for SME owners or beneficiaries that are natural persons: the hourly rate set out in Annex 2 (see Points A.4 and A.5 above), or
- (ii) for personnel costs declared on the basis of the beneficiary’s usual cost accounting practices: the hourly rate calculated by the beneficiary in accordance with its usual cost accounting practices, if:
  - the cost accounting practices used are applied in a consistent manner, based on objective criteria, regardless of the source of funding;
  - the hourly rate is calculated using the actual personnel costs recorded in the beneficiary’s accounts, excluding any ineligible cost or costs included in other budget categories.

The actual personnel costs may be adjusted by the beneficiary on the basis of budgeted or estimated elements. Those elements must be relevant for calculating





the personnel costs, reasonable and correspond to objective and verifiable information;

and

- the hourly rate is calculated using the number of annual productive hours (see above).

**B. Direct costs of subcontracting** (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible if the conditions in Article 13.1.1 are met.

**C. Direct costs of providing financial support to third parties** *not applicable*.

**D. Other direct costs**

**D.1 Travel costs and related subsistence allowances** (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible if they are in line with the beneficiary's usual practices on travel.

**D.2 The depreciation costs of equipment, infrastructure or other assets** (*new or second-hand*) as recorded in the beneficiary's accounts are eligible, if they were purchased in accordance with Article 10.1.1 and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

*The costs of renting or leasing equipment, infrastructure or other assets (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are also eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets and do not include any financing fees.*

*The costs of equipment, infrastructure or other assets **contributed in-kind against payment** are eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets, do not include any financing fees and if the conditions in Article 11.1 are met.*

*The only portion of the costs that will be taken into account is that which corresponds to the duration of the action and rate of actual use for the purposes of the action.*

**D.3 Costs of other goods and services** (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible, if they are:

- (a) purchased specifically for the action and in accordance with Article 10.1.1 or
- (b) contributed in kind against payment and in accordance with Article 11.1.

Such goods and services include, for instance, consumables and supplies, dissemination (including open access), protection of results, certificates on the financial statements (if they are required by the Agreement), certificates on the methodology, translations and publications.



**D.4 Capitalised and operating costs of ‘large research infrastructure’<sup>3</sup> directly used for the action are eligible, if:**

- (a) *the value of the large research infrastructure represents at least 75% of the total fixed assets (at historical value in its last closed balance sheet before the date of the signature of the Agreement or as determined on the basis of the rental and leasing costs of the research infrastructure<sup>4</sup>);*
- (b) *the beneficiary’s methodology for declaring the costs for large research infrastructure has been positively assessed by the Commission (‘ex-ante assessment’);*
- (c) *the beneficiary declares as direct eligible costs only the portion which corresponds to the duration of the action and the rate of actual use for the purposes of the action, and*
- (d) *they comply with the conditions as further detailed in the annotations to the H2020 grant agreements.*

**E. Indirect costs**

**Indirect costs** are eligible if they are declared on the basis of the flat-rate of 25% of the eligible direct costs (see Article 5.2 and Points A to D above), from which are excluded:

- (a) costs of subcontracting and
- (b) costs of in-kind contributions provided by third parties which are not used on the beneficiary’s premises;
- (c) *not applicable;*
- (d) *not applicable.*

Beneficiaries receiving an operating grant<sup>5</sup> financed by the EU or Euratom budget cannot declare indirect costs for the period covered by the operating grant.

<sup>3</sup> ‘**Large research infrastructure**’ means research infrastructure of a total value of at least EUR 20 million, for a beneficiary, calculated as the sum of historical asset values of each individual research infrastructure of that beneficiary, as they appear in its last closed balance sheet before the date of the signature of the Agreement or as determined on the basis of the rental and leasing costs of the research infrastructure.

<sup>4</sup> For the definition, see Article 2(6) of Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) (OJ L 347, 20.12.2013 p.104)-(**‘Horizon 2020 Framework Programme Regulation No 1291/2013’**): ‘**Research infrastructure**’ are facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields. Where relevant, they may be used beyond research, e.g. for education or public services. They include: major scientific equipment (or sets of instruments); knowledge-based resources such as collections, archives or scientific data; e-infrastructures such as data and computing systems and communication networks; and any other infrastructure of a unique nature essential to achieve excellence in research and innovation. Such infrastructures may be ‘single-sited’, ‘virtual’ or ‘distributed’.

<sup>5</sup> For the definition, see Article 121(1)(b) of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 (OJ L 218, 26.10.2012, p.1) (**‘Financial Regulation No 966/2012’**): ‘**operating grant**’ means direct financial contribution, by way of donation, from the budget in order to finance the functioning of a body which pursues an aim of general EU interest or has an objective forming part of and supporting an EU policy.

**F. Specific cost category(ies)**

*Not applicable*

**6.3 Conditions for costs of linked third parties to be eligible**

*not applicable*

**6.4 Conditions for in-kind contributions provided by third parties free of charge to be eligible**

**In-kind contributions provided free of charge** are eligible direct costs (for the beneficiary), if the costs incurred by the third party fulfil — *mutatis mutandis* — the general and specific conditions for eligibility set out in this Article (Article 6.1 and 6.2) and Article 12.1.

**6.5 Ineligible costs**

‘**Ineligible costs**’ are:

- (a) costs that do not comply with the conditions set out above (Article 6.1 to 6.4), in particular:
  - (i) costs related to return on capital;
  - (ii) debt and debt service charges;
  - (iii) provisions for future losses or debts;
  - (iv) interest owed;
  - (v) doubtful debts;
  - (vi) currency exchange losses;
  - (vii) bank costs charged by the beneficiary’s bank for transfers from the *Agency*;
  - (viii) excessive or reckless expenditure;
  - (ix) deductible VAT;
  - (x) costs incurred during suspension of the implementation of the action (see Article 49);
- (b) costs declared under another EU or Euratom grant (including grants awarded by a Member State and financed by the EU or Euratom budget and grants awarded by bodies other than the *Agency* for the purpose of implementing the EU or Euratom budget); in particular, indirect costs if the beneficiary is already receiving an operating grant financed by the EU or Euratom budget in the same period.

**6.6 Consequences of declaration of ineligible costs**

Declared costs that are ineligible will be rejected (see Article 42).

This may also lead to any of the other measures described in Chapter 6.



## **CHAPTER 4 RIGHTS AND OBLIGATIONS OF THE PARTIES**

### **SECTION 1 RIGHTS AND OBLIGATIONS RELATED TO IMPLEMENTING THE ACTION**

#### **ARTICLE 7 — GENERAL OBLIGATION TO PROPERLY IMPLEMENT THE ACTION**

##### **7.1 General obligation to properly implement the action**

The beneficiaries must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement and all legal obligations under applicable EU, international and national law.

##### **7.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

#### **ARTICLE 8 — RESOURCES TO IMPLEMENT THE ACTION — THIRD PARTIES INVOLVED IN THE ACTION**

The beneficiaries must have the appropriate resources to implement the action.

If it is necessary to implement the action, the beneficiaries may:

- purchase goods, works and services (see Article 10);
- use in-kind contributions provided by third parties against payment (see Article 11);
- use in-kind contributions provided by third parties free of charge (see Article 12);
- call upon subcontractors to implement action tasks described in Annex 1 (see Article 13);
- call upon linked third parties to implement action tasks described in Annex 1 (see Article 14).

In these cases, the beneficiaries retain sole responsibility towards the *Agency* and the other beneficiaries for implementing the action.

#### **ARTICLE 9 — IMPLEMENTATION OF ACTION TASKS BY BENEFICIARIES NOT RECEIVING EU FUNDING**

*Not applicable*

#### **ARTICLE 10 — PURCHASE OF GOODS, WORKS OR SERVICES**

##### **10.1 Rules for purchasing goods, works or services**

10.1.1 If necessary to implement the action, the beneficiaries may purchase goods, works or services.

The beneficiaries must make such purchases ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests (see Article 35).

The beneficiaries must ensure that *the Agency*, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their contractors.

10.1.2 Beneficiaries that are ‘contracting authorities’ within the meaning of Directive 2004/18/EC<sup>6</sup> or ‘contracting entities’ within the meaning of Directive 2004/17/EC<sup>7</sup> must comply with the applicable national law on public procurement.

## **10.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under Article 10.1.1, the costs related to the contract concerned will be ineligible (see Article 6) and will be rejected (see Article 42).

If a beneficiary breaches any of its obligations under Article 10.1.2, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 11 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES AGAINST PAYMENT**

### **11.1 Rules for the use of in-kind contributions against payment**

If necessary to implement the action, the beneficiaries may use in-kind contributions provided by third parties against payment.

The beneficiaries may declare costs related to the payment of in-kind contributions as eligible (see Article 6.1 and 6.2), up to the third parties’ costs for the seconded persons, contributed equipment, infrastructure or other assets or other contributed goods and services.

The third parties and their contributions must be set out in Annex 1. The *Agency* may however approve in-kind contributions not set out in Annex 1 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that *the Agency*, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards the third parties.

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<sup>6</sup> Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public work contracts, public supply contracts and public service contracts (OJ L 134, 30.04.2004, p. 114).

<sup>7</sup> Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors (OJ L 134, 30.04.2004, p. 1).



## **11.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the costs related to the payment of the in-kind contribution will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 12 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES FREE OF CHARGE**

### **12.1 Rules for the use of in-kind contributions free of charge**

If necessary to implement the action, the beneficiaries may use in-kind contributions provided by third parties free of charge.

The beneficiaries may declare costs incurred by the third parties for the seconded persons, contributed equipment, infrastructure or other assets or other contributed goods and services as eligible in accordance with Article 6.4.

The third parties and their contributions must be set out in Annex 1. The *Agency* may however approve in-kind contributions not set out in Annex 1 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that *the Agency*, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards the third parties.

### **12.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the costs incurred by the third parties related to the in-kind contribution will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 13 — IMPLEMENTATION OF ACTION TASKS BY SUBCONTRACTORS**

### **13.1 Rules for subcontracting action tasks**

13.1.1 If necessary to implement the action, the beneficiaries may award subcontracts covering the implementation of certain action tasks described in Annex 1.

Subcontracting may cover only a limited part of the action.

The beneficiaries must award the subcontracts ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests (see Article 35).

The tasks to be implemented and the estimated cost for each subcontract must be set out in Annex 1 and the total estimated costs of subcontracting per beneficiary must be set out in Annex 2. The



*Agency* may however approve subcontracts not set out in Annex 1 and 2 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- they do not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that *the Agency*, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their subcontractors.

13.1.2 The beneficiaries must ensure that their obligations under Articles 35, 36, 38 and 46 also apply to the subcontractors.

Beneficiaries that are ‘contracting authorities’ within the meaning of Directive 2004/18/EC or ‘contracting entities’ within the meaning of Directive 2004/17/EC must comply with the applicable national law on public procurement.

### **13.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under Article 13.1.1, the costs related to the subcontract concerned will be ineligible (see Article 6) and will be rejected (see Article 42).

If a beneficiary breaches any of its obligations under Article 13.1.2, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 14 — IMPLEMENTATION OF ACTION TASKS BY LINKED THIRD PARTIES**

*Not applicable*

## **ARTICLE 15 — FINANCIAL SUPPORT TO THIRD PARTIES**

### **15.1 Rules for providing financial support to third parties**

*Not applicable*

### **15.2 Financial support in the form of prizes**

*Not applicable*

### **15.3 Consequences of non-compliance**

*Not applicable*





## **ARTICLE 16 — PROVISION OF TRANS-NATIONAL OR VIRTUAL ACCESS TO RESEARCH INFRASTRUCTURE**

### **16.1 Rules for providing trans-national access to research infrastructure**

*Not applicable*

### **16.2 Rules for providing virtual access to research infrastructure**

*Not applicable*

### **16.3 Consequences of non-compliance**

*Not applicable*

## **SECTION 2 RIGHTS AND OBLIGATIONS RELATED TO THE GRANT ADMINISTRATION**

## **ARTICLE 17 — GENERAL OBLIGATION TO INFORM**

### **17.1 General obligation to provide information upon request**

The beneficiaries must provide — during implementation of the action or afterwards and in accordance with Article 41.2 — any information requested in order to verify eligibility of the costs, proper implementation of the action and compliance with any other obligation under the Agreement.

### **17.2 Obligation to keep information up to date and to inform about events and circumstances likely to affect the Agreement**

Each beneficiary must keep information stored in the 'Beneficiary Register' (via the electronic exchange system; see Article 52) up to date, in particular, its name, address, legal representatives, legal form and organisation type.

Each beneficiary must immediately inform the coordinator — which must immediately inform the *Agency* and the other beneficiaries — of any of the following:

- (a) **events** which are likely to affect significantly or delay the implementation of the action or the EU's financial interests, in particular:
  - (i) changes in its legal, financial, technical, organisational or ownership situation
- (b) **circumstances** affecting:
  - (i) the decision to award the grant or
  - (ii) compliance with requirements under the Agreement.



### 17.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## ARTICLE 18 — KEEPING RECORDS — SUPPORTING DOCUMENTATION

### 18.1 Obligation to keep records and other supporting documentation

The beneficiaries must — for a period of *five* years after the payment of the balance — keep records and other supporting documentation in order to prove the proper implementation of the action and the costs they declare as eligible.

They must make them available upon request (see Article 17) or in the context of checks, reviews, audits or investigations (see Article 22).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Articles 22), the beneficiaries must keep the records and other supporting documentation until the end of these procedures.

The beneficiaries must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The *Agency* may accept non-original documents if it considers that they offer a comparable level of assurance.

#### 18.1.1 Records and other supporting documentation on the scientific and technical implementation

The beneficiaries must keep records and other supporting documentation on scientific and technical implementation of the action in line with the accepted standards in the respective field.

#### 18.1.2 Records and other documentation to support the costs declared

The beneficiaries must keep the records and documentation supporting the costs declared, in particular the following:

- (a) for **actual costs**: adequate records and other supporting documentation to prove the costs declared, such as contracts, subcontracts, invoices and accounting records. In addition, the beneficiaries' usual cost accounting practices and internal control procedures must enable direct reconciliation between the amounts declared, the amounts recorded in their accounts and the amounts stated in the supporting documentation;
- (b) for **unit costs**: adequate records and other supporting documentation to prove the number of units declared. Beneficiaries do not need to identify the actual eligible costs covered or to keep or provide supporting documentation (such as accounting statements) to prove the amount per unit.

In addition, for **direct personnel costs declared as unit costs calculated in accordance with the beneficiary's usual cost accounting practices**, the beneficiaries must keep adequate



records and documentation to prove that the cost accounting practices used comply with the conditions set out in Article 6.2, Point A.

The beneficiaries may submit to the Commission, for approval, a certificate (drawn up in accordance with Annex 6) stating that their usual cost accounting practices comply with these conditions (**‘certificate on the methodology’**). If the certificate is approved, costs declared in line with this methodology will not be challenged subsequently, unless the beneficiaries have concealed information for the purpose of the approval.

- (c) for **flat-rate costs**: adequate records and other supporting documentation to prove the eligibility of the costs to which the flat-rate is applied. The beneficiaries do not need to identify the costs covered or provide supporting documentation (such as accounting statements) to prove the amount declared at a flat-rate.

In addition, for **personnel costs** (declared as actual costs or on the basis of unit costs), the beneficiaries must keep **time records** for the number of hours declared. The time records must be in writing and approved by the persons working on the action and their supervisors, at least monthly. In the absence of reliable time records of the hours worked on the action, the *Agency* may accept alternative evidence supporting the number of hours declared, if it considers that it offers an adequate level of assurance.

As an exception, for **persons working exclusively on the action**, there is no need to keep time records, if the beneficiary signs a **declaration** confirming that the persons concerned have worked exclusively on the action.

## 18.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 42), and the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## ARTICLE 19 — SUBMISSION OF DELIVERABLES

### 19.1 Obligation to submit deliverables

The coordinator must submit the **‘deliverables’** identified in Annex 1, in accordance with the timing and conditions set out in it.

### 19.2 Consequences of non-compliance

If the coordinator breaches any of its obligations under this Article, the *Agency* may apply any of the measures described in Chapter 6.

## ARTICLE 20 — REPORTING — PAYMENT REQUESTS

### 20.1 Obligation to submit reports

The coordinator must submit to the *Agency* (see Article 52) the technical and financial reports set out in this Article. These reports include the requests for payment and must be drawn up using the forms and templates provided in the electronic exchange system (see Article 52).



## 20.2 Reporting periods

The action is divided into the following ‘**reporting periods**’:

- RP1: from month 1 to month 12
- RP2: *from month 13 to month 30*
- RP3: *from month 31 to month 42*

## 20.3 Periodic reports — Requests for interim payments

The coordinator must submit a periodic report within 60 days following the end of each reporting period.

The **periodic report** must include the following:

(a) a ‘**periodic technical report**’ containing:

- (i) an **explanation of the work carried out** by the beneficiaries;
- (ii) an **overview of the progress** towards the objectives of the action, including milestones and deliverables identified in Annex 1.

This report must include explanations justifying the differences between work expected to be carried out in accordance with Annex 1 and that actually carried out.

The report must also detail the exploitation and dissemination of the results and — if required in Annex 1 — an updated ‘**plan for the exploitation and dissemination of the results**’;

- (iii) a **summary** for publication by the *Agency*;
- (iv) the answers to the ‘**questionnaire**’, covering issues related to the action implementation and the economic and societal impact, notably in the context of the Horizon 2020 key performance indicators and the Horizon 2020 monitoring requirements;

(b) a ‘**periodic financial report**’ containing:

- (i) an ‘**individual financial statement**’ (see Annex 4) from each beneficiary, for the reporting period concerned.

The individual financial statement must detail the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) for each budget category (see Annex 2).

The beneficiaries must declare all eligible costs, even if — for actual costs, unit costs and flat-rate costs — they exceed the amounts indicated in the estimated budget (see Annex 2). Amounts which are not declared in the individual financial statement will not be taken into account by the *Agency*.

If an individual financial statement is not submitted for a reporting period, it may be included in the periodic financial report for the next reporting period.



The individual financial statements of the last reporting period must also detail the **receipts of the action** (see Article 5.3.3).

Each beneficiary must **certify** that:

- the information provided is full, reliable and true;
  - the costs declared are eligible (see Article 6);
  - the costs can be substantiated by adequate records and supporting documentation (see Article 18) that will be produced upon request (see Article 17) or in the context of checks, reviews, audits and investigations (see Article 22), and
  - for the last reporting period: that all the receipts have been declared (see Article 5.3.3);
- (ii) an **explanation of the use of resources** and the information on subcontracting (see Article 13) and in-kind contributions provided by third parties (see Articles 11 and 12) from each beneficiary, for the reporting period concerned;
- (iii) *not applicable*;
- (iv) a ‘**periodic summary financial statement**’ (see Annex 4), created automatically by the electronic exchange system, consolidating the individual financial statements for the reporting period concerned and including — except for the last reporting period — the **request for interim payment**.

#### 20.4 Final report — Request for payment of the balance

In addition to the periodic report for the last reporting period, the coordinator must submit the final report within 60 days following the end of the last reporting period.

The **final report** must include the following:

- (a) a ‘**final technical report**’ with a **summary** for publication containing:
- (i) an overview of the results and their exploitation and dissemination;
  - (ii) the conclusions on the action, and
  - (iii) the socio-economic impact of the action;
- (b) a ‘**final financial report**’ containing:
- (i) a ‘**final summary financial statement**’ (see Annex 4), created automatically by the electronic exchange system, consolidating the individual financial statements for all reporting periods and including the **request for payment of the balance** and



- (ii) a ‘**certificate on the financial statements**’ (drawn up in accordance with Annex 5) for each beneficiary, if it requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices (see Article 5.2 and Article 6.2, Point A).

## 20.5 Information on cumulative expenditure incurred

*Not applicable*

## 20.6 Currency for financial statements and conversion into euro

Financial statements must be drafted in euro.

Beneficiaries with accounting established in a currency other than the euro must convert the costs recorded in their accounts into euro, at the average of the daily exchange rates published in the C series of the *Official Journal of the European Union*, calculated over the corresponding reporting period.

If no daily euro exchange rate is published in the *Official Journal of the European Union* for the currency in question, they must be converted at the average of the monthly accounting rates published on the Commission’s website, calculated over the corresponding reporting period.

Beneficiaries with accounting established in euro must convert costs incurred in another currency into euro according to their usual accounting practices.

## 20.7 Language of reports

All reports (technical and financial reports, including financial statements) must be submitted in the language of the Agreement.

## 20.8 Consequences of non-compliance — Suspension of the payment deadline — Termination

If the reports submitted do not comply with this Article, the *Agency* may suspend the payment deadline (see Article 47) and apply any of the other measures described in Chapter 6.

If the coordinator breaches its obligation to submit the reports and if it fails to comply with this obligation within 30 days following a written reminder sent by the *Agency*, the Agreement may be terminated (see Article 50).

# ARTICLE 21 — PAYMENTS AND PAYMENT ARRANGEMENTS

## 21.1 Payments to be made

The following payments will be made to the coordinator:

- one **pre-financing payment**;
- one or more **interim payments**, on the basis of the request(s) for interim payment (see Article 20), and
- one **payment of the balance**, on the basis of the request for payment of the balance (see Article 20).



## 21.2 Pre-financing payment — Amount — Amount retained for the Guarantee Fund

The aim of the pre-financing is to provide the beneficiaries with a float.

It remains the property of the *EU* until the payment of the balance.

The amount of the pre-financing payment will be EUR **2,488,668.17** (two million four hundred and eighty eight thousand six hundred and sixty eight EURO and seventeen eurocents).

The *Agency* will — except if Article 48 applies — make the pre-financing payment to the coordinator within 30 days either from the entry into force of the Agreement (see Article 58) or from 10 days before the starting date of the action (see Article 3), whichever is the latest.

An amount of EUR **373,300.23** (three hundred and seventy three thousand three hundred EURO and twenty three eurocents), corresponding to 5% of the maximum grant amount (see Article 5.1), is retained by the *Agency* from the pre-financing payment and transferred into the ‘**Guarantee Fund**’.

## 21.3 Interim payments — Amount — Calculation

Interim payments reimburse the eligible costs incurred for the implementation of the action during the corresponding reporting periods.

The *Agency* will pay to the coordinator the amount due as interim payment within 90 days from receiving the periodic report (see Article 20.3), except if Articles 47 or 48 apply.

Payment is subject to the approval of the periodic report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as interim payment** is calculated by the *Agency* in the following steps:

Step 1 – Application of the reimbursement rates

Step 2 – Limit to 90% of the maximum grant amount

### 21.3.1 Step 1 — Application of the reimbursement rates

The reimbursement rate(s) (see Article 5.2) are applied to the eligible costs (actual costs, unit costs and flat-rate costs ; see Article 6) declared by the beneficiaries (see Article 20) and approved by the *Agency* (see above) for the concerned reporting period.

### 21.3.2 Step 2 — Limit to 90% of the maximum grant amount

The total amount of pre-financing and interim payments must not exceed 90% of the maximum grant amount set out in Article 5.1. The maximum amount for the interim payment will be calculated as follows:

{90% of the maximum grant amount (see Article 5.1)

minus

{pre-financing and previous interim payments}}.





## 21.4 Payment of the balance — Amount — Calculation — Release of the amount retained for the Guarantee Fund

The payment of the balance reimburses the remaining part of the eligible costs incurred by the beneficiaries for the implementation of the action.

If the total amount of earlier payments is greater than the final grant amount (see Article 5.3), the payment of the balance takes the form of a recovery (see Article 44).

If the total amount of earlier payments is lower than the final grant amount, the *Agency* will pay the balance within 90 days from receiving the final report (see Article 20.4), except if Articles 47 or 48 apply.

Payment is subject to the approval of the final report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as the balance** is calculated by the *Agency* by deducting the total amount of pre-financing and interim payments (if any) already made, from the final grant amount determined in accordance with Article 5.3:

{final grant amount (see Article 5.3)}

minus

{pre-financing and interim payments (if any) made}.

At the payment of the balance, the amount retained for the Guarantee Fund (see above) will be released and:

- if the balance is positive: the amount released will be paid in full to the coordinator together with the amount due as the balance;
- if the balance is negative (payment of the balance taking the form of recovery): it will be deducted from the amount released (see Article 44.1.2). If the resulting amount:
  - is positive, it will be paid to the coordinator
  - is negative, it will be recovered.

The amount to be paid may however be offset — without the beneficiary's consent — against any other amount owed by the beneficiary to the *Agency*, the Commission or another executive agency (under the EU or Euratom budget), up to the maximum EU contribution indicated, for that beneficiary, in the estimated budget (see Annex 2).

## 21.5 Notification of amounts due

When making payments, the *Agency* will formally notify to the coordinator the amount due, specifying whether it concerns an interim payment or the payment of the balance.

For the payment of the balance, the notification will also specify the final grant amount.



In the case of reduction of the grant or recovery of undue amounts, the notification will be preceded by the contradictory procedure set out in Articles 43 and 44.

## **21.6 Currency for payments**

The *Agency* will make all payments in euro.

## **21.7 Payments to the coordinator — Distribution to the beneficiaries**

Payments will be made to the coordinator.

Payments to the coordinator will discharge the *Agency* from its payment obligation.

The coordinator must distribute the payments between the beneficiaries without unjustified delay.

Pre-financing may however be distributed only:

- (a) if the minimum number of beneficiaries set out in the call for proposals has acceded to the Agreement (see Article 56) and
- (b) to beneficiaries that have acceded to the Agreement (see Article 56).

## **21.8 Bank account for payments**

All payments will be made to the following bank account:

Name of bank: ING BANK N.V.

Address of branch: HAAKSBERGWEG 4 OL C 07.01 AMSTERDAM, Netherlands

Full name of the account holder: TNO EC GELDEN

Full account number (including bank codes):

IBAN code: NL30INGB0651227798

## **21.9 Costs of payment transfers**

The cost of the payment transfers is borne as follows:

- the *Agency* bears the cost of transfers charged by its bank;
- the beneficiary bears the cost of transfers charged by its bank;
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

## **21.10 Date of payment**

Payments by the *Agency* are considered to have been carried out on the date when they are debited to its account.

## **21.11 Consequences of non-compliance**

21.11.1 If the *Agency* does not pay within the payment deadlines (see above), the beneficiaries are entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main



refinancing operations in euros ('reference rate'), plus three and a half points. The reference rate is the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the coordinator only upon request submitted within two months of receiving the late payment.

Late-payment interest is not due if all beneficiaries are EU Member States (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

Suspension of the payment deadline or payments (see Articles 47 and 48) will not be considered as late payment.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

21.11.2 If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or the participation of the coordinator may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 22 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS**

### **22.1 Checks, reviews and audits by the *Agency and the Commission***

#### **22.1.1 Right to carry out checks**

The *Agency or the Commission* will — during the implementation of the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing deliverables and reports.

For this purpose the *Agency or the Commission* may be assisted by external persons or bodies.

The *Agency or the Commission* may also request additional information in accordance with Article 17. The *Agency or the Commission* may request beneficiaries to provide such information to it directly.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

#### **22.1.2 Right to carry out reviews**

The *Agency or the Commission* may — during the implementation of the action or afterwards — carry out reviews on the proper implementation of the action (including assessment of deliverables and reports), compliance with the obligations under the Agreement and continued scientific or technological relevance of the action.

Reviews may be started **up to two years after the payment of the balance**. They will be formally notified to the coordinator or beneficiary concerned and will be considered to have started on the date of the formal notification.

If the review is carried out on a third party (see Articles 10 to 16), the beneficiary concerned must inform the third party.

The *Agency or the Commission* may carry out reviews directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the coordinator or beneficiary concerned of the identity of the external persons or bodies. They have the right to object to the appointment on grounds of commercial confidentiality.

The coordinator or beneficiary concerned must provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information on the use of resources). The *Agency or the Commission* may request beneficiaries to provide such information to it directly.

The coordinator or beneficiary concerned may be requested to participate in meetings, including with external experts.

For **on-the-spot** reviews, the beneficiaries must allow access to their sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a '**review report**' will be drawn up.

The *Agency or the Commission* will formally notify the review report to the coordinator or beneficiary concerned, which has 30 days to formally notify observations ('**contradictory review procedure**').

Reviews (including review reports) are in the language of the Agreement.

### **22.1.3 Right to carry out audits**

The *Agency or the Commission* may — during the implementation of the action or afterwards — carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Audits may be started **up to two years after the payment of the balance**. They will be formally notified to the coordinator or beneficiary concerned and will be considered to have started on the date of the formal notification.

If the audit is carried out on a third party (see Articles 10 to 16), the beneficiary concerned must inform the third party.

The *Agency or the Commission* may carry out audits directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the coordinator or beneficiary concerned of the identity of the external persons or bodies. They have the right to object to the appointment on grounds of commercial confidentiality.

The coordinator or beneficiary concerned must provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. The *Agency or the Commission* may request beneficiaries to provide such information to it directly.

For **on-the-spot** audits, the beneficiaries must allow access to their sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a ‘**draft audit report**’ will be drawn up.

The *Agency or the Commission* will formally notify the draft audit report to the coordinator or beneficiary concerned, which has 30 days to formally notify observations (‘**contradictory audit procedure**’). This period may be extended by the *Agency or the Commission* in justified cases.

The ‘**final audit report**’ will take into account observations by the coordinator or beneficiary concerned. The report will be formally notified to it.

Audits (including audit reports) are in the language of the Agreement.

The *Agency or the Commission* may also access the beneficiaries’ statutory records for the periodical assessment of unit costs or flat-rate amounts.

## 22.2 Investigations by the European Anti-Fraud Office (OLAF)

Under Regulations No 883/2013<sup>15</sup> and No 2185/96<sup>16</sup> (and in accordance with their provisions and procedures) the European Anti-Fraud Office (OLAF) may — at any moment during implementation of the action or afterwards — carry out investigations, including on-the-spot checks and inspections, to establish whether there has been fraud, corruption or any other illegal activity affecting the financial interests of the EU.

## 22.3 Checks and audits by the European Court of Auditors (ECA)

Under Article 287 of the Treaty on the Functioning of the European Union (TFEU) and Article 161 of the Financial Regulation No 966/2012<sup>17</sup>, the European Court of Auditors (ECA) may — at any moment during implementation of the action or afterwards — carry out audits.

The ECA has the right of access for the purpose of checks and audits.

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<sup>15</sup> Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18.09.2013, p. 1).

<sup>16</sup> Council Regulation (Euratom, EC) No 2185/1996 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities’ financial interests against fraud and other irregularities (OJ L 292, 15.11.1996, p. 2).

<sup>17</sup> Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 (‘**Financial Regulation No 966/2012**’) (OJ L 298, 26.10.2012, p. 1).



## 22.4 Checks, reviews, audits and investigations for international organisations

*Not applicable*

## 22.5 Consequences of findings in checks, reviews, audits and investigations — Extension of findings

### 22.5.1 Findings in this grant

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to the rejection of ineligible costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44) or to any of the other measures described in Chapter 6.

Rejection of costs or reduction of the grant after the payment of the balance will lead to a revised final grant amount (see Article 5.4).

Findings in checks, reviews, audits or investigations may lead to a request for amendment for the modification of Annex 1 (see Article 55).

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations may also lead to consequences in other EU or Euratom grants awarded under similar conditions (**‘extension of findings from this grant to other grants’**).

Moreover, findings arising from an OLAF investigation may lead to criminal prosecution under national law.

### 22.5.2 Findings in other grants

The *Agency or the Commission* may extend findings from other grants to this grant (**‘extension of findings from other grants to this grant’**), if:

- (a) the beneficiary concerned is found, in other EU or Euratom grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and
- (b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — no later than two years after the payment of the balance of this grant.

The extension of findings may lead to the rejection of costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44), suspension of payments (see Article 48), suspension of the action implementation (see Article 49) or termination (see Article 50).

### 22.5.3 Procedure

The *Agency or the Commission* will formally notify the beneficiary concerned the systemic or recurrent errors and its intention to extend these audit findings, together with the list of grants affected.

22.5.3.1 If the findings concern **eligibility of costs**: the formal notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings;



- (b) the request to submit **revised financial statements** for all grants affected;
- (c) the **correction rate for extrapolation** established by the *Agency or the Commission* on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected if the beneficiary concerned:
  - (i) considers that the submission of revised financial statements is not possible or practicable or
  - (ii) does not submit revised financial statements.

The beneficiary concerned has 90 days from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method**. This period may be extended by the *Agency or the Commission* in justified cases.

The amounts to be rejected will be determined on the basis of the revised financial statements, subject to their approval.

If the *Agency or the Commission* does not receive any observations or revised financial statements, does not accept the observations or the proposed alternative correction method or does not approve the revised financial statements, it will formally notify the beneficiary concerned the application of the initially notified correction rate for extrapolation.

If the *Agency or the Commission* accepts the alternative correction method proposed by the beneficiary concerned, it will formally notify the application of the accepted alternative correction method.

22.5.3.2 If the findings concern **improper implementation** or a **breach of another obligation**: the formal notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings and
- (b) the flat-rate the *Agency or the Commission* intends to apply according to the principle of proportionality.

The beneficiary concerned has 90 days from receiving notification to submit observations or to propose a duly substantiated alternative flat-rate.

If the *Agency or the Commission* does not receive any observations or does not accept the observations or the proposed alternative flat-rate, it will formally notify the beneficiary concerned the application of the initially notified flat-rate.

If the *Agency or the Commission* accepts the alternative flat-rate proposed by the beneficiary concerned, it will formally notify the application of the accepted alternative flat-rate.

## 22.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, any insufficiently substantiated costs will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.





## **ARTICLE 23 — EVALUATION OF THE IMPACT OF THE ACTION**

### **23.1 Right to evaluate the impact of the action**

The *Agency or the Commission* may carry out interim and final evaluations of the impact of the action measured against the objective of the *EU* programme.

Evaluations may be started during implementation of the action and up to *five* years after the payment of the balance. The evaluation is considered to start on the date of the formal notification to the coordinator or beneficiaries.

The *Agency or the Commission* may make these evaluations directly (using its own staff) or indirectly (using external bodies or persons it has authorised to do so).

The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

### **23.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the *Agency* may apply the measures described in Chapter 6.

## **SECTION 3 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND AND RESULTS**

### **SUBSECTION 1 GENERAL**

#### **ARTICLE 23a — MANAGEMENT OF INTELLECTUAL PROPERTY**

##### **23a.1 Obligation to take measures to implement the Commission Recommendation on the management of intellectual property in knowledge transfer activities**

Beneficiaries that are universities or other public research organisations must take measures to implement the principles set out in Points 1 and 2 of the Code of Practice annexed to the Commission Recommendation on the management of intellectual property in knowledge transfer activities<sup>18</sup>.

This does not change the obligations set out in Subsections 2 and 3 of this Section.

The beneficiaries must ensure that researchers and third parties involved in the action are aware of them.

##### **23a.2 Consequences of non-compliance**

If a beneficiary breaches its obligations under this Article, the *Agency* may apply any of the measures described in Chapter 6.

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<sup>18</sup> Commission Recommendation C (2008) 1329 of 10.4.2008 on the management of intellectual property in knowledge transfer activities and the Code of Practice for universities and other public research institutions attached to this recommendation.



## **SUBSECTION 2 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND**

### **ARTICLE 24 — AGREEMENT ON BACKGROUND**

#### **24.1 Agreement on background**

The beneficiaries must identify and agree (in writing) on the background for the action (**‘agreement on background’**).

**‘Background’** means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that:

- (a) is held by the beneficiaries before they acceded to the Agreement, and
- (b) is needed to implement the action or exploit the results.

#### **24.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

### **ARTICLE 25 — ACCESS RIGHTS TO BACKGROUND**

#### **25.1 Exercise of access rights — Waiving of access rights — No sub-licensing**

To exercise access rights, this must first be requested in writing (**‘request for access’**).

**‘Access rights’** means rights to use results or background under the terms and conditions laid down in this Agreement.

Waivers of access rights are not valid unless in writing.

Unless agreed otherwise, access rights do not include the right to sub-license.

#### **25.2 Access rights for other beneficiaries, for implementing their own tasks under the action**

The beneficiaries must give each other access — on a royalty-free basis — to background needed to implement their own tasks under the action, unless the beneficiary that holds the background has — before acceding to the Agreement —:

- (a) informed the other beneficiaries that access to its background is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel), or
- (b) agreed with the other beneficiaries that access would not be on a royalty-free basis.

#### **25.3 Access rights for other beneficiaries, for exploiting their own results**

The beneficiaries must give each other access — under fair and reasonable conditions — to background needed for exploiting their own results, unless the beneficiary that holds the background has — before acceding to the Agreement — informed the other beneficiaries that access to its



background is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel).

‘**Fair and reasonable conditions**’ means appropriate conditions, including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

## 25.4 Access rights for affiliated entities

Unless otherwise agreed in the consortium agreement, access to background must also be given — under fair and reasonable conditions (see above; Article 25.3) and unless it is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel) — to affiliated entities<sup>19</sup> established in an EU Member State or ‘**associated country**’<sup>20</sup>, if this is needed to exploit the results generated by the beneficiaries to which they are affiliated.

Unless agreed otherwise (see above; Article 25.1), the affiliated entity concerned must make the request directly to the beneficiary that holds the background.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

## 25.5 Access rights for third parties

*Not applicable*

## 25.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

<sup>19</sup> For the definition, see Article 2.1(2) of the Rules for Participation Regulation No 1290/2013: ‘**affiliated entity**’ means any legal entity that is under the direct or indirect control of a participant, or under the same direct or indirect control as the participant, or that is directly or indirectly controlling a participant.

‘Control’ may take any of the following forms:

- (a) the direct or indirect holding of more than 50% of the nominal value of the issued share capital in the legal entity concerned, or of a majority of the voting rights of the shareholders or associates of that entity;
- (b) the direct or indirect holding, in fact or in law, of decision-making powers in the legal entity concerned.

However the following relationships between legal entities shall not in themselves be deemed to constitute controlling relationships:

- (a) the same public investment corporation, institutional investor or venture-capital company has a direct or indirect holding of more than 50% of the nominal value of the issued share capital or a majority of voting rights of the shareholders or associates;
- (b) the legal entities concerned are owned or supervised by the same public body.

<sup>20</sup> For the definition, see Article 2.1(3) of the Rules for Participation Regulation No 1290/2013: ‘**associated country**’ means a third country which is party to an international agreement with the Union, as identified in *Article 7 of Horizon 2020 Framework Programme Regulation No 1291/2013. Article 7 sets out the conditions for association of non-EU countries to Horizon 2020.*



## SUBSECTION 3 RIGHTS AND OBLIGATIONS RELATED TO RESULTS

### ARTICLE 26 — OWNERSHIP OF RESULTS

#### 26.1 Ownership by the beneficiary that generates the results

Results are owned by the beneficiary that generates them.

‘**Results**’ means any (tangible or intangible) output of the action such as data, knowledge or information — whatever its form or nature, whether it can be protected or not — that is generated in the action, as well as any rights attached to it, including intellectual property rights.

#### 26.2 Joint ownership by several beneficiaries

Two or more beneficiaries own results jointly if:

- (a) they have jointly generated them and
- (b) it is not possible to:
  - (i) establish the respective contribution of each beneficiary, or
  - (ii) separate them for the purpose of applying for, obtaining or maintaining their protection (see Article 27).

The joint owners must agree (in writing) on the allocation and terms of exercise of their joint ownership (**‘joint ownership agreement’**), to ensure compliance with their obligations under this Agreement.

Unless otherwise agreed in the joint ownership agreement, each joint owner may grant non-exclusive licences to third parties to exploit jointly-owned results (without any right to sub-license), if the other joint owners are given:

- (a) at least 45 days advance notice and
- (b) fair and reasonable compensation.

Once the results have been generated, joint owners may agree (in writing) to apply another regime than joint ownership (such as, for instance, transfer to a single owner (see Article 30) with access rights for the others).

#### 26.3 Rights of third parties (including personnel)

If third parties (including personnel) may claim rights to the results, the beneficiary concerned must ensure that it complies with its obligations under the Agreement.

If a third party generates results, the beneficiary concerned must obtain all necessary rights (transfer, licences or other) from the third party, in order to be able to respect its obligations as if those results were generated by the beneficiary itself.

If obtaining the rights is impossible, the beneficiary must refrain from using the third party to generate the results.



## 26.4 Agency ownership, to protect results

26.4.1 *The Agency* may — with the consent of the beneficiary concerned — assume ownership of results to protect them, if a beneficiary intends — up to four years after the period set out in Article 3 — to disseminate its results without protecting them, except in any of the following cases:

- (a) the lack of protection is because protecting the results is not possible, reasonable or justified (given the circumstances);
- (b) the lack of protection is because there is a lack of potential for commercial or industrial exploitation, or
- (c) the beneficiary intends to transfer the results to another beneficiary or third party established in an EU Member State or associated country, which will protect them.

Before the results are disseminated and unless any of the cases above under Points (a), (b) or (c) applies, the beneficiary must formally notify the *Agency* and at the same time inform it of any reasons for refusing consent. The beneficiary may refuse consent only if it can show that its legitimate interests would suffer significant harm.

If the *Agency* decides to assume ownership, it will formally notify the beneficiary concerned within 45 days of receiving notification.

No dissemination relating to these results may before the end of this period or, if the *Agency* takes a positive decision, until it has taken the necessary steps to protect the results.

26.4.2 *The Agency* may — with the consent of the beneficiary concerned — assume ownership of results to protect them, if a beneficiary intends — up to four years after the period set out in Article 3 — to stop protecting them or not to seek an extension of protection, except in any of the following cases:

- (a) the protection is stopped because of a lack of potential for commercial or industrial exploitation;
- (b) an extension would not be justified given the circumstances.

A beneficiary that intends to stop protecting results or not seek an extension must — unless any of the cases above under Points (a) or (b) applies — formally notify the *Agency* at least 60 days before the protection lapses or its extension is no longer possible and at the same time inform it of any reasons for refusing consent. The beneficiary may refuse consent only if it can show that its legitimate interests would suffer significant harm.

If the *Agency* decides to assume ownership, it will formally notify the beneficiary concerned within 45 days of receiving notification.

## 26.5 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to the any of the other measures described in Chapter 6.



## ARTICLE 27 — PROTECTION OF RESULTS — VISIBILITY OF EU FUNDING

### 27.1 Obligation to protect the results

Each beneficiary must examine the possibility of protecting its results and must adequately protect them — for an appropriate period and with appropriate territorial coverage — if:

- (a) the results can reasonably be expected to be commercially or industrially exploited and
- (b) protecting them is possible, reasonable and justified (given the circumstances).

When deciding on protection, the beneficiary must consider its own legitimate interests and the legitimate interests (especially commercial) of the other beneficiaries.

### 27.2 Agency ownership, to protect the results

If a beneficiary intends not to protect its results, to stop protecting them or not seek an extension of protection, *The Agency* may — under certain conditions (see Article 26.4) — assume ownership to ensure their (continued) protection.

### 27.3 Information on EU funding

Applications for protection of results (including patent applications) filed by or on behalf of a beneficiary must — unless the *Agency* requests or agrees otherwise or unless it is impossible — include the following:

“The project leading to this application has received funding from the *European Union’s Horizon 2020 research and innovation programme* under grant agreement No 653522”.

### 27.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

## ARTICLE 28 — EXPLOITATION OF RESULTS

### 28.1 Obligation to exploit the results

Each beneficiary must — up to four years after the period set out in Article 3 — take measures aiming to ensure ‘**exploitation**’ of its results (either directly or indirectly, in particular through transfer or licensing; see Article 30) by:

- (a) using them in further research activities (outside the action);
- (b) developing, creating or marketing a product or process;
- (c) creating and providing a service, or
- (d) using them in standardisation activities.

This does not change the security obligations in Article 37, which still apply.



## **28.2 Results that could contribute to European or international standards — Information on EU funding**

*If results could reasonably be expected to contribute to European or international standards, the beneficiary concerned must — up to four years after the period set out in Article 3 — inform the Agency.*

If results are incorporated in a standard, the beneficiary concerned must — unless the *Agency* requests or agrees otherwise or unless it is impossible — ask the standardisation body to include the following statement in (information related to) the standard:

*“Results incorporated in this standard received funding from the *European Union’s Horizon 2020 research and innovation programme* under grant agreement No 653522”.*

## **28.3 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced in accordance with Article 43.

Such a breach may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 29 — DISSEMINATION OF RESULTS — OPEN ACCESS — VISIBILITY OF EU FUNDING**

### **29.1 Obligation to disseminate results**

Unless it goes against their legitimate interests, each beneficiary must — as soon as possible — ‘**disseminate**’ its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium).

This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

A beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries of — unless agreed otherwise — at least 45 days, together with sufficient information on the results it will disseminate.

Any other beneficiary may object within — unless agreed otherwise — 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests.

If a beneficiary intends not to protect its results, it may — under certain conditions (see Article 26.4.1) — need to formally notify the *Agency* before dissemination takes place.

### **29.2 Open access to scientific publications**

Each beneficiary must ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results.



In particular, it must:

- (a) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications;

Moreover, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.

- (b) ensure open access to the deposited publication — via the repository — at the latest:
  - (i) on publication, if an electronic version is available for free via the publisher, or
  - (ii) within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.
- (c) ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication.

The bibliographic metadata must be in a standard format and must include all of the following:

- the terms “*European Union (EU)*” and “*Horizon 2020*”;
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

### **29.3 Open access to research data**

*Not applicable*

### **29.4 Information on EU funding — Obligation and right to use the EU emblem**

Unless the *Agency* requests or agrees otherwise or unless it is impossible, any dissemination of results (in any form, including electronic) must:

- (a) display the EU emblem and
- (b) include the following text:

“This project has received funding from the *European Union’s Horizon 2020 research and innovation programme* under grant agreement No 653522”.

When displayed together with another logo, the EU emblem must have appropriate prominence.

For the purposes of their obligations under this Article, the beneficiaries may use the EU emblem without first obtaining approval from the *Agency*.

This does not however give them the right to exclusive use.





Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

### **29.5 Disclaimer excluding *Agency* responsibility**

Any dissemination of results must indicate that it reflects only the author's view and that the *Agency* is not responsible for any use that may be made of the information it contains.

### **29.6 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 30 — TRANSFER AND LICENSING OF RESULTS**

### **30.1 Transfer of ownership**

Each beneficiary may transfer ownership of its results.

It must however ensure that its obligations under Articles 26.2, 26.4, 27, 28, 29, 30 and 31 also apply to the new owner and that this owner has the obligation to pass them on in any subsequent transfer.

This does not change the security obligations in Article 37, which still apply.

Unless agreed otherwise (in writing) for specifically-identified third parties or unless impossible under applicable EU and national laws on mergers and acquisitions, a beneficiary that intends to transfer ownership of results must give at least 45 days advance notice (or less if agreed in writing) to the other beneficiaries that still have (or still may request) access rights to the results. This notification must include sufficient information on the new owner to enable any beneficiary concerned to assess the effects on its access rights.

Unless agreed otherwise (in writing) for specifically-identified third parties, any other beneficiary may object within 30 days of receiving notification (or less if agreed in writing), if it can show that the transfer would adversely affect its access rights. In this case, the transfer may not take place until agreement has been reached between the beneficiaries concerned.

### **30.2 Granting licenses**

Each beneficiary may grant licences to its results (or otherwise give the right to exploit them), if:

- (a) this does not impede the rights under Article 31 and
- (b) *not applicable*.

In addition to Points (a) and (b), exclusive licences for results may be granted only if all the other beneficiaries concerned have waived their access rights (see Article 31.1).

This does not change the dissemination obligations in Article 29 or security obligations in Article 37, which still apply.





### **30.3 Agency right to object to transfers or licensing**

*Not applicable*

### **30.4 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 31 — ACCESS RIGHTS TO RESULTS**

### **31.1 Exercise of access rights — Waiving of access rights — No sub-licensing**

The conditions set out in Article 25.1 apply.

The obligations set out in this Article do not change the security obligations in Article 37, which still apply.

### **31.2 Access rights for other beneficiaries, for implementing their own tasks under the action**

The beneficiaries must give each other access — on a royalty-free basis — to results needed for implementing their own tasks under the action.

### **31.3 Access rights for other beneficiaries, for exploiting their own results**

The beneficiaries must give each other — under fair and reasonable conditions (see Article 25.3) — access to results needed for exploiting their own results.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

### **31.4 Access rights of affiliated entities**

Unless agreed otherwise in the consortium agreement, access to results must also be given — under fair and reasonable conditions (Article 25.3) — to affiliated entities established in an EU Member State or associated country, if this is needed for those entities to exploit the results generated by the beneficiaries to which they are affiliated.

Unless agreed otherwise (see above; Article 31.1), the affiliated entity concerned must make any such request directly to the beneficiary that owns the results.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

### **31.5 Access rights for the EU institutions, bodies, offices or agencies and EU Member States**

*The beneficiaries must give access to their results — on a royalty-free basis — to EU institutions, bodies, offices and agencies as well as EU Member States' national authorities, necessary for developing, implementing or monitoring their policies or programmes in this area.*



*Such access rights are limited to non-commercial and non-competitive use.*

*Access is conditional on an agreement to define specific conditions ensuring that:*

- (a) the access will be used only for the intended purpose and*
- (b) appropriate confidentiality obligations are in place.*

*The requesting EU Member State or EU institution, body, office or agency must inform all other EU Member States of such a request.*

*This does not change the security obligations in Article 37, which still apply.*

### **31.6 Access rights for third parties**

*Not applicable*

### **31.7 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **SECTION 4 OTHER RIGHTS AND OBLIGATIONS**

### **ARTICLE 32 — RECRUITMENT AND WORKING CONDITIONS FOR RESEARCHERS**

#### **32.1 Obligation to take measures to implement the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers**

The beneficiaries must take all measures to implement the principles set out in the Commission Recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers<sup>22</sup>, in particular regarding:

- working conditions;
- transparent recruitment processes based on merit, and
- career development.

The beneficiaries must ensure that researchers and third parties involved in the action are aware of them.

#### **32.2 Consequences of non-compliance**

If a beneficiary breaches its obligations under this Article, the *Agency* may apply any of the measures described in Chapter 6.

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<sup>22</sup> Commission Recommendation 2005/251/EC of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (OJ L 75, 22.3.2005, p. 67).



## ARTICLE 33 — GENDER EQUALITY

### 33.1 Obligation to aim for gender equality

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

### 33.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the *Agency* may apply any of the measures described in Chapter 6.

## ARTICLE 34 — ETHICS

### 34.1 Obligation to comply with ethical principles

The beneficiaries must carry out the action in compliance with:

- (a) ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity<sup>23</sup> — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct) and
- (b) applicable international, EU and national law.

Funding will not be granted for activities carried out outside the EU if they are prohibited in all Member States.

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

- (a) aim at human cloning for reproductive purposes;
- (b) intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or
- (c) intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

### 34.2 Activities raising ethical issues

Activities raising ethical issues must comply with the ‘**ethics requirements**’ set out in Annex 1.

Before the beginning of an activity raising an ethical issue, the coordinator must submit (see Article 52) to the *Agency* copy of:

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<sup>23</sup> The European Code of Conduct for Research Integrity of ALLEA (All European Academies) and ESF (European Science Foundation) of March 2011.

[http://www.esf.org/fileadmin/Public\\_documents/Publications/Code\\_Conduct\\_ResearchIntegrity.pdf](http://www.esf.org/fileadmin/Public_documents/Publications/Code_Conduct_ResearchIntegrity.pdf)



- (a) any ethics committee opinion required under national law and
- (b) any notification or authorisation for activities raising ethical issues required under national law.

If these documents are not in English, the coordinator must also submit an English summary of the submitted opinions, notifications and authorisations (containing, if available, the conclusions of the committee or authority concerned).

If these documents are specifically requested for the action, the request must contain an explicit reference to the action title. The coordinator must submit a declaration by each beneficiary concerned that all the submitted documents cover the action tasks.

### **34.3 Activities involving human embryos or human embryonic stem cells**

Activities involving research on human embryos or human embryonic stem cells may be carried out only if:

- they are set out in Annex 1 or
- the coordinator has obtained explicit approval (in writing) from the *Agency* (see Article 52).

### **34.4 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or participation of the beneficiary may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 35 — CONFLICT OF INTERESTS**

### **35.1 Obligation to avoid a conflict of interests**

The beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the action is compromised for reasons involving economic interest, political or national affinity, family or emotional ties or any other shared interest (**‘conflict of interests’**).

They must formally notify to the *Agency* without delay any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The *Agency* may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

### **35.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or participation of the beneficiary may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.



## ARTICLE 36 — CONFIDENTIALITY

### 36.1 General obligation to maintain confidentiality

During implementation of the action and for four years after the period set out in Article 3, the parties must keep confidential any data, documents or other material (in any form) that is identified as confidential at the time it is disclosed (**‘confidential information’**).

If a beneficiary requests, the *Agency* may agree to keep such information confidential for an additional period beyond the initial four years.

If information has been identified as confidential only orally, it will be considered to be confidential only if this is confirmed in writing within 15 days of the oral disclosure.

Unless otherwise agreed between the parties, they may use confidential information only to implement the Agreement.

The beneficiaries may disclose confidential information to their personnel or third parties involved in the action only if they:

- (a) need to know to implement the Agreement and
- (b) are bound by an obligation of confidentiality.

This does not change the security obligations in Article 37, which still apply.

The *Agency* may disclose confidential information to its staff, other EU institutions and bodies or third parties, if:

- (a) this is necessary to implement the Agreement or safeguard the EU's financial interests and
- (b) the recipients of the information are bound by an obligation of confidentiality.

Under the conditions set out in Article 4 of the Rules for Participation Regulation No 1290/2013<sup>24</sup>, the Commission must moreover make available information on the results to other EU institutions, bodies, offices or agencies as well as Member States or associated countries.

The confidentiality obligations no longer apply if:

- (a) the disclosing party agrees to release the other party;
- (b) the information was already known by the recipient or is given to him without obligation of confidentiality by a third party that was not bound by any obligation of confidentiality;
- (c) the recipient proves that the information was developed without the use of confidential information;
- (d) the information becomes generally and publicly available, without breaching any confidentiality obligation, or

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<sup>24</sup> Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" (OJ L 347, 20.12.2013 p.81).



(e) the disclosure of the information is required by EU or national law.

### **36.2 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## **ARTICLE 37 — SECURITY-RELATED OBLIGATIONS**

### **37.1 Results with a security recommendation**

*Not applicable*

### **37.2 Classified results**

*Not applicable*

### **37.3 Activities involving dual-use goods or dangerous materials and substances**

*Not applicable*

### **37.4 Consequences of non-compliance**

*Not applicable*

## **ARTICLE 38 — PROMOTING THE ACTION — VISIBILITY OF EU FUNDING**

### **38.1 Communication activities by beneficiaries**

#### **38.1.1 Obligation to promote the action and its results**

The beneficiaries must promote the action and its results, by providing targeted information to multiple audiences (including the media and the public) in a strategic and effective manner.

This does not change the dissemination obligations in Article 29, the confidentiality obligations in Article 36 or the security obligations in Article 37, all of which still apply.

Before engaging in a communication activity expected to have a major media impact, the beneficiaries must inform the *Agency* (see Article 52).

#### **38.1.2 Information on EU funding — Obligation and right to use the EU emblem**

Unless the *Agency* requests or agrees otherwise or unless it is impossible, any communication activity related to the action (including in electronic form, via social media, etc.) and any infrastructure, equipment and major results funded by the grant must:

- (a) display the EU emblem and
- (b) include the following text:



For communication activities: “This project has received funding from the *European Union’s Horizon 2020 research and innovation programme* under grant agreement No 653522”.

For infrastructure, equipment and major results: “This *[infrastructure]/[equipment]/[insert type of result]* is part of a project that has received funding from the *European Union’s Horizon 2020 research and innovation programme* under grant agreement No 653522”.

When displayed together with another logo, the EU emblem must have appropriate prominence.

For the purposes of their obligations under this Article, the beneficiaries may use the EU emblem without first obtaining approval from the *Agency*.

This does not, however, give them the right to exclusive use.

Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

### **38.1.3 Disclaimer excluding the *Agency* responsibility**

Any communication activity related to the action must indicate that it reflects only the author's view and that the *Agency* is not responsible for any use that may be made of the information it contains.

## **38.2 Communication activities by the *Agency***

### **38.2.1 Right to use beneficiaries’ materials, documents or information**

The *Agency* may use, for its communication and publicising activities, information relating to the action, documents notably summaries for publication and public deliverables as well as any other material, such as pictures or audio-visual material that it receives from any beneficiary (including in electronic form).

This does not change the confidentiality obligations in Article 36 and the security obligations in Article 37, all of which still apply.

However, if the *Agency’s* use of these materials, documents or information would risk compromising legitimate interests, the beneficiary concerned may request the *Agency* not to use it (see Article 52).

The right to use a beneficiary’s materials, documents and information includes:

- (a) **use for its own purposes** (in particular, making them available to persons working for the *Agency* or any other EU institution, body, office or agency or body or institutions in EU Member States; and copying or reproducing them in whole or in part, in unlimited numbers);
- (b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes);
- (c) **editing or redrafting** for communication and publicising activities (including shortening, summarising, inserting other elements (such as meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation);

- (d) **translation**;
- (e) giving **access in response to individual requests** under Regulation No 1049/2001<sup>25</sup>, without the right to reproduce or exploit;
- (f) **storage** in paper, electronic or other form;
- (g) **archiving**, in line with applicable document-management rules, and
- (h) the right to authorise **third parties** to act on its behalf or sub-license the modes of use set out in Points (b),(c),(d) and (f) to third parties if needed for the communication and publicising activities of the *Agency*.

If the right of use is subject to rights of a third party (including personnel of the beneficiary), the beneficiary must ensure that it complies with its obligations under this Agreement (in particular, by obtaining the necessary approval from the third parties concerned).

Where applicable (and if provided by the beneficiaries), the *Agency* will insert the following information:

“© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the *Executive Agency for Small and Medium-sized Enterprises* under conditions.”

### 38.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

## ARTICLE 39 — PROCESSING OF PERSONAL DATA

### 39.1 Processing of personal data by the *Agency and the Commission*

Any personal data under the Agreement will be processed by the *Agency or the Commission* under Regulation No 45/2001<sup>26</sup> and according to the ‘notifications of the processing operations’ to the Data Protection Officer (DPO) of the *Agency or the Commission* (publicly accessible in the DPO register).

Such data will be processed by the ‘**data controller**’ of the *Agency or the Commission* for the purposes of implementing, managing and monitoring the Agreement or protecting the financial interests of the EU or Euratom (including checks, reviews, audits and investigations; see Article 22).

The persons whose personal data are processed have the right to access and correct their own personal data. For this purpose, they must send any queries about the processing of their personal data to the data controller, via the contact point indicated in the ‘service specific privacy statement(s) (SSPS)’ that are published on the *Agency and the Commission* websites.

<sup>25</sup> Regulation (EC) No 1049/2001 of the European Parliament and of the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents, OJ L 145, 31.5.2001, p. 43.

<sup>26</sup> Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data (OJ L 8, 12.01.2001, p. 1).





They also have the right to have recourse at any time to the European Data Protection Supervisor (EDPS).

### **39.2 Processing of personal data by the beneficiaries**

The beneficiaries must process personal data under the Agreement in compliance with applicable EU and national law on data protection (including authorisations or notification requirements).

The beneficiaries may grant their personnel access only to data that is strictly necessary for implementing, managing and monitoring the Agreement.

The beneficiaries must inform the personnel whose personal data are collected and processed by the *Agency or the Commission*. For this purpose, they must provide them with the service specific privacy statement (SSPS) (see above), before transmitting their data to the *Agency or the Commission*.

### **39.3 Consequences of non-compliance**

If a beneficiary breaches any of its obligations under Article 39.2, the *Agency* may apply any of the measures described in Chapter 6.

## **ARTICLE 40 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE AGENCY**

The beneficiaries may not assign any of their claims for payment against the *Agency* to any third party, except if approved by the *Agency* on the basis of a reasoned, written request by the coordinator (on behalf of the beneficiary concerned).

If the *Agency* has not accepted the assignment or the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiaries from their obligations towards the *Agency*.

## **CHAPTER 5 DIVISION OF BENEFICIARIES' ROLES AND RESPONSIBILITIES**

### **ARTICLE 41 — DIVISION OF BENEFICIARIES' ROLES AND RESPONSIBILITIES**

#### **41.1 Roles and responsibilities towards the Agency**

The beneficiaries have full responsibility for implementing the action and complying with the Agreement.

The beneficiaries are jointly and severally liable for the **technical implementation** of the action as described in Annex 1. If a beneficiary fails to implement its part of the action, the other beneficiaries become responsible for implementing this part (without being entitled to any additional EU funding for doing so), unless the *Agency* expressly relieves them of this obligation.

The **financial responsibility** of each beneficiary is governed by Articles 44, 45 and 46.

#### **41.2 Internal division of roles and responsibilities**

The internal roles and responsibilities of the beneficiaries are divided as follows:



(a) Each **beneficiary** must:

- (i) keep information stored in the 'Beneficiary Register' (via the electronic exchange system) up to date (see Article 17);
- (ii) inform the coordinator immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 17);
- (iii) submit to the coordinator in good time:
  - individual financial statements for itself and, if required, certificates on the financial statements (see Article 20);
  - the data needed to draw up the technical reports (see Article 20);
  - ethics committee opinions and notifications or authorisations for activities raising ethical issues (see Article 34);
  - any other documents or information required by the *Agency or the Commission* under the Agreement, unless the Agreement requires the beneficiary to submit this information directly to the *Agency or the Commission*.

(b) The **coordinator** must:

- (i) monitor that the action is implemented properly (see Article 7);
- (ii) act as the intermediary for all communications between the beneficiaries and the *Agency* (in particular, providing the *Agency* with the information described in Article 17), unless the Agreement specifies otherwise;
- (iii) request and review any documents or information required by the *Agency* and verify their completeness and correctness before passing them on to the *Agency*;
- (iv) submit the deliverables and reports to the *Agency* (see Articles 19 and 20);
- (v) ensure that all payments are made to the other beneficiaries without unjustified delay (see Article 21);
- (vi) inform the *Agency* of the amounts paid to each beneficiary, when required under the Agreement (see Articles 44 and 50) or requested by the *Agency*.

The coordinator may not delegate the above-mentioned tasks to any other beneficiary or subcontract them to any third party.

### 41.3 Internal arrangements between beneficiaries — Consortium agreement

*The beneficiaries must have internal arrangements regarding their operation and co-ordination to ensure that the action is implemented properly. These internal arrangements must be set out in a written 'consortium agreement' between the beneficiaries, which may cover:*



- *internal organisation of the consortium;*
- *management of access to the electronic exchange system;*
- *distribution of EU funding;*
- *additional rules on rights and obligations related to background and results (including whether access rights remain or not, if a beneficiary is in breach of its obligations) (see Section 3 of Chapter 4);*
- *settlement of internal disputes;*
- *liability, indemnification and confidentiality arrangements between the beneficiaries.*

*The consortium agreement must not contain any provision contrary to the Agreement.*

#### **41.4 Relationship with complementary beneficiaries — Collaboration agreement**

*Not applicable*

#### **41.5 Relationship with partners of a joint action — Coordination agreement**

*Not applicable*

### **CHAPTER 6 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY — PENALTIES — DAMAGES — SUSPENSION — TERMINATION — FORCE MAJEURE**

#### **SECTION 1 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY — PENALTIES**

#### **ARTICLE 42 — REJECTION OF INELIGIBLE COSTS**

##### **42.1 Conditions**

42.1.1 The *Agency* will — at the time of an **interim payment, at the payment of the balance or afterwards** — reject any costs which are ineligible (see Article 6), in particular following checks, reviews, audits or investigations (see Article 22).

42.1.2 The rejection may also be based on the **extension of findings from other grants to this grant**, under the conditions set out in Article 22.5.2.

##### **42.2 Ineligible costs to be rejected — Calculation — Procedure**

Ineligible costs will be rejected in full.

If the *Agency* rejects costs **without reduction of the grant** (see Article 43) or **recovery of undue amounts** (see Article 44), it will formally notify the coordinator or beneficiary concerned the rejection of costs, the amounts and the reasons why (if applicable, together with the notification of amounts



due; see Article 21.5). The coordinator or beneficiary concerned may — within 30 days of receiving notification — formally notify the *Agency* of its disagreement and the reasons why.

If the *Agency* rejects costs **with reduction of the grant** or **recovery of undue amounts**, it will formally notify the rejection in the ‘**pre-information letter**’ on reduction or recovery set out in Articles 43 and 44.

### 42.3 Effects

If the *Agency* rejects costs at the time of an **interim payment** or **the payment of the balance**, it will deduct them from the total eligible costs declared, for the action, in the periodic or final summary financial statement (see Articles 20.3 and 20.4). It will then calculate the interim payment or payment of the balance as set out in Articles 21.3 or 21.4.

If the *Agency* — **after an interim payment but before the payment of the balance** — rejects costs declared in a periodic summary financial statement, it will deduct them from the total eligible costs declared, for the action, in the next periodic summary financial statement or in the final summary financial statement. It will then calculate the interim payment or payment of the balance as set out in Articles 21.3 or 21.4.

If the *Agency* rejects costs **after the payment of the balance**, it will deduct the amount rejected from the total eligible costs declared, by the beneficiary, in the final summary financial statement. It will then calculate the revised final grant amount as set out in Article 5.4.

## ARTICLE 43 — REDUCTION OF THE GRANT

### 43.1 Conditions

43.1.1 The *Agency* may — **at the payment of the balance** or **afterwards** — reduce the maximum grant amount (see Article 5.1), if the action has not been implemented properly as described in Annex 1 or another obligation under the Agreement has been breached.

43.1.2 The *Agency* may also reduce the maximum grant amount on the basis of the **extension of findings from other grants to this grant**, under the conditions set out in Article 22.5.2.

### 43.2 Amount to be reduced — Calculation — Procedure

The amount of the reduction will be proportionate to the improper implementation of the action or to the seriousness of the breach.

Before reduction of the grant, the *Agency* will formally notify a ‘**pre-information letter**’ to the coordinator or beneficiary concerned:

- informing it of its intention to reduce the grant, the amount it intends to reduce and the reasons why and
- inviting it to submit observations within 30 days of receiving notification

If the *Agency* does not receive any observations or decides to pursue reduction despite the observations it has received, it will formally notify **confirmation** of the reduction (if applicable, together with the notification of amounts due; see Article 21).



### 43.3 Effects

If the *Agency* reduces the grant at the time of **the payment of the balance**, it will calculate the reduced grant amount for the action and then determine the amount due as payment of the balance (see Articles 5.3.4 and 21.4).

If the *Agency* reduces the grant **after the payment of the balance**, it will calculate the revised final grant amount for the beneficiary concerned (see Article 5.4). If the revised final grant amount for the beneficiary concerned is lower than its share of the final grant amount, the *Agency* will recover the difference (see Article 44).

## ARTICLE 44 — RECOVERY OF UNDUE AMOUNTS

### 44.1 Amount to be recovered — Calculation — Procedure

The *Agency* will — after **termination of the participation of a beneficiary, at the payment of the balance or afterwards** — claim back any amount that was paid but is not due under the Agreement.

Each beneficiary's financial responsibility in case of recovery is limited to its own debt, except for the amount retained for the Guarantee Fund (see Article 21.4).

#### 44.1.1 Recovery after termination of a beneficiary's participation

If recovery takes place after termination of a beneficiary's participation (including the coordinator), the *Agency* will claim back the undue amount from the beneficiary concerned, by formally notifying it a debit note (see Article 50.2 and 50.3). This note will specify the amount to be recovered, the terms and the date for payment.

If payment is not made by the date specified in the debit note, the *Agency or the Commission* will **recover** the amount:

- (a) by '**offsetting**' it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the *Agency, the Commission* or *another* executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the *Agency* may offset before the payment date specified in the debit note;

- (b) *Not applicable*;

- (c) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial regulation No 966/2012.

If payment is not made by the date specified in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the *Agency or the Commission* receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.



Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC<sup>27</sup> applies.

#### 44.1.2 Recovery at payment of the balance

If the payment of the balance takes the form of a recovery (see Article 21.4), the *Agency* will formally notify a '**pre-information letter**' to the coordinator:

- informing it of its intention to recover, the amount due as the balance and the reasons why;
- specifying that it intends to deduct the amount to be recovered from the amount retained for the Guarantee Fund;
- requesting the coordinator to submit a report on the distribution of payments to the beneficiaries within 30 days of receiving notification, and
- inviting the coordinator to submit observations within 30 days of receiving notification.

If no observations are submitted or the *Agency* decides to pursue recovery despite the observations it has received, it will **confirm recovery** (together with the notification of amounts due; see Article 21.5) and:

- pay the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is positive** or
- formally notify to the coordinator a **debit note** for the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is negative**. This note will also specify the terms and the date for payment.

If the coordinator does not repay the *Agency* by the date in the debit note and has not submitted the report on the distribution of payments: the *Agency* or the Commission will **recover** the amount set out in the debit note from the coordinator (see below).

If the coordinator does not repay the *Agency* by the date in the debit note, but has submitted the report on the distribution of payments: the *Agency* will:

- (a) identify the beneficiaries for which the amount calculated as follows is negative:

$\{ \{ \{ \text{beneficiary's costs declared in the final summary financial statement and approved by the } \}$   
*Agency* multiplied by the reimbursement rate set out in Article 5.2 for the beneficiary concerned}

divided by

the EU contribution for the action calculated according to Article 5.3.1 }

multiplied by

the final grant amount (see Article 5.3) },

<sup>27</sup> Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market amending Directives 97/7/EC, 2002/65/EC, 2005/60/EC and 2006/48/EC and repealing Directive 97/5/EC (OJ L 319, 05.12.2007, p. 1).



minus

{pre-financing and interim payments received by the beneficiary}}.

- (b) formally notify to each beneficiary identified according to point (a) a **debit note** specifying the terms and date for payment. The amount of the debit note is calculated as follows:

{ {amount calculated according to point (a) for the beneficiary concerned

divided by

the sum of the amounts calculated according to point (a) for all the beneficiaries identified according to point (a)}

multiplied by

the amount set out in the debit note formally notified to the coordinator}.

If payment is not made by the date specified in the debit note, the *Agency* will **recover** the amount:

- (a) by '**offsetting**' it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the *Agency*, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the *Agency* may offset before the payment date specified in the debit note;

- (b) by **drawing on the Guarantee Fund**. The *Agency or the Commission* will formally notify the beneficiary concerned the debit note on behalf of the Guarantee Fund and recover the amount:

(i) *not applicable*;

(ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the *Agency or the Commission* receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

#### 44.1.3 Recovery of amounts after payment of the balance





If, for a beneficiary, the revised final grant amount (see Article 5.4) is lower than its share of the final grant amount, it must repay the difference to the *Agency*.

The beneficiary's share of the final grant amount is calculated as follows:

{ {beneficiary's costs declared in the final summary financial statement and approved by the *Agency* multiplied by the reimbursement rate set out in Article 5.2 for the beneficiary concerned}

divided by

the EU contribution for the action calculated according to Article 5.3.1}

multiplied by

the final grant amount (see Article 5.3)}.

If the coordinator has not distributed amounts received (see Article 21.7), the *Agency* will also recover these amounts.

The *Agency* will formally notify a **pre-information letter** to the beneficiary concerned:

- informing it of its intention to recover, the due amount and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If no observations are submitted or the *Agency* decides to pursue recovery despite the observations it has received, it will **confirm** the amount to be recovered and formally notify to the beneficiary concerned a **debit note**. This note will also specify the terms and the date for payment.

If payment is not made by the date specified in the debit note, the *Agency* will **recover** the amount:

- (a) by '**offsetting**' it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the *Agency*, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the *Agency* may offset before the payment date specified in the debit note;

- (b) by **drawing on the Guarantee Fund**. The *Agency or the Commission* will formally notify the beneficiary concerned the debit note on behalf of the Guarantee Fund and recover the amount:

- (i) *not applicable*;

- (ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the date for payment in the debit note, up to and including the date the *Agency or the Commission* receives full payment of the amount.



Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

## ARTICLE 45 — ADMINISTRATIVE AND FINANCIAL PENALTIES

### 45.1 Conditions

Under Articles 109 and 131(4) of the Financial Regulation No 966/2012, the *Agency* may impose **administrative** and **financial penalties** if a beneficiary:

- (a) has committed substantial errors, irregularities or fraud or is in serious breach of its obligations under the Agreement or
- (b) has made false declarations about information required under the Agreement or for the submission of the proposal (or has not supplied such information).

Each beneficiary is responsible for paying the financial penalties imposed on it.

Under Article 109(3) of the Financial Regulation No 966/2012, the *Agency or the Commission* may — under certain conditions and limits — publish decisions imposing administrative or financial penalties.

### 45.2 Duration — Amount of penalty — Calculation

**Administrative penalties** exclude the beneficiary from all contracts and grants financed from the EU or Euratom budget for a maximum of five years from the date the infringement is established by the *Agency*.

If the beneficiary commits another infringement within five years of the date the first infringement is established, the *Agency* may extend the exclusion period up to 10 years.

**Financial penalties** will be between 2% and 10% of the maximum EU contribution indicated, for the beneficiary concerned, in the estimated budget (see Annex 2).

If the beneficiary commits another infringement within five years of the date the first infringement is established, the *Agency* may increase the rate of financial penalties to between 4% and 20%.

### 45.3 Procedure

Before applying a penalty, the *Agency* will formally notify the beneficiary concerned:

- informing it of its intention to impose a penalty, its duration or amount and the reasons why and
- inviting it to submit observations within 30 days.

If the *Agency* does not receive any observations or decides to impose the penalty despite of observations it has received, it will formally notify **confirmation** of the penalty to the beneficiary concerned and — in case of financial penalties — deduct the penalty from the payment of the balance or formally notify a **debit note**, specifying the amount to be recovered, the terms and the date for payment.



If payment is not made by the date specified in the debit note, the *Agency or the* Commission may **recover** the amount:

- (a) by ‘**offsetting**’ it — without the beneficiary’s consent — against any amounts owed to the beneficiary concerned by the *Agency, the* Commission or *another* executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU’s financial interests, the *Agency* may offset before the payment date specified in the debit note;

- (b) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the *Agency or the* Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

## **SECTION 2 LIABILITY FOR DAMAGES**

### **ARTICLE 46 — LIABILITY FOR DAMAGES**

#### **46.1 Liability of the *Agency***

The *Agency* cannot be held liable for any damage caused to the beneficiaries or to third parties as a consequence of implementing the Agreement, including for gross negligence.

The *Agency* cannot be held liable for any damage caused by any of the beneficiaries or third parties involved in the action, as a consequence of implementing the Agreement.

#### **46.2 Liability of the beneficiaries**

##### **46.2.1 Conditions**

Except in case of force majeure (see Article 51), the beneficiaries must compensate the *Agency* for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement.

Each beneficiary is responsible for paying the damages claimed from it.

##### **46.2.2 Amount of damages - Calculation**

The amount the *Agency* can claim from a beneficiary will correspond to the damage caused by that beneficiary.



### 46.2.3 Procedure

Before claiming damages, the *Agency* will formally notify the beneficiary concerned:

- informing it of its intention to claim damages, the amount and the reasons why and
- inviting it to submit observations within 30 days.

If the *Agency* does not receive any observations or decides to claim damages despite the observations it has received, it will formally notify **confirmation** of the claim for damages and a **debit note**, specifying the amount to be recovered, the terms and the date for payment.

If payment is not made by the date specified in the debit note, the *Agency or the Commission* may **recover** the amount:

- (a) by ‘**offsetting**’ it — without the beneficiary’s consent — against any amounts owed to the beneficiary concerned by the *Agency*, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU’s financial interests, the *Agency* may offset before the payment date specified in the debit note;

- (b) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the *Agency or the Commission* receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

## **SECTION 3 SUSPENSION AND TERMINATION**

### **ARTICLE 47 — SUSPENSION OF PAYMENT DEADLINE**

#### **47.1 Conditions**

The *Agency* may — at any moment — suspend the payment deadline (see Article 21.2 to 21.4) if a request for payment (see Article 20) cannot be approved because:

- (a) it does not comply with the provisions of the Agreement (see Article 20);
- (b) the technical reports or financial reports have not been submitted or are not complete or additional information is needed, or



- (c) there is doubt about the eligibility of the costs declared in the financial statements and additional checks, reviews, audits or investigations are necessary.

## 47.2 Procedure

The *Agency* will formally notify the coordinator of the suspension and the reasons why.

The suspension will **take effect** the day notification is sent by the *Agency* (see Article 52).

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining period will resume.

If the suspension exceeds two months, the coordinator may request the *Agency* if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the technical or financial reports (see Article 20) and the revised report or statement is not submitted or was submitted but is also rejected, the *Agency* may also terminate the Agreement or the participation of the beneficiary (see Article 50.3.1(l)).

## ARTICLE 48 — SUSPENSION OF PAYMENTS

### 48.1 Conditions

The *Agency* may — at any moment — suspend, in whole or in part, the pre-financing payment and interim payments for one or more beneficiaries or the payment of the balance for all beneficiaries, if a beneficiary:

- (a) has committed or is suspected of having committed substantial errors, irregularities, fraud or serious breach of obligations in the award procedure or under this Agreement or
- (b) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2).

### 48.2 Procedure

Before suspending payments, the *Agency* will formally notify the coordinator:

- informing it of its intention to suspend payments and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the *Agency* does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the suspension procedure is not continued.

The suspension will **take effect** the day the confirmation notification is sent by the *Agency*.

If the conditions for resuming payments are met, the suspension will be **lifted**. The *Agency* will formally notify the coordinator.



During the suspension, the periodic report(s) (see Article 20.3) must not contain any individual financial statements from the beneficiary concerned. When the *Agency* resumes payments, the coordinator may include them in the next periodic report.

The beneficiaries may suspend implementation of the action (see Article 49.1) or terminate the Agreement or the participation of the beneficiary concerned (see Article 50.1 and 50.2).

## ARTICLE 49 — SUSPENSION OF THE ACTION IMPLEMENTATION

### 49.1 Suspension of the action implementation, by the beneficiaries

#### 49.1.1 Conditions

The beneficiaries may suspend implementation of the action or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 51) — make implementation impossible or excessively difficult.

#### 49.1.2 Procedure

The coordinator must immediately formally notify to the *Agency* the suspension (see Article 52), stating:

- the reasons why and
- the expected date of resumption.

The suspension will **take effect** the day this notification is received by the *Agency*.

Once circumstances allow for implementation to resume, the coordinator must immediately formally notify the *Agency* and request an **amendment** of the Agreement to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement or the participation of a beneficiary has been terminated (see Article 50).

The suspension will be **lifted** with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension of the action implementation are not eligible (see Article 6).

### 49.2 Suspension of the action implementation, by the *Agency*

#### 49.2.1 Conditions

The *Agency* may suspend implementation of the action or any part of it:

- (a) if a beneficiary has committed or is suspected of having committed substantial errors, irregularities, fraud or serious breach of obligations in the award procedure or under this Agreement;
- (b) if a beneficiary has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations



that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2), or

(c) if the action is suspected of having lost its scientific or technological relevance.

#### 49.2.2 Procedure

Before suspending implementation of the action, the *Agency* will formally notify the coordinator:

- informing it of its intention to suspend the implementation and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the *Agency* does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the procedure is not continued.

The suspension will **take effect** five days after confirmation notification is received by the coordinator (or on a later date specified in the notification).

It will be **lifted** if the conditions for resuming implementation of the action are met.

The coordinator will be formally notified of the lifting and the Agreement will be **amended** to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement has already been terminated (see Article 50).

The suspension will be lifted with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension are not eligible (see Article 6).

The beneficiaries may not claim damages due to suspension by the *Agency* (see Article 46).

Suspension of the action implementation does not affect the *Agency's* right to terminate the Agreement or participation of a beneficiary (see Article 50), reduce the grant or recover amounts unduly paid (see Articles 43 and 44).

### ARTICLE 50 — TERMINATION OF THE AGREEMENT OR OF THE PARTICIPATION OF ONE OR MORE BENEFICIARIES

#### 50.1 Termination of the Agreement by the beneficiaries

##### 50.1.1 Conditions and procedure

The beneficiaries may terminate the Agreement.

The coordinator must formally notify termination to the *Agency* (see Article 52), stating:

- the reasons why and
- the date the termination will take effect. This date must be after the notification.



If no reasons are given or if the *Agency* considers the reasons do not justify termination, the Agreement will be considered to have been ‘**terminated improperly**’.

The termination will **take effect** on the day specified in the notification.

### 50.1.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a periodic report (for the open reporting period until termination; see Article 20.3) and
- (ii) the final report (see Article 20.4).

If the *Agency* does not receive the reports within the deadline (see above), only costs which are included in an approved periodic report will be taken into account.

The *Agency* will **calculate** the final grant amount (see Article 5.3) and the balance (see Article 21.4) on the basis of the reports submitted. Only costs incurred until termination are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Improper termination may lead to a reduction of the grant (see Article 43).

After termination, the beneficiaries’ obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38 and 40) continue to apply.

## 50.2 Termination of the participation of one or more beneficiaries, by the beneficiaries

### 50.2.1 Conditions and procedure

The participation of one or more beneficiaries may be terminated by the coordinator, on request of the beneficiary concerned or on behalf of the other beneficiaries.

The coordinator must formally notify termination to the *Agency* (see Article 52) and inform the beneficiary concerned.

If the coordinator’s participation is terminated without its agreement, the formal notification must be done by another beneficiary (acting on behalf of the other beneficiaries).

The notification must include:

- the reasons why;
- the opinion of the beneficiary concerned (or proof that this opinion has been requested in writing);
- the date the termination takes effect. This date must be after the notification, and
- a request for amendment (see Article 55), with a proposal for reallocation of the tasks and the estimated budget of the beneficiary concerned (see Annexes 1 and 2) and, if necessary, the addition of one or more new beneficiaries (see Article 56). If termination takes effect after the period set out in Article 3, no request for amendment must be included unless the beneficiary





concerned is the coordinator. In this case, the request for amendment must propose a new coordinator.

If this information is not given or if the *Agency* considers that the reasons do not justify termination, the participation will be considered to have been **terminated improperly**.

The termination will **take effect** on the day specified in the notification.

### 50.2.2 Effects

The coordinator must — within 30 days from when termination takes effect — submit:

- (i) a report on the distribution of payments to the beneficiary concerned and
- (ii) if termination takes effect during the period set out in Article 3, a '**termination report**' from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, an overview of the use of resources, the individual financial statement and, if applicable, the certificate on the financial statement (see Articles 20.3 and 20.4).

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 20.3).

If the request for amendment is rejected by the *Agency*, (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the Agreement may be terminated according to Article 50.3.1(c).

If the request for amendment is accepted by the *Agency*, the Agreement is **amended** to introduce the necessary changes (see Article 55).

The *Agency* will **calculate** — on the basis of the periodic reports, the termination report and the report on the distribution of payments — if the (pre-financing and interim) payments received by the beneficiary concerned exceed the beneficiary's EU contribution (calculated by applying the reimbursement rate(s) to the eligible costs declared by the beneficiary and approved by the *Agency*). Only costs incurred by the beneficiary concerned until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

- If the payments received **exceed the amounts due**:
  - if termination takes effect during the period set out in Article 3 and the request for amendment is accepted, the beneficiary concerned must repay to the coordinator the amount unduly received. The *Agency* will formally notify the amount unduly received and request the beneficiary concerned to repay it to the coordinator within 30 days of receiving notification. If it does not repay the coordinator, the *Agency* will draw upon the Guarantee Fund to pay the coordinator and then notify a **debit note** on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
  - in all other cases (in particular if termination takes effect after the period set out in Article 3), the *Agency* will formally notify a **debit note** to the beneficiary concerned. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the *Agency* the amount due





and the *Agency* will notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);

- if the beneficiary concerned is the former coordinator, it must repay the new coordinator according to the procedure above, unless:
  - termination is after an interim payment and
  - the former coordinator has not distributed amounts received as pre-financing or interim payments (see Article 21.7).

In this case, the *Agency* will formally notify a **debit note** to the former coordinator. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the *Agency* the amount due. The *Agency* will then pay the new coordinator and notify a debit note on behalf of the Guarantee Fund to the former coordinator (see Article 44).

- If the payments received **do not exceed the amounts due**: amounts owed to the beneficiary concerned will be included in the next interim or final payment.

If the *Agency* does not receive the termination report within the deadline (see above), only costs included in an approved periodic report will be taken into account.

If the *Agency* does not receive the report on the distribution of payments within the deadline (see above), it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

Improper termination may lead to a reduction of the grant (see Article 43) or termination of the Agreement (see Article 50).

After termination, the concerned beneficiary's obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38 and 40) continue to apply.

### **50.3 Termination of the Agreement or the participation of one or more beneficiaries, by the *Agency***

#### **50.3.1 Conditions**

The *Agency* may terminate the Agreement or the participation of one or more beneficiaries, if:

- (a) one or more beneficiaries do not accede to the Agreement (see Article 56);
- (b) a change to their legal, financial, technical, organisational or ownership situation is likely to substantially affect or delay the implementation of the action or calls into question the decision to award the grant;
- (c) following termination of participation for one or more beneficiaries (see above), the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants (see Article 55);



- (d) implementation of the action is prevented by force majeure (see Article 51) or suspended by the coordinator (see Article 49.1) and either:
  - (i) resumption is impossible, or
  - (ii) the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants;
- (e) a beneficiary is declared bankrupt, being wound up, having its affairs administered by the courts, has entered into an arrangement with creditors, has suspended business activities, or is subject to any other similar proceedings or procedures under national law;
- (f) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has been found guilty of professional misconduct, proven by any means;
- (g) a beneficiary does not comply with the applicable national law on taxes and social security;
- (h) the action has lost scientific or technological relevance;
- (i) *not applicable*;
- (j) *not applicable*;
- (k) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed fraud, corruption, or is involved in a criminal organisation, money laundering or any other illegal activity affecting the EU's financial interests;
- (l) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has — in the award procedure or under the Agreement — committed:
  - (i) substantial errors, irregularities, fraud or
  - (ii) serious breach of obligations, including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles;
- (m) a beneficiary has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**'extension of findings from other grants to this grant'**).

### 50.3.2 Procedure

Before terminating the Agreement or participation of one or more beneficiaries, the *Agency* will formally notify the coordinator:

- informing it of its intention to terminate and the reasons why and
- inviting it, within 30 days of receiving notification, to submit observations and — in case of Point (l.ii) above — to inform the *Agency* of the measures to ensure compliance with the obligations under the Agreement.



If the *Agency* does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify to the coordinator **confirmation** of the termination and the date it will take effect. Otherwise, it will formally notify that the procedure is not continued.

The termination will **take effect**:

- for terminations under Points (b), (c), (e), (g), (h), (j), and (l.ii) above: on the day specified in the notification of the confirmation (see above);
- for terminations under Points (a), (d), (f), (i), (k), (l.i) and (m) above: on the day after the notification of the confirmation is received by the coordinator.

### 50.3.3 Effects

#### (a) for **termination of the Agreement**:

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a periodic report (for the last open reporting period until termination; see Article 20.3) and
- (ii) a final report (see Article 20.4).

If the Agreement is terminated for breach of the obligation to submit the reports (see Articles 20.8 and 50.3.1(l)), the coordinator may not submit any reports after termination.

If the *Agency* does not receive the reports within the deadline (see above), only costs which are included in an approved periodic report will be taken into account.

The *Agency* will **calculate** the final grant amount (see Article 5.3) and the balance (see Article 21.4) on the basis of the reports submitted. Only costs incurred until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

This does not affect the *Agency's* right to reduce the grant (see Article 43) or to impose administrative and financial penalties (Article 45).

The beneficiaries may not claim damages due to termination by the *Agency* (see Article 46).

After termination, the beneficiaries' obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38 and 40) continue to apply.

#### (b) for **termination of the participation of one or more beneficiaries**:

The coordinator must — within 60 days from when termination takes effect — submit:

- (i) a report on the distribution of payments to the beneficiary concerned;
- (ii) a request for amendment (see Article 55), with a proposal for reallocation of the tasks and estimated budget of the beneficiary concerned (see Annexes 1 and 2) and, if



necessary, the addition of one or more new beneficiaries (see Article 56). If termination is notified after the period set out in Article 3, no request for amendment must be submitted unless the beneficiary concerned is the coordinator. In this case the request for amendment must propose a new coordinator, and

- (iii) if termination takes effect during the period set out in Article 3, a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, an overview of the use of resources, the individual financial statement and, if applicable, the certificate on the financial statement (see Article 20).

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 20.3).

If the request for amendment is rejected by the *Agency* (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the Agreement may be terminated according to Article 50.3.1(c).

If the request for amendment is accepted by the *Agency*, the Agreement is **amended** to introduce the necessary changes (see Article 55).

The *Agency* will **calculate** — on the basis of the periodic reports, the termination report and the report on the distribution of payments — if the (pre-financing and interim) payments received by the beneficiary concerned exceed the beneficiary's EU contribution (calculated by applying the reimbursement rate(s) to the eligible costs declared by the beneficiary and approved by the *Agency*). Only costs incurred by the beneficiary concerned until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

- If the payments received **exceed the amounts due**:
  - if termination takes effect during the period set out in Article 3 and the request for amendment is accepted, the beneficiary concerned must repay to the coordinator the amount unduly received. The *Agency* will formally notify the amount unduly received and request the beneficiary concerned to repay it to the coordinator within 30 days of receiving notification. If it does not repay the coordinator, the *Agency* will draw upon the Guarantee Fund to pay the coordinator and then notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
  - in all other cases, in particular if termination takes effect after the period set out in Article 3, the *Agency* will formally notify a **debit note** to the beneficiary concerned. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the *Agency* the amount due and the *Agency* will notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);
  - if the beneficiary concerned is the former coordinator, it must repay the new coordinator the amount unduly received, unless:
    - termination takes effect after an interim payment and



- the former coordinator has not distributed amounts received as pre-financing or interim payments (see Article 21.7)

In this case, the *Agency* will formally notify a **debit note** to the former coordinator. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the *Agency* the amount due. The *Agency* will then pay the new coordinator and notify a debit note on behalf of the Guarantee Fund to the former coordinator (see Article 44).

- If the payments received **do not exceed the amounts due**: amounts owed to the beneficiary concerned will be included in the next interim or final payment.

If the *Agency* does not receive the termination report within the deadline (see above), only costs included in an approved periodic report will be taken into account.

If the *Agency* does not receive the report on the distribution of payments within the deadline (see above), it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned, and that
- the beneficiary concerned must not repay any amount to the coordinator.

After termination, the concerned beneficiary's obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38 and 40) continue to apply.

## **SECTION 4 FORCE MAJEURE**

### **ARTICLE 51 — FORCE MAJEURE**

'Force majeure' means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties' control,
- was not due to error or negligence on their part (or on the part of third parties involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

The following cannot be invoked as force majeure:

- any default of a service, defect in equipment or material or delays in making them available, unless they stem directly from a relevant case of force majeure,
- labour disputes or strikes, or
- financial difficulties.

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.



The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

The party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

## **CHAPTER 7 FINAL PROVISIONS**

### **ARTICLE 52 — COMMUNICATION BETWEEN THE PARTIES**

#### **52.1 Form and means of communication**

Communication under the Agreement (information, requests, submissions, ‘formal notifications’, etc.) must:

- be made in writing and
- bear the number of the Agreement.

**Until the payment of the balance:** all communication must be made through the electronic exchange system and using the forms and templates provided there.

**After the payment of the balance:** formal notifications must be made by registered post with proof of delivery (‘formal notification on paper’).

Communications in the electronic exchange system must be made by persons authorised according to the ‘Terms and Conditions of Use of the electronic exchange system’. For naming the authorised persons, each beneficiary must have designated — before the signature of this Agreement — a ‘Legal Entity Appointed Representative (LEAR)’. The role and tasks of the LEAR are stipulated in his/her appointment letter (see Terms and Conditions of Use of the electronic exchange system).

If the electronic exchange system is temporarily unavailable, instructions will be given on the *Agency and Commission* websites.

#### **52.2 Date of communication**

**Communications** are considered to have been made when they are sent by the sending party (i.e. on the date and time they are sent through the electronic exchange system).

**Formal notifications** through the **electronic** exchange system are considered to have been made when they are received by the receiving party (i.e. on the date and time of acceptance by the receiving party, as indicated by the time stamp). A formal notification that has not been accepted within 10 days after sending is considered to have been accepted.

Formal notifications **on paper** sent by **registered post** with proof of delivery (only after the payment of the balance) are considered to have been made on either:

- the delivery date registered by the postal service or
- the deadline for collection at the post office.



If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

### 52.3 Addresses for communication

The **electronic** exchange system must be accessed via the following URL:

<https://ec.europa.eu/research/participants/portal/desktop/en/projects/>

The *Agency* will formally notify the coordinator and beneficiaries in advance any changes to this URL.

**Formal notifications on paper** (only after the payment of the balance) addressed **to the Agency** must be sent to the following address:

*Executive Agency for Small and Medium-sized Enterprises (EASME)  
H2020 Environment & Resources  
10/056  
B-1049 Brussels Belgium*

Formal notifications on paper (only after the payment of the balance) addressed **to the beneficiaries** must be sent to their legal address as specified in the 'Beneficiary Register'.

## ARTICLE 53 — INTERPRETATION OF THE AGREEMENT

### 53.1 Precedence of the Terms and Conditions over the Annexes

The provisions in the Terms and Conditions of the Agreement take precedence over its Annexes.

Annex 2 takes precedence over Annex 1.

### 53.2 Privileges and immunities

*Not applicable*

## ARTICLE 54 — CALCULATION OF PERIODS, DATES AND DEADLINES

In accordance with Regulation No 1182/71<sup>28</sup>, periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

## ARTICLE 55 — AMENDMENTS TO THE AGREEMENT

### 55.1 Conditions

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

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<sup>28</sup> Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8.6.1971, p. 1).



Amendments may be requested by any of the parties.

## 55.2 Procedure

The party requesting an amendment must submit a request for amendment signed in the electronic exchange system (see Article 52).

The coordinator submits and receives requests for amendment on behalf of the beneficiaries (see Annex 3).

If a change of coordinator is requested without its agreement, the submission must be done by another beneficiary (acting on behalf of the other beneficiaries).

The request for amendment must include:

- the reasons why;
- the appropriate supporting documents;
- for a change of coordinator without its agreement: the opinion of the coordinator (or proof that this opinion has been requested in writing).

The *Agency* may request additional information.

If the party receiving the request agrees, it must sign the amendment in the electronic exchange system within 45 days of receiving notification (or any additional information the *Agency* has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected.

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date agreed by the parties or, in the absence of such an agreement, on the date on which the amendment enters into force.

## ARTICLE 56 — ACCESSION TO THE AGREEMENT

### 56.1 Accession of the beneficiaries mentioned in the Preamble

The other beneficiaries must accede to the Agreement by signing the Accession Form (see Annex 3) in the electronic exchange system (see Article 52) within 30 days after its entry into force (see Article 58).

They will assume the rights and obligations under the Agreement with effect from the date of its entry into force (see Article 58).

If a beneficiary does not accede to the Agreement within the above deadline, the coordinator must — within 30 days — request an amendment to make any changes necessary to ensure proper implementation of the action. This does not affect the *Agency's* right to terminate the Agreement (see Article 50).





## **56.2 Addition of new beneficiaries**

In justified cases, the beneficiaries may request the addition of a new beneficiary.

For this purpose, the coordinator must submit a request for amendment in accordance with Article 55. It must include an Accession Form (see Annex 3) signed by the new beneficiary in the electronic exchange system (see Article 52).

New beneficiaries must assume the rights and obligations under the Agreement with effect from the date of their accession specified in the Accession Form (see Annex 3).

## **ARTICLE 57 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES**

### **57.1 Applicable law**

The Agreement is governed by the applicable EU law, supplemented if necessary by the law of Belgium.

### **57.2 Dispute settlement**

If a dispute concerning the interpretation, application or validity of the Agreement cannot be settled amicably, the General Court — or, on appeal, the Court of Justice of the European Union — has sole jurisdiction. Such actions must be brought under Article 272 of the Treaty on the Functioning of the EU (TFEU).

If a dispute concerns administrative or financial penalties, offsetting or an enforceable decision under Article 299 TFEU (see Articles 44, 45 and 46), the beneficiaries must bring action before the General Court — or, on appeal, the Court of Justice of the European Union — under Article 263 TFEU. *Actions against enforceable decisions must be brought against the Commission (not against the Agency).*



## **ARTICLE 58 — ENTRY INTO FORCE OF THE AGREEMENT**

The Agreement will enter into force on the day of signature by the *Agency* or the coordinator, depending on which is later.

### **SIGNATURES**

For the coordinator

For the *Agency*



## **EUROPEAN COMMISSION**

Executive Agency for Small and Medium-sized Enterprises (EASME)

H2020 Environment & Resources



### **ANNEX 1 (part A)**

**Research and Innovation action**

**NUMBER — 653522 — RESIN**

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## 1.1. The project summary

Project Number <sup>1</sup>	653522	Project Acronym <sup>2</sup>	RESIN
One form per project			
General information			
Project title <sup>3</sup>	Climate Resilient Cities and Infrastructures		
Starting date <sup>4</sup>	01/05/2015		
Duration in months <sup>5</sup>	42		
Call (part) identifier <sup>6</sup>	H2020-DRS-2014		
Topic	DRS-09-2014 Disaster Resilience & Climate Change topic 1: Science and innovation for adaptation to climate change: from assessing costs, risks and opportunities to demonstration of options and practices		
Fixed EC Keywords	Risks assessment, modelling and impact reduction		
Free keywords	Climate change, adaptation options and adaptation strategies, vulnerability, cities, critical infrastructure, decision support system, standardisation		
Abstract <sup>7</sup>			
<p>With most of its population and capital goods concentrated in urban areas, cities are key to the European economy. One of the major challenges cities face are more frequent extreme weather events due to climate change. The current diversity of approaches and methods available for cities developing an adaptation strategy limits the comparability between cities of vulnerabilities, adaptation options, infrastructures, etc., and, as a result, the resilience capability. The lack of standardized information to prioritize and select appropriate adaptation options restricts the exchange of experiences between cities. The objective of RESIN is to provide standardised methodologies for vulnerability assessments, performance evaluations of adaptation measures, and for decision support tools supporting the development of robust adaptation strategies tailored to the city. To this end, RESIN aims to create a common unifying framework that allows comparing strategies, results and identification of best practices by:</p> <ul style="list-style-type: none"> <li>• Creating an urban typology that characterises European cities based on different socio-economic and biophysical variables</li> <li>• Delivering standardised methods for assessing climate change impacts, vulnerabilities, and risks; providing an inventory of adaptation measures and developing standardised methods to assess the performance of such adaptation measures</li> <li>• Collaborating closely with 4 ‘case cities’ for practical applicability and reproducibility, and with European Standardisation organisations to ensure a systematic (standardised) implementation</li> <li>• Integrating findings in a coherent framework for the decision making process, with associated methods, tools and datasets</li> </ul> <p>The consortium consists of 17 partners from 8 different European countries, experienced in urban resilience and climate change, and combining theory (knowledge institutes/universities) with practice (cities, consultancies, network organisation, standardisation institute).</p>			

## 1.2. List of Beneficiaries

Project Number <sup>1</sup>	653522	Project Acronym <sup>2</sup>	RESIN
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### List of Beneficiaries

No	Name	Short name	Country	Project entry month <sup>8</sup>	Project exit month
1	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO	TNO	Netherlands	1	42
2	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	Fraunhofer	Germany	1	42
3	FUNDACION TECNALIA RESEARCH & INNOVATION	TECNALIA	Spain	1	42
4	ICLEI EUROPEAN SECRETARIAT GMBH (ICLEI EUROPASEKRETARIAT GMBH)*	ICLEI	Germany	1	42
5	EIVP	EIVP	France	1	42
6	ITTI SP ZOO	ITTI	Poland	1	42
7	STICHTING NEDERLANDS NORMALISATIE - INSTITUUT	NEN	Netherlands	1	42
8	ARCADIS NEDERLAND BV	Arcadis	Netherlands	1	42
9	BC3 BASQUE CENTRE FOR CLIMATE CHANGE - KLIMA ALDAKETA IKERGAI	BC3	Spain	1	42
10	HLAVNE MESTO SLOVENSKEJ REPUBLIKY BRATISLAVA	Bratislava	Slovakia	1	42
11	THE UNIVERSITY OF MANCHESTER	UNIMAN	United Kingdom	1	42
12	UNIVERZITA KOMENSKÉHO V BRATISLAVE	UNIBA	Slovakia	1	42
13	AYUNTAMIENTO DE BILBAO	Bilbao	Spain	1	42
14	OLDHAM METROPOLITAN BOROUGH COUNCIL	Manchester	United Kingdom	1	42
15	SIEMENS AKTIENGESELLSCHAFT OESTERREICH	Siemens AT	Austria	1	42
16	SIEMENS AKTIENGESELLSCHAFT	Siemens DE	Germany	1	42
17	UNIRESEARCH BV	Uniresearch	Netherlands	1	42

## 1.3. Workplan Tables - Detailed implementation

### 1.3.1. WT1 List of work packages

WP Number <sup>9</sup>	WP Title	Lead beneficiary <sup>10</sup>	Person-months <sup>11</sup>	Start month <sup>12</sup>	End month <sup>13</sup>
WP1	Concepts and Approaches	11 - UNIMAN	67.50	1	40
WP2	Methods for impact and vulnerability assessments	2 - Fraunhofer	93.00	3	40
WP3	Adaptation Options and Implementation	3 - TECNALIA	115.00	1	40
WP4	City Cases	4 - ICLEI	291.00	6	36
WP5	Standardization of methods and certification for climate resilient cities and infrastructures	7 - NEN	42.00	5	40
WP6	Guide to Decision Support Tools for climate adaptation planning in urban regions	1 - TNO	98.50	3	42
WP7	Dissemination	4 - ICLEI	93.75	1	42
WP8	Project management	1 - TNO	66.00	1	42
<b>Total</b>			866.75		

### 1.3.2. WT2 list of deliverables

<b>Deliverable Number</b> <sup>14</sup>	<b>Deliverable Title</b>	<b>WP number</b> <sup>9</sup>	<b>Lead beneficiary</b>	<b>Type</b> <sup>15</sup>	<b>Dissemination level</b> <sup>16</sup>	<b>Due Date (in months)</b> <sup>17</sup>
D1.1	Reviews concepts and approaches	WP1	11 - UNIMAN	Report	Public	7
D1.2	Project glossary	WP1	11 - UNIMAN	Report	Public	9
D1.3	Conceptual framework	WP1	11 - UNIMAN	Report	Public	9
D1.4	Urban typology	WP1	11 - UNIMAN	Report	Public	40
D1.5	WP1 final report	WP1	11 - UNIMAN	Report	Public	40
D1.6	City typology interim report	WP1	14 - Manchester	Report	Confidential, only for members of the consortium (including the Commission Services)	21
D2.1	Design IVAVIA	WP2	2 - Fraunhofer	Report	Public	10
D2.2	Standardisation options	WP2	7 - NEN	Report	Public	12
D2.3	Realisation & implementation IVAVIA	WP2	2 - Fraunhofer	Report	Public	28
D2.4	Use case realisation IVAVIA	WP2	2 - Fraunhofer	Report	Public	36
D2.5	Test & assessment IVAVIA	WP2	5 - EIVP	Report	Public	40
D2.6	Feedback from end users to task 2.3	WP2	5 - EIVP	Report	Confidential, only for members of the consortium (including the Commission Services)	35
D3.1	Library structure on line	WP3	3 - TECNALIA	Websites, patents filling, etc.	Public	6
D3.2	Toolbox	WP3	3 - TECNALIA	Report	Public	32
D3.3	Policy guideline	WP3	3 - TECNALIA	Report	Public	40
D3.4	Proposal standard units	WP3	3 - TECNALIA	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D3.5	Standard performance values adaptation options	WP3	3 - TECNALIA	Report	Confidential, only for members of the consortium	29



<b>Deliverable Number <sup>14</sup></b>	<b>Deliverable Title</b>	<b>WP number <sup>9</sup></b>	<b>Lead beneficiary</b>	<b>Type <sup>15</sup></b>	<b>Dissemination level <sup>16</sup></b>	<b>Due Date (in months) <sup>17</sup></b>
					(including the Commission Services)	
D3.6	Completed library of adaptation options	WP3	3 - TECNALIA	Websites, patents filling, etc.	Public	40
D4.1	City assessment report	WP4	4 - ICLEI	Report	Public	10
D4.2	City report testing	WP4	4 - ICLEI	Report	Public	32
D4.3	Guidance document	WP4	4 - ICLEI	Report	Public	36
D5.1	Standardising methods study	WP5	7 - NEN	Report	Public	40
D5.2	Certification study	WP5	7 - NEN	Report	Public	28
D5.3	City viewpoints on standardization	WP5	7 - NEN	Report	Confidential, only for members of the consortium (including the Commission Services)	20
D6.1	Actor Analysis	WP6	1 - TNO	Report	Public	6
D6.2	Framework APP	WP6	1 - TNO	Report	Public	12
D6.3	Coping with uncertainty	WP6	1 - TNO	Report	Public	21
D6.4	eGuide	WP6	6 - ITTI	Websites, patents filling, etc.	Public	28
D6.5	Decision support tools	WP6	1 - TNO	Websites, patents filling, etc.	Public	34
D6.6	eGuide (final)	WP6	6 - ITTI	Websites, patents filling, etc.	Public	40
D7.1	Communication strategy	WP7	4 - ICLEI	Report	Confidential, only for members of the consortium (including the Commission Services)	4
D7.2	Website	WP7	4 - ICLEI	Websites, patents filling, etc.	Public	4

<b>Deliverable Number <sup>14</sup></b>	<b>Deliverable Title</b>	<b>WP number <sup>9</sup></b>	<b>Lead beneficiary</b>	<b>Type <sup>15</sup></b>	<b>Dissemination level <sup>16</sup></b>	<b>Due Date (in months) <sup>17</sup></b>
D7.3	Knowledge transfer workshops	WP7	4 - ICLEI	Other	Public	30
D7.4	2-tier webinars	WP7	4 - ICLEI	Report	Public	32
D7.5	Stakeholder dialogues	WP7	4 - ICLEI	Other	Public	32
D7.6	Policy briefs	WP7	4 - ICLEI	Report	Public	38
D7.7	Final conference	WP7	4 - ICLEI	Other	Public	42
D8.1	Composition and TORs boards	WP8	1 - TNO	Report	Confidential, only for members of the consortium (including the Commission Services)	4
D8.2	Minutes	WP8	1 - TNO	Report	Confidential, only for members of the consortium (including the Commission Services)	1
D8.3	Risk management plan	WP8	1 - TNO	Report	Confidential, only for members of the consortium (including the Commission Services)	6

### 1.3.3. WT3 Work package descriptions

<b>Work package number</b> <sup>9</sup>	WP1	<b>Lead beneficiary</b> <sup>10</sup>	11 - UNIMAN
<b>Work package title</b>	Concepts and Approaches		
<b>Start month</b>	1	<b>End month</b>	40

#### Objectives

The goal of WP 1 is to establish a coherent framework of concepts and approaches linked to extreme weather and climate risk in urban areas. This will structure and guide work undertaken across the RESIN project. A key element of WP1 is to create a city typology of European cities based on different socio-economic and biophysical variables linked to extreme weather and climate risk and resilience. The objectives of WP1 are to provide RESIN, and by extension urban decision makers and actors across Europe, with:

1. Insights on the concepts and approaches to guide and inform adaptation and resilience planning and action in European cities and urban areas. Here, specific attention will be paid to reducing vulnerability of critical infrastructure assets and networks.
2. A city typology to support the application of standardised tools and methods to protect and reduce the vulnerability of Europe's urban critical infrastructure to climate change and extreme weather.

#### Description of work and role of partners

##### **WP1 - Concepts and Approaches** [Months: 1-40]

**UNIMAN**, TNO, Fraunhofer, TECNALIA, ICLEI, EIVP, ITTI, Siemens DE

##### T 1.1 Concepts and approaches (M01-M06)

This task will be formed around a series of 'state-of-the-art' reviews of concepts and approaches linked to the RESIN project's objectives. This will help to ensure that RESIN's principal underpinning themes are clearly defined and consistently applied by the project partners. The reviews will contribute to the development of a project glossary. Six sub-tasks will be undertaken:

1.1.1 Review method and organisation: UNIMAN will organise the review process, including tasks such as developing a common method, preparing a report template and reviewing draft reports. Here, a protocol will be developed to ensure that data protection and privacy standards are adhered to (UNIMAN)

1.1.2 Overarching concepts – two key themes will be covered here;

- Urban critical infrastructure systems – including scope and definitions, social-ecological systems, indirect and cross-sectoral/scale effects and cascade impacts (UNIMAN, Fraunhofer, Siemens).
- Resilience, adaptation and disaster resilience – including theories, definitions, synergies, methods and approaches (EIVP).

1.1.3 Conceptual frameworks and methods for assessing weather/climate risk and disaster resilience – critical review of relevant frameworks and methods including those produced by IPCC, UNISDR, DFID, EEA, World Bank and the Urban Climate Change Research Network (UNIMAN).

1.1.4 Vulnerability assessment – definitions, indicators, existing assessment methods (Fraunhofer and UNIMAN).

1.1.5 Adaptation approaches – existing approaches for characterising and assessing the performance of adaptation measures, methods for prioritising the selection of adaptation options to reduce weather and climate risk (Tecnalia, EIVP)

1.1.6 Decision support approaches – decision making processes and support systems (generic and adaptation specific), adaptation governance, dealing with uncertainty (TNO).

##### T 1.2 RESIN Research Framework (M03-M09)

A coherent research framework will be developed to clarify thinking across the RESIN project and to help structure and guide its work packages. For example, it will provide an early input to the development of the WP6 Decision Support System (DSS). The framework will be formed around concepts and approaches linked to assessing and responding to extreme weather and climate risk, incorporating the themes of hazards, vulnerability to these hazards and capacity to adapt. Hence, we are not aiming to develop a new conceptual framework, but to build on established frameworks to generate project-specific insights to support the goals of RESIN. This process will be informed by the reviews of related theory and research completed within task 1.1. Interrelationships between the central concepts and guiding approaches will be highlighted in the research framework. Project partners involved during task 1.1 will engaged in an iterative

process to develop a research framework that adopts a multi-disciplinary perspective. The following sub-tasks will be undertaken:

1.2.1 Develop the RESIN research framework, drawing on the outputs of task 1.1 (UNIMAN, with input from TNO, Fraunhofer, Tecalia and EIVP).

1.2.1 Prepare a report on the research framework. This will be used by the partners, with the support of UNIMAN, to consistently integrate the framework within RESIN project (UNIMAN).

T.1.3 City typology (M09-M40)

Cities and urban areas are diverse and varied. This influences the nature of extreme weather and climate change hazards, vulnerabilities and capacities to respond. Classifications such as Eurostat's Urban Audit provide important information on European cities and city types. However, these resources do not make a direct connection to climate risk. Characterising cities according to factors linked to adaptation and resilience will therefore represent an important step forward, for example by supporting the development of responses tailored to the characteristics of specific urban areas. Indeed, appropriate methods to protect and reduce the vulnerability of critical infrastructure in one city may be misguided or unachievable in another.

The typology can therefore be viewed as a decision-aid that supports more efficient and effective urban adaptation. It will complement the standardisation work across the project. In addition to delivering benefits locally for RESIN's case study cities, the typology will enhance the effectiveness of European adaptation policy, as channelled through initiatives such as Mayors Adapt and Climate Adapt. Related tasks include:

1.3.1 Methodology development – This will include a systematic review of existing urban typologies and wider statistical approaches commonly used to develop urban classifications (e.g. factor, cluster, and discriminant function analysis). The review will address: methodological principles of the approach; data and technical requirements; and application and final output features. This task will also review existing spatial units and the challenges associated with operationalising these in practice in relation to urban-scale analysis. (UNIMAN, TNO, ITTI).

1.3.2 Data audit – The choice of the spatial unit to base the typology around will be influenced by the availability and geographical coverage of existing data. Therefore, an audit of existing data from a range of official sources (e.g. Eurostat and ESPON) will be undertaken along with in-house datasets collected and held by partner cities and ICLEI's networks of local authorities. The audit will assess existing datasets in relation to conceptual relevance to climate risk and resilience (as clarified by the RESIN research framework); current policy application; and technical robustness. This will provide options for operationalising the typology within the DSS and approaches for ensuring the transferability of the typology to cities and urban areas across Europe (UNIMAN).

1.3.3 Typology development - Initial desk-based development and testing will create a prototype typology for a sample of European cities. Data gathered within task 1.3.2 will be organised using cluster analysis to group cities according to variables linked to extreme weather and climate risk and resilience. The typology will be developed within an online portal to enhance its accessibility within and beyond the RESIN project. The ongoing FP7 BESECURE project, involving several of the RESIN project partners, is developing an online tool (led by ITTI) to support decision making on urban security issues. Learning from this project will inform the RESIN urban typology process and output. The typology will also build on and learn from other relevant typologies such as Eurostat's Urban Audit and ESPON's CityBench tool (UNIMAN, TNO, ITTI, Siemens).

1.3.4 Data gathering – Initially, relevant EU-wide data will be sourced from organisations including ESPON, EEA and Eurostat. Additional relevant city-scale data will be accessed with the support of the city partners, and through and ICLEI's networks of local authorities. The quantitative data will likely capture variables including population (size and density), geographic location, climate change projections and hazards, and per capita income among others. In terms of qualitative data, information on governance arrangements and the current status of adaptation planning will also be gathered. Conceivably, it is possible that the qualitative data can be coded and integrated with existing quantitative data. Alternatively, the qualitative data might simply be used to contextualise and help inform the testing of the typology. It is not possible to definitively state which option will be adopted until the review stage is completed, but this approach builds in much needed flexibility to the methodology. A database will be developed to store the data, which will connect to the WP6 DSS.

There are also connections between this task and WPs 2 and 3; synergies between approaches taken to developing impact and vulnerability assessment and selecting and prioritising adaptation options will be encouraged (UNIMAN, ICLEI, ITTI).

1.3.5 Typology testing and refinement – The prototype typology will be tested with the support of RESIN partners and case study cities. Tier-2 city selection will be partly informed by the typology. This stage will look at issues including the replicability of the typology process across European cities, enhancing the value of the typology for end users and strengthening connections to RESIN WPs. A short interim report will be prepared detailing the outcomes of the typology testing and refinement task. This will include an overview of comments made by the RESIN partners and actions taken to strengthen the typology (UNIMAN, TNO, ITTI, ICLEI, Fraunhofer, Tecnalía).

1.3.6 Typology integration - The final typology will be integrated across the RESIN project. In particular, it will inform WPs 2, 3 and 6. For example, the typology will connect to the criteria used to organise the identification and prioritisation of adaptation options in WP3. Further, city type will exert an important influence over how cities assess and respond to extreme weather and climate risk, and hence the typology will enhance the effectiveness and usability of the RESIN DSS developed in WP6 (UNIMAN, TNO, Fraunhofer, Tecnalía, ITTI).

1.3.7 Typology completion – The final version of the typology will link to the DSS. A significant number of European cities will have their type established via the typology development process. The DSS interface will be designed to guide city decision makers through a process to establish their city type through inputting relevant local data, some of which will be held within the system. The case study cities and tier-2 cities will test the usability of the typology within the DSS. (UNIMAN, TNO, ITTI, ICLEI).

1.3.8 Typology reporting - A report will outline the development, application and value of the city typology, and connections to policy, practice and research (UNIMAN, TNO).

#### Participation per Partner

Partner number and short name	WP1 effort
1 - TNO	11.00
2 - Fraunhofer	5.50
3 - TECNALIA	4.50
4 - ICLEI	3.00
5 - EIVP	4.50
6 - ITTI	5.00
11 - UNIMAN	32.00
16 - Siemens DE	2.00
<b>Total</b>	<b>67.50</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D1.1	Reviews concepts and approaches	11 - UNIMAN	Report	Public	7
D1.2	Project glossary	11 - UNIMAN	Report	Public	9
D1.3	Conceptual framework	11 - UNIMAN	Report	Public	9
D1.4	Urban typology	11 - UNIMAN	Report	Public	40
D1.5	WP1 final report	11 - UNIMAN	Report	Public	40

### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D1.6	City typology interim report	14 - Manchester	Report	Confidential, only for members of the consortium (including the Commission Services)	21

### Description of deliverables

D1.1 Six 'state-of-the-art' reviews of concepts and approaches linked to the RESIN project's objectives. Each review will follow a common structure. (UNIMAN, TNO, EIVP, Fraunhofer, Tecnalía) – M07. D 1.2 RESIN project glossary (UNIMAN, TNO, EIVP, Fraunhofer, Tecnalía) – M09. D 1.3 Report on the RESIN research conceptual framework. (UNIMAN, TNO) – M09. D 1.4. Interim report for the RESIN partners on the form and function of the prototype city typology - M21. D 1.5 Report on the development, application and value of the city typology (UNIMAN, TNO) – M40. D 1.6 WP1 final report condensing key outputs and recommendations – M40. Milestones: M1.1 Research framework delivered – M09.

D1.1 : Reviews concepts and approaches [7]

Six 'state-of-the-art' reviews of concepts and approaches linked to the RESIN project's objectives. Each review will follow a common structure. (UNIMAN, TNO, EIVP, Fraunhofer, Tecnalía)

D1.2 : Project glossary [9]

RESIN project glossary (UNIMAN, TNO, EIVP, Fraunhofer, Tecnalía)

D1.3 : Conceptual framework [9]

Report on the RESIN research conceptual framework. (UNIMAN, TNO)

D1.4 : Urban typology [40]

Report on the development, application and value of the city typology (UNIMAN, TNO).

D1.5 : WP1 final report [40]

WP1 final report condensing key outputs and recommendations.

D1.6 : City typology interim report [21]

Interim report for the RESIN partners on the form and function of the prototype city typology

### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS2	Conceptual framework	1 - TNO	9	Research framework delivered
MS3	City assessment reports	4 - ICLEI	10	Four city assessment reports finished

<b>Work package number</b> <sup>9</sup>	WP2	<b>Lead beneficiary</b> <sup>10</sup>	2 - Fraunhofer
<b>Work package title</b>	Methods for impact and vulnerability assessments		
<b>Start month</b>	3	<b>End month</b>	40

### Objectives

- Development of methods for impact and vulnerability analysis for critical infrastructures and built-up areas (IVAVIA) building on the RESIN research framework (WP1)
- Development and implementation of a tool for IVAVIA and joint integration into the DSS (WP6)
- Contributing to investigating and assessing the options for standardising IVAVIA methods (WP5)
- Elaborating recommendations regarding standardising IVAVIA methods (WP5)
- Realising at least one use case for the IVAVIA tool, based on the modelling input of WP4
- Test and assessment of the IVAVIA tool and method (validation)

### Description of work and role of partners

#### **WP2 - Methods for impact and vulnerability assessments** [Months: 3-40]

**Fraunhofer**, TNO, TECNALIA, EIVP, ITTI, NEN, Arcadis, UNIMAN, UNIBA, Siemens DE

##### T2.1 Standardisation options of impact and vulnerability analysis (M07-M12)

Researching and evaluating the state of the art in best practices and standardisation efforts of IVAVIA (with a special emphasis on Europe), in the related field of CCIVA (climate change impact and vulnerability analysis), taking into account results of D1.1. Based on the findings of this study, recommendations for standardisation of IVAVIA methods within RESIN shall be elaborated. Finally, an assessment of whether standardisation should be promoted and, if yes, how, this might be provided. For example, national legislation in Member States may prescribe certain (and different) IVAVIA methods that act as a barrier to standardisation. The result will be a study report (D2.1). (Lead: NEN. Contributors: Fraunhofer)

##### T2.2 Conceptual design, architecture, realisation and implementation of an impact and vulnerability analysis tool (M03-M40)

1) Conceptual design of an impact and vulnerability analysis tool suite. This will integrate WP5's standardisation recommendations and WP1's overall conceptual framework. We expect that the tool will need to support different phases of IVAVIA, so a fundamental design decision will concern whether, for example, a coupled tool suite or an integrated toolbox should be created.

2) Functional design and architecture of an impact and vulnerability analysis tool suite, based on the conceptual method design, and following a model-driven architectural approach.

3) Design of software use cases for the various phases of IVAVIA, tailored for all participating user groups (decision-takers, policy-makers, infrastructure operators, crisis managers, town planners etc.) (Lead: Fraunhofer. Contributors: TNO, Tecnalía, EIVP). The software use cases follow the IVAVIA process methodology to be developed in WP1 (Task 1.1.4). Result: D2.2

4) Realisation and implementation of the IVAVIA tool suite, following the design and architecture specified in D2.2. Result: D2.3

##### T2.3 IVAVIA tool integration into DSS (M28-M30)

Joint integration work with WP6, including specification of interfaces between DSS and IVAVIA tool, data requirements, specification of user interface (to be realised jointly in WP6). Result: See WP6 (Lead: Fraunhofer. Contributors: TNO, ITTI).

##### T2.4 Use case realization and scenario for IVAVIA tool (M06-M36)

Specifying data requirements for data to be delivered by WP4 (depending on availability, modelling effort, security and privacy requirements by data owners). Acquiring scenarios from the use cases for testing the IVAVIA tool. Getting the data on at least one use case, modelling the vulnerabilities and modelling or calculating the impacts for the scenarios available in the use case(s). Functional testing of the instantiated IVAVIA tool. Result: D2.4 (Lead: Fraunhofer. Contributors).

##### T2.5: Testing IVAVIA with (end-)users (M32-M40)



Testing IVAVIA in the covered use cases. Users select story lines available in the use case scenarios. IVAVIA provides assessments of impacts and vulnerabilities of vital infrastructures and built-up areas. Feedback and assessments of end users will be gathered and compiled. Conclusions and further recommendations for improving the IVAVIA method and tool will be provided based on an assessment of the user feedback. Result: D2.5 Lead: EIVP. Contributors: Fraunhofer, ICLEI).

#### Participation per Partner

Partner number and short name	WP2 effort
1 - TNO	10.00
2 - Fraunhofer	45.00
3 - TECNALIA	10.00
5 - EIVP	3.00
6 - ITTI	2.00
7 - NEN	2.00
8 - Arcadis	3.00
11 - UNIMAN	8.00
12 - UNIBA	4.00
16 - Siemens DE	6.00
<b>Total</b>	<b>93.00</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D2.1	Design IVAVIA	2 - Fraunhofer	Report	Public	10
D2.2	Standardisation options	7 - NEN	Report	Public	12
D2.3	Realisation & implementation IVAVIA	2 - Fraunhofer	Report	Public	28
D2.4	Use case realisation IVAVIA	2 - Fraunhofer	Report	Public	36
D2.5	Test & assessment IVAVIA	5 - EIVP	Report	Public	40
D2.6	Feedback from end users to task 2.3	5 - EIVP	Report	Confidential, only for members of the consortium (including the Commission Services)	35

#### Description of deliverables

D2.1 Study report on standardisation options of impact and vulnerability analysis of vital infrastructures and built-up areas. Analysis of the state of the art and best practices in IVAVIA and CCIVA, with a special emphasis on



current standardisation activities in this field. Assessment of possibilities for standardisation in this field and final recommendations on how to proceed. Lead: NEN, M12 D2.2 Conceptual and functional design and architecture of impact and vulnerability analysis. Conceptual design of IVA methods, specification of the model-driven architecture of the IVAVIA tool suite and software use cases for the IVAVIA process (Report). Lead: Fraunhofer, M10 D2.3 Realisation and implementation of impact and vulnerability analysis tool. Realisation and implementation of the IVAVIA tool based on the design in D2.1 (Report, Software). Lead: Fraunhofer, M28 D2.4 Use case realisation for impact and vulnerability analysis. Report on the use case realisation for the IVAVIA tool, including feeding data and scenario story line information from one or more suitable use cases into the IVAVIA tool and performing functional tests of IVAVIA tool (Report, Software, Other). Lead: Fraunhofer, M36 D2.5 Test and assessment of impact and vulnerability analysis tool. Testing and validating IVAVIA in the covered use cases. Elaboration of a test methodology. Compiled feedback and assessments of end users. Conclusions and further recommendations. (Report, Other) Lead: EIVP, M40 D2.6 Feedback from end users to task 2.3, Qualitative description of the data delivered for instantiating the use cases; description of first experiences with the tools and proposed corrections and improvements of the tools in terms of functionality and user interface (Report). Lead: EIVP, M35. Milestones: M2.1: Functional design IVAVIA ready for consideration by cities –M10 M2.2: IVAVIA ready for implementation in DSS –M30

#### D2.1 : Design IVAVIA [10]

Conceptual and functional design and architecture of impact and vulnerability analysis. Conceptual design of IVA methods, specification of the model-driven architecture of the IVAVIA tool suite and software use cases for the IVAVIA process.

#### D2.2 : Standardisation options [12]

Study report on standardisation options of impact and vulnerability analysis of vital infrastructures and built-up areas.

#### D2.3 : Realisation & implementation IVAVIA [28]

Realisation and implementation of the IVAVIA tool based on the design in D2.1 (Report, Software).

#### D2.4 : Use case realisation IVAVIA [36]

Report on the use case realisation for the IVAVIA tool, including feeding data and scenario story line information from one or more suitable use cases into the IVAVIA tool and performing functional tests of IVAVIA tool (Report, Software, Other).

#### D2.5 : Test & assessment IVAVIA [40]

Testing and validating IVAVIA in the covered use cases. Elaboration of a test methodology. Compiled feedback and assessments of end users. Conclusions and further recommendations. (Report, Other)

#### D2.6 : Feedback from end users to task 2.3 [35]

Qualitative description of the data delivered for instantiating the use cases; description of first experiences with the tools and proposed corrections and improvements of the tools in terms of functionality and user interface

### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS4	Functional design IVAVIA	2 - Fraunhofer	10	Functional design IVAVIA ready for consideration by cities
MS5	Collection of tools ready for city testing	1 - TNO	18	Collections of Tools ready for city testing
MS8	Testing results from cities to WP2 and WP3	4 - ICLEI	24	Testing results from cities to WP2 and WP3
MS10	IVAVIA ready for implementation in DSS	2 - Fraunhofer	30	IVAVIA ready for implementation in DSS

### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS11	Final testing results from cities to WP2, WP3 and WP6	4 - ICLEI	32	Final testing Results from cities to WP2, WP3 and WP6
MS12	Catalogue of DSS tools	1 - TNO	36	Decision Support tools catalogue ready

<b>Work package number</b> <sup>9</sup>	WP3	<b>Lead beneficiary</b> <sup>10</sup>	3 - TECNALIA
<b>Work package title</b>	Adaptation Options and Implementation		
<b>Start month</b>	1	<b>End month</b>	40

### Objectives

The main aim of this WP is to put forward standard and widely applicable methods and tools that can be implemented by urban decision makers to (1) pre-identify the most appropriate adaptation measures implementable in each city basing on those applied in similar urban contexts; (2) compare specific adaptation measures in terms of climate-driven damage aversion potential (benefit) and the social, environmental and economic impact (cost); and (3) deploy the best performing portfolio of adaptation measures through existing or newly designed planning and policy instruments. The specific objectives of this WP are:

- To develop an adaptation library/catalogue of effective adaptation measures based on standardisation and comprehensive characterisation of adaptation options including costs and benefits.
- To put forward a new comprehensive, flexible and operational, integrated standard method for prioritising between adaptation measures at the city level based on the combination of performance and cost assessment of adaptation measures.
- To propose an operational method to decide on the most suitable implementation strategy for adaptation approaches at the city level, according to legal, technical, financial and governance implications of the selected adaptation measures.

### Description of work and role of partners

#### **WP3 - Adaptation Options and Implementation** [Months: 1-40]

**TECNALIA**, TNO, Fraunhofer, EIVP, ITTI, NEN, Arcadis, BC3, Bratislava, UNIMAN, UNIBA

This WP draws on two research strands: The first strand (Task 3.1) aims at standardising knowledge on adaptation options by means of a comprehensive characterisation of the adaptation measures that have been already designed and applied in diverse urban settings. The second strand focuses on finding standard and operational ways to actually design (Task 3.2) and implement (Task 3.3) adaptation portfolios at the city level.

##### **T3.1 Inventory of standard(-ised) adaptation measures (M01-M40)**

This task will deliver a detailed library/catalogue of adaptation measures already implemented (i.e. not just planned but already applied or programmed) at the city level, focusing on standard performance parameters. This task will (1) collect a large sample of adaptation measures that have already been implemented at the city level across Europe and worldwide; (2) propose standard figures for characterising the adaptation measures in terms of costs and benefits under specific conditions of implementation (in connection with WP 1), and; (3) store and organize all the information in a library/catalogue of adaptation measures that will allow benchmarking and classifying such measures in a number of relevant dimensions. The work will be structured into the following – non-sequential – sub-tasks:

**3.1.1. Database design and completion (M01-M06):** The database of adaptation options will underpin the activities performed within the other WPs of the RESIN project by (1) allowing partners to access the database in all phases of implementation, and (2) by enabling partners to upload information. Embedded in the RESIN Guide for Decisions Support ( see also Task 6.3) the database will also be made accessible (and editable upon validation) for city managers, practitioners, and the general public upon registration on the RESIN project website. The RESIN project will ensure that the catalogue of adaptation measures will remain accessible after the project implementation phase (preferably via Climate Adapt). (Tecnalia, with TNO, ITTI)

**3.1.2. Standardisation of adaptation measures (M05-M29):** Within the scope of this WP, standardisation refers to agreeing on standard costs (expressed as monetary units per unit of “product”) and benefits (i.e. the amount of avoided impact) of the most widely spread adaptation measures addressing specific climate hazards (heat waves, droughts, sea level raise, fluvial and pluvial floods and wind storms). This entails (1) proposing standard units of measure for assessing costs and benefits of adaptation options, and; (2) proposing standard (i.e. average or typical) values for assessing performance of similar adaptation measures applied under similar conditions (e.g. within the same city typology, as defined in WP1). (BC3, with UNIMAN, TNO, Tecnalia, EIVP, NEN, Arcadis, UNIBA)

**3.1.3. Characterisation of adaptation measures (M01-M32):** A systematic review of the empirical evidence related to the adaptation measures found in literature, city plans and other sources, alongside the evidence collected in previous sub-task, will allow RESIN to deliver a comprehensive characterization of the adaptation measures to be included in the library/catalogue.

The information on the adaptation measures will include as much detail as possible, including among others the following dimensions: (1) general aim (climate impact(s) addressed and components of city systems considered); (2) contextual features (applicability within urban typologies, as defined within WP1, time, space and functional dimensions); (3) structural condition (grey/blue versus green/soft measures); (4) standard cost and benefits; (5) indirect effects (cascading effects tackled, side-effects on social conditions, urban form or functions, etc.); (6) trade-offs and co-benefits (e.g. the combined effects with climate change mitigation measures); (7) policy formulation, monitoring and evaluation (governance approach, legal and operational instruments used, stakeholder engagement and participation, monitoring and evaluation schemes, etc.). Eventually, the library/catalogue of standard(-ised) adaptation measures will allow practitioners to develop a preliminary portfolio of feasible adaptation measures for each city. This portfolio should subsequently be fine-tuned by means of the standard assessment and implementation tools provided by the following tasks. (Tecnalia, with contributions from TNO, Fraunhofer, EIVP, Arcadis, BC3 and UNIMAN)

### T3.2 Standardising methods for prioritising adaptation options (M14-M32)

This task will put forward a robust decision-making procedure based on a comprehensive resilience framework as a central component for planning climate resilient cities and infrastructures under uncertainty. This will feed the Guide of decision support tools that is the objective of WP6.

3.2.1. Conceptualisation (M14-M16): In close cooperation with WP1 for a consistent – and stable – conceptual framework for decision making building existing approaches – or narratives – to climate change adaptation, and with WP2 that focuses on vulnerability assessment. (UNIMAN with Tecnalia, Fraunhofer, BC3.)

3.2.2. Operationalization (M17-M23): The practical tools and valuation schemes for the assessment of adaptation options will be assessed and characterized in terms of their capacity for being integrated into long-lasting, flexible and transferable tools and methods for designing suitable portfolios of adaptation measures within cities. This will be done by (1) packing existing tools and methods in a new consistent and comprehensive methodology designed for the selection of the best performing adaptation options, and/or (2) developing new integrated tools designed ex-novo for assessing adaptation costs, benefits, risks and opportunities within the urban setting, with a particular focus on infrastructures. The ultimate outcome will be a methodological toolset for decision makers. (Tecnalia with TNO, Fraunhofer, NEN, BC3 UNIMAN).

3.2.3. Implementation (M23-M32): The toolset designed in the previous sub-task will be tested within two case studies (WP4). The main goal of these exercises will be generating specific adaptation options at the city level to be delivered in different ways (e.g. adaptation plan, adaptation strategy, etc.) based on the conceptual and operational insights provided by previous sub-tasks. The practical implementation will deliver criteria for process standardisation, in cooperation with WP5. (Tecnalia with BC3, UNIMAN)

### T3.3 Standardising the formulation of adaptation approaches (M28-M40)

The policy formulation and implementation of adaptation measures may involve mainstreaming adaptation in relevant policies, and designing new policy instruments for deploying climate change adaptation. Additionally, financial mechanisms to support policy and operational instruments should also be designed, alongside monitoring and evaluation schemes.

3.3.1. Guideline development (M28-M32): this sub-task will develop a policy guideline at the city level covering all the dimensions mentioned above. This will allow European city managers to design those policy, governance and financial instruments that are more appropriate in each case. This selection will depend, among other criteria, (1) on the climate hazards to be faced, (2) on the internal vulnerability conditions of cities, (3) on the type of adaptation measures that are more suitable in each urban setting, (4) on the policy and governance settings of each city, and (5) on the funding mechanisms that are more practicable in each case. (Tecnalia with TNO, Fraunhofer, EIVP, NEN, Bratislava)

3.3.2. Guideline implementation (M33-M40): The policy guideline will be tested within two case studies (WP 4). One case study will assess the guideline as a support tool for mainstreaming adaptation into one or more of the city-level policies. The second case study will use the policy guideline for the development of a new operational instrument – an adaptation strategy or similar tool. The extent to which these outputs will be actually formalised within cities will of course be left to the decision of city managers. (Tecnalia with Bratislava, ..)

## Participation per Partner

Partner number and short name	WP3 effort
1 - TNO	8.00
2 - Fraunhofer	10.00
3 - TECNALIA	45.00

Partner number and short name	WP3 effort
5 - EIVP	8.00
6 - ITTI	1.00
7 - NEN	2.00
8 - Arcadis	3.00
9 - BC3	15.00
10 - Bratislava	4.00
11 - UNIMAN	15.00
12 - UNIBA	4.00
<b>Total</b>	<b>115.00</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D3.1	Library structure on line	3 - TECNALIA	Websites, patents filling, etc.	Public	6
D3.2	Toolbox	3 - TECNALIA	Report	Public	32
D3.3	Policy guideline	3 - TECNALIA	Report	Public	40
D3.4	Proposal standard units	3 - TECNALIA	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D3.5	Standard performance values adaptation options	3 - TECNALIA	Report	Confidential, only for members of the consortium (including the Commission Services)	29
D3.6	Completed library of adaptation options	3 - TECNALIA	Websites, patents filling, etc.	Public	40

#### Description of deliverables

3.1.1. Relational database structure and data entry forms for the effective collection of adaptation options. (Tecnalia, TNO, ITTI, Arcadis - M06) 3.1.2a. Discussion papers proposing standard units of measure for communicating costs and benefits for the most relevant categories of adaptation options. (Tecnalia, TNO, EIVP, NEN, Arcadis, BC3, UNIMAN, UNIBA - M12) 3.1.2b. Discussion papers proposing standard performance values (i.e. costs and benefits) for the most relevant categories of adaptation options applied under similar conditions of implementation. (Tecnalia, TNO, EIVP, NEN, Arcadis, BC3, UNIMAN, UNIBA - M29) 3.1.3. Inventory of standard(-ised) adaptation measures: library/catalogue of fully characterized adaptation measures currently including standard performance values. (Tecnalia, TNO, Fraunhofer, EIVP, Arcadis, BC3, UNIMAN - M40) 3.2. Methodological toolset including standard tools to assess the performance and impacts of adaptation options; with prioritizing methods for adaptation approaches. This toolset will be included in the RESIN e-Guide. (Tecnalia, TNO, Fraunhofer, ITTI, NEN, BC3,

UNIMAN - M32) 3.3. Policy guideline for the implementation of adaptation options: guideline proposing a standard approach to the design of implementation strategies for climate adaptation at the city level, according to legal, technical, financial and governance implications. (Tecnalia, TNO, Fraunhofer, EIVP, NEN, Bratislava - M40)  
Milestones: M3.1 Database structure ready for data entry using internet technologies – M6

D3.1 : Library structure on line [6]

3.1.1. Relational database structure and data entry forms for the effective collection of adaptation options. (Tecnalia, TNO, ITTI, Arcadis)

D3.2 : Toolbox [32]

Methodological toolset including standard tools to assess the performance and impacts of adaptation options; with prioritizing methods for adaptation approaches. This toolset will be included in the RESIN e-Guide. (Tecnalia, TNO, Fraunhofer, ITTI, NEN, BC3, UNIMAN - M32)

D3.3 : Policy guideline [40]

Policy guideline for the implementation of adaptation options: guideline proposing a standard approach to the design of implementation strategies for climate adaptation at the city level, according to legal, technical, financial and governance implications. (Tecnalia, TNO, Fraunhofer, EIVP, NEN, Bratislava - M40)

D3.4 : Proposal standard units [12]

3.1.2a. Discussion papers proposing standard units of measure for communicating costs and benefits for the most relevant categories of adaptation options. (Tecnalia, TNO, EIVP, NEN, Arcadis, BC3, UNIMAN, UNIBA )

D3.5 : Standard performance values adaptation options [29]

3.1.2b. Discussion papers proposing standard performance values (i.e. costs and benefits) for the most relevant categories of adaptation options applied under similar conditions of implementation. (Tecnalia, TNO, EIVP, NEN, Arcadis, BC3, UNIMAN, UNIBA)

D3.6 : Completed library of adaptation options [40]

3.1.3. Inventory of standard(-ised) adaptation measures: library/catalogue of fully characterized adaptation measures currently including standard performance values. (Tecnalia, TNO, Fraunhofer, EIVP, Arcadis, BC3, UNIMAN)

#### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS1	Database structure	3 - TECNALIA	6	Database structure ready for data entry using internet technologies
MS4	Functional design IVAVIA	2 - Fraunhofer	10	Functional design IVAVIA ready for consideration by cities
MS5	Collection of tools ready for city testing	1 - TNO	18	Collections of Tools ready for city testing
MS8	Testing results from cities to WP2 and WP3	4 - ICLEI	24	Testing results from cities to WP2 and WP3
MS11	Final testing results from cities to WP2, WP3 and WP6	4 - ICLEI	32	Final testing Results from cities to WP2, WP3 and WP6
MS12	Catalogue of DSS tools	1 - TNO	36	Decision Support tools catalogue ready
MS13	Toolset adaptation measures tested	3 - TECNALIA	32	The methodological toolset designed for prioritising between

Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
				adaptation measures has been tested within two case studies



<b>Work package number</b> <sup>9</sup>	WP4	<b>Lead beneficiary</b> <sup>10</sup>	4 - ICLEI
<b>Work package title</b>	City Cases		
<b>Start month</b>	6	<b>End month</b>	36

### Objectives

WP4 concerns the testing of the tooling in the four case cities for their applicability at the respective locations and for appreciation and lessons for the design of the RESIN guide and its tools (adaptation library/catalogue, IVAVIA, DSS). This requires proper coordination of, and interaction between, the four core cities, their respective local research institutes, and the WP2, WP3 and WP6 leaders, responsible for design, development and integration of respective tools and databases. For this the prototype tools and products of the project will be offered within the city-relevant integrated management process for climate resilience (see also section 1.3, Fig 4).

The four core cities are at different stages in their respective disaster risk reduction and climate change adaptation process. And of course has each city its own specific vulnerabilities, type of infrastructure and key economic sectors, hence different priorities. These factors will be taken into account in deciding which of the prototype tools and products derived from WP2, 3 and 6 will be assigned to and tested by which city.

The cities and the research will iteratively co-create knowledge in order to ensure the applicability of the tools and products. As part of this process, the four core cities will be guided by an identical methodology in testing their assigned tools and products to ensure replicability, comparability and transferability of the activities and results between the core cities as well as to a wider network of cities in Europe (see WP7). Workshops and webinars will be developed to integrate the city activities into a wider urban management process.

The networks of actors and stakeholders involved in the governance and management of infrastructure (including their protection) are often city-specific. So, a crucial component of the co-creation process will be to identify and engage with the relevant urban stakeholders to take part in the project activities. This will facilitate access to necessary data for testing the tools as well as facilitate the mainstreaming of the results in the city governance and management processes. In line with the above, WP4 will:

- Identify the state of play of the four core cities with relation to the current stage of each city's adaptation process and their stakeholder constellation relevant to the project activities;
- Allocate and structure the testing of the project pilots and prototypes in the core cities;
- Structure and coordinate the interaction between the core cities and the local research partners to ensure fruitful cooperation and exchange throughout the project;
- Conduct the testing of the project pilots and prototypes in the core cities;
- Set up a co-creation process with the core cities to design the project tools and products as a result of the testing activities;
- Introduce a management process for cities that will facilitate and guide the use of the project tools in supporting their urban decision-making processes.

### Description of work and role of partners

#### **WP4 - City Cases** [Months: 6-36]

**ICLEI**, TNO, Fraunhofer, TECNALIA, EIVP, ITTI, BC3, Bratislava, UNIMAN, UNIBA, Bilbao, Manchester, Siemens DE

**T4..1 Process Management Workshops (M06-M24)** : Four 'Process Management Workshops' will be organised. Each of the 'core cities' will host one workshop. The four core cities, their local research partners and the WP2, 3 and 6 leaders will participate in each of these workshops. ICLEI will be responsible for designing and developing the programme and methodology for the workshops with input from relevant project partners. The design of the workshops will be informed by the city assessments (task 4.2) to more effectively target the training and interaction. The four workshops will be organized according to the main steps of the Integrated Management System (IMS) that include aspects such as impact, risk and vulnerability assessments, the identification and prioritization of measures and strategy development. The workshops will be spread out throughout the project. Each workshop will zoom in on a specific aspect of the IMS reflecting the development stage of the project tools.

The overarching aim of the workshops is to foster an understanding on how to create, manage and implement a process for resilience building and protection of vital infrastructure within a larger framework of urban planning and decision-making, and how the tools developed within the project can support this process. One of the main workshop foci will



be on stakeholder mapping and involvement since this will be one of the key activities that the core cities will have to carry out during the testing of the prototypes and development of tools. These workshops will give WP2, 3 and 6 leaders valuable input on how to structure and develop their research outcomes in order to incorporate the needs and expectations of cities. (Lead: ICLEI).

T4.2 City assessment report (M06-M08): The aim of this task is to create a thorough assessment of the state of advancement with regard to adaptation, infrastructure protection and socio-economic and infrastructure characteristics for each of the core cities as well as to provide an understanding of their current gaps and needs. To this end, a report will be prepared to assess the key features and characteristics of the cities and their state of advancement with regard to resilience planning and infrastructure protection. The report will also include the results of a decision-making and stakeholder mapping that each core city will have to carry out in task 4.2. The mapping exercise will focus on stakeholders crucial to the management, operations and maintenance of urban infrastructure. The report will be drafted by ICLEI in cooperation with the 4 core cities and the local research institutes. The report will be based on a questionnaire that will be prepared by ICLEI in cooperation with WP2, 3 and 6 leaders, with the aim of gathering the necessary data to inform the testing allocation of the pilots and prototypes by the core cities. (Lead: ICLEI, with TNO, Tecnia, Fraunhofer, Bratislava, Manchester, Paris, Bilbao)

T4.3 Allocation of cities to testing different project pilots and tools (M09-M10): Based on the city assessment report, ICLEI, in cooperation with TNO, Fraunhofer and Tecnia, and in consultation with the core cities and their research partners will coordinate the allocation of the project pilot and prototypes to be tested by each core city. The allocation will be informed by the state of advancement of the cities' adaptation and infrastructure protection management processes and will be carried out in agreement with the core cities. (Lead: ICLEI, with TNO, Tecnia, Fraunhofer, Bratislava, Manchester, Paris, Bilbao).

T4.4 Coordination of implementation of testing activities (M10-M32): Once the cities have been allocated the prototype tools and products for testing, the corresponding WP leaders will be in charge of coordinating the testing activities. Local research partners and the cities will be responsible for retrieving and providing data needed for the testing. Each of the WP leaders will be required to provide a timeline of activities, prepared by ICLEI, to the consortium in order to coordinate the different activities and to define a schedule for exchange between the core cities. Furthermore, ICLEI will create a list of milestones for the research to be embedded in the cities' governance management process that began during task 4.1. The corresponding WP leaders will be in close communication with the cities and the local research partners to ensure a consistent research effort. TNO, Fraunhofer and Tecnia will report results back to ICLEI periodically in order to allow coordination of the work between cities and informing remaining workshops. Each of the core cities, with their local research institutes, will be responsible for co-producing a report on the tested tools and products (i.e. adaptation library/catalogue, IVAVIA, DSS) that will consolidate their experience during the testing phase and inform their development from pilots to final tools and products. To facilitate communication between the WP leaders 2, 3 and 6 and to share progress more widely, webinars and/or meetings will be organised. The specific focus, content and timing of such activities will depend on the project development and on crucial points that might need to be discussed during the development phase. (Lead: ICLEI).

T4.5 Guiding document on the use of the tested products and tools for decision-making (M32- M36): ICLEI will draft a guiding document on the use of the products created by the project and their applicability in the framework of urban decision-making processes. The core cities and the local research partners will provide recommendations on the transferability of these tools and products and on lessons learnt throughout the process. This document will include guidelines on how to embed these tools in an integrated management process, following a 'step-by-step' approach, to facilitate their mainstreaming in urban processes. It will contain general recommendations and 'policy pointers' to support cities in developing their adaptation strategy. The guiding document will link to the outcomes of WP7. It will also support the dissemination of the project results and ensure the sustainability of the project legacy. (Lead: ICLEI).

#### Participation per Partner

Partner number and short name	WP4 effort
1 - TNO	4.00
2 - Fraunhofer	4.00
3 - TECNALIA	19.00
4 - ICLEI	21.00

Partner number and short name	WP4 effort
5 - EIVP	60.00
6 - ITTI	2.00
9 - BC3	15.00
10 - Bratislava	30.00
11 - UNIMAN	30.00
12 - UNIBA	30.00
13 - Bilbao	30.00
14 - Manchester	30.00
16 - Siemens DE	16.00
<b>Total</b>	<b>291.00</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D4.1	City assessment report	4 - ICLEI	Report	Public	10
D4.2	City report testing	4 - ICLEI	Report	Public	32
D4.3	Guidance document	4 - ICLEI	Report	Public	36

#### Description of deliverables

D4.1 City assessment report: A city assessment report will be compiled by ICLEI. Cities and their local research partners will be responsible for providing data on the state of the art of their resilience building activities, management processes and governance structures with regard to key infrastructure stakeholders. The report will present single in-depth city assessments that will inform the assignment of each of the cities to the different products and tools to be tested (M10). D4.2 City report on tested tools and products: At the end of the testing phase, the core cities, supported by their local research partners, will compile a report that will consolidate their experiences and provide TECNALIA, Fraunhofer and TNO with input for the finalisation of the tools and products (M32). D4.3 Guidance document on the use of the products and tools in disaster risk reduction and adaptation: ICLEI shall draft a guiding document on the use of the RESIN tools in cities in combination with an adaptation and infrastructure protection strategy. This document will present a step-by-step approach on how to integrate the tools and products into urban planning using the IMS. In addition it will support future use and spread of the tools (M36).

##### D4.1 : City assessment report [10]

A city assessment report will be compiled by ICLEI. Cities and their local research partners will be responsible for providing data on the state of the art of their resilience building activities, management processes and governance structures with regard to key infrastructure stakeholders. The report will present single in-depth city assessments that will inform the assignment of each of the cities to the different products and tools to be tested.

##### D4.2 : City report testing [32]

City report on tested tools and products: At the end of the testing phase, the core cities, supported by their local research partners, will compile a report that will consolidate their experiences and provide TECNALIA, Fraunhofer and TNO with input for the finalisation of the tools and products (M32).

##### D4.3 : Guidance document [36]

Guidance document on the use of the products and tools in disaster risk reduction and adaptation: ICLEI shall draft a guiding document on the use of the RESIN tools in cities in combination with an adaptation and infrastructure

protection strategy. This document will present a step-by-step approach on how to integrate the tools and products into urban planning using the IMS. In addition it will support future use and spread of the tools

#### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS3	City assessment reports	4 - ICLEI	10	Four city assessment reports finished
MS8	Testing results from cities to WP2 and WP3	4 - ICLEI	24	Testing results from cities to WP2 and WP3
MS9	Draft RESIN e-Guide	1 - TNO	28	Draft RESIN eGuide ready for testing
MS11	Final testing results from cities to WP2, WP3 and WP6	4 - ICLEI	32	Final testing Results from cities to WP2, WP3 and WP6

<b>Work package number</b> <sup>9</sup>	WP5	<b>Lead beneficiary</b> <sup>10</sup>	7 - NEN
<b>Work package title</b>	Standardization of methods and certification for climate resilient cities and infrastructures		
<b>Start month</b>	5	<b>End month</b>	40

### Objectives

1. Assess the feasibility of standardisation of methods for impact and vulnerability analysis, adaptation option prioritisation and decision support tools) for climate resilient cities and infrastructures.
2. Assess the feasibility of certification related to climate resilient cities and infrastructures.

### Description of work and role of partners

**WP5 - Standardization of methods and certification for climate resilient cities and infrastructures** [Months: 5-40]

**NEN, TNO, Fraunhofer, TECNALIA, ICLEI, EIVP**

Standards are agreements made by interested parties regarding a product, service or system. Standardisation is the process leading to the agreement of a standard, and provides a management tool for recurrent activities. Standards are developed by all interested parties including manufacturers, users, consumers and regulators of a particular material, product, process or service. Everyone benefits from standardization through the improvement of products, services and processes in terms of safety, health, efficiency, quality and sustainability. Standardisation has a significant role in the process of bringing innovation to the market, cross-cutting all research fields, and thus can be the subject for climate resilient cities and infrastructures.

This WP will be led by NEN, the Netherlands Standardisation Institute. All project partners will contribute with their expertise and networks for climate resilient cities and infrastructures. Partners in this work package will assess the feasibility of the standardization of methods and related certification possibilities for climate resilient cities. ICLEI currently acts as 'outside organisation' in standardisation processes at ISO, CEN/CENELEC and DIN level in the field of sustainable development in communities, climate mitigation and climate adaptation. From this position ICLEI will bring in the view of a city network and its member cities into the elaboration of tasks 5.1, 5.2 and 5.3; share their experiences in regard of standardisation needs of cities and options from working with and in cities on climate adaptation and resilience and help target-group specific approach to standardization; bring in their experience regarding approach to and structure of standards from the various standardisation processes they are involved with and help alignment; and finally link to ongoing standardisation processes and, thus, transfer RESIN results on spot.

It is possible that this WP will establish that the feasibility of such standardised methods and certification might still be limited. Exploring the opportunities and the obstacles for standardisation is part of the WP. Moreover this WP will explore the potential benefits of standardisation for developing and implementing methods for climate resilient cities and infrastructures.

#### T5.1 General study of the possibilities of standardising operating procedures (M05-M28)

In this task, the partners will review the possibilities of standardization related to the development of methods within the other research related Work Packages of the RESIN project. The analysis of standardisation possibilities will focus on the three main topics of the RESIN project:

- impact and vulnerability analysis;
- prioritising and selecting between adaptation options;
- decision support tools.

There might be limits to standardisation which relate to the transferability of methods, options and tools related to climate resilient cities and infrastructures from the research phase into the standardisation phase. In the standardisation phase, standardisation is used as a tool for knowledge transfer. The partners will study to what extent the three topics have become subject to standardised operating procedures, and what the possibilities are for developing them into European standards.

The partners will also review the current standardisation initiatives and committees related to climate resilient cities and infrastructures. Purpose of this review is to identify if initiatives exist that are related to the three main topics of the RESIN project, to identify the most relevant initiatives and to prepare potential alliances with existing standardisation committees.

As a part of this Task, the partners will review and analyse the progress within CEN (European Committee for Standardisation) regarding the mandate of the European Commission related to the EU strategy on Adaptation to Climate Change. The European Commission requested CEN to develop documents to ensure that climate change adaptation is taken into account in a systematic way in European standardisation. Three priority sectors were identified: transport infrastructure, energy infrastructure, and buildings/construction. Within these priority sectors, existing European standards will be identified that are most relevant for adaptation to climate change. These standards will be revised or new ones will be developed if deemed necessary, to enhance the resilience to climate change to the infrastructure they apply to. A coordination group on Adaptation to Climate Change (ACC-CG) will be established to co-ordinate the standardisation request, of which NEN will hold the secretariat. This project is expected to start in September 2014. The aim for the partners will be to analyse if the results of the RESIN project may be developed into European Standards as a part of the standardisation request of the EC.

Additionally existing standards and standardisation initiatives of ISO (International Organization for Standardisation) will be reviewed and analysed for its applicability in the RESIN project. For example ISO Standards related to Risk Management or ISO Technical Committee 268 'Sustainable Development of Communities' could feed back into the work packages 1, 2 and 3. (Task leader: NEN).

#### T5.2 General study of certification in climate change adaptation (M05-M28):

Alongside Task 5.1, the partners will study to what extent climate change adaptation measures in general may be subject to certification; including the related obstacles and problems. Taking into account certification procedures, the partners will examine what could be done to certify procedures, services or products related to climate resilient cities and infrastructures and, in particular, what support might exist among stakeholders for such certification measures. Also existing or possible certification procedures related to standards within the scope of the mandate from the European Commission related to the EU strategy on Adaptation to Climate Change will be assessed. (Task leader: TNO).

#### T5.3 Development of a framework for standardised methods for climate resilient cities and infrastructures (M17-M40)

Taking into account the findings of Task 5.1, the partners will prepare a report on the feasibility of standardised methods for climate resilient cities and infrastructures. The partners will first determine and agree what elements in climate resilient cities and infrastructures can be standardised (e.g., impact and vulnerability analysis, prioritising adaptation options and decision support tools). Our report will be based on interviews with several national standardisation bodies.

In addition, we will query representatives from the participating cities on the feasibility of standardised methods for climate resilient cities and infrastructures and, in particular, whether there have ever been efforts or considerations in this direction in the past. Standardization is a significant instrument to support dissemination. Therefore, the report will include a strategy for standardisation of climate resilient cities and infrastructures. An outcome could be the initiation of a standardisation process that will lead to results that could be published as, a CEN Workshop Agreement (CWA). A CWA is a European standardisation deliverable, developed within CEN, but with a relatively short timeline and simplified rules. Often, the results of a CWA may be used as a starting point for developing other European standardisation deliverables.

The partners envisage a series of workshops involving the public and the project partners; thus, the standardisation process will be open to any interested parties. The results of the standardization activities will be publicly available to facilitate dissemination of the project results. In this task, to which the development of the possible CWA is allocated, the contribution of all partners will be requested, e.g., by contributing to the development of the business plan for the CWA and its contents, and by attending several workshops (one workshop to discuss the standardization potential among stakeholders from within the project and from outside, a CWA kick-off Workshop, workshops regarding the development of the CWA, and a final workshop for endorsing the final version of the CWA). If possible standardisation workshops will be held in conjunction with other RESIN workshops. Relevant external stakeholders, who may be instrumental in progressing the standardisation process, will be invited to the workshops (Task leader: NEN).

### Participation per Partner

Partner number and short name	WP5 effort
1 - TNO	4.00
2 - Fraunhofer	3.00
3 - TECNALIA	3.00

Partner number and short name	WP5 effort
4 - ICLEI	10.00
5 - EIVP	3.00
7 - NEN	19.00
<b>Total</b>	<b>42.00</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D5.1	Standardising methods study	7 - NEN	Report	Public	40
D5.2	Certification study	7 - NEN	Report	Public	28
D5.3	City viewpoints on standardization	7 - NEN	Report	Confidential, only for members of the consortium (including the Commission Services)	20

#### Description of deliverables

D5.1 A report of the partners' general study related to task 5.1 and 5.3 of standardizing methods in assessment procedures and specifically on the feasibility of standardizing methods for climate resilient cities and infrastructures. Lead: NEN (M40) D5.2 A report of the partners' general study of certification in assessment procedures and specifically on the feasibility of certification for climate resilient cities and infrastructures. Lead: NEN (M28). D1.3. Interim report for the RESIN partners on the city viewpoints on standardization. Lead NEN (M20) Milestones M5.1 Workshop decision on whether to initiate (or not) the preparation of a CEN Workshop Agreement (CWA) related to standardised methods for climate resilient cities and infrastructures – M24.

D5.1 : Standardising methods study [40]

A report of the partners' general study related to task 5.1 and 5.3 of standardizing methods in assessment procedures and specifically on the feasibility of standardizing methods for climate resilient cities and infrastructures.

D5.2 : Certification study [28]

A report of the partners' general study of certification in assessment procedures and specifically on the feasibility of certification for climate resilient cities and infrastructures.

D5.3 : City viewpoints on standardization [20]

D1.3. Interim report for the RESIN partners on the city viewpoints on standardization.

#### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS7	Go/no-go for CEN workshop agreement	7 - NEN	24	A report of the partners' general study related to task 5.1 and 5.3 of standardizing methods in assessment procedures and specifically on

**Schedule of relevant Milestones**

<b>Milestone number <sup>18</sup></b>	<b>Milestone title</b>	<b>Lead beneficiary</b>	<b>Due Date (in months)</b>	<b>Means of verification</b>
				the feasibility of standardizing methods for climate resilient cities and infrastructures.



<b>Work package number</b> <sup>9</sup>	WP6	<b>Lead beneficiary</b> <sup>10</sup>	1 - TNO
<b>Work package title</b>	Guide to Decision Support Tools for climate adaptation planning in urban regions		
<b>Start month</b>	3	<b>End month</b>	42

## Objectives

This work package concerns the identification and analysis of ‘state of the art’ decision support tools (methods, processes, software) to facilitate and guide respective end-users (e.g. public authorities, planners, CI operators, first responders) in and through their individual and joint planning processes. The findings will be consolidated in the RESIN e-guide that in a well-structured way will present tools for use in adaptation planning processes.

Based on a generic approach for adaptation planning and supported by WP1’s city typology, the Guide will facilitate projections onto the specific local settings (including functional, organisational and geographical lay-outs and data requirements). The Guide will integrate the standardised approaches to assess vulnerability and risk (WP2), and approaches to assess and prioritise between the impact of adaptation and risk reduction measures (WP3). And will also provide access to datasets developed in WP3 (on adaptation options) and (if allowed) from the case cities (WP4).

The principal objectives are:

1. to provide for a generic structure of the decision making process for adaptation and disaster resilience planning
2. to identify state of the art tools and provide guidance for their use in the various phases of the adaptation planning process
3. to integrate the findings in a software tool to guide and support the decision making process for climate resilient cities and infrastructures.

## Description of work and role of partners

### **WP6 - Guide to Decision Support Tools for climate adaptation planning in urban regions** [Months: 3-42]

**TNO, Fraunhofer, TECNALIA, ITTI, Arcadis, UNIMAN, Siemens AT, Siemens DE**

T6.1 Provide for a generic structure of the adaptation planning process ( M03-M12)

6.1.1. Actors Analysis: In order to develop consistent adaptation plans a good understanding is required of what is at stake for various actors and stakeholders and the contributions they are willing and able to make (ref. WP 1, 2 and 3). This sub-task focuses on the identification of tools and methods which can be used by RESIN end-users in order to identify, understand, and share stakeholder interests in their adaptation strategies. These tools and methods will be incorporated as the element of the framework for adaptation planning process to be developed within sub-task 6.1.2. [TNO, with Siemens, Arcadis]

6.1.2. Framework for planning processes: Building upon the management process developed in WP 4, this task is to operationalising this for adaptation planning processes in urban environments, and to identify entry points for decision support tools for decision makers, and so provides a reference adaptation planning process. It will form the baseline for the next WP6 tasks; for example the referenced tools and methods for particular phases of the adaptation planning process, the recommended data sources and data gathering/visualisation methods etc. (TNO with UNIMAN, ITTI).

T6.2 Identify Decision Support Tooling (M10-M36)

6.2.1. State of the art tools and methods: For the respective phases in the adaptation planning process, ‘state of the art’ decision support tools and methods will be identified/selected and/or recommend for further development. This activity will start with identification of criteria to assess such tools. This investigation will include results from other WP’s (specifically WPs 1,2 and 3) and from tests with stakeholders, particularly the case cities (WP4) and in broader engagements and dissemination activities (WP7). Specifically, this investigation seeks for tools for

- stakeholder analysis
- risk and vulnerability assessment (WP2)
- prioritising between adaptation options and risk reduction strategies (WP 3)
- cost - benefit analysis
- decision making / constraints
- monitoring and evaluation

Building on WP1, a structured catalogue of selected decision support tools and methods will be provided. The catalogue will provide and in-depth insight into these tools and methods taking into consideration aspects of their applicability, usefulness and required data. Where possible, the tools and methods will be gathered and evaluated in both theory and in practice, gained through the experimenting and testing of these tools in the core cities (WP4). The catalogue will



be core input for the design of the eventual software Guide that will be development under Task 6.3. The concept of user-centered design will be used to assess stakeholder requirements at a very early stage and to develop designs and guidance for further development activities (TNO with ITTI, Arcadis, Tecnia, Fraunhofer, Siemens).

6.2.2. Data: Acquisition, Handling and Presentation / Visualisation: For proper use of the tools and methods identified (6.2.1) relevant data is required. This task aims to provide guidance for data collection and interpretation (generic vs specific data); to provide for particular data sets, generic data, specific (case related) data; and how to present such data to decision makers. It will consider both the use of own (internal) data sources and external, public, ones. Some of these data(sets) will be provided by other WPs (WPs 2,3,4). Depending on practical possibilities, the City Intelligence Platform could be deployed in the city cases. By interconnecting with existing data systems in the city, the other WPs could base their work on a realistic, up-to-date dataset and understanding about the current performance, interdependencies and limits of the infrastructure. The findings if this task will also be input to the software guide to be developed in T6.3 (Siemens with TNO, Tecnia, Fraunhofer, ITTI).

6.2.3. Coping with Uncertainty / Handling Complexity: With considerable uncertainty about future climate and the local impacts of global climate change trends there is a requirement for robust adaptation actions planning, and to be prepared for a range of possible scenarios. This task will provide guidelines how to develop scenarios as a guide for decision makers to provide for robust and resilient planning under a wide range of potential future (long-term) climate conditions. These guidelines will be incorporated within framework of adaptation planning process and software Guide implementation (TNO with UNIMAN, Siemens).

#### T6.3 Develop Guide for Decision Support in Adaptation Planning (M19-M42)

##### 6.3.1. End-user Requirements for Guidance for Decision Support Systems / Tooling:

This activity will result in a definition of 'use cases', which are typical situations and needs that end-users have. These uses-cases will help to refine the functional implementation of the software Guide. Moreover, non-functional aspects (usability, data visualization and interpretation, user interaction with the Guide) should also be considered in this task (TNO with Tecnia, Fraunhofer, ITTI, Siemens and the case cities).

6.3.2. Design of the Guide: This task will provide the Guide's design and technical specifications, including references to decision support tools, data sets and guidelines for the best use of such tools. The framework of adaptation planning process, developed in Task 6.1, will be used to inform the design along with the elements positioned within its context through other WP6 tasks (e.g. Task 6.2.1 Decision support tooling, Task 6.2.2 data guidelines and data sets). This also includes the integration requirements with and for the tooling developments of WP2 and WP3. An up-to-date user-centred approach will be used with techniques like rapid paper prototyping and Personas (ITTI with TNO, Siemens).

6.3.3. Implementation of the Guide: Develop the Guide and populate models and tools as identified under Task 6.2 and results from other WP's (especially WP2 and WP3). The implementation of the Guide focuses on appropriate interactive representation of adaptation planning process framework and all elements positioned within its context (e.g. decision support tools catalogue, data acquisition guidelines, methods for identification of stakeholders interests). An agile approach will be used in order to maximise focus on user experience and make results available already at early stages (e.g. for evaluation and testing purposes) (ITTI with Siemens).

6.3.4. Testing of the Guide with (end-)users: Present the Guide and its tooling to end-users to reflect on its contributions, and to identify further requirements in support of their planning process. This will include various validation and verification testing activities conducted together with involved project stakeholders. This will be dealt with through the case cities (WP 4) and in broader dissemination activities (WP7). Feedback will be used for further development and refinement of the Guide (TNO with Tecnia, Fraunhofer, ITTI, Siemens).

#### Participation per Partner

Partner number and short name	WP6 effort
1 - TNO	25.00
2 - Fraunhofer	6.00
3 - TECNALIA	6.00
6 - ITTI	42.00
8 - Arcadis	5.00
11 - UNIMAN	2.00
15 - Siemens AT	2.50

Partner number and short name	WP6 effort
16 - Siemens DE	10.00
<b>Total</b>	<b>98.50</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D6.1	Actor Analysis	1 - TNO	Report	Public	6
D6.2	Framework APP	1 - TNO	Report	Public	12
D6.3	Coping with uncertainty	1 - TNO	Report	Public	21
D6.4	eGuide	6 - ITTI	Websites, patents filling, etc.	Public	28
D6.5	Decision support tools	1 - TNO	Websites, patents filling, etc.	Public	34
D6.6	eGuide (final)	6 - ITTI	Websites, patents filling, etc.	Public	40

#### Description of deliverables

D6.1 Framework for adaptation planning process (M12) Generic/ description of planning process with entry points for Decisions Support Tools. Lead: TNO D6.2 Actor Analysis (M6) Tooling to support interdependency analysis and to identify stakeholder interests for climate change adaptation planning and action. Lead: TNO D6.3 Decision Support Tools (M34) Overview of 'state of the art' Decision Support Tools in support of long term climate change adaptation planning. Lead: TNO D6.4 Coping with uncertainty (M21) Guidelines for decision makers to develop robust and resilient adaptation plans. Lead: TNO D6.5 RESIN eGuide – draft (M28) Initial version of RESIN Guide with models and tools as provide by other WP's for testing and experimenting with end-users (WP4). Lead: ITTI D6.6 RESIN eGuide – final (M40) Final version of RESIN Guide with additional models and tools and modified based on feedback from end-users. Lead: ITTI Milestones M6.1 Collections of Tools ready for city testing – M18 M6.2 Draft RESIN eGuide ready for testing – M28 M6.3 Decision Support tools catalogue ready – M36

D6.1 : Actor Analysis [6]

Tooling to support interdependency analysis and to identify stakeholder interests for climate change adaptation planning and action.

D6.2 : Framework APP [12]

Framework for adaptation planning process (M12) Generic/ description of planning process with entry points for Decisions Support Tools.

D6.3 : Coping with uncertainty [21]

Guidelines for decision makers to develop robust and resilient adaptation plans.

D6.4 : eGuide [28]

Initial version of RESIN Guide with models and tools as provide by other WP's for testing and experimenting with end-users (WP4)

D6.5 : Decision support tools [34]

Overview of 'state of the art' Decision Support Tools in support of long term climate change adaptation planning.

D6.6 : eGuide (final) [40]

Final version of RESIN Guide with additional models and tools and modified based on feedback from end-users.

#### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS1	Database structure	3 - TECNALIA	6	Database structure ready for data entry using internet technologies
MS2	Conceptual framework	1 - TNO	9	Research framework delivered
MS4	Functional design IVAVIA	2 - Fraunhofer	10	Functional design IVAVIA ready for consideration by cities
MS5	Collection of tools ready for city testing	1 - TNO	18	Collections of Tools ready for city testing
MS9	Draft RESIN e-Guide	1 - TNO	28	Draft RESIN eGuide ready for testing
MS10	IVAVIA ready for implementation in DSS	2 - Fraunhofer	30	IVAVIA ready for implementation in DSS
MS11	Final testing results from cities to WP2, WP3 and WP6	4 - ICLEI	32	Final testing Results from cities to WP2, WP3 and WP6
MS12	Catalogue of DSS tools	1 - TNO	36	Decision Support tools catalogue ready

<b>Work package number</b> <sup>9</sup>	WP7	<b>Lead beneficiary</b> <sup>10</sup>	4 - ICLEI
<b>Work package title</b>	Dissemination		
<b>Start month</b>	1	<b>End month</b>	42

### Objectives

WP7 will establish the dissemination and communication framework for the successful replication and transferability of the project outcomes. The core of WP7 will consist of a “circle of sharing and learning” between the four core cities and a tier-2 group of cities. The tier-2 cities will be selected by the project consortium according to specific criteria (connected to the WP1 city typology) and will be involved in capacity building activities including hands on training on the use of the project products and outcomes (i.e. adaptation library/catalogue, IVAVIA and DSS). WP7 will also ensure sharing and dissemination of the project results to a wider audience. Moving away from quantity-focused dissemination activities, WP7 will place value on a qualitative approach, which will be effective not only in creating awareness on the research products but, most importantly, in ensuring application and use of these in support of decision-making in cities and urban areas.

Furthermore, WP7 will ensure that the findings and results of the project will inform relevant European and international policy processes, such as the mid-term review of the EU Adaptation Strategy, in order to mainstream its results into the European debate.

### Description of work and role of partners

#### **WP7 - Dissemination** [Months: 1-42]

**ICLEI**, TNO, Fraunhofer, TECNALIA, EIVP, ITTI, NEN, Arcadis, BC3, Bratislava, UNIMAN, UNIBA, Bilbao, Manchester, Siemens DE

##### **T7.1 Dissemination and communication strategy and dissemination material (M01-M42)**

A communication strategy will be drafted by ICLEI so as to give the project a consistent and effective branding, target messaging and ensure proper dissemination channels and activities. This will outline how the project communicates with crucial stakeholders and how to address awareness-raising amongst different target groups. A mid-term evaluation of the strategy will be carried out and an appropriate realignment of activities will be implemented where necessary. Dissemination material will be produced by the project to best support communication of its results. This may include a brochure, audio/visual material, as well as publication of relevant information and news on the project website and on the project partners' websites (ICLEI).

##### **T7.2 Project website (M01-M42)**

A project website will be created to present the project and its findings and give exposure to the core cities. The project website will also host the guiding document (developed in WP4) and the DSS tool (developed in WP6). In order to ensure consistency, the interface between the DSS tool and the website should be agreed with TNO in accordance with activities under WP6. The website will be created, maintained, and populated by ICLEI. Links and interfaces to relevant websites maintained by the European Commission will be sought to ensure the uptake of the project results upon project completion (ICLEI).

##### **T7.3 Identification, involvement and coordination of a 2-tier circle of learning (M12-M32)**

A ‘circle of learning’ including a group of tier-2 cities will be created. Each of the core cities will be assigned a 2-tier cities group (composed by 4 to 5 cities) to which they will transfer outcomes and interim results to and exchange lessons learnt to facilitate uptake and replication.

The tier-2 cities will be selected by the project consortium to ensure a variety in climate regions, size, local economic sectors, and infrastructure type, etc. The selection will also be informed by the city typology developed in WP1. Several cities have already expressed their support and interest in being included in the proposal. These cities, such as Almada (Portugal), Barcelona (Spain), Alba (Italy), Vilnius (Lithuania), Sfantu Gheorghe (Romania), Rotterdam (The Netherlands) have been actively involved in projects like EU Cities Adapt, and so can ensure a good level of understanding of the main concepts related to adaptation and resilience. Furthermore, they have good connections to local private stakeholders and utilities that are crucial to resilience and disaster risk reduction. Once selected, the tier-2 cities will be assigned to one of the core cities based on their characteristics. They will be included in training and information activities (including face-to-face and long distance training activities and support on the features and use of the tools, i.e. adaptation library/ catalogue, IVAVIA and DSS), which will be implemented by ICLEI in cooperation

with the core cities and with the respective WP 2, 3 and 6 leaders. These activities will facilitate the uptake of the project tools in tier-2 cities (ICLEI).

#### T7.4 Advocacy and networking with relevant stakeholders (M10-M40)

Networking with relevant stakeholders and experts in adaptation and infrastructure protection, including making use of existing networking platforms and structures, will be carried out during the duration of the project lifetime. Two stakeholder dialogues will be organised by the project consortium to facilitate targeted knowledge sharing. ICLEI will be in charge of the invitation process, programme development and overall facilitation whereas the relevant partners will deliver topical contributions. The programme will be developed in close cooperation with the WP2, 3 and 6 leaders and the core cities and their local research partners. Invitees to these Stakeholder Dialogues will be targeted at actors that can act as multipliers in disseminating the project results. Two policy briefs will be prepared by ICLEI to present policy relevant results generated by the project. Such policy briefs will be developed in close cooperation with the core cities and project partners and will be fed into European and international processes, such as the mid-term revision of the EU Adaptation Strategy, the Mayors Adapt Initiative and the UNISDR Making Cities Resilient Campaign (ICLEI with All partners).

#### T7.5 Final Conference (M36-M42)

The RESIN project intends to share and disseminate its outcomes to relevant European and international stakeholders. In line with the project's focus on qualitative and effective dissemination the project results and outcomes will be presented at established and renowned adaptation and resilience related events, in order to reach out to its target audience (i.e. European cities and key adaptation stakeholders, businesses, companies, utilities, infrastructure providers, etc.). To this end, ICLEI will early on in the project timeline explore opportunities for inclusion of the RESIN final findings at such events. The Open European Day at Bonn Resilient Cities will be considered as a potential suitable opportunity for the project results to be presented. Further to disseminating the project results, the selected conference will include a training session to strengthen the legacy of the project and ensure its uptake (ICLEI).

### Participation per Partner

Partner number and short name	WP7 effort
1 - TNO	6.00
2 - Fraunhofer	4.50
3 - TECNALIA	4.50
4 - ICLEI	39.00
5 - EIVP	7.50
6 - ITTI	3.75
7 - NEN	2.00
8 - Arcadis	2.00
9 - BC3	3.75
10 - Bratislava	3.75
11 - UNIMAN	3.75
12 - UNIBA	3.75
13 - Bilbao	3.75
14 - Manchester	3.75
16 - Siemens DE	2.00
<b>Total</b>	<b>93.75</b>

### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D7.1	Communication strategy	4 - ICLEI	Report	Confidential, only for members of the consortium (including the Commission Services)	4
D7.2	Website	4 - ICLEI	Websites, patents filling, etc.	Public	4
D7.3	Knowledge transfer workshops	4 - ICLEI	Other	Public	30
D7.4	2-tier webinars	4 - ICLEI	Report	Public	32
D7.5	Stakeholder dialogues	4 - ICLEI	Other	Public	32
D7.6	Policy briefs	4 - ICLEI	Report	Public	38
D7.7	Final conference	4 - ICLEI	Other	Public	42

### Description of deliverables

7.1 4 ‘knowledge transfer workshops’: One workshop per core city will be organised in close cooperation with the core cities to kick-off the 2-tier group engagement. Financing to attend the workshop will be provided for one city representative from each 2-tier city. The core cities will be required to ensure the participation of crucial local infrastructure stakeholders. [M28-M30] 7.2 4 ‘2-tier webinars’: These webinars will connect the core cities to their tier-2 circle of learning to further share results and encourage exchange. The timing of the webinars will be aligned with the completion of the deliverables in WP 2, 3 and 6. [M30-M32] 7.3 2 Stakeholder Dialogues: The aim of the dialogues is to disseminate the project (interim) results. To this end, a selected target audience composed of cities, local private adaptation stakeholders (utilities, businesses, industry, etc.) will be invited to participate. The attendance of two representatives from each tier-2 city will be financed by the project consortium. Invited to these Stakeholder Dialogues will be rather targeted actors that can act as multipliers in disseminating the project results. [M20-M24/M32] 7.4 Communication strategy: A communication strategy will be drafted by ICLEI at the onset of the project and will be later evaluated and updated [M04] (update in M24) 7.5 Policy Briefs: Two policy briefs will be drafted by ICLEI with the support of the relevant partners. [M24, M38] 7.6 Final Conference: A final conference presenting the results of the project will be organised as part of one or more renowned and well-established adaptation and resilience events. [M42]

D7.1 : Communication strategy [4]

A communication strategy will be drafted by ICLEI at the onset of the project and will be later evaluated and updated [M04] (update in M24)

D7.2 : Website [4]

A project website will be created to present the project and its findings and give exposure to the core cities.

D7.3 : Knowledge transfer workshops [30]

One workshop per core city will be organised in close cooperation with the core cities to kick-off the 2-tier group engagement. Financing to attend the workshop will be provided for one city representative from each 2-tier city. The core cities will be required to ensure the participation of crucial local infrastructure stakeholders.

D7.4 : 2-tier webinars [32]

4 ‘2-tier webinars’: These webinars will connect the core cities to their tier-2 circle of learning to further share results and encourage exchange. The timing of the webinars will be aligned with the completion of the deliverables in WP 2, 3 and 6. [M30-M32]

#### D7.5 : Stakeholder dialogues [32]

3 2 Stakeholder Dialogues: The aim of the dialogues is to disseminate the project (interim) results. To this end, a selected target audience composed of cities, local private adaptation stakeholders (utilities, businesses, industry, etc.) will be invited to participate. The attendance of two representatives from each tier-2 city will be financed by the project consortium. Invited to these Stakeholder Dialogues will be rather targeted actors that can act as multipliers in disseminating the project results. [M20-M24/ M32]

#### D7.6 : Policy briefs [38]

Two policy briefs will be drafted by ICLEI with the support of the relevant partners. [M24, M38]

#### D7.7 : Final conference [42]

A final conference presenting the results of the project will be organised as part of one or more renowned and well-established adaptation and resilience events.

### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS6	Selection 2nd tier cities	4 - ICLEI	12	Selection of cities for the 2-tier circle of learning: The application selection and group division process, managed by ICLEI in cooperation with the core cities and the WP leaders.



<b>Work package number</b> <sup>9</sup>	WP8	<b>Lead beneficiary</b> <sup>10</sup>	1 - TNO
<b>Work package title</b>	Project management		
<b>Start month</b>	1	<b>End month</b>	42

### Objectives

- Set-up and maintenance of adequate communication within the consortium and with the Commission.
- Adequate management of the contractual, administrative and financial aspects of the RESIN project.
- To manage the project in such a way that the specified results are delivered with high quality at the agreed upon deadlines and within the financial boundaries.
- To coordinate all activities with keeping the project scope and objectives as basis.

### Description of work and role of partners

#### **WP8 - Project management** [Months: 1-42]

**TNO**, Fraunhofer, TECNALIA, ICLEI, EIVP, ITTI, NEN, Arcadis, BC3, Bratislava, UNIMAN, UNIBA, Bilbao, Manchester, Siemens DE, Uniresearch

WP8 is led by TNO, in close collaboration with leaders of the other WP's. For operational elements of this WP Uniresearch will assist TNO as project management partner.

#### T8.1 Internal communication and contractual, administrative and financial project management (M01-M42)

This task covers activities that are necessary for the daily operation of the project, such as:

- Preparation of the Project Management plan, with supported of all WP-leads (TNO, Uniresearch);
- Take care of the day to day contractual, administrative management and financial management (Uniresearch);
- Administration of the EU financial contribution and distribution thereof within the consortium (TNO);
- Set-up and maintenance of web based tool (Project Place®, Basecamp® or a similar professional project planning tool) for: internal communication, documentation (archive), on-line manuals and procedures and monitoring of the progress in terms of deliverables, milestones, task completion and resource use (Uniresearch);
- Keep track of the progress, costs and budget situation and create an early-warning system (TNO responsible, Uniresearch support);
- Monitoring of compliance by the beneficiaries with their obligations under the Grant Agreement (TNO responsible, Uniresearch support);
- Preparation, organization, administration, drafting of minutes and follow up of the meetings of the General Assembly, Executive Board and Advisory Board and, if required of midterm and final EC review meetings (Uniresearch);
- Management of the technical, financial, organizational risks in the project. This is based on a risk assessment and preparation of a risk management plan in the first 6 months of the project followed by regular reassessments (once every six months). The risk (re)assessment will be included in the periodic and final reports (TNO, Uniresearch);
- Arranging the review of reports (Deliverables) to verify consistency with the project tasks and safeguarding their quality (TNO, Uniresearch);
- Compilation of contractual periodic and final reports (Uniresearch, WP leaders);
- Collection administrative documents, statements of expenditures, including required audit certificates of individual partners, compilation thereof, and transmission to the Commission/Participant Portal (TNO responsible, Uniresearch support);
- Maintain the Grant Agreement and the Consortium Agreement including the preparation of Amendments, if required (TNO);
- Handling (including preparation or compilation) of any document connected with the project from the consortium to the Commission and conversely (TNO responsible, Uniresearch support);
- Set-up and maintenance of adequate communication with the Commission's project officer(s) on the project's progression and other relevant issues; submission of deliverables, reports, documents and information to the Commission (TNO).

### Participation per Partner



Partner number and short name	WP8 effort
1 - TNO	21.00
2 - Fraunhofer	2.00
3 - TECNALIA	2.00
4 - ICLEI	2.00
5 - EIVP	2.00
6 - ITTI	2.00
7 - NEN	2.00
8 - Arcadis	2.00
9 - BC3	2.00
10 - Bratislava	2.00
11 - UNIMAN	2.00
12 - UNIBA	2.00
13 - Bilbao	2.00
14 - Manchester	2.00
16 - Siemens DE	2.00
17 - Uniresearch	17.00
<b>Total</b>	<b>66.00</b>

#### List of deliverables

Deliverable Number <sup>14</sup>	Deliverable Title	Lead beneficiary	Type <sup>15</sup>	Dissemination level <sup>16</sup>	Due Date (in months) <sup>17</sup>
D8.1	Composition and TORs boards	1 - TNO	Report	Confidential, only for members of the consortium (including the Commission Services)	4
D8.2	Minutes	1 - TNO	Report	Confidential, only for members of the consortium (including the Commission Services)	1
D8.3	Risk management plan	1 - TNO	Report	Confidential, only for members of the consortium (including the Commission Services)	6

#### Description of deliverables

The periodic and final reports resulting from WP8 (Project management reports are obligatory reports and are included in the periodic reporting systems of the European Commission (Participant Portal) and are not included as deliverables) (TNO, M12, M30 and M42)

D8.1 : Composition and TORs boards [4]

Composition and terms of reference of the ESAG and the external advisory board

D8.2 : Minutes [1]

Minutes of the meetings of the General Assembly and the external Advisory Board (due dates spread over the running period of the project)

D8.3 : Risk management plan [6]

Risk management plan and Security Aspects Letter

#### Schedule of relevant Milestones

Milestone number <sup>18</sup>	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS6	Selection 2nd tier cities	4 - ICLEI	12	Selection of cities for the 2-tier circle of learning: The application selection and group division process, managed by ICLEI in cooperation with the core cities and the WP leaders.
MS7	Go/no-go for CEN workshop agreement	7 - NEN	24	A report of the partners' general study related to task 5.1 and 5.3 of standardizing methods in assessment procedures and specifically on the feasibility of standardizing methods for climate resilient cities and infrastructures.

### 1.3.4. WT4 List of milestones

Milestone number <sup>18</sup>	Milestone title	WP number <sup>9</sup>	Lead beneficiary	Due Date (in months) <sup>17</sup>	Means of verification
MS1	Database structure	WP3, WP6	3 - TECNALIA	6	Database structure ready for data entry using internet technologies
MS2	Conceptual framework	WP1, WP6	1 - TNO	9	Research framework delivered
MS3	City assessment reports	WP1, WP4	4 - ICLEI	10	Four city assessment reports finished
MS4	Functional design IVAVIA	WP2, WP3, WP6	2 - Fraunhofer	10	Functional design IVAVIA ready for consideration by cities
MS5	Collection of tools ready for city testing	WP2, WP3, WP6	1 - TNO	18	Collections of Tools ready for city testing
MS6	Selection 2nd tier cities	WP7, WP8	4 - ICLEI	12	Selection of cities for the 2-tier circle of learning: The application selection and group division process, managed by ICLEI in cooperation with the core cities and the WP leaders.
MS7	Go/no-go for CEN workshop agreement	WP5, WP8	7 - NEN	24	A report of the partners' general study related to task 5.1 and 5.3 of standardizing methods in assessment procedures and specifically on the feasibility of standardizing methods for climate resilient cities and infrastructures.
MS8	Testing results from cities to WP2 and WP3	WP2, WP3, WP4	4 - ICLEI	24	Testing results from cities to WP2 and WP3
MS9	Draft RESIN e-Guide	WP4, WP6	1 - TNO	28	Draft RESIN eGuide ready for testing
MS10	IVAVIA ready for implementation in DSS	WP2, WP6	2 - Fraunhofer	30	IVAVIA ready for implementation in DSS
MS11	Final testing results from cities to WP2, WP3 and WP6	WP2, WP3, WP4, WP6	4 - ICLEI	32	Final testing Results from cities to WP2, WP3 and WP6
MS12	Catalogue of DSS tools	WP2, WP3, WP6	1 - TNO	36	Decision Support tools catalogue ready
MS13	Toolset adaptation measures tested	WP3	3 - TECNALIA	32	The methodological toolset designed for prioritising between adaptation

Milestone number <sup>18</sup>	Milestone title	WP number <sup>9</sup>	Lead beneficiary	Due Date (in months) <sup>17</sup>	Means of verification
					measures has been tested within two case studies

### 1.3.5. WT5 Critical Implementation risks and mitigation actions

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
R1	Key persons leave consortium partner		All partners work in organisations with a sufficient pool of staff that allows them to bring in other qualified personnel into the project. All project work will be rigorously documented to facilitate a smooth replacement of persons, if this should become necessary. If possible, identify other partners within the consortium having a similar profile.
R2	Partner leaves consortium		Reassignment of tasks to other consortium partners, supported by well-documented work, if possible. If the partner possesses an expertise or capability that is unique in the consortium and essential for the execution of RESIN, the consortium will seek for alternative new partner that possesses the same or a similar expertise. In this case, an amendment of the Grant Agreement is required.
R3	Partner is unable to produce work on time		Regular contacts between project co-ordinator and partners. Other representatives from partner organisations to undertake or assist in the production of the work Work will be assigned to other party.
R4	Partner unable to effectively work with other partners and/or stakeholders		Effective communication and co-operation skills are mandatory. Another representatives from partner organisations to undertake or assist in the production of the work Work will be assigned to other party.
R5	Deliverables from one WP not (in-time) available for other WP		Regular contacts between WP Leaders about progress and commitments; Adapt timelines where possible;

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
			Optimise interaction between WP's rather than maximising individual WP-activities; (eventual) re-allocation of resources;
R6	Inadequate access to stakeholders		The large network and experience of the other RESIN partners and the RESIN advisory board
R7	Stakeholders ignore RESIN results		A strong engagement of stakeholders (public and private) from the start of the project Intensive dialogues and interaction sessions and workshops to identify challenges and stakeholder requirements. The RESIN open communication plan with its many dissemination activities to ensure opening to broader audiences. Opportunities will be searched elsewhere to present and discuss the RESIN project.
R8	Not a European wide impact		The RESIN consortium consists of partners from the South West to the North East of Europe. Collaboration with related projects to disseminate RESIN results to wider audiences and stakeholders across Europe.
R9	Leakage of Security Sensitive Information		dealing with security sensitive information and the responsibilities of the internal actors will be laid down in RESIN risk management plan
R10	Budget Excess		Essentially it is the responsibility of the project team to keep control of and monitor resources allocated and used for respective work packages and tasks. Stringent review and monitoring of project development, and timely and adequate measures. The consortium partners do all have (long) proven experience in international

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
			(EU-) projects and a sound financial standing

### 1.3.6. WT6 Summary of project effort in person-months

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	Total Person/Months per Participant
1 - TNO	11	10	8	4	4	25	6	21	89
2 - Fraunhofer	5.50	45	10	4	3	6	4.50	2	80
3 - TECNALIA	4.50	10	45	19	3	6	4.50	2	94
4 - ICLEI	3	0	0	21	10	0	39	2	75
5 - EIVP	4.50	3	8	60	3	0	7.50	2	88
6 - ITTI	5	2	1	2	0	42	3.75	2	57.75
7 - NEN	0	2	2	0	19	0	2	2	27
8 - Arcadis	0	3	3	0	0	5	2	2	15
9 - BC3	0	0	15	15	0	0	3.75	2	35.75
10 - Bratislava	0	0	4	30	0	0	3.75	2	39.75
11 - UNIMAN	32	8	15	30	0	2	3.75	2	92.75
12 - UNIBA	0	4	4	30	0	0	3.75	2	43.75
13 - Bilbao	0	0	0	30	0	0	3.75	2	35.75
14 - Manchester	0	0	0	30	0	0	3.75	2	35.75
15 - Siemens AT	0	0	0	0	0	2.50	0	0	2.50
16 - Siemens DE	2	6	0	16	0	10	2	2	38
17 - Uniresearch	0	0	0	0	0	0	0	17	17
<b>Total Person/Months</b>	67.50	93	115	291	42	98.50	93.75	66	866.75



### *1.3.7. WT7 Tentative schedule of project reviews*

<b>Review number <sup>19</sup></b>	<b>Tentative timing</b>	<b>Planned venue of review</b>	<b>Comments, if any</b>
RV1	12	TBD	
RV2	30	TBD	

## 1.4. Ethics Requirements

Ethics Issue Category	Ethics Requirement Description
HUMANS	- Humans will be involved in interviews, but the participants selection criteria (recruitment policy) are not detailed. Details on the procedures and criteria that will be used to identify/recruit research participants must be provided in the Technical Annex.
HUMANS	- Detailed information must be provided in the Technical Annex on the informed consent procedures that will be implemented.
HUMANS	- If under national legislation an ethical approval will be necessary, a copy of the report by the competent Ethics Committee will be submitted to the EU Commission.
PROTECTION OF PERSONAL DATA	- Copies of authorization, opinion or notification (which ever applies according to the Data Protection Directive and the national law) by the competent Institutional Data Protection Officer / National Data Protection authority must be submitted to the PO.
PROTECTION OF PERSONAL DATA	- Detailed information must be provided on the procedures that will be implemented for data collection, storage, protection, retention and destruction and confirmation that they comply with national and EU legislation.
PROTECTION OF PERSONAL DATA	- Clarification must be provided on the possible re-use of existing data sets and these must be included in the Technical Annex.
MISUSE	- Details on measures to prevent malevolent/criminal/terrorist abuse of research findings must be provided in the Technical Annex.
OTHER ETHICS ISSUES	- The composition and the role of the Ethics and Security Advisory Group must be clarified and this information must be communicated to the EU Commission services.

### 1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

### 2. Project acronym

Use the project acronym as given in the submitted proposal. It can generally not be changed. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

### 3. Project title

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

### 4. Starting date

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Commission). Please note that if a fixed starting date is used, you will be required to provide a written justification.

### 5. Duration

Insert the duration of the project in full months.

### 6. Call (part) identifier

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

### 7. Abstract

### 8. Project Entry Month

The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.

### 9. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

### 10. Lead beneficiary

This must be one of the beneficiaries in the grant (not a third party) - Number of the beneficiary leading the work in this work package

### 11. Person-months per work package

The total number of person-months allocated to each work package.

### 12. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

### 13. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

### 14. Deliverable number

Deliverable numbers: D1 - Dn

### 15. Type

Please indicate the type of the deliverable using one of the following codes:

- R Document, report
- DEM Demonstrator, pilot, prototype
- DEC Websites, patent filings, videos, etc.
- OTHER

### 16. Dissemination level

Please indicate the dissemination level using one of the following codes:

- PU Public

CO Confidential, only for members of the consortium (including the Commission Services)

CI Classified, as referred to in Commission Decision 2001/844/EC

**17. Delivery date for Deliverable**

Month in which the deliverables will be available, month 1 marking the start date of the project, and all delivery dates being relative to this start date.

**18. Milestone number**

Milestone number: MS1, MS2, ..., MSn

**19. Review number**

Review number: RV1, RV2, ..., RVn

**20. Installation Number**

Number progressively the installations of a same infrastructure. An installation is a part of an infrastructure that could be used independently from the rest.

**21. Installation country**

Code of the country where the installation is located or IO if the access provider (the beneficiary or linked third party) is an international organization, an ERIC or a similar legal entity.

**22. Type of access**

VA if virtual access,

TA-uc if trans-national access with access costs declared on the basis of unit cost,

TA-ac if trans-national access with access costs declared as actual costs, and

TA-cb if trans-national access with access costs declared as a combination of actual costs and costs on the basis of unit cost.

**23. Access costs**

Cost of the access provided under the project. For virtual access fill only the second column. For trans-national access fill one of the two columns or both according to the way access costs are declared. Trans-national access costs on the basis of unit cost will result from the unit cost by the quantity of access to be provided.



## **Annex 1, Part B**

# **Climate Resilient Cities and Infrastructures RESIN**

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## Summary

[WHY]: With most of its population and capital goods concentrated in urban areas, cities are central to a well-functioning European economy and society. However, the concentration of people and assets in cities also renders them extremely vulnerable to the effects of extreme weather events and climate change. When disasters occur in urban areas, they threaten the lives of large numbers of people, critical infrastructure systems, and interregional and global value chains. By 2050 it is expected that 82% of the population in Europe will live in urban areas. The combination of increased urbanisation and the increasing consequences of global climate change place an imperative on cities to be proactive in strengthening their resilience to disasters in order to secure their economic competitiveness and to enhance the quality of life for their residents.

[URGENCY]: Despite this imperative, the development of urban climate change adaptation strategies has been slow. The majority of EU cities are still lagging, and there is a significant north-south divide with cities in southern Europe showing less progress in this regard. Even where urban adaptation strategies exist, there are weaknesses in the process of adaptation planning and the nature of the outputs produced. Indeed, a recent report of the European Environment Agency (EEA) notes the poor integration of different domains, such as housing, sanitation, water management, and traffic management, within urban adaptation strategies. Further, urban adaptation strategies are imbalanced in the way that they address vulnerable sectors. In the European Commission (EC) communication, *An EU Strategy on Adaptation to Climate Change*, the urgency for implementing adaptation measures and their mainstreaming in the policies of vulnerable sectors is underscored and the commitment to promote urban adaptation strategies reaffirmed. Yet, the absence of a standardised approach with regard to the methods for undertaking key tasks such as assessing climate risks and vulnerability, and prioritising between adaptation responses, limits urban adaptation planning. It is also a barrier to the provision of national and EU funding for adaptation projects.

[WHAT]: The RESIN project will thus develop standardised approaches to help city administrators, the operators of urban infrastructure networks, and related stakeholders to develop their adaptation strategies and ensure that their decisions strengthen the resilience of the whole city. These will be comprehensive by dealing with all elements of the urban system: critical infrastructures, built-up spaces and public spaces, and will cover impact-and-vulnerability assessment and selection of adaptation options. A decision support system will be developed to support decision makers in following a standardised path towards the choice of appropriate and effective adaptation measures into strategies tailored to the particular circumstances of a specific city. RESIN will explore the possibilities and prepare the materials to include adaptation in European standardisation processes.

[WHO]: The RESIN consortium consist of researchers with a respected background in urban climate adaptation (such as the University of Manchester, TNO, TecNALIA) and in risk assessment of critical infrastructures (Fraunhofer, TNO, Siemens). In the team, these organisations represent the development of fundamental and applied knowledge on climate adaptation. The team includes a large (ARCADIS) and a small (BC3) consultancy experienced in delivering this knowledge to the cities and other customers (aligning to the market needs and “getting things done”). Siemens and ITTI are a large and a small business that deliver technical support for managing cities. Four cities from various parts of Europe are a key part of the team. These cities will serve as a testing ground and are part of the co-creation process to ensure the practical applicability of the research findings. ICLEI, as networking partner, has the capacity to disseminate all outcomes to other cities in Europe. NEN, as member of CEN, the European standardisation body, will take the work forward towards formal standardisation. Finally, Uniresearch will bring project coordination capacities to ensure a successful delivery.

# 1. Excellence

## 1.1 Project Objectives and Background

Over recent decades, the occurrence of natural disasters has increased across Europe, bringing large economic damages. In Europe, two-thirds of the reported damage costs between 1980 and 2012 were attributed to hydro-meteorological events, that is storms, floods and landslides<sup>1</sup>. In addition (and in some cases linked to) the greater impact of natural disasters, the consequences of climate change are increasingly being felt<sup>1</sup>. Extreme weather events (such as floods, droughts, cold and heat waves) are projected to increase in frequency, duration and intensity. The severity of the consequences of these events strongly depends on the level of exposure and the sensitivity of human and natural systems to these climate change impacts, factors which differ depending on the location being considered. The impacts of extreme weather and climate change in urban areas are clearly of particular concern in Europe. With most of its population and capital goods concentrated in urban areas<sup>2</sup>, cities are key to the European economy and society; as the German Federal Ministry for Economic Cooperation and Development states that: “*Cities generate up to 80% of a country’s GDP*”<sup>3</sup>. Moreover, cities are also Europe’s cultural and creative centres<sup>4</sup>.

Thus, climate change stands out as one of the major challenges cities and the EU face to achieve a vision centred on a secure and prosperous future for Europe and its citizens. In its communication *An EU Strategy on Adaptation to Climate Change*<sup>5</sup>, the Commission recognises the urgency for adaptation measures to deal with climate impacts and be mainstreamed in the policies for vulnerable sectors. This strategy also reaffirms the commitment to promote urban adaptation strategies through the improvement of funding options and the creation of knowledge and local commitment networks.

The vulnerability of cities to climate change is determined by (interconnected) vulnerable critical infrastructure sectors such as energy provision, water services, and ICT networks, and by sensitive elements of the city structure and their socio-economic values (Figure 1). Within cities well-functioning infrastructures are essential for the effective performance of the city-systems and to provide a safe and healthy living environment to all city inhabitants. Moreover, according to a recent report<sup>6</sup> by the European Environment Agency (EEA), this will be one of the most important challenges that cities face when planning for adaptation. This is particularly important because critical infrastructure can lead to cascading effects because of the interrelations between various types of infrastructures whereby a break-down in one area, such as energy, may impact on others. Critical infrastructure also intersects with buildings and public space, and thus the adaptation of urban areas demands an integrated approach that involves many different (public and private) stakeholders simultaneously. In line with this, increasing the resilience of cities and their

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<sup>1</sup> EEA 2012. Climate change, impacts and vulnerability in Europe, 2012, An indicator based report. EEA report 12/2012. European Environment Agency, Copenhagen.

<sup>2</sup> According to Satterthwaite (2011), there is no universally accepted definition for ‘urban area’ or for ‘city’. For example in Europe each country has a different definition of what a city is, which usually depends on population size, density, on urban functions, on having a city charter or on being a recipient of national funds (Dijkstra and Poelman 2012). In this proposal both terms are used interchangeably.

<sup>3</sup> BMZ, 2013. Perspektiven der Urbanisierung – Städte nachhaltig gestalten. Information brochure of German Federal Ministry for Economic Cooperation and Development, Germany.

<sup>4</sup> For example see KEA European Affairs 2006. The economy of culture in Europe: a study prepared for the European Commission (Directorate-General for Education and Culture).

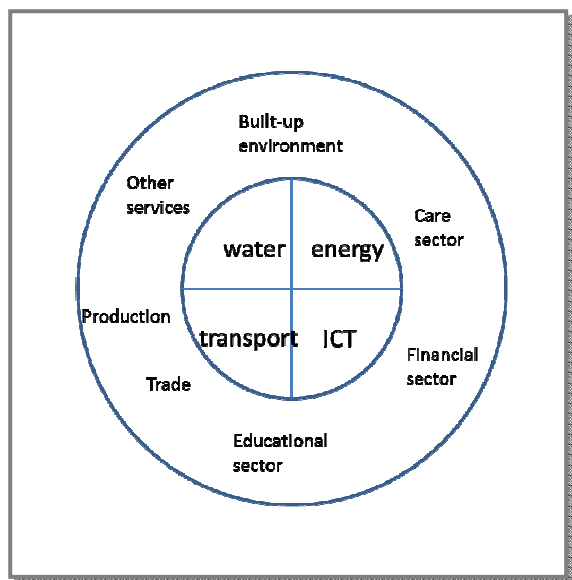
<sup>5</sup> European Commission, COM(2013)216.

<sup>6</sup> EEA Report, 2/2012 – Urban adaptation to climate change in Europe



infrastructures demands the mainstreaming of adaptation measures into various policies and strategies of both administrations and private companies, as well as developing a coherent and socially equitable approach to disaster risk management policies.

Bringing together these stakeholders, with their different responsibilities and non-aligned (direct and indirect) interests in adaptation measures, is one of the challenges facing any agreement on coherent adaptation programmes. Similarly it is of importance to align increasing resilience of a city with the existing urban dynamics, for which a participatory stakeholder process is needed.



**Figure 1:** The cities living and working environment depends on well-functioning infrastructures

City administrations have a key role in fostering climate adaptation: they can enact legislation, allocate budgets and create local incentives to shape urban planning in the desired direction. Cities express this power to shape places in several ways, e.g. by developing building codes, by fostering the resilient development of critical infrastructure systems in cooperation with the private stakeholders, by building enabling infrastructure and creating spaces that provide multiple benefits (e.g. green and blue spaces as recreational areas that in turn offer biodiversity and climate change adaptation benefits), by maintaining a resilient care sector, and by increasing citizens' preparedness and awareness in how to respond to climate and weather hazards.

Several cities have started to take up their role in increasing climate change resilience by developing a climate change adaptation strategy. The next section turns to the progress that has already been made to date in the field of urban climate change adaptation, and identifies the current knowledge gaps that the RESIN project will address.

### ***Progress and issues in urban adaptation***

The development of urban adaptation strategies in Europe has been a slow process, with a few frontrunners emerging at the national and international level<sup>7, 8</sup>. The majority of cities are still

<sup>7</sup> Carter, J. 2011. Climate change adaptation in European Cities. *Current Opinion in Environmental Sustainability* 3 (3) 193-198.

lagging, with cities in southern Europe showing relatively less activity<sup>9</sup>. Many of these lack the knowledge and the organisational capacity needed.

If policies have been developed, the resulting strategies are imbalanced particularly around addressing vulnerable economic sectors<sup>10</sup>, different infrastructures and services such as housing, sanitation, water management are poorly integrated<sup>6</sup>. *The first knowledge gap concerns how existing approaches can be widened and integrated to include all critical sectors and infrastructures.* It is also clear that both infrastructure providers and local communities are dependent upon one another: the local community has limited control over the cities' critical infrastructures and the infrastructure manager is not in a position to implement all necessary adaptation options. Depending on the type of infrastructure, the relation between these two differs. Many cities also face difficulties in involving relevant stakeholders and social communities in the development and execution of the strategies. Thus, there is a *knowledge gap over how to bridge the different worlds (in way of working, in language) in a common approach to decision making on climate resilience.*

A range of methods and approaches are applied during adaptation planning processes, and vulnerability mapping is one of the first steps in clarifying the challenges of climate change for a city and its relevant stakeholders. This can help to identify those receptors (people, infrastructure etc.) that are most susceptible to harm from climate change hazards. However, cities that are developing an adaptation strategy (often supported by consultants or research institutes) apply different approaches to mapping vulnerability to climate change with regard to the inclusion of climate threats, the methodology and the reporting. The absence of a standardised approach limits comparability between cities and, hence, limits benchmarking and peer to peer learning, and inhibits the setting of priorities and funding allocations for adaptation projects at a national or European scale. *A further knowledge gap occurs in the need to connect the risk management approach (used for critical infrastructures) with the vulnerability approach (used for other parts of the city) to allow for integrated planning of adaptation responses, and to increase comparability.*

More broadly, there is a diversity to adaptation planning approaches, and whilst this is enabling local pockets of good practice to emerge, standardised approaches that are well developed and readily accessible to urban planners and decision makers could help to more effectively develop the urban adaptation agenda. *This provides the scope for the development of generally applicable planning tools that provide enough room for locally specific implementation.*

Approaches for prioritising between and deciding on the most appropriate adaptation options, taking into account the specific natural and built environment characteristics of the city, happens in a policy arena which lacks comparable empirical evidence on the potential costs and benefits of adaptation options. There is a scarcity of well-structured operational and standardised tools to identify and implement the best performing, efficient and effective adaptation options for a

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<sup>8</sup> Broto, V., and Bulkeley, H. 2013. A survey of urban climate change experiments in 100 cities. *Global Environmental Change* 23 (1), 92-102.

<sup>9</sup> Reckien, D., Flacke, J., Dawson, R. J., Heidrich, O., Olazabal, M., Foley, A., Hamann, J. J. P., Orru, H., Salvia, M., De Gregorio Hurtado, S., Geneletti, D., and Pietrapertosa, F. 2014. Climate change response in Europe: what's the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries. *Climatic Change* 122(1-2): 331-340.

<sup>10</sup> Even on national scale the vulnerable sectors are not addressed equally, like in Holland (Algemene Rekenkamer, 2012. *Aanpassing aan klimaatverandering: strategie en beleid*).

particular context<sup>11</sup>. This means that there is a *knowledge gap on the increased understanding of the applicability and (cost)effectiveness of adaptation options*.

The difficulty in assessing the effectiveness of various adaptation options arises from:

- the diversity of measurement units that are used by existing methods for assessing adaptation benefits<sup>12, 13</sup>;
- the diversity of situations where the effect of adaptation approaches are measured and the conditions under which these effects have been measured and modelled<sup>14</sup>;
- that the quantification of benefits of adaptation measures is sometimes inadequate<sup>15</sup>; or
- there are inconsistencies in methodologies and assumptions that underpin the measurement and monitoring of adaptation approaches, which hampers comparison across studies<sup>16</sup>.

This means that a further *knowledge gap exists on the conventions for measuring, modeling and reporting the effectiveness of adaptation options*.

Lastly, in addition to these specific issues, there are proven methods that can actually evaluate the costs and benefits of adaptation measures, and to design adaptation portfolios appropriate for the local characteristics of the urban area within which they are to be applied. This relates to identifying the most appropriate implementation strategies and techniques, proposing optimal governance approaches, and specifying legal and financial instruments to implement or mainstream adaptation options within cities. A further implication of this lack of standardization is that the exchange of knowledge and experiences between cities is restricted, which prevents cities learning from one other and, thus, slows down the proliferation of adaptation strategies which standardisation could help to progress. *A knowledge gap therefore exists over identifying possibilities for enhancing standardisation in all stages of climate change adaptation*.

The RESIN project aims to address the knowledge gaps identified above, and, in doing so, RESIN will help to progress resilience, adaptation and disaster risk reduction in urban areas.

### ***Project objectives***

Overall aim: RESIN will develop standardised approaches to increase the resilience of Europe's cities and urban areas to extreme weather and climate change. This will be achieved by developing tools and methodologies that will not only support well-informed urban planning and decision

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<sup>11</sup> Kunreuther, H., Heal, G., Allen, M., Edenhofer, O., Field, C.B., Yohe, G., 2013. Risk management and climate change. *Nat. Clim. Chang.* 3, 447–450. doi:10.1038/nclimate1740 and Mustelin, J., Kuruppu, N., Kramer, A.M., Daron, J., de Bruin, K., Noriega, A.G., 2013. Climate adaptation research for the next generation. *Clim. Dev.* 5, 189–193. doi:10.1080/17565529.2013.812953.

<sup>12</sup> Bowler, D.E., Buyung-Ali, L., Knight, T.M., Pullin, A.S., 2010. Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landsc. Urban Plan.* 97, 147–155. doi:10.1016/j.landurbplan.2010.05.006

<sup>13</sup> Damodaram et al.(2010) Simulation of Combined Best Management Practices and Low Impact Development for Sustainable Stormwater Management, JAWRA Journal of the American Water Resources Association, Volume 46, Issue 5, 907–918.

<sup>14</sup> Sussman, F., Krishnan, N., Maher, K., Miller, R., Mack, C., Stewart, P., Shouse, K., Perkins, B., 2014. Climate change adaptation cost in the US: what do we know? *Clim. Policy* 14, 242–282. doi:10.1080/14693062.2013.777604

<sup>15</sup> Jenkins, K., Hall, J., Glenis, V., Kilsby, C., McCarthy, M., Goodess, C., Smith, D., Malleon, N., Birkin, M., 2014. Probabilistic spatial risk assessment of heat impacts and adaptations for London. *Clim. Change* 124, 105–117.

<sup>16</sup> Dupuis, J., Biesbroek, R., 2013. Comparing apples and oranges: The dependent variable problem in comparing and evaluating climate change adaptation policies. *Glob. Environ. Chang.* 23, 1476–1487.

making, but will also encourage the market deployment of innovative climate adaptation and resilience technologies.

To meet this aim, RESIN will:

- *link existing approaches* for climate change adaptation and disaster risk management to develop an overall approach for all sectors and elements of the urban system: critical infrastructures, built-up areas and public spaces, standardising what can be and needs to be standardised.
- develop a *common unifying framework* for the adaptation decision making process, with associated methods, tools and datasets created to support of decision-making at appropriate stages.
- provide for a conceptual and methodological framework that consists of *standardised methods for assessing impacts* of climate change and associated *vulnerabilities and risks*, with an *inventory of potential adaptation measures* and *standardised methods for prioritising between these adaptation measures*.
- building on these ‘technical’ instruments, the framework will also address the *governance of the adaptation planning process*, aiming at the involvement of different stakeholders for robust optimisation of efforts along and across the various ‘city’ dimensions, and monitoring agreed actions and their effects for feedback and further guidance.
- on this broad basis, develop *on-line decision support tools and guidance* to support the formulation of adaptation strategies by administrations and private stakeholders, such as infrastructure network managers. The decision support system will bring together resources developed within the RESIN project. The decision support system will provide, within a generic structure of the decision making process, for adaptation and disaster resilience planning, on-line tool(s) assessing vulnerability and selecting between adaptation options under conditions of uncertainty in a complex and dynamic urban setting.
- ensure that all deliverables can be applied in practice by extensive consultation and testing in real life situations in cities.
- work with a European Standardisation organisation as a partner (NEN) in order to prepare materials that ensure that adaptation to climate change can be progressed in a systematic way, through *European standardisation*, which will ensure practical applicability and reproducibility.
- and seek alignment with related EU activities, such as EU Climate Adapt<sup>17</sup>, to disseminate and promote the project’s achievements, also beyond the project life time.

Overall, RESIN aims to make a substantial contribution to strengthening Europe’s resilience to extreme weather and climate change, by supporting cities in preparing for the challenges and risks of climate change. Co-production of the project outputs between research institutes and end users lies therefore at the heart of the RESIN approach.

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<sup>17</sup> <http://climate-adapt.eea.europa.eu/>

## 1.2 Relation to the work programme

RESIN responds to the security programme, call *DRS-9-2014/2015: Disaster Resilience & Climate Change, topic 1: Science and innovation for adaptation to climate change: from assessing costs, risks and opportunities to demonstration of options and practices*. This call addresses the lack of coherence and harmonisation in adapting to extreme weather events and the longer term implications of climate change for European sectors of particular socio-economic and environmental significance.

RESIN will be a research and innovation action that specifically addresses urban areas and will overcome the issue of incomparability of methods and approaches by developing standardised approaches for each step in the planning process towards an adaptation strategy and to bring these resources together in a decision support system for end-users. Equally, cities operate in a multi-level governance context. It is necessary for many stakeholders (city managers, network operators, project developers, private business and the citizens themselves) to be involved in advancing urban resilience. Consequently RESIN focuses on providing a common language, common approaches, and standardised methods and tools to enable a successful cooperation between the different stakeholders.

The call refers to securing society against disasters. As cities and their critical infrastructures are particularly vulnerable to extreme weather events, related shocks and stresses may have wider repercussions for Europe's economy. For example, if global cities, such as London, Paris or Rotterdam, were to suffer from extreme weather events, such as the impact of Hurricane Sandy in New York showed, there is the potential for a standstill that the wider European economy would suffer from<sup>1</sup>. In this respect, providing support to the development of urban adaptation strategies is urgent. Indeed, operational objective 2b of the EU Adaptation Strategy (2013) anticipated that before 2020, cities of more than 150, 000 inhabitants should have adopted an adaptation strategy<sup>5</sup>.

Critical infrastructure networks are central to the effective functioning of cities. Their quality and effectiveness connects strongly to DRS-9's central themes including economic competitiveness and social welfare. Adapting critical infrastructures to extreme weather events and the risks of climate change will help to increase the resilience of city neighbourhoods: several adaptation options that can be applied on a neighbourhood scale are effective in protecting critical infrastructures too. Many options for improving the resilience of cities also increases the (economic) attractiveness of European cities to multi-national companies and may thus generate employment, predominantly on a local scale, which further contributes to the economic growth of European cities.

Although, the development of adaptation strategies must ultimately be sensitive to the characteristics of individual cities, there are many arguments for harmonising related approaches and methods. Firstly, as mentioned previously, multilevel governance requires that cities speak with one another. Critical infrastructure often extends across borders and a harmonisation of approaches will help cities to explore solutions and to decide on the roles and contributions across the range of actors involved in adaptation planning. Secondly, cities need to select between intervention options which means that standardised data on the performance of adaptation measures are necessary. Thirdly, the allocation of funding for adaptation projects presupposes that the information on urgency and effectiveness can be compared (this holds within the city and for funding from national or European sources). Lastly, harmonised approaches will support mutual learning between cities and will support collective intelligence gathering.

There are two means of harmonisation and standardisation; either through informal agreements on "the best way" to proceed whereby cities and stakeholders in a series of meetings gradually come to



a common understanding, or through formal standardisation approaches involving European Standardisation organisations. RESIN will investigate and pursue both avenues.

The Horizon 2020 work programme pays special attention to communication and access to information. RESIN's consortium has been assembled in order to underline that *communication* with the end users of the research outcomes, co-creation, dissemination to other cities and the training of municipal staff are crucial. Thus, RESIN has secured four cities as fully integrated partners in the project and a second tier of cities (tier-2) will be linked to them so that experiences begin to be shared. The skills and connections of ICLEI will support this and ensure further dissemination to the right audiences.

Table 1.1 details the contribution of RESIN to specific objectives of DRS9 call:

<i>H2020-DRS-2014/2015 Research and Innovation Action 2014</i>	RESIN project contribution
Challenges	Contributions (with references to the work packages described in Ch. 3)
A more standardised basis (including transferable, widely applicable tools and methods) for assessing potential climate change impacts, vulnerabilities, costs, benefits, risks and opportunities.	<i>Common frameworks, a city typology for adaptation (WP1, task 1.3), decision making tools based on standardised assessments of impact, vulnerability and risk, and the applicability and effectiveness of adaptation options (WP2, WP3 and WP6).</i>
A strengthened knowledge base, through a more coherent approach to the identification and assessment of the performance and impacts of different adaptation measures, with a view to prioritise relevant interventions.	<i>A catalogue of adaptation options that are based on standardised conventions for reporting on costs and effectiveness (WP3, especially task 3.1).</i>
Aim	
Develop standardised methods to assess climate change impacts, vulnerabilities, and risks, and to identify and assess the performance of adaptation measures (technological and non-technological options).  Methods should focus on long-term climate change and extreme events for European sectors of particular socio-economic and environmental significance, paying due consideration to uncertainty, and encompass indirect, cross-sector effects and cascade impacts, where relevant.	<i>A standardised tool for impact and vulnerability analysis for critical infrastructures and built up areas (IVAVIA)(WP2) A methodology for assessing adaptation costs, benefits, risks and opportunities within the urban setting (WP3, task 3.2) Documentation through the preparation of a formal European standardisation process (WP5).  RESIN covers all relevant climate impacts for European urban areas (with 73% of the population, and an estimated 80% contribution to GDP). RESIN will provide for approaches and methods for dealing with uncertainty (WP6, task 6.2), linear dependencies (1-1) and for cross sector and cascading effects (m-n) (WP2, task 2.1).</i>

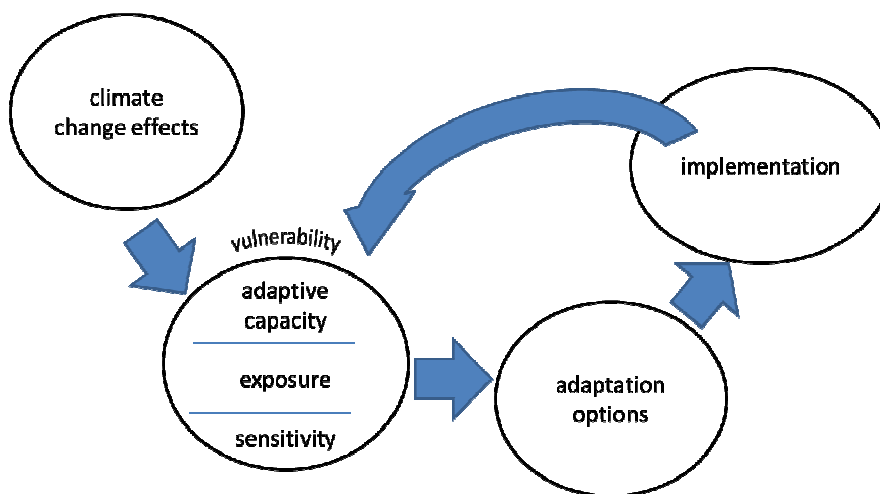
Provide state-of-the-art decision support tools tailored to facilitate decision-making by different end-users (e.g. individuals, businesses, other private sector firms, local authorities and planners, governments), while developing adaptation plans and measures.	<i>An on-line decision support tool to facilitate the decision making processes in multi stakeholder (public-private) environments (WP6).</i>
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Table 1.1: The contribution of RESIN to the work programme, H2020-DRS-2014/2015

### 1.3 Concept and approach

#### Conceptual background

As established in the previous sections, interconnected socio-economic and physical factors, such as population density, the high presence of sealed surfaces, the concentration of capital goods, and interrelated critical infrastructure networks, make cities highly vulnerable to climate change impacts. Common frameworks are needed to understand the nature and scope of the challenges associated with the changing climate, to identify associated drivers and their interconnections, and to explore available solutions. Conceptual frameworks, such as Figure 2 illustrates, can combine with a common language that is readily understood by end-users to enhance organisational learning and collective intelligence and, in turn, can foster resilience building<sup>18</sup>. RESIN will be founded upon a well-developed conceptual framework (see work package 1).



**Figure 2:** The classical approach to adaptation to climate change (source Groot et al, 2014<sup>19</sup>)

In developing responses to build resilience to extreme weather and climate change, planners and decision makers will generally follow an adaptation planning process, sometimes informally, which typically involves a chain of activities (Figure 2). This often begins with exploring the expected impacts of climate change (including gradual changes and the increased risk of extreme events);

<sup>18</sup> Webler T., Tuler S, Dow K, Whitehead J, Kettle N (2014) Design and evaluation of a local analytic-deliberative process for climate adaptation planning. Local Environment, 1-23

<sup>19</sup> Groot, AME, PR Bosch, S Buijs, CMJ Jacobs, EJ Moors (2014). Integration in urban climate adaptation: Lessons from Rotterdam on integration between scientific disciplines and integration between scientific and stakeholder knowledge. Building and Environment doi: 10.1016/j.buildenv.2014.07.023

then assessing the vulnerability of the city and its assets and systems; then identifying the associated, direct and indirect risk to stakeholders involved; followed by the consideration of relevant and applicable adaptation options; and, finally, determining the conditions for their implementation (involvement, financing, monitoring).

Although this seems straightforward, planning for climate change adaptation faces many complexities and uncertainties. Exemplifying this issue is the observation that cities are dynamic and complex systems which incorporate numerous infrastructure networks and services. This has an important influence over the choice of adaptation options. Aspects<sup>20</sup>, <sup>21</sup> include:

- Adaptation is possible at different, but related, geographical scales: from infrastructure elements through to buildings, to streets, to the whole city, and its hinterland;
- Different time scales are involved: from current extreme events to longer term incremental changes in various climate impacts. The restructuring and ongoing maintenance of each building, infrastructure element and district has a distinct frequency pattern;
- There is uncertainty with regard to future climate conditions and, hence, the return on investment from implementing adaptation options;
- There is an often long and unpredictable time gap between investing in adaptation and realising the benefits that accrue from them;
- And, finally, trade-offs between different stakeholders and beneficiaries, costs and benefits may be necessary.

Although cities and their administrators are the primary actors responsible for creating an enabling environment for adaptation and disaster risk reduction in their territories, they have to embed their efforts within a coherent multi-level governance approach engaging different tiers of governments (i.e. provinces, regions and the national states)<sup>1</sup> and a variety of stakeholder groups working across a diverse range of sectors. Hence, adaptive policy making requires a good understanding of the city 'landscape' from a biophysical and a socio-economic perspective. Apart from identifying the geographic, demographic, economic and climatological/environmental conditions, it is also necessary to pinpoint the stakeholders involved, not only with regard to their individual areas of responsibility, but also concerning their mutual dependencies and their exposure to short and long term cost/benefits from climate change and associated adaptation.

In order to respect these complexities, and to help address the challenges involved, RESIN will build on the concept of *adaptive policy making* which involves repeated steps: (1) Understanding the impacts (2) vulnerabilities and risks (3) selecting the most appropriate interventions (4) choosing the best implementation strategy (5) implementing measures and (6) monitoring and learning (Figure 3).

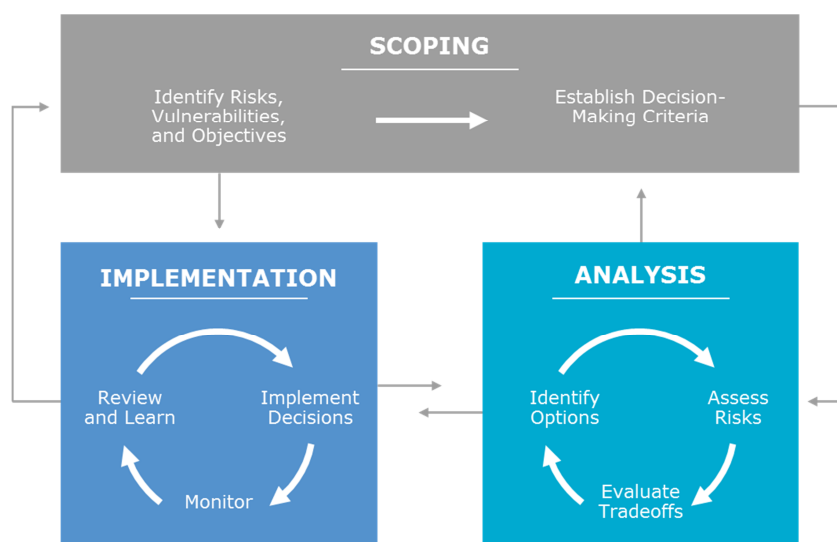
As these steps are the same for the development of any adaptation strategy, the framework can also be used for developing sectoral or integral urban adaptation strategies. This will bring together the following elements explored in the project:

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<sup>20</sup> Kambiz Maani / National Climate Change Adaptation Research Facility, University of Queensland, 2013, Decision-making for climate change adaptation: a systems thinking approach

<sup>21</sup> Corfee-Morlot J., L. Kamal-Chaoui, M. G. Donovan, I. Cochran, A. Robert and P.J. Teasdale. 2009. Cities, Climate Change and Multilevel Governance. OECD Environmental Working Papers N° 14.





**Figure 3:** Climate-change adaptation as an iterative risk management process (IPCC-AR5/WG2, 2014).

- inventory of climate change impacts, and the use of climate scenarios;
- integrated vulnerability mapping;
- cataloguing of relevant adaptation options;
- detailing assessment methods and decision support tools.

Conceptually, the RESIN project will be based on the co-creation of knowledge and tools. By involving a number of cities as full partners, RESIN will avoid creating a gap between science and practice, and will also ensure an efficient process and a smooth uptake by further cities. This is, however, not a simple and linear process since each city has different starting points, the appropriate involvement of stakeholders has to be organised, and clarity is needed on the communication between the project team and in dissemination activities beyond the project team.

The case study cities will develop following an Integrated Management Approach to structure activities, to integrate these into existing practices (thereby mainstreaming adaptation into different policies), and to support the organisational management in keeping the extensive entity of a city and the stakeholders together (see also section 3.1, WP 4). This Integrated Management System cycle (Figure 4) has been used successfully by the 21 pioneer cities, guided by ICLEI, during the DG CLIMA-funded 'EU Cities Adapt' project to frame and manage their adaptation work.



**Figure 4:** The Integrated Management System Cycle (Source: ICLEI)

### *The approach*

To achieve the vision outlined above, RESIN proposes the following approach (further details on how this translates into work packages and deliverables is outlined in Section 3).

1) A coherent, **overarching conceptual framework** will be developed to clarify thinking within the RESIN project and to guide its associated work packages. This will be built around existing and well-established frameworks based on extreme weather and climate risk, and will incorporate the themes of weather and climate hazards, vulnerability to these hazards and the capacity to adapt<sup>22</sup>. We will make use of and revisit relevant frameworks such as produced by the IPCC, UNISDR, DFID, EEA, the World Bank and the Urban Climate Change Research Network to evolve the broad risk framework and target it to the specific objectives of RESIN. This work will guide the identification and application of adaptation and disaster resilience concepts and methods throughout the project.

2) Europe's cities and urban areas are not homogeneous entities. This influences both the nature of extreme weather and climate change hazards, vulnerabilities and capacities to respond. The importance of urban diversity in the context of adaptation and resilience should be recognised. However, there is no current method of comparison to support an assessment of weather and climate risks and the prioritisation of responses. For this, RESIN will develop a **City Typology** to characterise cities according to factors linked to adaptation and resilience, and will therefore represent an important step forward. It will support the development of a suitable mix of adaptation and resilience approaches tailored to the specific characteristics of urban areas. In addition to delivering benefits locally for RESIN's case study cities, the typology will enhance the

<sup>22</sup> Hazard, vulnerability and adaptive capacity are the core elements of conceptual frameworks developed by organisations including the Intergovernmental Panel on Climate Change and the Urban Climate Change Research Network to understand extreme weather and climate change risk.

effectiveness of European adaptation policy, as channelled through initiatives such as the Covenant of Mayors. The typology will be embedded within the decision support system (see further) being developed within the project.

3) Currently, approaches for assessing the implications of the changing climate on critical infrastructure are based on risk reduction, while assessment approaches for other parts of the cities, such as buildings and public spaces, are mainly oriented toward increasing resilience<sup>23</sup>. RESIN will combine these broad approaches to develop **a consistent evaluation of impacts, vulnerabilities and risks** in a city, which is a necessary step towards a harmonised choice between adaptation options. Starting from available approaches for assessing the vulnerability of and the risks to critical infrastructures, human beings, buildings, neighbourhoods and other parts of cities, we will develop an standardised method to assess climate change impacts<sup>24</sup> and associated vulnerabilities and risks. During this process, RESIN will integrate the available methods for dealing with individual effects, such as heat<sup>25</sup>, extreme rainfall/pluvial flooding<sup>26</sup>, marine flooding<sup>27</sup>, and drought<sup>28</sup>. Some of the existing methods focus on the built-up area of a city, others on critical infrastructures. Some of the methods are risk management based, others resilience based. Whilst cities do not face the same climate impacts, an inclusive vulnerability assessment should, as a minimum, cover the relevant impacts and present vulnerabilities of all relevant sectors/systems in a comparable way. Similarly, the analysis of cascading effects will be included in the assessment. The concept of interconnectedness of urban infrastructure systems will be translated in practical guidance for analysis and presentation (Figure 5).

4) The complexity of urban adaptation processes calls for the development of simplified methods and standards supporting city planners and local decision makers in designing and implementing feasible, socially-balanced and cost-effective adaptation strategies. To address this issue, RESIN will put forward operational approaches for urban decision makers to identify and assess the performance of different adaptation approaches, allowing city practitioners to design and compare different adaptation responses suitable for their cities. Thus, two complementary research strands will be followed.

The first strand aims at standardising knowledge on adaptation options by means of a **comprehensive characterisation of the adaptation measures** that have been already designed and applied in diverse urban settings

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<sup>23</sup> J. Park, T. P. Seager, P. S. C. Rao, M. Convertino, and I. Linkov. Integrating Risk and Resilience Approaches to Catastrophe Management in Engineering Systems. Risk Analysis, Vol. 33, No. 3, 2013.

<sup>24</sup> The downscaling of climate change effects under various scenarios to infrastructures and cities will be outside the scope of this study. Several recent studies (Prudence, CIRCE) provide a sufficient working basis in the form of a regional quantification of most important climatic effects

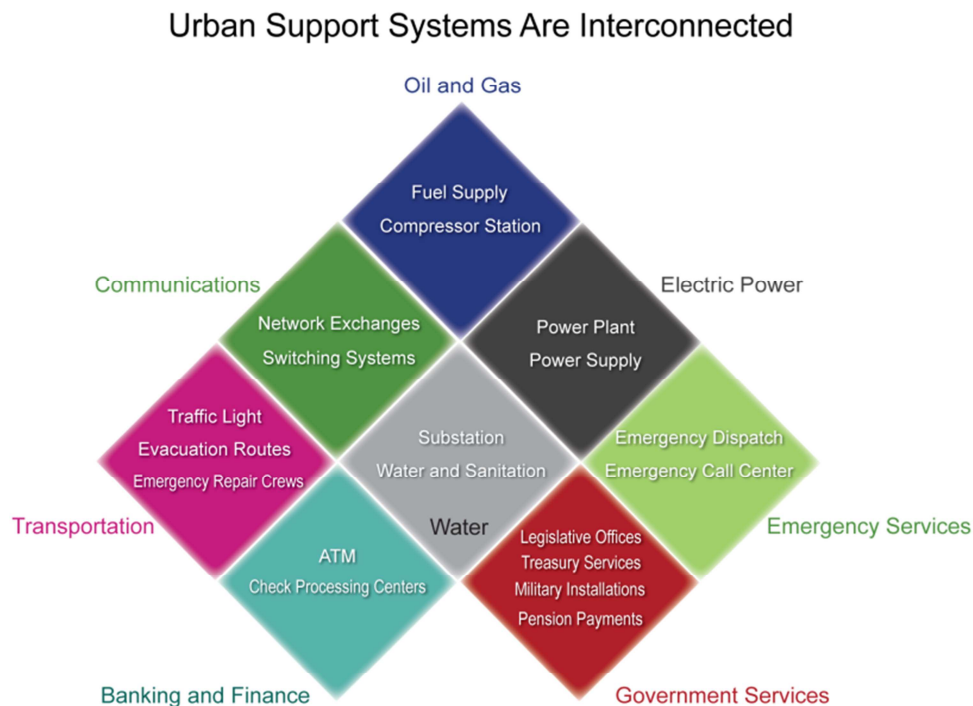
<sup>25</sup> Ren, C., T. Spit, S. Lenzholder, H.L.S. Yim, B. Heusinkveld, B. van Hove, L. Chen, S. Kupski, R. Burghard & L. Katzschner (2012). Urban Climate Map System for Dutch Spatial Planning. International Journal of Applied Earth Observation and Geoinformation, Vol.18: 207-221; Van der Hoeven F, Wandl A. Amsterwarm: Mapping the landues, health and energy-efficiency implications of the Amsterdam urban heat island. Sage, June 24, 2014, Building Serv Eng Res Technol.

<sup>26</sup> WOLK: [http://www.youtube.com/watch?v=cV4VId\\_QYFo](http://www.youtube.com/watch?v=cV4VId_QYFo); 3Di: <http://vimeo.com/93080389>

<sup>27</sup> A. Muller, J. Reiter, and U. Weiland. Assessment of urban vulnerability towards floods using an indicator-based approach – a case study for Santiago de Chile. Nat. Hazards Earth Syst. Sci., 11, 2107–2123, 2011;

S. F. Balica, N. G. Wright, F. van der Meulen. A flood vulnerability index for coastal cities and its use in assessing climate change impacts. Nat Hazards (2012) 64:73–105.

<sup>28</sup> Water Information System for Europe - <http://water.europa.eu/>



**Figure 5:** Urban support systems are interconnected<sup>29</sup>

Standardisation in this respect will imply:

- Proposing standard ways of communicating the cost and benefits (performance) for the most used adaptation measures. Practically, RESIN will deliver a catalogue of urban adaptation options (technical options as well as ecological and behavioural/institutional ones) with comparable information on costs, benefits and effectiveness for various climatic and urban conditions. The catalogue will be based on the city typology and will be structured in accordance with existing approaches in disaster risk management (prevention, preparedness, response and recovery).
- Proposing standard metrics for assessing the performance of similar adaptation measures, applied under similar conditions (e.g. within similar urban contexts). This includes costs and benefits for such measures under diverse local conditions, as well as proposing standard units for expressing those costs and benefits.

The second strand focuses on finding **standardised – and operational – ways to actually design and implement adaptation portfolios** at the city level. These scientific activities will substantially strengthen the knowledge base on the performance of adaptation options. They will stimulate the exchange of experiences between cities and provide a better basis for prioritising investments in urban resilience.

5) RESIN will deliver a generic description of the decision making process (for public and private actors) for urban adaptation to climate change. This recognises that adaptation planning takes place in a wider decision making context within public and private sector agencies and that, to be

<sup>29</sup> Adapted from Climate Change and Infrastructure, Urban Systems, and Vulnerabilities. Technical Report to the U.S. Department of Energy in Support of the National Climate Assessment.

effective, adaptation measures need to become integrated in a timely and relevant manner into wider processes. Thus, the development of harmonised and standardised methods and approaches will be met with an online **decision support system**. This will build on the resources gathered and methodologies developed within the project, and will be designed to support various decision makers (infrastructure managers, urban managers, real estate managers) in developing strategies for increasing climate resilience. It will include considerations on:

- costs and possible financing mechanisms;
- risk reduction potential of measure(s);
- reduction of cascading effects between infrastructure types;
- trade-offs and co-benefits with other policies and interventions in the city;
- tangible synergies with other policies.

The RESIN decision support tools will explore the utilisation of existing approaches for organising and managing the growing volumes of data available to urban managers. The Siemens City Intelligence Platform, for example, has successfully demonstrated data mining techniques. The City Intelligence Platform is already being used as system prototype demonstration in operational environment in selected pilot projects, including the FP7 project “Streetlife<sup>30</sup>”. Siemens involvement in RESIN means that the City Intelligence Platform’s methods of data collection, data integration, storage and visualization form an open basis for tools and applications that will be identified or developed in RESIN.

6) Planning for adaptation to climate change is an ongoing process with no defined endpoint. Existing plans will need to be revisited and updated based on the latest observations on climate development and assessments of associated risk, implemented adaptation measures, and new options to reduce risk. To support the demands of adaptive policy making, RESIN will bring together the elements of the decision support system in a practical **e-guide: the RESIN Suite of Decision Support Tools for Urban Climate Change Adaptation Planning**. This will be developed and tested with RESIN’s case study cities. This e-guide will include tools for actor/stakeholder analysis; impact, vulnerability and risk assessment; adaptation options and risk reduction; cost-benefit analyses; and guidelines for decision -making under uncertainty.

7) Four (4) core cities are embedded as partners in the RESIN project team to support the design, user testing and assessing the operational value of the RESIN outputs. This will help to ensure that the added value of the approaches and decision support tools for city governments and other urban stakeholders. Each of the core cities is at a different stage in the adaptation planning process and may focus on different areas of action based on their hazards, vulnerabilities, type of infrastructure and key economic sectors.

The **four case study cities** are outlined below. The criteria for their selection were based on:

- a) Geographical distribution over Europe;
- b) Balance in the expected challenges from climate change: flooding (river/sea), extreme rainfall, drought, heat;
- c) Balance in political/socio-economic context;
- d) Coverage of a range of infrastructures and economic sectors;

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<sup>30</sup> FP7/2007-2013 project “STREETLIFE: Steering towards Green and Perceptive Mobility of the Future”, grant agreement No. 608991, <http://www.streetlife-project.eu/index.html>

- e) Providing important services to the hinterland on EU or at least national level;
- f) Balance in city typology (size, type of city);
- g) In the course of developing adaptation-risk management policies, but not a frontrunner;
- h) Enthusiasm, good contacts and mutual trust.

#### *City profiles:*

- **Bilbao:** The harbour city of Bilbao (354 000 inhabitants), located in the Mediterranean region in Northern Spain, is just beginning the process of developing adaptation and risk management policies. It does not yet have an adaptation strategy. A vulnerability assessment has not been carried out nor options for adaptation assessed. Local political commitment to an adaptation strategy is still lacking and, accordingly, no budget has been allocated to it. Decision-support tools, such as Cost-Benefit Analysis (CBA), are limited in use for city planning processes. However, despite the absence of an adaptation strategy, some adaptation measures have already been implemented, e.g. it has been decided to widen the River channel in order to avoid flooding.
- **Bratislava:** The city of Bratislava (420 000 inhabitants plus ca. 150 000 – 200 000 daily commuters), located in South-Western Slovakia, has taken several steps to adapt to climate change. A vulnerability assessment which integrates climate change risks with non-climate stresses has been carried out. This has been structured according to sectors and themes (including health, water management, biodiversity and forests, waste management, agriculture and food production, the energy sector and related infrastructure, transport and related infrastructure and the urbanised environment) and the assessment has prioritised the most vulnerable sectors and groups. Based on this, an adaptation strategy for the city has been developed including an assessment of different adaptation options (due for city approval in September 2014). A budget has not been allocated to the strategy yet, but the city is starting the development of an Adaptation Action Plan which will also indicate the financial resources needed to secure the implementation. So far, no adaptation measures have been implemented.
- **Manchester:** Oldham Metropolitan Borough Council is acting as the representative of the conurbation-wide Greater Manchester (2.6 million inhabitants), which is located in North-West England. Collectively, the ten borough councils which comprise Greater Manchester are addressing climate change adaptation in different ways. Whilst a sector-wide vulnerability assessment for the whole Greater Manchester conurbation does not exist, several assessments have been carried of Greater Manchester's vulnerability to climate change, partly even for single districts. A formal stand-alone adaptation strategy has not been adopted, but local politicians have secured political commitment to adaptation. Climate risks and adaptation have been embedded into the thematic working plans and address the issue in several strategy and policy documents. The Greater Manchester Strategy aims, amongst other items, to adapt to a rapidly changing climate; and the Greater Manchester Climate Change Strategy and the Greater Manchester Climate Change Implementation Plan both address climate risks and adaptation as cross-cutting issues. The commitment of local politicians is also shown by Greater Manchester's decision to participate in UNISDR's resilient cities campaign and the EU's Mayors Adapt initiative. Adaptation and resilience measures are being developed and implemented.
- **Paris:** The city of Paris (2 million inhabitants for the city, 12 million inhabitants for the metropolitan area) carried out a vulnerability assessment in, which is structured according to sectors and themes, being mainly related to heat waves and flood risks. In the framework of the Territorial Energy and Climate Plan (PCET) the necessity to define a coherent and multi-sectoral adaptation strategy has been stated, establishing a link between the city, its metropolitan area and the Region Île-de-France. PCET will be declined in a series of roadmaps for each category of actors, like the roadmap for the City of Paris Administration (2012). This latest



framework includes actions which can be regarded as adaptation measures, such as awareness raising and communication, crisis management against heat waves or floods as well as long term actions to manage these extreme events. The framework of the 2012 PCET and for instance the 2012 Administration Roadmap, provide some qualitative assessment of different options that can contribute to adaptation, without however providing a comparison of the different options and a precise evaluation of their efficiency. Local politicians have clearly stated as a strategic objective to develop an Adaptation Plan for the City. Budgets for the participating departments of the city of Paris will be administered by EIVP, hence no other departments of the city of Paris are added in the list of participants of the RESIN consortium.

8) Based on existing standardisation initiatives related to climate resilient cities and infrastructures and the results of RESIN research, we will develop a strategy for formal standardisation of climate resilient cities and infrastructures. For this we will identify relevant initiatives and prepare alliances with existing standardization committees. If prospects are positive, this could be the **initiation of a standardisation process** either in a CEN Workshop as a part of the RESIN project or within existing standardization committees after the RESIN project. A CEN Workshop will lead to results that could be published as a CEN Workshop Agreement (CWA)<sup>31</sup> which is a European standardisation deliverable. In turn, the resulting CWA could be the basis for further development to other standardization deliverables, such as a European Standard (EN) or Technical Specification (CEN/TS).

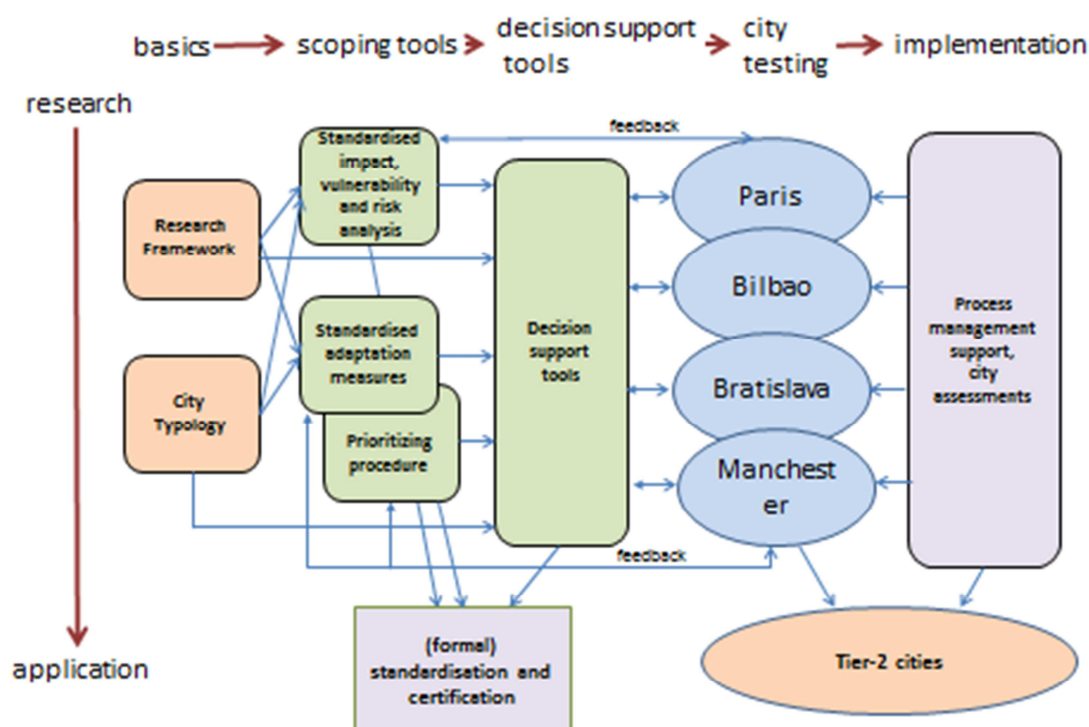
RESIN's focus on standardisation may provide relevant input for the upcoming "Standardisation request addressed to the European Standardisation Organisations in support of the implementation of the EU Strategy on Adaptation to Climate Change" announced in the EU Adaptation Strategy (COM(2013)216), which asks for standardisation work in three priority sectors: transport infrastructure, energy infrastructure, and buildings/construction and the related ICT infrastructures. RESIN's focus on cities will permit these sectors to be covered.

9) Particular attention will be dedicated to the **communication and dissemination** of the RESIN achievements. We will create a "circle of sharing and learning" between the four core cities (tier-1) and a selected group of "tier-2" cities. The tier-2 cities will be involved in capacity building activities including hands on training on the project products and outcomes. Selected by the project consortium according to specific criteria, attention will be directed towards cities in Southern Europe. The tier-2 cities will be targeted for the initial dissemination of the project outcomes.

We will also ensure that the project results are disseminated to a wider audience. We will follow an approach which will create awareness of the research products and, most importantly, support the application and use of these products in support of decision-making in cities and urban areas. ICLEI's inclusion in the research team is intended to provide the networks and expertise to make this work. RESIN's findings and results will also be policy relevant and the timing means that the results can feed into relevant European policy processes, such as the mid-term review of the EU Adaptation Strategy. The connection with standardisation organisations at national and EU levels, a key element of the RESIN approach, will provide a home for the project's standardisation initiatives and proposals.

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<sup>31</sup><http://www.cen.eu/work/products/cwa/pages/default.aspx>



**Figure 6:** RESIN activities, interactions and feedback-loops.

To achieve its objectives and to gain the support of relevant end user groups, the RESIN consortium will draw on existing networks to engage stakeholders to participate in project activities. This will include, for example, expert sessions on risk and vulnerability analysis within the actual case cities and the tier-2 cities. Stakeholders will be invited from various expert groups such as meteorologists, public and private policy makers, critical infrastructure-operators, and crisis managers. They will participate in the development of realistic scenarios, identifying critical decision points in planning for and responding to climate change.

This requires RESIN to prepare for an interactive process with feedback loops between its individual activities and developments as depicted in Figure 6. The RESIN Work Packages will be aligned accordingly.

### ***Building on previous and ongoing research***

The RESIN project builds upon the results of recent national and international research programmes and projects in which consortium partners were involved (See Table 1.2). These projects covered:

- **Climate change** and the impact of extreme weather on critical infrastructures
- Vulnerability and **risk assessment** methods
- Technical and non-technical **adaptation options** for city (infra)structures,
- Methodologies in support of **policy and planning** processes, including cost/benefit analyses, and Governance for multi-stakeholder engagements.





**Table 1.2:** Relevant knowledge/results from existing initiatives to be used as baseline for RESIN activities

Project	Climate change	Risk assessment	Adaptation options	Policy & Planning
Adaptatio	X		X	X
BASE	X		X	X
Blue-green Dream			X	
CPC/INCAH	X	X	X	X
ECONADAPT				X
EU Cities Adapt	X		X	X
FLOODPROBE		X		
FloodResilientCity		X		X
GRaBS	X		X	X
Impetus	X		X	X
INTACT	X	X	X	
PREDICT		X	X	
RAMSES			X	X
RESILIS		X		X
STREST		X		
WEATHER	X			

Details on these projects, such as objectives, outcome and partner participation, relevant to RESIN, can be found in Annex 1.

### ***Technology Readiness***

RESIN is not a technology development project; with the testing of the RESIN suite of decision support tooling (vulnerability assessment methods, tools and databases to identify and assess performance of adaptation options and decision support for developing adaptation strategies) in environments close to operational (the four case cities) its readiness level can be stated somewhere between TRL5 (technology validated in relevant environment) and TRL7 (system prototype demonstration in operational environment).

### ***Gender aspects***

The RESIN research and its deliverables aim to support a wide array of stakeholders (public, private and third sector). In no way there is any intention to favour specific persons and parties or to exclude access.

As is clear from Articles 2 and 3 of the Treaty on European Union, gender equality is a requirement for all activities relating to the European Union, including in research projects. This is not only to

eliminate inequalities, but also to promote equality. The RESIN consortium is aware of the proactive stance that the EU takes on creating equal opportunities between men and women. The involved partners have committed themselves to gender equality and will actively promote the participation of women in this project and all of its activities (of the 31 persons contributing to this proposal 30% were female). For the RESIN Advisory Board we seek a 50/50 male to female representation.

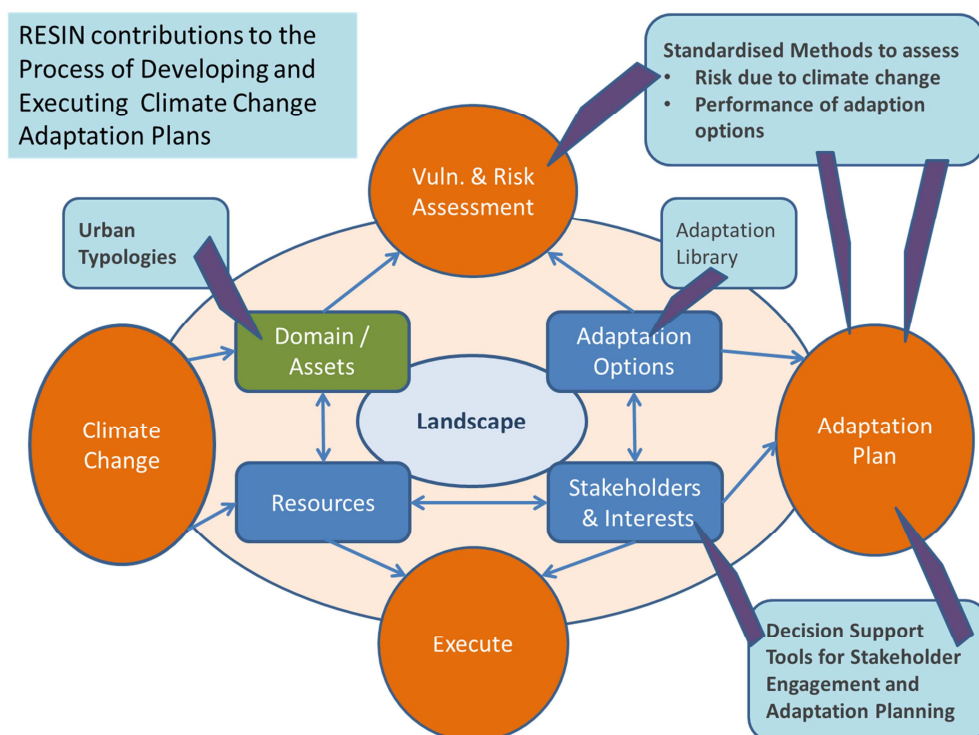
#### ***1.4 Innovation and Ambition***

RESIN's outputs will allow European cities, and their relevant stakeholders, to take a step forward in the development and implementation of adaptation strategies, with a particular focus on urban infrastructure systems and networks. Current weaknesses in adaptation and resilience approaches, and associated barriers related to deficiencies in knowledge and information will be addressed, with the project outputs presented as practical and user-friendly decision support tools (see Figure 7).

Whereas current methods for assessing urban climate risks are piecemeal and different for each climate threat and sector (see section 1.1-Progress and issues in urban adaptation), our ambition is to arrive at a single, integrated approach for vulnerability assessment for all components of the city system (WP2). This will include the linking of vulnerability and risk management concepts that, up until now, are practiced as separate research fields involving research communities. For cities this will allow for an efficiency in approach: cities can focus on their biggest threat, and elaborate adaptation strategies in an integral and integrated way for all sectors. Identifying adaptation options that increase the resilience of, for example, critical infrastructures and neighbourhoods at the same time (WP3) is scientifically new and therefore not yet commonplace in policy practice.

The development of standards throughout the RESIN project, will allow for comparing and benchmarking. Cities will be better able to prioritise geographical areas, infrastructures, economic sectors, and actions to be taken. With standard approaches to developing adaptation responses, benchmarking between cities becomes possible. Cities will be able to understand and develop their position (and competitive advantage) compared to others.

In a developing research area as urban adaptation, where researchers have designed numerous ways of measuring and expressing the impacts of extreme weather and climate change and the effects of adaptation measures, this project aims to introduce some basic conventions to allow for the comparability of risk assessments and adaptation options (WP2 and 3).



**Figure 7:** RESIN Contributions to City Adaptation Planning

RESIN will also provide a platform to explore opportunities and obstacles for formal standardisation in adaptation (WP5), something which has not been done before. Formal standardisation supports knowledge transfer and the introduction of (innovative) products to the market and can thus constitute an important new element in increasing the resilience of cities and stimulating Europe's economy<sup>32</sup>.

Urban adaptation strategies will inherently be locally specific. Through the use of a city typology cities, that are at the initial stages of developing adaptation strategies, can quickly make use of relevant existing knowledge and experiences from cities with comparable underlying characteristics elsewhere (WP1). The typology will prove to be a useful instrument for national and European policy making to deal with the diversity of European cities. The design of the typology, making use of information on climate, population, economy, governance, is a ground-breaking exercise combining statistical analysis with local knowledge and will advance the (research-)agenda in Europe.

Various elements, such as the vulnerability mapping (WP2) and the decision support system (WP6), have potential to be marketed as innovative services. Their further development will be explored via the framework of the EIT-Climate-KIC<sup>33</sup> and through the business partners (Arcadis, Siemens, ITTI, BC3) in the consortium. Such factors are detailed more fully in the next section, which discusses the project's anticipated impacts.

<sup>32</sup> See, for example, COM(2008) 133 final "Towards an increased contribution from standardisation to innovation in Europe".

<sup>33</sup> <http://www.climate-kic.org/>

## 2. Impact

### 2.1 *Expected impacts*

RESIN brings value added to a number of external stakeholders beyond the project. These are listed below with the anticipated impacts.

- i. **Societal actors** will benefit from the improved decision-making on where and how to reduce risks and vulnerabilities in the most cost-efficient way. Thus, the security of Europe's citizens and Europe's economy will be further safeguarded.
- ii. **(Public and Private) Policy planners** will be provided with evidence based approaches to engage with public and private stakeholder communities, which will improve the acceptance of adaptation programmes and measures to protect their cities and critical infrastructures against extreme weather events and climate change.
- iii. **(City) Infrastructure Owners and Operators** will be able to improve their awareness of risks, take preventive actions, and formulate response and recovery options for extreme weather events. This will reduce the potential impact of climate change and extreme weather events to their assets in the broader perspective of multi-stakeholder (public-private) interests.
- iv. **Industries and SMEs** will benefit from the move towards formal standardised performance measures for climate change adaptation options as this will stimulate markets and open new ones to them with the possibility of innovative adaptation products emerging from the cross-fertilisation. As will be opportunities for new business services for vulnerability mapping and decision support.
- v. **The European Union and its member states** will be supported in their policies for increasing the resilience of cities, critical infrastructures and sectors. RESIN will also enhance the effectiveness of the allocation of EU funds directed to adaptation and resilience.
- vi. **Standardisation Organisations** will be provided with baselines to enable standards for Vulnerability and Risk Assessment to be effected.
- vii. **Academia and Scientists** will benefit from a stimulus to adaptation research based on common conventions for methodologies and reporting of results. The results may be applied in their academic curricula.

The execution of this project will transform the value added to various target groups into real impacts on the short term and expected impacts on the medium term. RESIN will contribute to the development of well-founded adaptation strategies in four case study cities, with a group of about 20 tier-2 cities forming an immediate Community of Practice. Several partners have experienced that broad communication of their research results stimulates cities and infrastructure providers to develop their strategies. In this way, the project will immediately **support the implementation of the EU adaptation strategy**. Due to the availability and acceptance of (standardised) guidance and instruments, more cities in Europe will develop adaptation strategies (either for the city as a whole or for (re)development projects). This all leads to **increased resilience of European cities and the European economy to climate change and other external threats**.

RESIN also contributes to improving the information on risks to critical infrastructures, economic sectors, and society at large from extreme weather events and climate change. It encourages, and, in the case cities applies, the combination of private and public sector information within a multi hazard approach (WP6). Through the work in the case cities (WP4) we will establish a close

cooperation between research and policy making. These are all elements promoted by the **EU Disaster Prevention Framework** to which the RESIN project is fully aligned.

The delivery of the tool for standardised impact and vulnerability analysis for critical infrastructures and built-up areas (WP2), the catalogue of adaptation options (WP3) are RESIN contributions to **improved and concise information for decision making for both public and private sectors**. The suite of decision support tools (WP6) brings this information to work in support of adaptive policy making by all relevant stakeholders.

European (formal) standardisation, for which the RESIN project will lay the foundations, will stimulate the **development of innovative marketable products** (ranging from analysis tools to adaptation products) and contribute to a faster distribution and broader diffusion of the knowledge. In this way the work on standardisation within RESIN will eventually contribute to the competitiveness of European industry in this area.

## ***2.2 Measures to maximise impact***

### ***a) Dissemination and exploitation of results***

RESIN will address three target groups that will be key users of project outputs (Figure 8):

i) **Cities and urban stakeholders:** Around each of the core cities a group of tier-2 cities will be invited to (a) demonstrate the RESIN results and share the experiences of concerned city and (b) to promote the application of the RESIN results in their environments. A number of meetings with the tier-2 cities will be organised. Apart from capacity building activities and training on the project products and outcomes, the goal is to reinforce co-creation and tailoring of the outputs to practitioners needs. Activities in WP7, led by ICLEI who manage a global network of cities working towards sustainability issues, are organised to ensure that tier-2 cities make practical use of the resources developed within RESIN. The initial set-up of tier-2 cities is already in place (see the attached letters of support – Annex 2).

The RESIN team will appraise and use a broad set of tools and opportunities to disseminate its (interim) achievements to a wider audience of cities and relevant stakeholders:

1. We will communicate with and wherever possible collaborate with the most relevant global and European initiatives on climate change adaptation and disaster risk reduction, such as the Mayors Adapt Initiative<sup>34</sup>, the UNISDR Making Cities Resilient campaign<sup>35</sup>, C40 and Connecting Delta Cities<sup>36</sup> and national and international city networks (such as the UK “core cities group”, the Dutch “G4” or the Union of Towns and Cities in Slovakia).
2. Two stakeholder dialogues are planned for communicating project results.
3. For its final conference RESIN seeks to integration on well-established European events on climate change adaptation and resilience (e.g. The Bonn Resilient Cities Conference, The Open European Days).
4. Through its website, periodic newsletters and presentations at representative events, seminars and exhibitions the RESIN team will further promote its achievements,

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<sup>34</sup> <http://mayors-adapt.eu/>

<sup>35</sup> <http://www.unisdr.org/campaign/resilientcities/>

<sup>36</sup> <http://www.deltacities.com/>

5. Individual RESIN partners will promote the project through the communication channels of their own organisation and to present RESIN at relevant national and international fora.

ii) **The EU policy level:** One of the main aims of the RESIN dissemination strategy is to ensure that the findings and results of the project inform relevant European policy processes and debates, such as the implementation of the EU Adaptation Strategy, including DG CLIMA's recently launched Mayors Adapt Initiative. To foster and inform the European debate, RESIN will produce two policy briefs. These will be hands-on, short visual documents that will raise awareness on the project outcome, and formulate recommendations as a contribution to the mid-term review of the EU Adaptation Strategy, due in 2017.

The engagements with national and international standardisation organisations (CEN, ISO) are also important. The interim and final results of RESIN will be promoted at selected meetings of these organisations with the aim to prepare a CEN workshop agreement related to standardised methods for vulnerability and risk assessment of cities and their infrastructures, and the performance of particular adaptation methods.

iii) **Research Community:** As RESIN will conduct cutting-edge research in the field of adaptation, resilience and Disaster Risk Reduction, scientific results will be spread as widely as possible (in journals such as *Regional Environmental Change*, *Urban Climate*, *Building and Environment*, *International Journal of Disaster Risk Reduction*, using an Open Access policy). The project results will be presented by different partners at the most renowned national, European and international events. RESIN will be furthermore linked with parallel research projects and established networks, including projects that the consortium partners are currently involved in (e.g. BASE, RAMSES, EUROTECH, Integrated Mission Group for Security (IMG-S), Public Safety Communications Europe (PSCE), etc.).

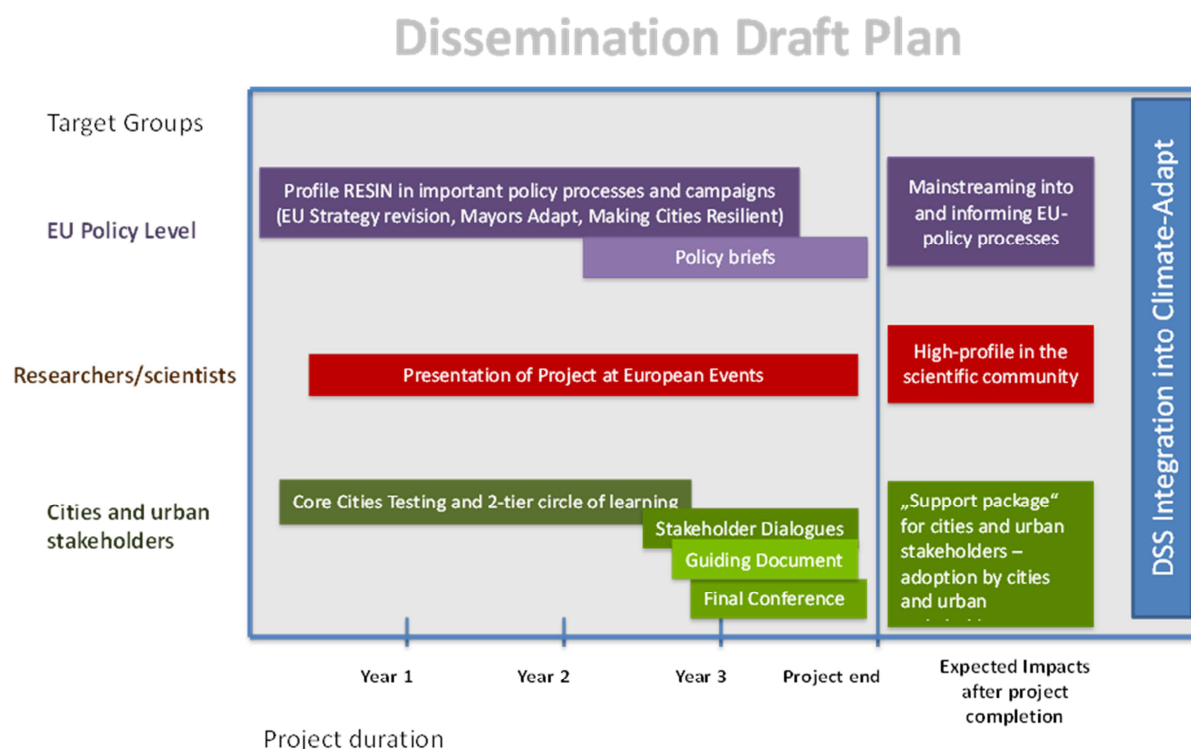
iv) Finally, our aim is for the project results to be integrated in the Climate-Adapt platform after project completion. **Climate-Adapt** represents a one-stop shop for European adaptation and features a special section focused on tools. For that matter a representative of the EEA is envisaged to take a seat in the RESIN Advisory Board (see also section 3.2). Securing visibility of the RESIN results on Climate-Adapt is a fundamental opportunity to maximise the impact of the project's results.

### ***b) Communication activities***

The dissemination and communication of RESIN results will be a continuous activity throughout the project time-span, covering interim and final results. ICLEI will define the specific contents and forms of communication and dissemination material in a *Dissemination and Communication Strategy*. This will take into account the three target groups introduced above, and will be sensitive to their specific background in terms of knowledge, context, motivation and their potential for supporting the uptake of the RESIN outputs beyond project completion.

Two *Stakeholder Dialogues* will be undertaken at key stages in the project and represent good occasions to communicate the project results to a wider audience. Securing appropriate participants to attend these events will be crucial to ensure their effectiveness. Therefore, the invitation and promotional campaign will be undertaken at an early stage of the project and will target significant stakeholders, such as European cities, urban stakeholders, research institutes and European Institutions (Commission, EIB, CoR).





**Figure 8:** Draft RESIN Dissemination Plan

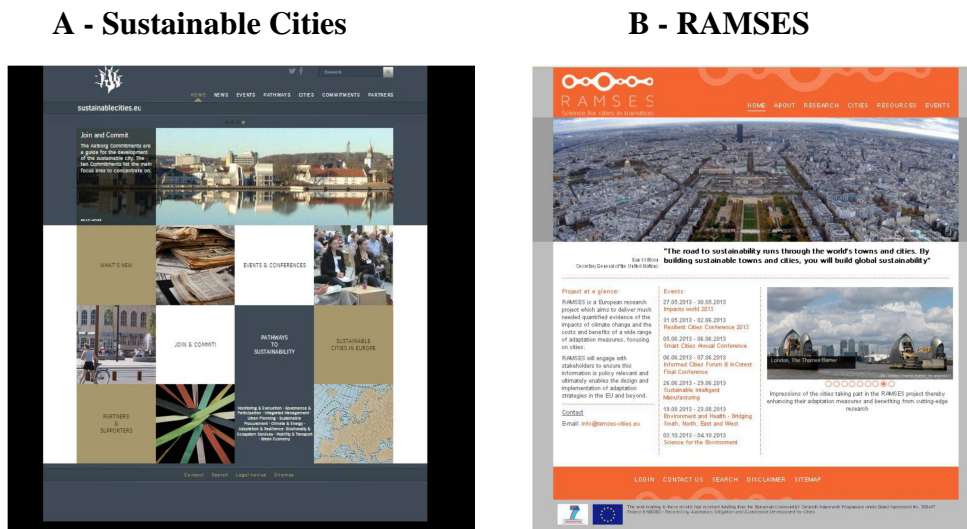
A final conference will ensure reaching a wide audience to present the project’s achievements and results. Rather than organising “yet another project conference”, which might not ensure an adequately high profile to the project in the European urban adaptation and resilience context, the Consortium will seek integration into well-established European events on adaptation and resilience. ICLEI can build on extensive experience in event organisation and management, and can count on several renowned European and global adaptation events that could host the RESIN final conference.

As an example, two major events could serve as a platform to disseminate the project results:

- The Bonn Resilient Cities (BRC) Conference, which has reached its 5<sup>th</sup> Edition. This event brings together urban planners and administrators, and key adaptation stakeholder and researchers, to provide a global platform for urban resilience and climate change adaptation. The conference, organised by ICLEI, hosts around 500 participants.
- The Open European Day, organised by ICLEI in cooperation with EEA as a back-to-back event to the Bonn Resilient Cities Conference. This is a unique, interactive event on urban adaptation in Europe, and is designed to foster an interactive and open dialogue between cities and key adaptation stakeholders. It hosts around 150 participants.

A website will be designed for the project to display the project background and context and to host the tools that will be created as well as guidance developed on how to use them. The consortium has considerable experience in designing, developing, implementing and maintaining web portals with an understanding of the target and user audience. The RESIN website will also provide information and updates on project activities and outcomes, and will act as a knowledge platform for urban adaptation by presenting front-runner city adaptation case studies and structuring relevant publications. ICLEI’s web development team has extensive experience with programming a broad variety of websites and is well placed to liaise with the EEA to identify the technical set-up of the

portal to be able to link with Climate Adapt<sup>17</sup>. Some examples of ICLEI project websites are displayed in Figure 9.



**Figure 9:** Examples of websites managed by ICLEI<sup>37</sup>

### ***Knowledge management and protection***

In order to avoid any problems related to IP issues within the consortium, special attention will be paid to the specific IP paragraphs in the Consortium Agreement (model DESCA Horizon 2020). These paragraphs will deal with (joint) ownership and possible transfer of the IP, and the access rights for project partners and affiliates. The basis will be that each partner will own its new IP and other results generated in the project (Results) and, obviously, its existing knowledge and IP (Background), and that other partners will get access rights to Results and Background whenever needed for the performance of their tasks in the project or for the use of their own Results.

When certain IP is identified to be attractive for future business opportunities of the involved partner(s), the necessary steps will be taken to protect that IP. Patent application may follow the procedures already in use by the partner(s). In order to secure the research and business interests of all partners involved, any issue that might arise from the patenting initiative during the project will be dealt with by the General Assembly.

<sup>37</sup> A - Sustainable Cities, [www.sustainablecities.eu](http://www.sustainablecities.eu). B - RAMSES, [www.ramses-cities.eu](http://www.ramses-cities.eu);



### 3. Implementation

#### 3.1 Work plan — Work packages, deliverables and milestones

Work package 1 provides RESIN with a common terminology, definitions, and classifications that will help the project to bridge between risk management approaches, typical in infrastructure management, with the vulnerability approaches often applied by city planners. A series of state-of-the-art reviews of relevant concepts and approaches will be undertaken. In addition, work package 1 will also develop the European city typology to support adaptation and resilience planning. The typology will connect to various follow-up tasks across the RESIN project, including impact and vulnerability assessment methods (work package 2) and adaptation options (work package 3).

Work package 2 will elaborate on a standardised approach to impact and vulnerability assessments, in alignment with work package 3 that is devoted to a wide range of adaptation options for urban environments and their critical infrastructures and to develop standardised information on their applicability and effectiveness. These developments will be steered by practitioner needs as expressed by our partner cities (and our tier-2 cities). To ensure that the information and tools are applicable in European cities, all of the material developed by RESIN will be done in collaboration with the partner cities, from formulation to initial user testing. Work package 4 delivers the testing with the involvement of our partner cities: Paris, Bilbao, Manchester, Bratislava (see Section 1.3 for the motivation for their selection). Work package 4 also includes the involvement of cities in the design of the RESIN outputs, the evaluation of the experiences of the case cities, and help to distil the lessons to be drawn from their engagement in the process.

The results of work packages 2 and 3 will feed into work package 6, which is devoted to the development of a unifying decision support system.

Although standardisation is the main driver behind work packages 2, 3 and 6, research into the possibilities for formal standardisation of adaptation and resilience tools and approaches will be undertaken in work package 5 (supported by CEN the European Committee for Standardization). The feasibility of standardisation and certification of operating procedures, specific methods and adaptation options will also be determined during work package 5.

From the beginning of the project, where an inventory of the needs of cities will be devised, to the project conclusion, involving the active dissemination of results to European cities, work package 7 will aim activities at cities and relevant stakeholders. Work package 7 will ensure that our results find their way to practitioners (through training and dialogue meetings), thereby generating awareness and knowledge of the need for adaptation in European cities.

Figures 10a and 10b present the individual work packages and how they take care for the activities, interactions and feedback-loops described earlier (see also Figure 6). Embedded are the many cross-cutting relations within the programme, where partners such as Siemens and Arcadis play a role to integrate findings.

Figure 11 presents the associated RESIN Gantt Chart. The following sections further outline objectives and tasks, milestones, and outputs for each work package with the specific partner roles.

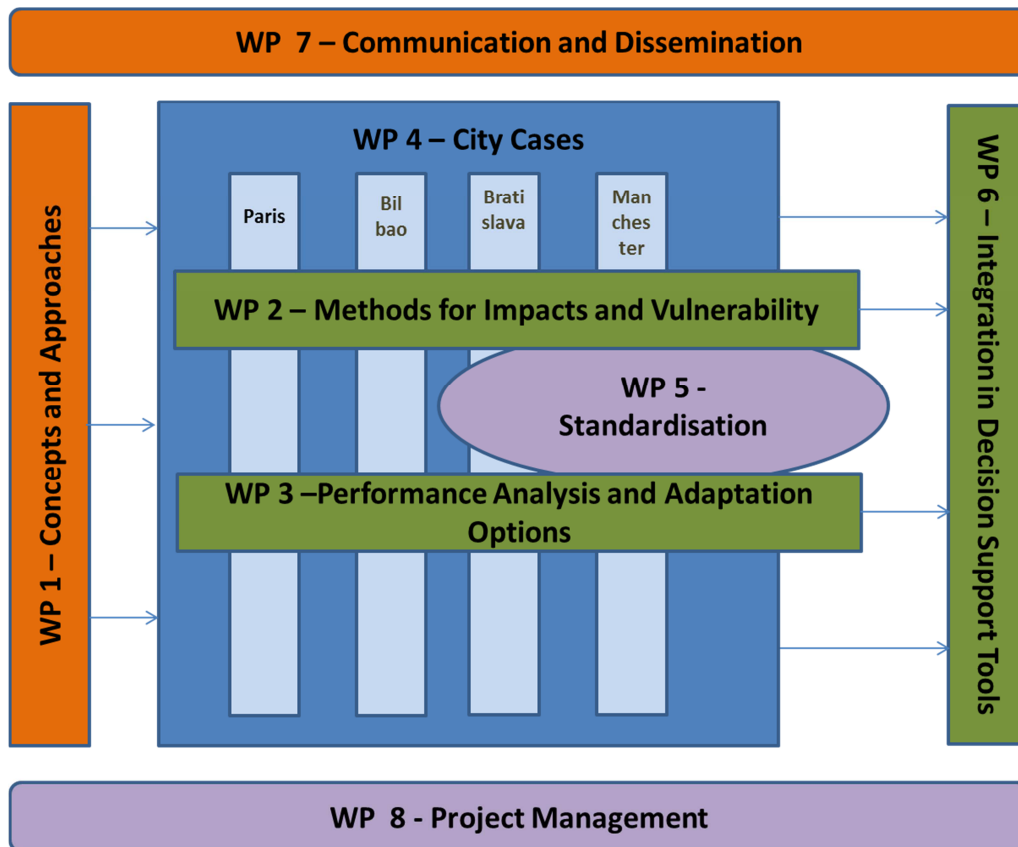


Figure 10a: RESIN Formal Breakdown in Work Packages

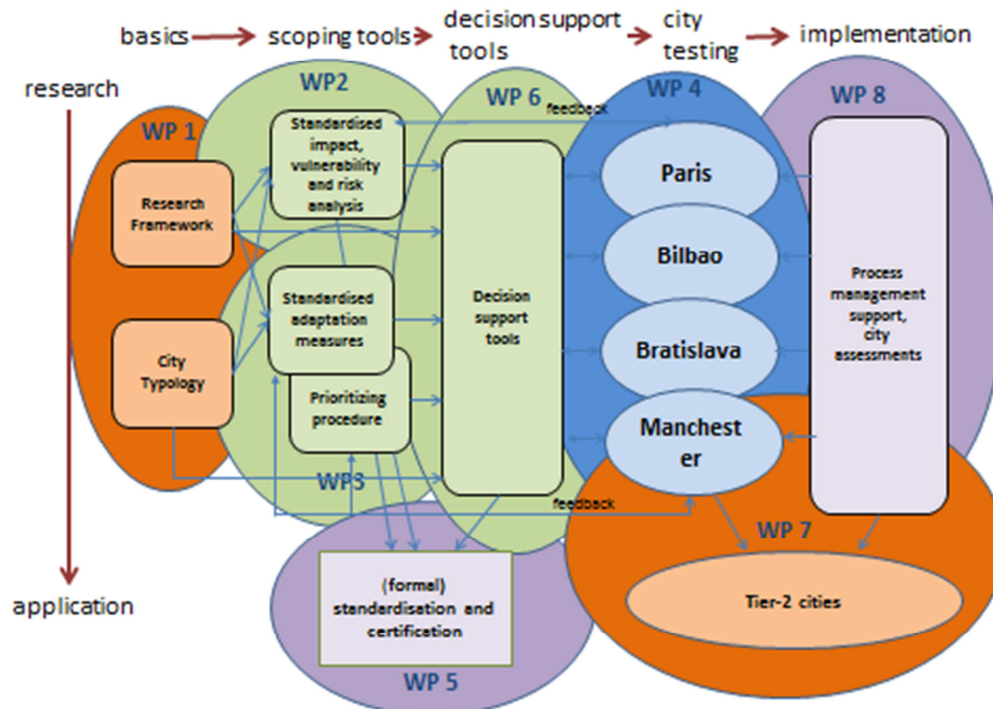
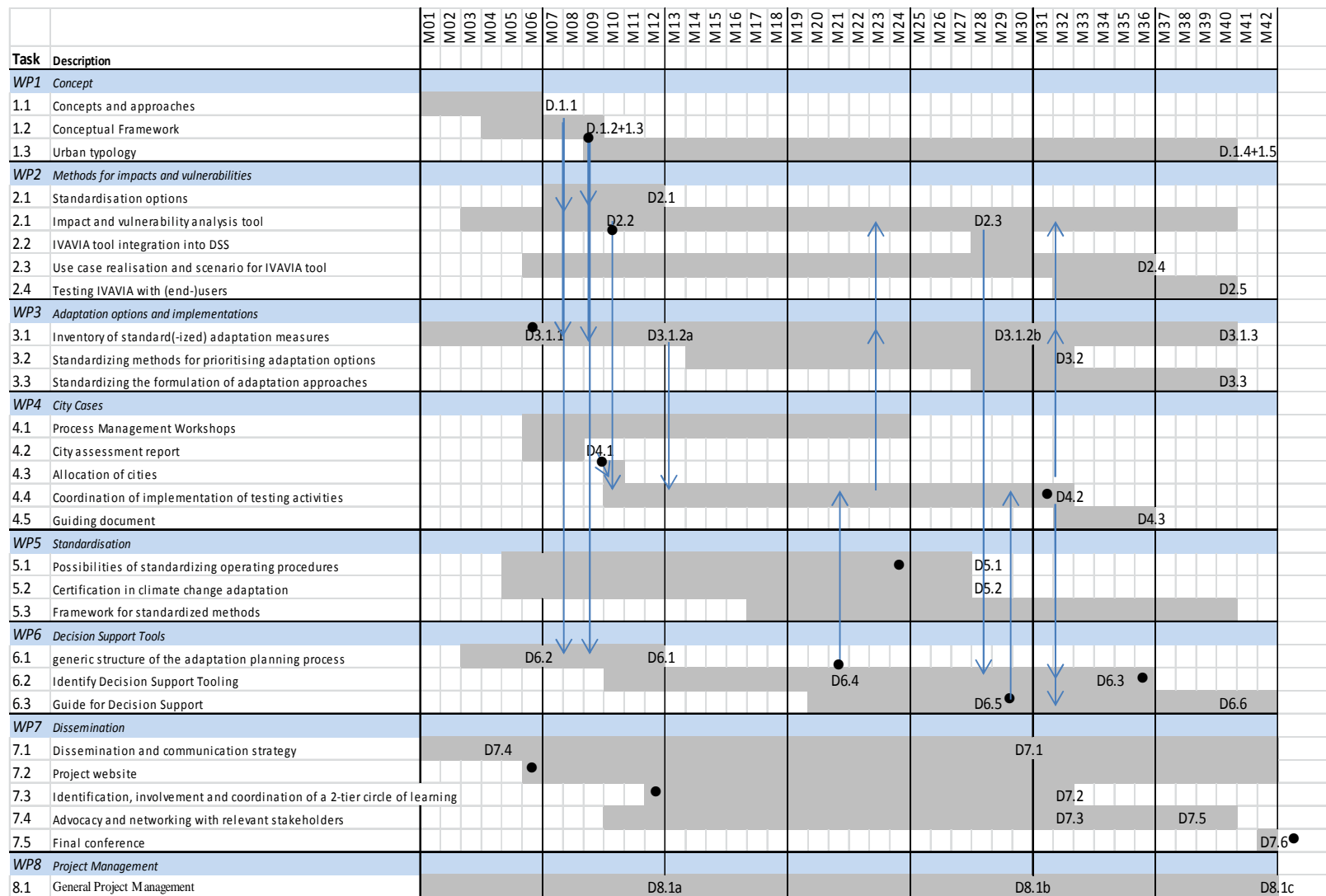


Figure 10b: RESIN Interaction between work packages for iterative development

**Figure 11: RESIN Gantt Chart**



**dots** represent milestones; **arrows** (most important) connections between respective Work Packages.



statements for the project as required by the contract, the arrangement of the Certificates on the Financial Statements and audits where necessary.

The R&D work in the project will be divided in 6 technical **Work Packages** (WPs). Additionally there are WPs for the project management, and for dissemination and exploitation of the project results including training activities. Each WP is managed by a **Work Package Leader** (WP Leader), provided by the partner that plays a central role in the specific WP.

The complete list of WPs with the intended WP Leaders is as follows:

- WP1 Concepts and Approaches (WP Leader: University of Manchester)
- WP2 Vulnerability (WP Leader: Fraunhofer)
- WP3 Adaptation Options (WP Leader: TECNALIA)
- WP4 City Cases (WP Leader: ICLEI)
- WP5 Standardisation (WP Leader: NEN)
- WP6 Decision Support Tools (WP Leader: TNO)
- WP7 Dissemination (WP Leader: ICLEI)
- WP8 Project management (WP Leader: TNO)

Two management bodies will comprise RESIN's organisational structure:

- **General Assembly (GA):** consists of one representative of each partner, chaired by the representative of the Coordinator (the PM). Note that due to their mutual dependencies Siemens DE and Siemens AT will have but one chair in the General Assembly. The task of the GA is to supervise the project and to take decisions in major issues like changes of work plan, change of Project Manager or WP Leader, budget relocations, IPR, entrance/leave of partners and other non-technical matters of general importance.
- **Executive Board (EB):** consists of all WP Leaders, chaired by the representative of the Coordinator (the PM). The EB monitors the technical progress, approves progress reports and deliverables, assesses milestones, and deals with technical problems that concern two or more WPs.

### ***External Advisory Board***

In the performance of its tasks, the EB will be supported by the **External Advisory Board** (EAB). The EAB will consist of a limited number of external (third party) experts that will be selected on the basis of their profound and extensive expertise in the field of research. The EAB members will be invited to general progress meetings of the project (after signing appropriate confidentiality agreements with all partners in the consortium) where they can advise the consortium and help the EB to address and overcome technical issues that may arise.

The following persons already confirmed their preparedness to take a seat in the RESIN External Advisory Board:

- 1 Prof. Pier Vellinga, Director Knowledge for Climate/Wageningen University and Research.
- 2 Birgit Georgi, European Environment Agency (confirmation after approval)
- 3 Nancy Saich (or colleague), European Investment Bank (confirmation after approval)

### ***Decision making/milestones***

A detailed description of the responsibilities of GA and EB and the decision making process (including voting procedure) will appear in the Consortium Agreement (CA, based on the DESCA model for Horizon 2020), that will be signed by all partners before the official start of the project.

The Coordinator (TNO) is responsible for the overall management of the project, including the administrative tasks and all contacts with the EC and the Project Officer. The PM at TNO will

coordinate all technical activities (including progress reporting), organise and chair the meetings of the GA and EB managing bodies, assist in coordinating the dissemination and exploitation activities, and represent the project in public exposure and media contacts. The WP Leaders coordinate the technical work in the WPs (including contribution to reporting), identify IPR issues and opportunities, organise WP meetings and contribute to the dissemination activities. In the case of technical problems at WP level, the WP Leader should be notified as soon as possible. The WP Leader will initiate all actions necessary for reaching a solution or decision in consultation with the researchers involved and the PM.

The GA is the highest management body and decides on:

- major changes of the work plan (such decisions always need consultation with the EC Project Officer),
- major budget shifts (between partners or WPs),
- entrance or exit of partner(s),
- IPR issues,
- change of Coordinator or WP Leader,
- any unforeseen major non-technical issues.

At project technical level the EB is responsible for decision-making and the monitoring of technical progress. More specifically, the tasks of the EB are:

- monitor and discuss the overall progress (timely meeting of deadlines),
- discuss and decide on technical problems when two or more WPs are involved,
- discuss and update the possible risks in the project and contingency plans,
- approval of deliverables and progress reports, and assessment of milestones,
- coordination of meetings and conference visits,
- prepare issues that should be decided by the General Assembly, e.g. IPR and major changes in work plan.

A major tool for making technical decisions during the execution of the project is the assessment of identified milestones. For this project the milestones and the associated means of verification are assembled in table 3.2a. On approaching the dates indicated in the table, the involved WP Leaders and collaborators will evaluate the progress towards the identified milestones. The accomplishment of the milestone will be decided upon during an EB meeting. Whenever necessary, the workplan will be modified as a result of the milestone decision. Major changes of workplan will be communicated to the EC Project Officer as soon as possible, and adequate steps will be taken to proceed in the best way in order to achieve the project objectives.

The above described organisational structure and decision-making mechanisms rely on an effective communication within the consortium. The communication strategy will be based on three pillars: day-to-day communication, web-based communication, and the project meetings.

The day-to-day communication between the partners will mainly take place by telephone and e-mail. The PM will actively stimulate and facilitate a smooth communication and interaction between all researchers involved in the project.

Web-based communication will consist of an external, public website and an internal, password restricted web-based shared working environment (e.g. SharePoint-based). On the internal site all relevant project documents (reports, meeting minutes, presentations, etc.) will be posted and project members will have access to download and upload data and documents.



In addition, the following project meetings will be organised:

- Kick-off meeting at the start of the project for all project members;
- GA meetings, at least once a year;
- EB meetings, at least 4 times a year, face-to-face or by telephone conference;
- General technical progress meetings, at least 2 times a year;
- WP meetings, whenever considered necessary for the progress of the WP;
- Review meetings (to be organised by PM in agreement with the EC Project Officer), at the end of each reporting period (12 or 18 months).

In order to obtain maximum efficiency, the various meetings will as much as possible be organised in conjunction, e.g. GA and EB meetings will be combined with review meetings or general progress meetings.

The reported organisational structure, together with the outlined communication approach, is expected to be highly appropriate to manage the RESIN project.

### ***Ethics and Security Assurance***

RESIN will establish an **Ethics and Security Advisory Group (ESAG)** for the project and the project team to comply with ethical standards, and to assess that the deliverables and dissemination materials produced do not contain classified information (foreground). An ethics and security assessment procedure will be included in the quality management procedure for all deliverables. The ESAG will be composed of ethics and security experts from consortium partners, and report to the project coordinator and the general assembly.

### ***Quality assurance***

All partners will perform their part of the work according to their internal quality control and assurance procedures, e.g. with respect to experimental procedures and review of reports. If necessary, quality issues will be on the agenda of the EB meetings, possibly resulting in preventive or corrective actions. The overall quality of the execution of the research programme is also controlled by the use of milestones and deliverables, and updated timetables within the project. The WP Leaders will regularly (at least monthly, e.g. by telephone conference) inform the PM on the detailed progress of the WP, on the status of milestones and deliverables, and on possible problems or delays. All deliverables have to be approved by the EB. The milestones will be assessed by the EB and, if appropriate, decisions or selections will be approved.

### ***Innovation management***

The degree of innovation that can be reached by the results of the project, does not only depend on the technical achievements, but also on the market needs and parallel technical developments. Therefore, the project partners will keep abreast of the newest developments with regard to market requirements, product and process innovations and scientific/technical publications in their respective research areas. WP Leaders will actively collect any such developments; the Executive Board will evaluate the possible need for modification of the research programme in order to maintain the innovative perspective of the project. Apart from this response to external developments, also internal accomplishments like an unexpected technical invention that might lead to even more impact than the originally planned solution, will be assessed for possible upgrading of the research programme. Eventually, the General Assembly will approve such innovation-driven (proposals for) changes to the research plan and, if necessary, the Coordinator will take appropriate action towards the EC.

## ***Critical risks***

In view of the highly innovative character of the proposed research, several risks are identified that may occur during the implementation of the RESIN project. The most important risks are summarized in Table 1.3.5.

The monitoring of these risks, and the reporting of new, as yet unidentified risks, will actually be a task of everyone involved in the associated part of the work plan. In the end it is the responsibility of the Executive Board to assess the possible occurrence of the risks, and to decide on the mitigation measures or, eventually, a modification of the work plan.

The prevention of problems, avoidance of deviations from the project work plan, and mitigation of any risk arising as well as enhancement of the project success is an important task of project management in general. The risk and contingency plan provides methods and establishes roles and responsibilities of all participants in the process in order to achieve this task.

The partners in the RESIN consortium have an impressive track record of collaboration projects under national and international programmes. They have a high degree of confidence in each other's capabilities. To execute the project all partners have assigned experienced senior people that will play an active role in the execution of the project and directly supervise junior researchers.

Access to and involvement of stakeholders in both public and private sectors, whether they are end-users or providers of security solutions, R&D organisations or regulators, is of utmost importance. Naturally, this broad network is available through the composition of the consortium itself. In the preparation of this proposal the various stakeholder communities have already been involved and consulted; and for (all) case studies aimed to demonstrate and assess the RESIN Risk Analysis approach stakeholders have already made commitments to support and contribute (see also Annex 2). The composition of the RESIN advisory board and its members that have already accepted a seat (see above), further enforces access to the stakeholder communities, in Europe and beyond.

To further guide and manage eventual conditions that may put the project at risk, at the start of the project, a risk management plan will be developed as part of the overall management work plan. The planning of the RESIN project foresees frequent meetings to monitor progress, stimulate interactions between respective work packages, seek for feedback and exchange lessons learned, and to respect timely delivery of intermediate results, project deliverables and milestones. The risk plan will provide further counter measures to cope with issues as mentioned in table below and to allow the RESIN co-ordinator to take appropriate measures that will be taken, after consulting the project partners, in the case of deviations of the work plan.

Elements of the management work plan will entail roles and responsibilities for proper execution of the RESIN Project and will distinguish between:

- **Persons responsible for deliverables:** who will identify risk, develop mitigation strategies and contingency plans for their tasks and monitor risk. They report potential risk factors to their Work Package Leader.
- **Work package leaders:** who will consolidate risk, and develop mitigation strategies and contingency plans on work package level. They report potential risk factors to the Project manager and other WP Leaders (see also ch2.1).
- **Project Manager:** who is responsible for the risk management of the whole project. He/she identifies risk, develops mitigation strategies and contingency plans, monitors risk and



reports risk status in the periodic progress reports to the EU, including planned contingency measures.

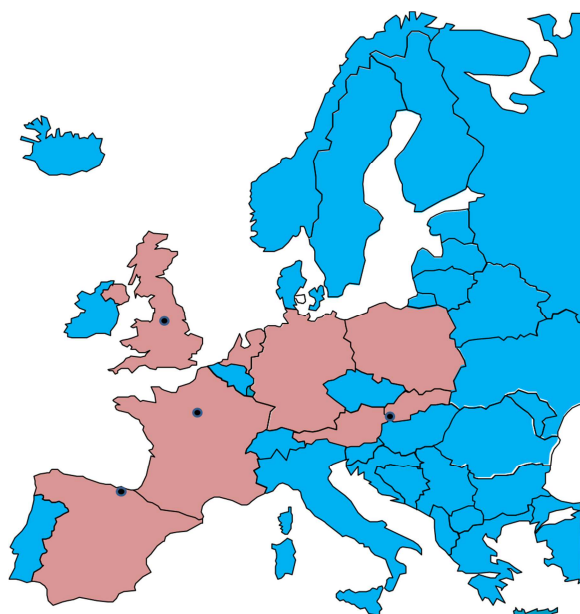
- Table 1.3.5 shows a basic risk assessment that will evolve during the project and eventually cover the then foreseeable risk of the project. Risk for the RESIN project at large will be assessed using a three-point scale (low, medium and high). The project's risk and contingency plan will provide a set of forms to specify risk and document status of risk.
- The RESIN consortium holds all partners to deal with the risk factors as sketched in the contingency plan. This initial contingency plan will be developed further during the implementation of the project.

### 3.3 Consortium as a whole

#### Capability to perform networking and research coordinated on a high level

The RESIN consortium brings together respected researchers with a background in urban climate adaptation (such as Univ. of Manchester, Tecalia, TNO, Arcadis) with those experienced in risk assessment of vital infrastructures (Fraunhofer, TNO, Siemens). This complementarity is necessary to serve the cities and related stakeholders with an integrated approach to impacts, vulnerability and adaptation options.

The team has been participating (or even had a leading role) in national and European research programmes covering all relevant domains of the proposal (see Annex 1): Impacts of extreme weather and climate change, urban climate, vulnerability assessment, risk and risk analysis and crisis management, adaptation options, and in standardisation. With regard to the different impacts of climate change the consortium covers geographically a line of seven countries from the Southwest to the Northeast in Europe, including the most relevant different climatic conditions in Europe.



**Figure 13:** RESIN Consortium Composition and Distribution throughout Europe

The composition of the consortium reflects different roles in the development of adaptation strategies: two academic institutions and three Research and Technology Organisations (RTO's) represent the development of fundamental and applied knowledge on climate adaptation. Arcadis and BC3 are two different sized consultancies which deliver this knowledge to the cities and other customers. Siemens and ITTI are again a large and a small business that deliver the technical support for managing cities, implementing the knowledge. Finally the consortium includes four cities, that are in the process of developing their adaptation strategy, as full partners. ICLEI is the experienced networking partner that ensures that all knowledge, tools and materials get distributed and used by other cities in Europe. UniResearch brings project management capacities to ensure that the consortium will deliver. It has a broad portfolio of EU projects in which it provides management coordination and dissemination support with project examples such as ENERGEO, ASTERICS, THORAX, and ASPECCS.

All of the partners know the issues that the proposal addresses (lack of harmonisation, scattered knowledge, lack of connections between sectors, infrastructures and other elements of the city) from practical experience and are strongly committed to join forces for achieving the Project's aims and objectives.

In turn, each partner has a stake in implementing the outcomes of the project. The business partners play a role in ensuring that the outcomes of the project can easily be included by other consultancies or technical companies in their working practice. The results will, of course, be freely available for other companies as well. The partner cities will be the exemplars for the implementation of the tools and will have an active role in the dissemination to peers. NEN, as part of the standardisation community, will take the work forward towards formal standardisation processes, if appropriate. NEN will also liaise with standardisation of efforts at EU-level. The research organisations will through their articles, presentations and publications ensure the incorporation of the acquired knowledge in practices of others.

Most of the partners have worked together in different groupings in other projects; for example, ICLEI, Arcadis and the University of Manchester have been involved in the EU Cities Adapt project; TecNALIA and ICLEI are partners in FP7-RAMSES; TNO, Fraunhofer and ITTI are partners in FP7-Predict; TNO, Arcadis and EIVP work together in the climate KIC project Urbanlab.

### **Excellence – Critical mass of CIP expertise and links to all major activities**

The partners in the consortium bring a wealthy range of relevant expertise and experience (see Table 3.2c for an overview of competences and technologies the consortium is offering). They have been and are engaged in many research activities related to climate and extreme weather, critical infrastructure protection, urban planning, crisis management and policy analysis and support for national and international and European programmes. An illustrative overview of (international) projects the RESIN partners are/were active in, and relevant publications, is provided in Part B chapter 4 of this proposal (partner descriptions) and in the attached Annex 1..

This critical mass of expert know-how will further be complemented by the advice of the Advisory Board, through network meetings and workshops with local stakeholders for respective case studies. RESIN furthermore welcomes experts and stakeholders that are engaged in related projects under this call to mutually share and further strengthen respective project's activities and achievements.

### **RESIN Capabilities and Competences**

Table 3.2c summarises the relevant competences that the respective partners bring together into the RESIN consortium. Within the project, each partner has particular areas of interest but (though not mentioned in this table) has additional back-up capabilities within their organisations for other areas.

Through its partners, RESIN offers an international network to all the relevant stakeholder categories, be they end-users, providers of solutions, regulators, national and international institutions and R&D Organisations. The table also shows the complementarity of participants' technological expertise and domain know-how. A certain overlap is required in order to enable effective collaboration on all the joint activities.

Partner	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15/ 16	17
Competence Areas and Technologies	TNO	Fraunhofer	Tecnalia	ICLEI	EIVP	ITTI	NEN	ARCADIS	BC3	Bratislava	UniMan	UniBA	Bilbao	Manchester	Siemens	UniResearch
<b>Climate and Climate Change</b>																
Climate change impacts and scenarios	V	V	V		V			V		V	V	V	V			
Urban Climate measurement/modelling	V		V		V					V	V					
<b>City (infra)structures and adaptation options</b>																
Energy systems		V	V		V		V	V							V	V
Water (drinking and sewerage)		V		V	V		V	V		V					V	
Transport	V	V	V	V		V	V	V			V			V	V	V
ICT		V				V	V								V	
Resilience Build-up areas	V	V	V	V	V			V	V	V	V	V		V	V	V
Humans	V		V	V				V		V		V		V		
<b>Vulnerability and Risk Analysis</b>																
Vulnerability assessment	V	V	V		V	V		V		V	V	V	V		V	
Risk analysis	V	V			V	V	V	V		V	V	V	V	V	V	
Impact models (incl. cascading)	V	V	V		V							V			V	
Economic analysis	V	V	V			V		V	V					V	V	
<b>Urban planning/Policy and Planning and Decision Support</b>																
Policy Analysis			V	V	V			V	V	V	V	V	V			
Societal Cost Benefit anal.	V	V	V					V	V							
Participatory Methods			V	V	V		V	V	V	V		V		V		
Decision Support Models	V	V	V	V	V	V		V			V	V			V	
Standardisation		V		V	V		V									
<b>Project management</b>																
Project Management	V	V	V	V	V	V	V	V		V	V	V	V		V	V
Dissemination		V	V	V			V			V		V	V		V	V

**Table 3.2c:** Summary of Competences within the RESIN consortium

### Partners' responsibilities within RESIN

All RESIN partners are highly committed to the tasks assigned to them. All the roles of the project management structures are assigned to lead scientists of the participating organisations. The following table details the commitments of all partners in RESIN.

Participant		Role, Responsibilities and Contributions
Nr	name	
1	TNO	Project Coordinator, lead WP 8 (project management) and WP6 (DSS). Responsible for delivery of DSS and thereby for the integrated approach throughout the programme. Contributions from risk assessment and vulnerability viewpoint to WP1,2,3, on infrastructures and the built environment. Delivering Certification study in WP5.
2	Fraunhofer	Lead WP2 (vulnerability). Responsible for delivery of IVAVIA. Contributing risk assessment knowledge to WP1, adaptation options for critical infrastructures to WP3, and vulnerability tools for the DSS.
3	Tecnalia	Lead WP3 (adaptation options). Responsible for delivery of the catalogue of adaptation options. Contributing to support for the city of Bilbao.
4	ICLEI	Lead WP4 (city cases) and 7 (dissemination)
5	EIVP <sup>38</sup>	Support to the city of Paris in testing the tools, risk assessment and vulnerability approaches contributions to WP1,2. Studies on adaptation options for WP3.
6	ITTI	Responsible for the IT side of the DSS. Contributing to the online development of the city typology
7	NEN	Lead WP5 (Standardisation). Responsible for all reports documenting the feasibility of standardization and contacts with the CEN.
8	Arcadis	Responsible for ensuring that all project results will be useful for consultancies. Contributing to the DSS.
9	BC3	Support to the city of Bilbao in testing the tools. Contributing the economics for the Adaptation options (WP4).
10	Bratislava	Testing City in WP4, contributing to dissemination of results
11	UNIMAN	Lead WP1 (Concepts and Approaches). Support to the city of Manchester in testing the tools. Responsible for the research framework and the city typology. Contributing studies for the catalogue of adaptation options.
12	UNIBA	Support to the city of Bratislava in testing the tools. Contributing to the catalogue of adaptation options and the development of the vulnerability assessment.
13	Bilbao	Testing City in WP4, contributing to dissemination of results
14	Manchester	Testing City in WP4, contributing to dissemination of results
15/ 16	Siemens	Responsible for data aspects of the DSS. Contributing to supporting cities in using datawarehouse systems in managing risks.
17	Uniresearch	Support for the coordination
	All parties	contribute to various dissemination activities of the Project (WP7), be it in workshops with stakeholders, through publications and wider dissemination activities. Parties take part in the various project management structures and activities (WP8).

**Table 3.2d:** Partner's responsibilities within the project

<sup>38</sup> Paris is testing City in WP4 and as such partner in the project; the budget and administration for the departments in Paris are, however, arranged through partner EIVP.

## **S&T coordination**

The TNO organisation coordinator for the RESIN project, is highly experienced in all aspects of coordination of these type of projects, both from a technical and from an administrative point of view and has an impressive track record of FP7 projects run under TNO coordination (within the Security Domain alone examples such as CPSI, SPIRIT, XP-DITE, CASSANDRA, BESECURE, INTACT).

In addition, several of the lead scientists and managers within the RESIN consortium have experience in coordinating EU projects and, thus, are familiar with the procedures, the tasks, and the management and reporting requirements of such projects. All partners are experienced in working in EU projects, and all of the lead scientists have worked in more than one EU project. This experience will be beneficial for the cooperation within RESIN and for a smooth implementation of the project

## **Financial coordination**

TNO has several decades of experience in administering EU and other publicly funded projects. It provides support in the proposal phase for project coordinators, including consulting, budget calculations, preparation of proposal part A, and ECAS uploads. During project execution, the administration takes care of most aspects of financial management, prepares financial statements, and conducts related communication with the EU.

## **Sub-contracting**

RESIN does not foresee subcontracting. Activities with respect to communication/dissemination , such as designing logo, banner and hosting RESIN website, and auditing services are considered “purchase of other services” under other direct costs.

## **Other countries**

The RESIN consortium does not include partners from “other countries”.

## **Additional partners**

In the planning of the RESIN program of work no provisions for additional partners have been made. This however does not exclude other parties to associate with the RESIN program and to participate in RESIN developments. This holds especially for (partners from) consortia for which the Commission has explicitly requested for coordination. Coordination actions further to be defined during the negotiation phase, will for example include information exchange, back-to-back project team meetings, and mutual participation in workshops and conferences.

### 3.4 Resources to be committed

**Table 3.4b:** ‘Other direct cost’ items (travel, equipment, other goods and services, large research infrastructure).

Partners for which the ‘other direct costs exceed 15% of respective personnel costs:

<b>1 TNO</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel etc</b>	195.732	TNO’s budget includes travels and per diem, other meeting costs, costs associated with advisory board, and costs of large research infrastructure compensation (LRI, see below).
<b>Total</b>		
<b>4/ICLEI</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel etc</b>	268.200	ICLEI’s budget includes reimbursements and meeting costs for a large number of city and stakeholder meetings.
<b>Total</b>		
<b>12 UNIBA</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel etc</b>	28.500	The large number of meetings in the project combined with relatively low rate personal costs creates a high share of other costs for this partner.
<b>Total</b>		
<b>17 Uniresearch</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel etc</b>	26.133	Travel costs and license fees for the use of EU-FIN (software for keeping track of project cost, progress and deliverables in accordance with EC rules & guidelines) and ProjectPlace (a secure online management tool, a virtual document management system and communication tool empowering project partners to achieve the Resin goals).
<b>Total</b>	518.565	

#### Detailed breakdown ‘Other direct costs’ per partner exceeding the 15% limit

<b>TNO</b>	<b>Cost (€)</b>	<b>Breakdown</b>
Travel costs	76.800	71 trips are foreseen for TNO in the course of the project. By assuming €800 average costs for travel in Europe, the sum amounts to €56.800. In addition, travel costs for Advisory Board members (25 trips in total) will be covered by TNO.
Large Research Infrastructure Compensation	102.932	TNO has opted for the LRI scheme in the Participants database of the EC (see below).
Other costs - Audit - Publication - Meetings	7.500 1.500 7.000	Open Access costs Meeting costs for all work packages except wp4 and 7 (covered by ICLEI) are administered by TNO. With 34 meetings scheduled and €250 average costs per meeting (e.g.venue and

		catering) this amounts to €8.500. However, €1.500 has already been subscribed to Fraunhofer, as required by their administration.
<i>Total 'Other Direct costs'</i>	195.732	=36% of direct personnel costs

ICLEI	Cost (€)	Breakdown
Travel costs	51.200	64 trips are foreseen for ICLEI in the course of the project. By assuming €800 average costs for travel in Europe, the sum amounts to €51.200.
Audit costs	8.000	
Meeting costs WP4	27.000	€6.750 per city for case study workshops (venue, catering, etc.)
Meeting costs WP7	182.000	In addition to the meetings in other wp's, 10 extra meetings are foreseen for wp 7 for knowledge transfer workshops, stakeholder dialogues and the final conference. Costs include venue, catering, etc.. Also included in these costs are travel costs for representatives of tier-2 cities and speakers at the final event.
<i>Total 'Other Direct costs'</i>	268.200	=63% of direct personnel costs

UNIBA	Cost (€)	Breakdown
Travel costs	24.800	31 trips are foreseen for UNIBA in the course of the project. By assuming €800 average costs for travel in Europe, the sum amounts to €24.800.
Other costs	3.700	consumables and supplies, publications, translations, postal, services and repairs of equipment
<i>Total 'Other Direct costs'</i>	28.500	=31% of direct personnel costs

Uniresearch	Cost (€)	Breakdown
Travel costs	13.600	17 trips are foreseen for Uniresearch in the course of the project. By assuming €800 average costs for travel in Europe, the sum amounts to €13.600.
Other costs	12.533	License fees for the use of EU-FIN (software for keeping track of project cost, progress and deliverables in accordance with EC rules & guidelines) and ProjectPlace (a secure online management tool, a virtual document management system and communication tool empowering project partners to achieve the Resin goals)
<i>Total 'Other Direct costs'</i>	26.133	=26% of direct personnel costs



**Table 3.4b:** ‘Costs of large infrastructure’

1/TNO	Cost (€)	Justification
<b>Large research infrastructure</b>	102.932	<p>“Large infrastructure” in terms of laboratory and testing facilities may be used in the RESIN project in task 3.1.2 and 3.1.3 when it comes to determining the effects of certain adaptation measures.</p> <p>TNO has opted for the LRI scheme in the Participants database of the EC. The LRI scheme has not yet been positively assessed by the Commission. This is in process and in conformity with the procedure which is communicated through the EC. This means that the following steps could be identified:</p> <ul style="list-style-type: none"> <li>- Step 1: validation phase: <ul style="list-style-type: none"> <li>o opting for the LRI scheme in the Participants database(performed by TNO)</li> <li>o Sending asked documents to the EC</li> </ul> </li> <li>- Step 2: Methodology compliance: <ul style="list-style-type: none"> <li>o an on the spot audit by the EC auditors</li> <li>o After this audit the EC will give a positive or negative outcome of the assessment.</li> </ul> </li> </ul> <p>The start of step 2 depends on the timing of the EC. It is understood that the outcome of the assessments is clear before the first financial reporting period is a fact.</p>

## Section 4: Members of the consortium

### 4.1. Participants

Participant No	Participant organisation name	Short name	Country
1 (Coordinator)	Nederlandse Organisatie voor Toegepast Natuur-Wetenschappelijk Onderzoek TNO (Netherlands Organisation for Applied Scientific Research)	TNO	NL
2	Fraunhofer-Gesellschaft zur Foerderung der angewandten Forschung e.V	Fraunhofer	DE
3	Fundación Tecnalia Research & Innovation	Tecnalia	ES
4	ICLEI - Local Governments for Sustainability e.V	ICLEI	DE
5	EIVP (School of Engineering of the City of Paris)	EIVP	FR
6	ITTI Sp. z o.o.	ITTI	PL
7	Stichting Nederlands Normalisatie Instituut (Standardisation Institute of the Netherlands)	NEN	NL
8	Arcadis Nederland BV	Arcadis	NL
9	BC3 Basque Centre for Climate Change - Klima Aldaketa Ikergai	BC3	ES
10	Hlavné mesto Slovenskej republiky Bratislava (Bratislava – Capital city of the Slovak Republic)	Bratislava	SK
11	The University of Manchester	UNIMAN	UK
12	Univerzita Komenského v Bratislave (Comenius University of Bratislava)	UNIBA	SK
13	Ayuntamiento de Bilbao (City of Bilbao)	Bilbao	ES
14	Oldham Metropolitan District Council (representing the Greater Manchester Area)	Manchester	UK
15	Siemens Aktiengesellschaft Österreich	Siemens AT	AT
16	Siemens Aktiengesellschaft	Siemens DE	DE
17	Uniresearch BV	Uniresearch	NL

**Table 4.1:** List of participants in the RESIN project



#### 4.1.1 TNO

<b>Organisation full name:</b>	Nederlandse Organisatie voor Toegepast Natuur-Wetenschappelijk Onderzoek TNO
<b>Organisation short name:</b>	TNO
<b>URL:</b>	<a href="http://www.tno.nl/">http://www.tno.nl/</a>

**TNO (Nederlandse organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek)** is one of the major contract research organisations in Europe. With a staff of approximately 3500 and an annual turnover of 580 million Euros, TNO is carrying out research in order to achieve impact on the following five themes: Industry, Health, Safety & Security, Urbanisation and Energy.

TNO functions as an intermediary between basic research organisations and industry. By translating scientific knowledge into practical applications, TNO contributes to the innovation capacity of businesses and government. TNO is involved in many international projects (about 30% of the market turnover), including EU-funded collaborations, be it research or service contracts, for the European Commission, the European Parliament or European agencies.

In the theme of Urbanisation applied research is carried out for both buildings and infrastructure and the overarching urban development:

- *Buildings and Infrastructure*: reducing use of material; innovative concepts for constructing, managing, renovating and maintaining buildings; new methods for sustainable infrastructure; developing energy-efficient buildings and installations;
- *Urban Development*: sustainable solutions for resource efficiency and climate-proofing; smart concepts for environmental quality and health in liveable cities; integrated solutions for cities.

TNO's expertise covers relevant technological aspects, business and policy innovation as well as user behaviour. TNO was consortium leader for two large Dutch projects on adaptation strategies for both cities (Climate Proof Cities) and infrastructure (INCAH), financed by the Dutch knowledge for Climate programme. TNO was involved in the climate risk analysis for the Dutch government for ICT, energy and transport infrastructure and in European projects related to risk governance, stakeholder engagements, risk analyses and modelling.

In the Theme Safety and Security TNO is renowned for its national and international studies on Critical (information) Infrastructure Protection and Crisis Management with national projects as KWINT, Quick scan on CIP, Vital Node Risk Analysis in the Energy Sector, and EC co-funded projects as VITA, CI2RCO, IRRIS, DIESIS, RECIPE and CIPRNet. On these projects, TNO's threat taxonomy for CI (CI), and its daily maintained database with CI disruptions worldwide, TNO has gained a deep knowledge of CI topologies, cascading effects, and disruption risk. For the National Risk Assessment analyst group, TNO develops and exploits scenarios to assess existing / emerging threats, their impact at national / regional / local risk level, and to determine capability requirements to counter such threats through prevention, protection and other measures. TNO is a member of EARTO, the European Association of Research and Technology Organizations, a network of about 350 RTOs from across the European Union and associated countries.

##### *Main tasks*

As Project coordinator TNO will lead WP 8 (project management) and be responsible for coordination and communication within the consortium and towards the EU. TNO will be assisted in this task by Uniresearch. TNO is also leader of WP 6 (Decision Support Tools) and will develop various types of decision support methodologies. In WP1 (Conceptual Framework) TNO will cooperate closely with UNIMAN, creating the conceptual framework that will lay the foundation

for the project. As such, TNO will provide input for the development of urban typologies and linking this to the decision support systems. In WP 2 and 3 TNO will bring in previous experience with vulnerability assessments and adaptation options.

#### *Persons carrying out the research*

**Peter Bosch** (Drs.) (male) has a wide ranging experience in climate change mitigation and adaptation. He is scientific coordinator of the Climate Proof Cities project, a large scale research project in The Netherlands aimed at generating knowledge for preparing Dutch cities for the impacts of climate Change. He has coordinated and contributed to reports to the Dutch government (Delta Program) on resilience of urban areas. He has an interest in sustainable urban development and has recently completed an assessment tool for evaluating innovative projects in low carbon, resilient city development. Before joining TNO, he was coordinator and editor of the 2007 report of the Intergovernmental Panel on Climate Change (IPCC) working group III on mitigation of climate change. He also served in the author team of the IPCC 4th Assessment Synthesis Report. Before he was employed at the European Environment Agency in Copenhagen as a specialist on sectoral and environmental sustainability indicators.

**René Willems** (Ir.) (male) held various TNO management positions, including Head of the Operational Research and Business Management Division at TNO-FEL. He was involved in and responsible for a series of international cooperation programs, and was chairman of NATO RTO's Panel on Studies, Analysis and Simulation. He erected the Hague Centre for Strategic Studies (HCSS). He developed concept of and contributed to the development of the national network of triple-helix parties in the field of Security, the Hague Security Delta.

**Nienke Maas** (Ir.) (female) is a senior consultant with a high strategic profile. She has broad experience in the field of implementing technologies in the built environment by working in several domains, like mobility and infrastructure, building process innovation, spatial development, climate adaptation. Her specific interest is development of policies and strategies for cities to deal with future challenges and the implementation of policies and measures in societal and institutional context. She works as project leader for science-practice projects as "Risk management for municipalities", "Climate robust infrastructure networks" and "Zero Energy districts". In these projects she combines skills for knowledge-development, management and consultancy and connects policy makers with scientists. She graduated as Master of Civil Engineering in 1997.

**Vera Rovers** (MSc) (female) is an expert in sustainable urban development focusing her research on climate adaptation and urban metabolism. She has produced several overview reports on resilient cities for the Climate Proof Cities project and improved the coherence and quality of the programme as a whole. In this programme she also organised conferences and consortium events. In addition, she has been working in several other projects related to urban climate adaptation (heat and drought stress model development, valorisation of outcomes, mitigation-adaptation relations). Before she has worked for environmental consultancies in Spain and the Netherlands, also focusing on sustainable urban development. She graduated in Biology at the University of Leiden in 2006.

#### *Relevant publications/products/services/achievements*

- Bosch, P.R., Hoogvliet, M., Goosen, H., Hoeven, F. van der (2011). Fysieke bouwstenen voor de knelpuntenanalyse nieuwbouw en herstructurering. Rapport Climate Proof Cities consortium, TNO-060-UT-2011-01826.
- R.A.W. Albers, P.R. Bosch; B.J.E. Blocken; A.A.J.F. van den Dobbelsteen; L.W.A. van Hove;

T.J.M. Spit; F. van de Ven; V. Rovers (2014). Overview of challenges and achievements in the Climate Proof Cities programme. Building & Environment (accepted)

- Pruyt, E., Wijnmalen, D., 2010. National risk assessment in the Netherlands a multi-criteria decision analysis approach, Lecture Notes in Economics and Mathematical Systems 634, pp. 133-143
- Fischer, K., Riedel, W., Häring, I., Nieuwenhuijs, A.H., Crabbe, S., Trojaborg, S., Hynes, W. & Müllers, I. (2012). Vulnerability Identification and Resilience Enhancements of Urban Environments. In Future Security : Proceedings 7th Security Research Conference, Future Security 2012, Bonn, Germany, September 4-6, 2012. (pp. 176-179). Berlin : [etc] : Springer. doi:[http://dx.doi.org/10.1007/978-3-642-33161-9\\_24](http://dx.doi.org/10.1007/978-3-642-33161-9_24)
- Groot, A.M.E., Bosch, P.R., Buijs, S., Jacobs, C.M.J., Moors, E.J. (2014). Integration in urban climate adaptation: Lessons from Rotterdam on integration between scientific disciplines and integration between scientific and stakeholder knowledge. Building and Environment (in press).

#### *Relevant previous projects/activities*

- **Climate Proof Cities**

TNO coordinates the 4-year research programme Climate Proof Cities (CPC) which is one of the themes within the Dutch research programme Knowledge for Climate. CPC aims at strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and to develop strategies and policy instruments for adapting Dutch cities and buildings. The consortium addresses the questions:

- How does the local climate work in Dutch cities??
- How vulnerable are Dutch cities to the effects of climate change?
- Which measures can be taken in order to better adapt cities to a future climate?
- How can these measures be implemented in urban areas?
- What is the final cost-benefit balance of the adaptation measures?

In order to answer five main research questions, researchers with diverse backgrounds and from different research institutes are working within the consortium on around twenty sub-projects. To enlarge the practical applicability, the researchers are collaborating on 4 case studies in different Dutch urban areas: Rotterdam, Haaglanden, Amsterdam, Arnhem/Nijmegen, Brabant and Utrecht.

- **INCAH (Infrastructure and Networks, Climate Adaptation and Hotspots)**

TNO coordinates the INCAH research programme, one of the themes within the Dutch research programme Knowledge for Climate. The objective of INCAH is to gain insight into the effects of climate change on the Dutch transport, energy and drinking water infrastructures, and to develop robust strategies to allow these networks to maintain their function, adapting to the effects of climate change.

The project has brought together multiple domains and focus on (1) to establish how climate change will impact the different infrastructures (2) to construct models to simulate the effects on the operation of infrastructures, i.e. the reliability, availability, capacity and socio-economic productivity and (3) adopt a network perspective and explore how we can avoid congestion, service interruption, system breakdown and systemic crisis through reinforcing effects rippling through interconnected infrastructures by network design and asset management strategies.

- **Heat and Drought Stress Model (Valorius)**

In order to anticipate to climate change, local governments need to know first which neighbourhoods are vulnerable to climate impacts. This creates a need for climate stress tests, preferable quickscans, to provide insight for policy actions. This project, involving TNO, Tauw, Deltares and Wageningen University, developed a quickscan model which indicates areas that are vulnerable to heat and drought stress and integrates both impacts. The necessary local specific information is commonly available in the Netherlands and can easily be implemented in the model. The vulnerability calculations are based on recent scientific research and are well founded. The resulting heat and drought maps are of high resolution and give good input in discussions on prioritising actions towards climate proof cities.

- **EURAM**

EUropean Risk Assessment Methodology (EURAM) was sponsored by the EPCIP programme. The objectives of EURAM were to Identify basic elements for a EU methodology for general risk assessment, Identify elements for a common methodology for analysis of (inter)dependencies, Support information sharing by defining procedures for creating qualified and trusted expert network. In its final report EURAM describes common elements for risk assessment methods for dependency analysis, and Key success factors for information sharing.

- **VITRUV : Vulnerability Identification Tools for Resilience Enhancements of Urban Environments**

The physical layout of the urban environment can have a huge impact on the security of that environment. Safety has a clear role to play in the urban planning process, but security is often dealt with only superficially or too late in the process. In the EU's VITRUV project, a tool has been developed that enables urban planners to integrate security into their planning processes so that they can resolve potential problems before they even occur.

*Relevant infrastructure/equipment*

n/a





#### 4.1.2 Fraunhofer

<b>Organisation full name:</b>	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
<b>Organisation short name:</b>	Fraunhofer
<b>URL:</b>	<a href="http://www.fraunhofer.de/">http://www.fraunhofer.de/</a>

The *Fraunhofer-Institute for Intelligent Analysis and Information Systems (IAIS)* is part of the Fraunhofer-Gesellschaft that undertakes applied research of direct utility to private and public enterprise and of wide benefit to society.

Its services are solicited by customers and contractual partners in industry, the service sector and public administration. The Fraunhofer-Gesellschaft maintains 67 institutes in Germany, with a staff of some 23,000 and an annual budget of 2 billion €. Roughly two thirds of this budget is derived from contracts with industry and from publicly financed research projects. The remaining one third is contributed by the Federal and State Governments, partly as a means of enabling the institutes to pursue more fundamental research in areas that are likely to become relevant to industry and society in five or ten years' time. The Fraunhofer-Gesellschaft is also active on an international level: Affiliated research centres and representative offices in Europe, the USA and Asia provide contact with the regions of greatest importance to present and future scientific progress and economic development.

The Adaptive Reflective Teams (ART) department of Fraunhofer works within application fields of agent-based technology, covering modelling of large technical, commercial, security or social systems in terms of agent-based paradigms. This includes inherently parallel models of e.g. companies, ICT systems, traffic, environmental systems or military or civil command and control structures. The resulting conceptual models are employed for describing, analysing and optimising these systems. This approach includes posterior analysis as well as online system control, prediction of future system behaviour and investigation of cause-and-effect dependencies. A main application field is **Preventive Security**, including **modelling**, **simulation**, and **analysis** for Critical Infrastructure Protection, simulation systems and **decision support systems** for civil and military purposes, and **risk and vulnerability assessment** for civil and military fields. In recent years, the focus in Critical Infrastructure Protection (CIP) research was on semantic interoperability of distributed federated simulation systems and semantic modelling for decision support systems for SCADA operators for emergency management situations. ART has also a track record in **systems integration** in EU and nationally funded multi-disciplinary projects (including the security research projects IRRIS and DIESIS and the robotics R&D projects DESIRE, MACS, MAKRO, and MAKROplus). Within the DIESIS project, Fraunhofer IAIS also participated in investigating standardisation possibilities for simulation interoperability middleware. Fraunhofer is a member of SISO, the Simulation Interoperability Standardisation Organisation. The aforementioned profile matches the tasks in the RESIN proposal assigned to Fraunhofer.

#### *Persons carrying out the research*

**Erich Rome** (male) is a senior researcher and project manager at Fraunhofer IAIS' ART department. In 1983, he received a diploma in Computer Science (U. Bonn). Thereafter, he worked as a researcher at GMD – National Research Center for Information Technology (merged in 2001 with Fraunhofer), investigating topics in Expert Systems and AI. In 1995, he received a PhD degree in Engineering Sciences from the University of Bremen. From 1995, he has investigated robotic perception, based on machine vision and 3D laser scanning systems. Since 2007, Erich Rome is pursuing several R&D topics, including modelling, simulation and analysis for critical infrastructure protection and multi-sensory systems for surveillance and security.

He published numerous peer-reviewed publications, edited several books and is a member of the steering committee of the conference series CRITIS (Critical Information Infrastructures Security). So far, he coordinated four EU projects, including the Security Research projects IRRIS (temporarily for 7 months), DIESIS and currently CIPRNet. His expertise also includes almost 30 years of R&D in multi-disciplinary contexts and more than 16 years of research in EU projects. **Jingquan Xie** is a researcher at Fraunhofer IAIS. He received the Bachelor of Science in Electric Engineering in 2004 and the Master of Science in Computer Science in 2010 respectively. Currently he is pursuing a PhD degree at the University of Bonn in the area of temporal databases and in-database analytics. Since 2004 he has been working in various industrial and academic research projects. From 2004 to 2006, he worked as an embedded system developer in China for the development of IEC61850-compliant Phase Measurement Units (PMU) for Smart Grids. After the postgraduate study in Computer Science in 2010 he joined Fraunhofer IAIS in Germany. Since then he has been working in several EU and German government funded research projects focusing on Critical Infrastructure Protection (CIP) like DIESIS, EMILI, VASA and CIPRNet. Besides of that, he also worked in the LinkedTV project where his main task was the development of a scalable semantic recommender system by combining Linked Open Data (LOD) and the Description Logic Reasoning. His main research interests are scalable knowledge management, advanced database techniques in particular temporal databases and in-database analytics, and agile full-stack application development.

#### *Relevant publications/products/services/achievements*

- Rome, Erich; Di Pietro, Antonio; Pollino, Maurizio; D'Agostino, Gregorio; Rosato, Vittorio: A global approach to risk assessment of critical infrastructures. 22nd Annual conference of SRA-E (The Society for Risk Analysis - Europe), 2013
- Rome, Erich; Langeslag, Peter; Usov, Andrij: Federated Modelling and Simulation for Critical Infrastructure Protection. In: Gregorio D'Agostino and Antonio Scala (eds): Networks of Networks: the last Frontier of Complexity, Springer-Verlag 2014, Series: Understanding Complex Systems, doi 10.1007/978-3-319-03518-5, p 225–254
- Carbone, Anna; Ajmone-Marsan, Marco; Axhausen, Kay; Batty, Mike; Masera, Marcelo; Rome, Erich: Complexity aided design. European Physical Journal Special Topics 214, 435–459 (2012), EDP Sciences, Springer-Verlag 2012
- Tofani, Alberto; Castorini, Elisa; Palazzari, Paolo; Usov, Andrij; Beyel, Césaire; Rome, Erich; Servillo, Paolo: Using ontologies for the federated simulation of critical infrastructures Procedia Computer Science, Vol. 1 (May 2010), No. 1, Sloot, Peter M.A. (Ed.) et al.: Special issue on ICCS 2010: International Conference on Computational Science, Amsterdam, 31.5.–2.6.2010, revised papers, pp. 2301–2309
- Usov, Andrij; Beyel, Césaire; Rome, Erich; Beyer, Uwe; Castorini, Elisa; Palazzari, Paolo; Tofani, Alberto: The DIESIS approach to semantically interoperable federated critical infrastructure simulation Williams, Edward (Hrsg.) et al.: SIMUL 2010: the second International Conference on Advances in System Simulation, 22–27 August 2010, Nice, France. Los Alamitos, Calif. [u.a.]: IEEE Computer Society, 2010, pp. 121–128

#### *Relevant previous projects/activities*

- **FP6 IRRIS** (GA 027568), IP in Security Research, 1.2.2006–31.7.2009, coordinated by



## Fraunhofer IAIS.

Public life, economy and society as a whole depend to a very large extent on the proper functioning of critical infrastructures (CIs) like energy supply or telecommunication. The EU Integrated Project IRRIS – Integrated Risk Reduction of Information-based Infrastructure Systems – aimed at protecting these infrastructures. The extensive use of information and communication technologies has pervaded other infrastructures, rendering them more intelligent, increasingly interconnected, complex, interdependent, and therefore more vulnerable.

IRRIS contributed to increase dependability, survivability and resilience of these underlying information-based infrastructures by:

- Determining a sound set of public and private sector requirements based upon detailed scenario and data analysis.
- Developing MIT (Middleware Improved Technology), a collection of software components, infrastructure providers.

By supporting recovery actions and increasing service stability in case of critical situations, MIT components will substantially enhance the security of large complex critical infrastructures.

- Building SimCIP (Simulation for Critical Infrastructure Protection), a simulation environment for controlled experimentation with a special focus on CIs interdependencies. The simulator will be used to deepen the understanding of critical infrastructures and their interdependencies, to identify possible problems, to develop appropriate solutions and to validate and test the MIT components.
- Disseminating novel and innovative concepts, results and products to other information-based critical sectors.

The interdisciplinary research and development has been performed by a well-balanced European consortium of fifteen partners, ranging from academia over technical consultant and service providers to key stakeholders from the fields of energy supply and telecommunication.

- **FP7 DIESIS** (GA 212830), e-Infrastructures & security research Design Study (STReP), 1.2.2008 - 31.3.2010, coordinated by Fraunhofer IAIS.

Within its 26 months term, the five DIESIS project partners conducted a design study for a new type of research infrastructure, a European modelling and simulation e-Infrastructure named EISAC (European Infrastructures Simulation and Analysis Centre). The facility shall later be used by researchers, security offices and stakeholders of Critical Infrastructures in order to perform modelling, simulation and analysis for investigating a wide range of aspects of European CI, such as telecommunication networks, energy grids, transport infrastructures, financial infrastructures, and more. These vital infrastructures are getting increasingly complex and intertwined, due to legislation and market liberalisation, to economic needs, and due to the increasing use of new information and communication technologies. In order to understand dependencies, to avoid cascading failures of CI, and to better protect CI, more research and cooperation between researchers, security offices, and CI stakeholders is required. DIESIS proposed to establish the basis for the EISAC, based upon open standards, to foster and support research on all aspects of CI with a specific focus on their protection. DIESIS performed a thorough conceptual design study in order to prepare the establishment of such a research e-Infrastructure. The design study delivered two proofs-of-concept: A technical proof-of-concept, demonstrating primarily techniques for coupling different infrastructures simulators and running distributed coupled simulations, and a comprehensive business proof-of-concept, describing the services of the facility, potential customers, and legal, organisational and economic aspects of the trans-national EISAC.

- **FP7 CIPRNet** (GA 312450), NoE in Security Research, 1.3.2013–28.2.2017, coordinated

by Fraunhofer IAIS.

CIPRNet is based on ideas developed in the DIESIS design study and aims at performing the next step towards EISAC. The Critical Infrastructure Preparedness and Resilience Research Network or CIPRNet establishes a Network of Excellence in Critical Infrastructure Protection. CIPRNet performs research and development that addresses a wide range of stakeholders including (multi)national emergency management, critical infrastructure operators, policy makers, and the society. By integrating resources of the CIPRNet partners acquired in more than 60 EU co-funded research projects, CIPRNet will create new advanced capabilities for its stakeholders. A key technology for the new capabilities will be modelling, simulation and analysis for CIP. CIPRNet builds a long-lasting virtual centre of shared and integrated knowledge and expertise in CIP. This virtual centre shall provide durable support from research to end-users. It will form the foundation for the EISAC by 2020.

*Relevant infrastructure/equipment*

Fraunhofer IAIS has accumulated Background from its involvement in relevant national and EU projects. This includes infrastructure and threat simulators, middleware for semantically interoperable federated simulations, architectural approaches for designing complex distributed systems, tools for modelling and risk assessment, and more. Fraunhofer will reuse items of this Background that are deemed relevant for the implementation of RESIN.



### 4.1.3 Tecnia

<b>Organisation full name:</b>	Fundación Tecnia Research and Innovation
<b>Organisation short name:</b>	Tecnia
<b>URL:</b>	<a href="http://www.tecnia.com/">http://www.tecnia.com/</a>

**TECNIA RESEARCH & INNOVATION** is a private, independent, non-profit applied research center of international excellence. Legally a Foundation, Tecnia is the leading private and independent research and technology organization in Spain and one of the largest in Europe, employing over 1,400 people (more than 150 of them PhDs).

The whole team at Tecnia has one GOAL: “to transform knowledge into GDP”, meaning to improve people’s quality of life by generating business opportunities for industry. Tecnia is committed to generate a positive impact on environment and society by means of innovation and technological development in various fields, addressed by 7 business divisions, covering the following sectors: Energy, Industry, Transportation, Construction, Health and ICT. Tecnia has been granted over 250 patents and promoted more than 30 spin-off companies.

Tecnia is a key agent in the ERA - European Research Area, holding position 12th among RECs and 26th overall in EC’s 6th FP7 Monitoring Report 2012. Tecnia actively participates in the governing bodies of several European Technology Platforms and partners in 377 FP7 projects, coordinating 81 of them. Tecnia is a member of EARTO and of EUROTECH, linking together the most important research centers in Europe.

Tecnia is an equal opportunity employer. The current ratio of female/male employees is 42/58.

Tecnia’s Energy and Development Division transforms energy and environmental challenges into opportunities of development. We dedicate our RTD activities to the development of technologies, products and tools for a rational and sustainable use of energy focused on clean energy generation and future vectors of the energy sector. The Spatial Development and Urban Sustainability Area within the Energy and Environment Division addresses the main challenges faced by industry and society as a result of climate change from a broad regional sustainability and urban resilience perspective.

The Spatial Development and Urban Sustainability Area holds a consistent record of projects that have contributed to the development of climate change adaptation strategies at the local level. On-going projects (in 2014) include the definition and implementation of a reference framework for the incorporation of adaptation criteria to climate change effects at local scale within the Basque Country, and the production of a roadmap to guide the design and implementation of local municipality plans for climate change adaptation in Spain.

#### *Main tasks*

The extensive expertise matured by Tecnia’s Spatial Development and Urban Sustainability Area in the field of climate adaptation within the urban setting will be deployed in RESIN project mainly through the WP3 – Adaptation options and implementation, which is central to RESIN implementation and falls under Tecnia’s leadership. Tecnia will also have a relevant participation in WP 2 – Methods for impacts and vulnerabilities and WP 4 – City Cases, where several tools will be tested. Tecnia will also contribute to the development of adaptation concepts within WP1, to the development of the DSS within WP6, as well as to the dissemination of project findings through WP7.

#### *Persons carrying out the research*

**Mr Efrén Feliu** (male) is Research Manager at the Spatial Development and Urban Sustainability Area, coordinating research projects in the fields of sustainable spatial development, climate change adaptation and environmental integration policies. Mr Feliu Holds a Building engineering Degree as well as different postgraduates (spatial planning and development, intercultural studies, social psychology and NGO Management). Has a relevant professional background in consultancy and strengthening initiatives for public administrations, specially focused in the fields of local development, spatial planning, sustainable development and climate change policies. He has been working at Central America for over 4 year, and involved in European initiatives for more than 9 years.

**Maddalen Mendizabal** (female) holds a Ph.D. in Biological Science from the University of the Basque Country in the field of Nature Evolution and Landscape Sustainability. Ms Mendizabal has gained extensive experience in the field of GIS and integrated modelling of multifunctional areas. She has engaged in several international research projects in collaboration with Indian and Spanish companies. She has also worked as Responsible of R&D in GIS-TELEDEK (RMSI Indian company) in Spain. She has gained experience in joint-venture projects and technological know-how transference. For the last 3 years she has worked as Project Leader in several projects related to Climate Change and Regional Adaptation strategies in Tecnalía. She has a relevant professional background in Environmental Strategy and Territorial Sustainability and she has been working and involved in European initiatives in last 5 years.

**Juan Ángel Acero** (male) holds a PhD from the Faculty of Urban Planning, University of Kassel (Germany) (2012). MSc in Physical Engineering from the University of the Basque Country (2002). BSc in Physics (focus on Earth Sciences, 1998) from the Complutense University of Madrid. Since joining the Environment Unit of Tecnalía in 1999, he has focused on Atmospheric Pollution, taking part and being responsible for a great number of studies in air quality. During the last four years he has focused on urban climate and thermal comfort at different spatial scales, analysing effects of vegetation, urban morphology and typology.

**Gemma García** (female), BA in Geography from the University of Oviedo (1998). MSc in Environmental Impact Assessment, Environmental Management Systems and Auditing, (2003) from the School of Environmental Sciences, University of East Anglia (UEA Norwich, UK). She joined Tecnalía in 2005 as researcher in the Energy and Environment Division.

Account for more than 8 years of experience in applied research and institutional support in the fields of spatial planning, sustainable territorial development, environmental assessment and management. Her main current research interest and focus is vulnerability and climate change adaptation. She has an widespread experience in European and international projects with multidisciplinary teams and large consortiums.

**Mr Carlos Tapia** (male) holds a Ph.D. in Geography from the University of the Basque Country. Over the last 10 years, Mr Tapia has engaged in several European and international research projects dealing with the design of sustainable spatial development strategies in various Latin American, African and European countries. He has also worked as consultant in various sectors (environmental policies, public finance, local development), and businesses (private, public and academic). He masters a vast range of land information systems, as well as econometric and spatial analysis techniques. Since joining Tecnalía in 2010, Mr Tapia has mainly conducted research on strategic spatial planning, leading several ESPON projects, and has also matured consistent research experience in the fields of environmental risk management and the assessment of urban vulnerability for climate change adaptation.

*Relevant publications/products/services/achievements*

- Dawson, R.J., Wyckmans, A., Heidrich, O., Köhler, J., Dobson, S. and Feliú, E. (2014) Understanding Cities: Advances in integrated assessment of urban sustainability, Final Report of COST Action TU0902, Centre for Earth Systems Engineering Research (CESER), Newcastle, UK. ISBN 978-0-9928437-0-0.

- Olazabal, M., Feliú, E., Herranz, K., Abajo, B., Gonzalez-Aparicio, I., Simon, A., & Alonso, A. (2012). Climate change adaptation plan of Vitoria- Gasteiz, Spain. In K. Otto-Zimmermann (Ed.). Springer.
- Olazabal, M., Feliú, E., Izaola, B., Pon, D., Pooley, M., Alonso-Martin, M., & Castillo, C. (2011). Local Strategies for Climate Change Adaptation: Urban Planning Criteria for Municipalities of the Basque Country, Spain. In K. Otto-Zimmermann (Ed.), (p. 521). Springer.
- Gonzalez-Aparicio, I., & Hidalgo, J. (2011). Dynamically-based daily and seasonal future temperature scenarios analysis for the northern of Iberian Peninsula. International Journal of Climatology, Published . doi:10.1002/joc.2397
- Olazabal, M., Garcia, I., Garcia, G., Abajo, B., Herranz, K., Alonso, A., Coloma, O. S. (2009). Flows, drivers, services and functions and urban typologies: an integrated approach for the analysis of urban eco-systems. Sustainable City V: Urban Regeneration and Sustainability, 117, 183–192.

#### *Relevant previous projects/activities*

- **RAMSES** - Reconciling Adaptation, Mitigation and Sustainable Development for Cities, coordinated by the University of New Castle FP7- ENV (2012-2017).

Research on adaptation to climate change is crucial to better inform and support the development and implementation of adaptation policies and related action programmes at international, European and Member State level. It is well known that the local effects of climate change and the costs and benefits of adaptation vary greatly. Because their social and economic importance makes them particularly vulnerable to climate impacts, the RAMSES project proposal focuses on cities. Thus, RAMSES addresses adaptation issues relevant to the 73% of Europeans who live in urban areas, whilst constraining the focus of the research to a realistically achievable subset of adaptation sectors. The overall aim of the RAMSES project is therefore to develop methods that can operationalize adaptation in European and other cities. This work is being developed in collaboration with cities like London, Rio de Janeiro and Bilbao.

- **OPENNESS** - Operationalisation of Natural Capital and EcoSystem Services: From Concepts to Real-world Applications, coordinated by SYKE FP7-ENV (2012-2017).

OpenNESS brings together a set of European centres of excellence with the interdisciplinary expertise and understanding to critically examine the potential of the concepts of Ecosystem Services and Natural Capital to inform sustainable land, water and urban management at different locales and scales, and across different sectors. It will therefore identify and show where, when and how the concepts can be used most effectively in decision-making.

- **INDRISK** - Updating the methodology of the IADB´s Disaster Risk Indicators IADB (2013-2014).

The objective of this project is to provide empirical evidence of the relationship between reforms in disaster risk management policies at the national level and their impact in terms of risk reduction of disaster losses at the local scales in Latin America. This goal will be accomplished by comparing the evolution of a national indicator of disaster risk management governance recently developed by the IADB (labelled IGOPP) and the historical records of personal and economic damages caused by extreme natural events (including weather events) in Mexico and Colombia. At the local level, the project will rely on a probabilistic approach to risk management designed to identify actions that have been developed as a result of policy reforms at the national level and have contributed to reduce disaster risks in Mexico DF and Bogota, respectively. Efficiency of local risk mitigation actions will be analyzed in terms of averted economic and social losses.

- **CITY-SENSE** Development of sensor-based Citizen’s Observatory Community for improving quality of life in cities, coordinated by NILU FP7 (2012-2017).

CITI-SENSE develops “citizens’ observatories” to empower citizens to contribute to and participate in environmental governance, to enable them to support and influence community and societal priorities and associated decision making. CITI-SENSE will develop, test, demonstrate and validate a community-based environmental monitoring and information system using innovative and novel Earth Observation applications. To achieve this, the project will: (i) raise environmental awareness in citizens, (ii) raise user participation in societal environmental decisions and (iii) provide feedback on the impact that citizens had in decisions. It will address the call’s request for effective participation by citizens in environmental stewardship, based on broad stakeholder and user involvement in support of both community and policy priorities. The project aims to learn from citizen experience and perception and enable citizenship co-participation in community decision making and co-operative planning.

- **Resilient and Sustainable Cities SRA** AERTOs 2011 (2011).

Required by the AERTOs Board, Tecnia coordinated the elaboration of a strategic agenda for the research on sustainability and urban resilience jointly with TNO, Joaneum Research, Fraunhofer and VTT.

*Relevant infrastructure/equipment*

n/a



#### 4.1.4 ICLEI

<b>Organisation full name:</b>	ICLEI – Local Governments for Sustainability E.V.
<b>Organisation short name:</b>	ICLEI
<b>URL:</b>	<a href="http://www.iclei.org/">http://www.iclei.org/</a>

**ICLEI - Local Governments for Sustainability** is the world's leading network on local and regional sustainability. ICLEI is an international association of local as well as regional government organisations that have made a commitment to sustainable development. ICLEI's growing membership comprises more than 1,200 cities, towns, counties, regions and their associations worldwide, of which some 200 are located in Europe. ICLEI works with these and numerous other local governments through performance-based, results-oriented campaigns and programmes to achieve tangible improvements in global environmental and sustainable urban development ([www.iclei-europe.org](http://www.iclei-europe.org)).

ICLEI's European Secretariat is based in Freiburg, Germany and has a staff of around 50 people. ICLEI Europe has a wide range of expertise and extensive experience in European project co-ordination and partnering. It provides technical consulting, training, thematic events and information services to build capacity, share knowledge and support local and regional governments in the implementation of sustainable development. The organisation's basic premise is that locally designed initiatives can provide an effective and cost-efficient way to achieve local, regional, national and global sustainability objectives. Sharing of experiences and the replication of good examples provide a solid foundation for its activities.

Focus topic areas to date include Climate Policy (incl. Mitigation, Adaptation and Energy), Urban Governance and Local Agenda 21, Sustainability and Environmental Management, Biodiversity, Sustainable Procurement, and Water. Typically, ICLEI approaches topics in an integrated fashion, with crosscutting issues such as Adaptation, Waste, Energy, Mobility, Soil & Land Use, Environment & Health, Green Economy and Sustainable Tourism covered.

The range of services that ICLEI offers as an agency includes Campaigning, Research, Piloting & Development, Training & Capacity Building, Networking, Preparation and Management of Projects, Planning & Delivery of Events, Communication & Dissemination, Production of Publications, Online Information and Tools, Consulting & Policy Advice. ICLEI has been lately involved in the 100 Resilient Cities campaign recently launched by the Rockefeller Foundation<sup>39</sup> and acted as a consultant in the cities of Rotterdam (The Netherlands) and Vejle (Denmark) to deliver kick-off workshops, which had the purpose to set the scene for a resilience strategy to be developed by each of the cities.

At European level, ICLEI is known as initiator of the Aalborg process, including Aalborg Charter and Aalborg Commitments. The organization has been involved with EU policy processes (e.g. Thematic Strategies, Covenant of Mayors, Green Capital Award, EU Adaptation Strategy), indicator based performance and monitoring processes (e.g. EEA driven Integrated Urban Monitoring in Europe, Aalborg Commitments, Local Evaluation 21, Reference Framework for Sustainable Cities), the development, testing and rollout of sustainability management and urban governance instruments.

<sup>39</sup> <http://www.100resilientcities.org/>



ICLEI Europe has been dedicating efforts to work on adaptation to climate change in urban areas since 2006, when it launched the CCP (Cities for Climate Protection) Reinforced Strategy for Europe. Since then ICLEI has been increasingly engaging in work on adaptation, understanding it as a fundamental component in the response to climate change.

#### *Main tasks*

Considering all of the above, it is of utmost importance for ICLEI to participate in the RESIN Consortium to co-develop outcomes that can support cities in progressing adaptation and infrastructure protection strategies. In the RESIN Project, ICLEI will be in charge of coordinating the testing of the project outcomes with the core cities combining this with a training on a management framework for adaptation and disaster risk reduction, and of the dissemination and communication campaign, including the constitution of the 2-tier circle of learning and the development and implementation of events. ICLEI has extensive experience in developing training and coaching activities in cities and in the involvement of diverse stakeholders in decision-making processes. To provide but a few examples, during the EU Cities Adapt Project, ICLEI delivered an 8-month training to 21 pioneering cities to develop an adaptation strategy.

#### *Persons carrying out the research*

**Holger Robrecht** (male) is Deputy Regional Director and member of ICLEI's Senior Management Team and responsible for team supervision, strategy and programme development. He holds a Diploma in spatial planning and has more than twenty years of experience with local environmental and sustainability management and planning, project development and co-ordination, team supervision as well as guidance and training. He is a renowned expert for sustainability management, climate adaptation and ecosystem services and has been member of several EU Expert Groups, incl. the EU Expert Group for the Soil Thematic Strategy (2003) and the EU Work Group on Urban Environmental Management Plans and Systems (2004) and the EU Adaptation Steering Group (since 2010).

During his career, Holger has managed and coordinated a large number of European and international projects, thus gaining a vast experience in overseeing project delivery, quality control of delivered service and conflict resolution in project with a similar and/or bigger size than the present tender. He is author and editor of various books and other publications. Before joining ICLEI, he led the Research department Soil Contamination, Soil Protection and Land-use management at the University of Dortmund, Institute for Environmental Research (1990-97).

**Julia Peleikis** (female) is a coordinator at ICLEI in the Sustainable Resources, Climate and Resilience Team. She is responsible for developing, coordinating and implementing projects and services in the topical areas of natural resource management, climate change adaptation and ecosystem resilience as well as supporting the strategic and programmatic development of ICLEI Europe in this field.

Before joining ICLEI, Julia worked for the Baltic Environmental Forum (BEF) Germany as an expert on climate and energy policy with a focus climate change adaptation. She was involved in the development processes of supranational adaptation strategies (EU Adaptation Strategy, Baltic Sea Region Strategy on Adaptation to Climate Change) and supported national governments in the development of national climate adaptation strategies. She furthermore worked on energy efficiency in the residential sector in the Eastern European Neighbourhood (North-West Russia, Belarus and Ukraine). Prior to that Julia was a research assistant at the University of Hamburg

during which time she contributed to the development of the local adaptation strategy and action plan of the City of Hamburg, focusing on questions of governance of climate adaptation and stakeholder involvement.

**Alberto Terenzi** (male) is an Officer within the Sustainable Resources, Climate and Resilience Team. After working on energy and energy efficiency projects and campaigns, Alberto focused on climate change adaptation. As an example, Alberto was in charge of the implementation of the [EU Cities Adapt](#) and [RAMSES](#) projects. Recently, Alberto worked as a consultant for the [100 Resilient Cities Foundation](#), designing and organising resilience workshops in the cities of Rotterdam (The Netherlands) and Vejle (Denmark). Alberto's tasks at ICLEI include communication with project partners and stakeholders, drafting topical studies, and designing and managing training and workshop events. Before joining ICLEI, Alberto worked for the Italian Consulate in Saarbrücken (Germany) and was a contributor to the online review Equilibri.net. Alberto holds an M.A. in International Relations, and an Executive Master's Degree in Renewable Energies, Decentralisation and Energy Efficiency. With a strong background in mitigation and sound experience in European urban adaptation to climate change, Alberto is interested in exploring synergies to develop local integrated adaptation and mitigation plans.

**Gabriel Nock** (male) is an Online Systems Coordinator within the Communications and Member Relations Team. He has 10 years of work experience in the fields of conceptual design and implementation of online projects, including web, software and database development and in the development of interactive web systems (emphasis on Open Source Systems) and administration and development of Content Management Systems (emphasis on Open Source Systems). Gabriel holds a MSc in Computer Science / Computer Engineering.

**Helen Franzen** (female) is Project Officer in the Communications and Member Relations team. She works on various communication and outreach activities for ICLEI and EU-funded projects such as OPTIMUS and PASTA. Her tasks include developing communication strategies, developing promotional materials, publications and online content; editorial oversight and quality control of project websites and newsletters; copywriting, copyediting and moderating social media accounts. Before joining ICLEI in 2013, she gained professional experience in the field of communication with a number of companies and charities including the United Nations Association (UNA) of the UK. Helen holds a MSc in Organisational Management and a BA in European Studies with French.

**Emilie Doran** (female) has worked on various aspects of communication and publications, event and workshop organising, participant and speaker management, and programme development for various local government conferences and projects.

She has had a strong role in organising and managing events such as the ICLEI World Congress 2009 in Edmonton, the 6th and 7th European Conference on Sustainable Cities and Towns Conferences in Dunkerque and Geneva, the Local Renewables 2010 and 2011 Conferences in Freiburg, the ICLEI European Convention in 2011, and more recently EcoProcura 2012 (Malmö, Sweden) and EcoProcura 2014 (Ghent, Belgium). Current events and projects in which she is involved include EcoProcura 2014 and the SOLUTIONS (Sharing Opportunities for Low carbon Urban transportaTION) project. Emilie holds a BA (Hons) in BA Hons in Latin American and Caribbean Studies. Emilie speaks English, French and Spanish, and intermediate German.

*Relevant publications/products/services/achievements*

- **ICLEI, Centre for European Policy Studies, 2013, [Climate change adaptation:](#)**

Empowerment of local and regional authorities, with a focus on their involvement in monitoring and policy design.

Report for the Committee of Regions drafted by ICLEI in cooperation with the Centre for European Policy Studies (CEPS) that includes research on adaptation support needs, challenges and opportunities conducted by way of a survey among a sample of European cities currently working on adaptation, and recommendations arising from this research.

- **ICLEI 2012, [Background paper for the Council of Europe's report on resilient cities](#).** This background paper, drafted by ICLEI aims to give a general overview of the state of cities with respect to global trends in climate and in disaster management, as well as other factors such as demographics and urbanisation, and to analyse the factors that make a city resilient.
- **ICLEI, UNESCO-IHE and International Water Association, 2011.** ICLEI, UNESCO-IHE and IWA have joined forces to publish a handbook on adapting urban water systems to climate change, aimed at decision makers within local governments and utilities. [Adapting urban water systems to climate change – A handbook for decision makers at the local level](#)
- **Ecologic Institute, Berlin/Vienna; AEA group; ICLEI Local Governments for Sustainability, European Secretariat, Regional Environmental Centre for Central and Eastern Europe (REC), 2011.** [Adaptation to climate change: policy instruments for adaptation to climate change in big European cities and metropolitan areas](#). This study evaluates existing best practices based on empirical research of twenty European cities to provide guidance to local and regional administrators and interested stakeholders.
- **100 Resilient Cities: *100 Resilient Cities - Pioneered by the Rockefeller Foundation (100RC)*** is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks – earthquakes, fires, floods, etc. – but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. Examples of these stresses include high unemployment; an overtaxed or inefficient public transportation system; endemic violence; or chronic food and water shortages. By addressing both the shocks and the stresses, a city becomes more able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations. In its capacity as a consultant to the initiative, ICLEI designed, organised and delivered two kick-off workshops in the cities of Rotterdam (The Netherlands) and Vejle (Denmark), which had the aim to set the scene and identify baseline conditions to kick-start the resilience campaigns in these two cities. <http://www.100resilientcities.org/>

*Relevant previous projects/activities*

- **Adaptation Strategies for European Cities (EU Cities Adapt)**

This project was delivered by a team led by Ricardo-AEA with ICLEI, Arcadis and other consortium partners. The aim of this project was to provide capacity building and assistance for cities in developing and implementing an adaptation strategy. This was achieved by raising awareness throughout Europe on the importance of preparing for climate change in cities, exchanging knowledge and good practices, and developing tools and guidance for cities on adaptation. Twenty-one cities directly participated in the project, as peers, trainees and adaptation pilots, setting an example for the majority of the other cities in EU-27. The project enabled some of the least advanced cities to kick-start the development of their adaptation strategies, by engaging their politicians and other stakeholders within their municipal authorities and outside it. They also established working groups to assess the vulnerabilities and impacts of climate change. The project assisted some of the more advanced training cities in developing their adaptation strategies and mainstreaming adaptation within their local policies e.g. by including adaptation to climate change

on the local authority risk register. The key findings of the project were disseminated at the final conference, directly linked to the 2013 Resilient Cities conference. These included policy recommendations for EC as well as recommendations for actions at city level which are being agreed with our client at EC. The legacy of this project includes ongoing commitment to the adaptation agenda by a number of cities, as evidenced by their participation in the Bonn conference on Resilient Cities (May 2014), and adaptation guidance, strategies and tools published on the Climate-ADAPT website (<http://climate-adapt.eea.europa.eu/en/>)

- **Asian Cities Adapt - Impacts of Climate Change in Target Cities in India and the Philippines and Local Adaptation Strategies**

AsianCitiesAdapt provided comprehensive support to local governments in order to improve their resilience to the impacts of climate change. The project brought together science, management and governance to properly inform cross-sectoral policy decision making. This, in turn, supported the achievement of national and supranational objectives on climate change adaptation. The project, led by the ICLEI European Secretariat, brought together science and policy in order to identify the impacts of climate change and to develop concrete local adaptation strategies in four Indian cities as well as four cities in the Philippines. The cities developed a local adaptation strategy and plan to be presented to the local council for endorsement based on a sound vulnerability assessment, the consideration of different options available for adaptation and the definition of targets. Once endorsed, the project partnership supported the cities in selecting and realising pilot projects and in further implementing the plan. In order to share the insights gained by the eight cities, several national knowledge transfer workshops were organised. Furthermore, **briefing notes, case studies, a pocket manual** for decision-making were drafted to reflect the experiences and lessons learned from the project activities and made them available to a broader audience. [www.asian-cities-adapt.org](http://www.asian-cities-adapt.org)

- **Covenant capaCITY - Capacity building of local governments to advance Local Climate and Energy Action – from planning to action to monitoring**

This European capacity building project addressed these gaps at the local level in 15 countries, motivating and directly enabling many Local Governments (LGs) to effectively respond to the municipal and community-wide “climate and energy challenges”. A particular focus was set on supporting small and medium-sized communities, as a vast number in Europe face inherent capacity challenges (limited funds and staff size). Once their capacity has improved – where possible in their own language - **LGs will be encouraged to join the Covenant of Mayors (CoM) initiative**, and can then also respond to its rigorous reporting and delivery requirements. Moving beyond the usual ad hoc, single workshop concept, **a comprehensive, well-structured European LG capacity building programme has been developed and rolled out to support all the phases of implementing a Sustainable Energy Action Plan (SEAP)** – from motivation, planning, implementation, to monitoring and evaluating. ([www.covenant-capacity.eu](http://www.covenant-capacity.eu)),

- **PRIMUS – Policies and Research for Managing Urban Sustainability**

Two research-based tools for urban sustainability are test-applied by 100 local governments, thereby examining the knowledge brokerage process between (European) research and (local) policy-making. The project is the backbone of the 'Informed Cities' initiative built around a series of events of different nature linking into and building upon each other. **They convene local governments from across Europe**, researchers in the field of urban sustainability management, and national ministries and agencies dealing with sustainability policies directed at the local level in their respective Member States. [www.iclei-europe.org/informed-cities](http://www.iclei-europe.org/informed-cities)

- **RAMSES – Science for cities in transition**

RAMSES is a European research project which aims to deliver much needed quantified evidence of the impacts of climate change and the costs and benefits of a wide range of adaptation measures, focusing on cities. RAMSES will engage with stakeholders to ensure this information is policy relevant and ultimately enables the design and implementation of adaptation strategies in the EU and beyond. The project will focus on climate impacts and adaptation strategies pertinent to urban areas due to their high social and economic importance. <http://www.ramses-cities.eu/>

*Relevant infrastructure/equipment*

n/a



#### 4.1.5 EIVP

<b>Organisation full name:</b>	Ecole des Ingénieurs de la Ville de Paris
<b>Organisation short name:</b>	EIVP
<b>URL:</b>	<a href="http://www.eivp-paris.fr/">http://www.eivp-paris.fr/</a>

The *Ecole des Ingénieurs de la Ville de Paris* (City of Paris Engineering Graduate School - EIVP) is specialized in urban Engineering. It carries out both training and research organized on the topic of the sustainable city. The fields of expertise the EIVP are: public space, building, infrastructures and mobility planning, environment, waste, water and energy issues.

In terms of research, EIVP has decided to focus its research activities on three axes: cities in climatic and energy transition, urban resilience, and planning. EIVP is involved in several projects (European and national sized) and collaborates with universities, research centers and industrial actors.

Within the Energy and Climate Axis (involved in RESIN project), ongoing research is structured around three main multi-scalar themes, urban climate, energy and mitigation of / adaptation to climate change. Various topics are addressed within these themes following a multidisciplinary approach in order to study arising issues. The urban ecosystem is for instance analyzed through analysis tools (territorial carbon footprint, urban metabolism, territorial ecology, etc) and assessment of related physical phenomena (urban climate, air pollution, etc). The question of urban energy management (energy efficiency, energy production and distribution...) though urban level and sectorial analysis is also addressed. Furthermore, actor analysis, toolbox development and assessment are approaches that are followed in the ongoing research activities. Last, the adaptation to climate change is studied at the local level of urban planning projects mobilizing knowledge from various disciplines (engineering, modeling, climatology, experimentation, economics etc) and involving practitioners during the whole research process.

Within EIVP Resilience Research axis, ongoing research is dedicated to two main subthemes, urban technical systems risk resilience and decision making support tools design in order to improve urban risk resilience. The objective is to contribute to the foundation of the resilient city taking into account urban technical systems resistance, as well as their absorption and recovery capacities, hence contributing to the capacity of the city to operate in a degraded mode before returning to service. This objective is thus achieved through the transmission of information on the city resilience level for different risk scenarios and the support provision to the decision making in order to improve this level. Ongoing research activities are focused on the modeling expert uncertainties towards a reliable decision making process, the spatialization of resistance and absorption capacities, spatial analysis of recovery capacity and on the development of support governance tools for urban technical systems.

So the EIVP is conducting research activities at the different scales of the city and is currently involved in several research projects both at European and national levels. Energy efficiency and in particular the objectives of the European energy and climate change 'package', as well as urban resilience and in particular the objectives of the European action plan for resilience, represent real challenges for enterprises, public bodies and local authorities. Those stakeholders have to develop and implement new responses at the technical, organizational and institutional levels to cope with EU new objectives.

The EIVP research contributes to define innovative answers to these challenges in urban areas by proposing methodological approaches to analyse the impact of innovative solutions. The ongoing

and finalized research projects presented below are highlighting the experience of EIVP both on adaptation to climate change and resilience research over the urban level. EIVP is an affiliated member of the Climate KIC.

EIVP will also trial and test, in cooperation with The Urban Ecology Agency and the Crisis Management Division of the Paris, the tools developed by the RESIN programme and link to relevant stakeholders in Paris. However, all costs for the RESIN project in Paris will be incurred, paid and registered in the accounts of EIVP.

#### *Persons carrying out the research*

**Youssef Diab** (48 y/o, male), Civil Engineer graduated from the National School of Public Works in Lyon – France. He obtained his PhD in Geotechnical Engineering in 1992 and his Habilitation Diploma for Research in 2000 in the field of Urban Engineering and Environment. He is Professor of Urban Engineering in the University Paris Est and also scientific director of the EIVP where he is in charge of the R/D strategy and management. The research budget of EIVP is around 1.3 million Euros/year. He already supervised 20 PhD thesis and has more than 75 papers in international conferences and journals. His research work is related to the field of civil, environmental and energy engineering and he is specialized in risk assessment related to buried structures and sustainable urban policy by developing making decision tools and using uncertainties models. He has built up with nine other partners a European project called “Greenov”. This project is financed by Interreg IVB.

**Morgane Colombert** (31 y/o, female), engineer and doctor in urban engineering, obtained in 2008 a PhD about the analysis of various means to take into account urban climate in urban planning. The purpose of the thesis was an analysis of urban heat island with a parametric study and an analysis of different tools and means for potential use by French local authorities to act in favor of their climatic environment. Morgane Colombert is now assistant professor at Paris Engineering School and works on urban climate, climate change and energy town. She participates to research projects in relation with urban planning, numerical modeling and instruments like: a research project on energy and CO2 indicators financed by the French Environment and Energy Management Agency (ADEME); IMPETUS (Innovative Methodology and Practical Evaluation Tools for Urban Sustainability) financed by the French National Research Agency (L'Agence nationale de la recherche - ANR) ; ADAPATIO a research project on climate change adaptation in urban development project; or GREENOV (Green Renovation Cluster) an European project (INTERREG IVB). She also coordinates students' projects in environment and sustainable development.

**Hypatia Nassopoulos** (30 y/o, female), Civil Engineer, is a lecturer-researcher of the Ecole des Ingénieurs de la Ville de Paris (EIVP), in the Energy and Climate department. She is also the Students Internships Coordinator of EIVP. She has obtained her PhD degree from the Ecole des Ponts-Université Paris- Est, and she has realized her PhD as a CNRS researcher in the laboratory CIRED. During her PhD she has worked on the impacts of climate change on water resources in the Mediterranean region. She holds also a MBA (Ecole des Ponts et Chaussées). She is currently involved in the integration of adaptation to CC within the conception process of urban planning projects, notably urban development zones in Paris, France (Adaptatio Project). She is also involved in lectures and student supervision within the Energy and Climate Department.

**Marc Vuillet** (31 y/o, male), is doctor, lecturer researcher and head of urban resilience research theme at the engineering school of the City of Paris. He specialized on issues such as risks



management, hydraulic works, urban technical networks, functional modeling, and exploitation of uncertain expert assessments in decision aid models.

*Relevant publications/products/services/achievements*

- **Vuillet M., Diab Y.**, 2013 "Decision making tools and probabilistic approaches in urban resilience engineering", *Bridging sciences in Resilience Engineering research and training, second workshop on Resilience Engineering*, Ecole des Mines, Paris, 18, 19&20 November 2013
- Toubin M., Serre D., **Diab Y.**, Laganier R., An auto diagnosis tool to improve urban resilience: The RATP case study, *Resilience and Urban Risk Management*, Taylor and Francis Group, London, 2013
- **Colombert M.**, Boudes P., Adaptation to CCs in urban areas and a global approach for green corridors. *VertigO – Electronic revue of environmental science [On lign]*, Special Edition 12, 2012
- **Colombert, M. Nassopoulos, H.**, ADAPTATIO PROJECT: Integration of adaptation to climate change within the design process of urban planning projects. In: *Proceedings of the international conference Industrial and Commercial Use of Energy (ICUE)*, 19-21 August, Cape Town, South Africa, pp. 219-222.
- **Vuillet, M.**, Peyras L., Carvajal C., Serre D., **Diab Y.**, (2013). "Levees performance evaluation based on subjective probability" *European Journal of Environment and Civil Engineering*, Volume 17, issue 5/2013, pp 329-349.

*Relevant previous projects/activities*

- **Adaptatio** project financed by the French Ministry of Ecology, Sustainable Development and Energy (EIVP leader, ongoing project): dedicated to the question of adaptation to CC (direct or indirect consideration) within the design process of a Parisian urban planning project
- **Impetus** project financed by the French Research Agency (EIVP partner, on going project): focus on the integration of urban planning project within the frame of transformation towards the sustainable city (cases for instance in Paris, Bordeaux)
- **SERVEAU** project financed by FUI, Ile de France Region (EIVP partner, ongoing project): focus on the management of urban planning projects energy vulnerability (cases in the suburbs of various FR cities)
- **FLOODPROBE** project financed by the European Union FP7 (EIVP partner, ongoing project): technologies for the cost effective flood protection of the built environment in relation to flood events <http://www.floodprobe.eu/>
- **RESILIS** project financed by the French Research Agency (EIVP partner, ongoing project): The main objective was to design methods and tools dedicated to local authorities, networks managers and populations in order to prepare to, adapt and design social and technical systems able to cope with and absorb disturbances. Several cases has been studied, especially city of Paris. <http://resilis.fr/en>

*Relevant infrastructure/equipment*

n/a



#### 4.1.6 ITTI

<b>Organisation full name:</b>	ITTI Sp. z o.o.
<b>Organisation short name:</b>	ITTI
<b>URL:</b>	<a href="http://www.itti.com.pl/">http://www.itti.com.pl/</a>

*ITTI sp. z o.o.* is an SME working in IT and telecommunications sectors, located in Poznan, Poland. The company has at present a team consisting of 60 persons. The activities of ITTI can be grouped into three categories:

- **technical consulting in the area of telecommunications and IT** - ITTI assists end-users (i.e. public administration, utilities, banks, companies) in purchasing, implementation and optimisation of IT and telecom systems; a number of professional methodologies are used in this area, e.g. PRINCE2, CISA, PMI, TOGAF, ITIL, ISO 27001, BS25999; ITTI offers also its services to practically all key telecommunications players in Poland;
- **applied R&D in the area of IT and telecommunications** – ITTI contributes to the R&D projects providing the expertise in the following areas: user requirements, system design, data processing (ontologies, data mining), lessons learnt systems, graphical user interfaces, mobile applications, quality of service and quality of experience, cybersecurity, simulation of telecommunication networks, simulation of procedures in crisis situations;
- **development of innovative applications and software solutions** - ITTI designs and develops innovative solutions which are adjusted to customer needs (e.g. in crisis management and health sector).

ITTI carried out research activities in the following programmes: EU-funded initiatives, currently in the FP7 (formerly also FP6 and FP5), European Defence Agency (EDA) programmes (e.g. Joint Investment Programme on Force Protection, Joint Investment Programme on CBRN) as well as Action Grant CIPS II and NATO Industrial Advisory Group studies. The company has also been active in some Polish applied research projects co-funded by industry and the Polish Ministry of Science and Higher Education or National Center of Research and Development. Recently, ITTI has been also involved in the European Space Agency (ESA) projects. In R&D activities the company cooperates closely with numerous universities and research institutes based in Poland as well as around Europe.

Moreover, ITTI is an institutional member of the Public Safety Communication Europe Forum, Integrated Mission Group for Security (IMG-S) and ITIC Group - International Telecommunications and IT Consultants. ITTI is also one of the co-founders of Polish Space Industry Association and participates to Wielkopolska ICT Cluster.

In the recent years ITTI was awarded the prestigious “Cristal Brussels Prize 2013” for the most active and successful Polish company participating in FP7, while in 2009 ITTI received the reward for high performance in R&D projects for the European Defence Agency awarded by the Polish Ministry of Defence.

##### *Main tasks*

ITTI will contribute to the RESIN project by:

- participation in the development of the framework for adaptation and disaster resilience planning process activities;
- relevant tools and methods state of the art analysis (including gathering, testing and evaluation of available methods and tools, integration capabilities analysis);
- development of guidance for data handling, visualization and supporting the data acquisition process (including user experience, usability and performance areas analysis);

- end-users needs analysis towards RESIN Decision Support Tools (requirements discovery, gathering, documenting, prioritization and validation);
- iterative design and implementation of RESIN Decision Support Tools;
- functional and acceptance testing of the RESIN Decision Support Tools.

#### *Persons carrying out the research*

**Wojciech Dymowski** obtained his M.Sc in 2004 from The Poznan University of Economics. Since 2003 he has been working in the ITTI Ltd, currently as Managing Consultant playing the role of both team leader and researcher. He is an expert in ICT applications (with special focus on security and public safety), knowledge management and project management with PMP certification. He is a member of the Board of Directors of Project Management Institute Poland Chapter, Poznan branch and represents ITTI in Public Safety Communications Europe Forum. He participated among others in number of international projects in 6th and 7th Framework Programme, EQUAL Initiative and European Defence Agency programme. He has the following certificates: Managing Successful Programmes Registered Practitioner, Business Continuity Management Systems Lead Auditor BS25999, Project Management Professional, Managing Successful Programmes Practitioner Level.

**Tomasz Springer** obtained his M.Sc. in applied computer science from the Adam Mickiewicz in Poznan in 2009. Since 2009 he has been working in ITTI where he was involved in a number of projects (FP7 – Fi-STAR, BESECURE, TALOS; for EDA – CARDINAL, SIMS; at national level – STAS: “Information system for rapid simulation applications development in purpose of performing analysis and trainings”, TASK: “Training-analytical simulator for crisis management”) aimed at designing and developing software applications, e.g. computer simulator of crisis situations. He is an expert in user-centered design, interface design, system functional analysis and data modeling, and has knowledge in the field of database systems and web applications technologies. He has PRINCE2 Foundation Level and Business Continuity Management Systems Lead Auditor BS 2599 certificates.

#### *Relevant publications/products*

- Flizikowski A., Stachowicz A., Dellavade T., Hokkanen L., Kurki T., Paivinen N., Hołubowicz W., „Social Media in Crisis Management – the iSAR+ Project Survey”, in Proceedings, ISCRAM 2014, Starr Roxanne Hiltz, Mark Pfaff, Linda Plotnick, Patrick Shih, and Andrea Tapia, eds.;
- Flizikowski A., Zych J., "Using game theory to reliability assessment for communication systems in crisis management", in "The functioning of the company during the crisis", eds. Piotr Bartkowiak, Scientific Society for Organization and Management, Poznań, 2011 (ISBN 978-83-927534-5-2);
- Choraś M., Kozik R., Flizikowski A. INSPIRE Decision Aid Tool: a Support for Risk Management and Cyber Protection of Critical Infrastructures, Telecommunications Review, vol. 8-9, p. 1215-1221, 2012;
- **PROCEED** - simulation tool for training on procedures in crisis management: PROCEED is a computer system which prepares its users for proper decision-making in crisis situations. It enables creating and running all kinds of simulation applications and can be used as an interactive decision-making training game, as well as a tool for multi-variant analysis. Implementation of simulation techniques enables accurate modelling of the actual emergency proceedings by providing all the necessary roles, flashpoints, events, physical objects, or the environment. While observing dynamically changing situation, application users can influence

on the other users engagement and make various decisions affecting future course of events.

- **LIMA2 - Lessons Learnt Tool:** LIMA2 is the software solution supporting the management of continuous process of learning the organisation from experience. It implements the Lessons Learnt approach defined in three phases: Acquiring experience, Gathering and analysing experience, Applying experience. It offers functions focusing on gathering information related to activities performed and incidents, analysing them and defining observations, preparing recommendations which can improve future activities and evaluating the application of such recommendations.

#### *Relevant previous projects/activities*

In the commercial technical consulting, ITTI with great success supports IT end-users in the process of designing, implementation and optimisation of IT systems and, ensuring that these IT solutions meet the highest level of users' expectations. On the other hand, ITTI has experience coming from numerous research projects in security and defence area in such international programmes as: PASR, 7FP (SEC, ICT, Transport), EDA JIP-FP, as well NIAG studies. ITTI has contributed (or still contributes) among others to the following projects:

- **PREDICT**

Better understanding of the cascading effect in crisis situations in order to improve future response and preparedness and contribute to lower damages and other unfortunate consequences (PREDICT) provides a comprehensive solution for dealing with cascading effects in multi-sectoral crisis situations covering aspects of critical infrastructures. The PREDICT solution will be composed of the following three pillars: methodologies, models and software tools. Their integrated use will increase the awareness and understanding of cascading effects by crisis response organisations, enhances their preparedness and improves their response capability to respond in case of cascading failures.

- **BESECURE**

Best practices for enhancing security policy in urban zones (BESECURE) works towards a better understanding of urban security through examination of different European urban areas. By examining 8 urban areas throughout Europe, BESECURE will build a comprehensive and pragmatic set of indicators, and a pragmatic risk assessment model that can provide cues about the development of certain scenarios. BESECURE will improve urban security policy making by sharing best practices that are in use throughout Europe, and by providing visualisation and assessment tools and guidelines that will help local policy makers to assess the impact of their practices, and improve their decision making.

- **DRIVER**

Driving innovation in crisis management for European Resilience (DRIVER) focuses on augmenting existing capabilities and will aim at producing a comprehensive, well-balanced and cost-effective Portfolio of CM tools exploiting high potential RTD work from the last decade, not least in FP7 and FP6 projects. This portfolio will address not only needs of professional responders but also of society at large. DRIVER will carry out experimentation campaigns in three strands: tools and methods for responders, resilience of civil society and learning by both. The intra-strand experimentation leads into two Joint Experiment campaigns and a Final Demo focusing on challenges requiring highly complex interaction between CM tools.

- **MaSC**

Modelling and Simulation for CBRN Defence Architecture (MaSC) project when completed should lead to a modelling and simulation environment, called the MaSC System. The MaSC

system will consist of a number of modules that will allow for the evaluation of CBRN defence architectures that are currently implemented in the National Defence organizations or might possibly be implemented in the future. The MaSC system aims to primarily support the EDA and its contributing members in R&D policy making in the field of CBRN protection as it will allow for capability gap analysis, mission planning and preparation and evaluation of current or future CBRN defence capabilities.

- **ARENA**

Architecture for the Recognition of thrEats to mobile assets using Networks of multiple Affordable sensors (ARENA) addresses the design of a flexible surveillance system for detection and recognition of threats towards deployment on mobile critical assets/platforms such as trucks, trains, vessels, and oil rigs. There is a substantial end-user need for intelligent and continuous proactive monitoring to enable situational awareness and determination of potential threats enabling timely and appropriate response. Hijacking, piracy, theft raise major security concerns, as well as problems to the personnel and companies who own or manage the platform or goods.

*Relevant infrastructure/equipment*

ITTI possesses the R&D infrastructure and the standard IT environment (i.e. workstations, servers, software tools, modern research equipment for a visual demonstration of the applications). ITTI owns standard office equipment (laptops, computers, phones) and conference facilities (inter alia GoToMeeting licence). ITTI has also servers that can be used for software development, repositories and testbeds. At ITTI there is also a team of software developers and programmers. ITTI has also long experience in development of software solutions in R&D projects at national and international level.



#### 4.1.7 NEN

<b>Organisation full name:</b>	Stichting Nederlands Normalisatie-Instituut
<b>Organisation short name:</b>	NEN
<b>URL:</b>	<a href="http://www.nen.nl/">http://www.nen.nl/</a>

**NEN, the Netherlands Standardisation Institute**, promotes the development of standards and supports the processes that this involves. NEN supports over 1400 standardization committees with 7500 members. NEN plays a facilitating role. Acting in the public interest, NEN coordinates efforts to create efficient, safe, healthy, renewable and reliable products, processes and services. NEN administers and publishes an extensive collection of thousands of international and national standards. NEN provides information, training courses and advice on standardisation, standards and their use in practice.

NEN is a member of various leading inter-institutional organizations at the European and global level, and occupies a key position in the web of international standardisation. NEN has extensive experience in supporting European standardisation deliverables, and is familiar with new European standardisation projects related to research projects.

##### *Main tasks*

NEN, the Netherlands standardization institute, has nearly 100 years of experience in developing standards and facilitating the standardization process on both a national, European and International level. With our knowledge of standardization and a large network within relevant working areas for climate change adaptation, we are well suited to investigate and advise on the possibilities for standardization for the topics that are subject of the RESIN project. As NEN holds the secretariat of the CEN Coordination group on Adaptation to Climate Change (ACC-CG), NEN can provide a connection between the work that will be done within CEN and within the RESIN project. As an important goal of the RESIN project is to develop standardized methods, this connects well to NEN's core business

##### *Persons carrying out the research*

**Ms. Nicolet Baas** has been working as a standardization consultant within the NEN group Environment & Society for over six years. She has a Bachelor degree in Environmental science and has reached an advanced level of international project- and process management skills. She is the secretary of several European and international standardization working groups regarding stationary source emissions and air quality. She is connected to a specific NEN team dealing with Climate Change Adaptation and works closely together with the project coordinator for mandated work on standardization related to the EU strategy on Climate Change Adaptation.

**Ms. Caroline van Hoek** is a senior consultant within the NEN group Environment & Society. She has been working at NEN for over 12 years, carrying out a broad variety of standardization activities. She is coordinator of the mandated work of M/461 Nanotechnologies and M/503 Ambient Air quality. She is the secretary of several European standardization working groups regarding ambient air and workplace air. She is also project coordinator for mandated work on standardization related to the EU strategy on Climate Change Adaptation.

##### *Relevant publications/products/services/achievements*

Not relevant for a standardization institute.

##### *Relevant previous projects/activities*

NEN is involved in numerous national, European and global standardisation projects. Within the



European Standardisation organization CEN, NEN for instance, holds the secretariat of the coordination group on **Adaptation to Climate Change** (ACC-CG). The coordination group will be established to co-ordinate the standardization request of the European Commission related to the EU strategy on Adaptation to Climate Change. This project is expected to start in September 2014.

The European Commission requested CEN to develop documents to ensure that climate change adaptation is taken into account in a systematic way in European standardization. The standardization request has identified three priority sectors: transport infrastructure, energy infrastructure, and buildings/construction. Within these priority sectors, existing European standards will be identified that are most relevant for adaptation to climate change. These standards will be revised or new ones will be developed if deemed necessary, to enhance the resilience to climate change to the infrastructure they apply to.

- **Project ‘2ndVegoil’ (FP7 project)**

This project covers research and demonstration on 2nd generation vegetable oil fuels in advanced engines. NEN is involved as a Standardization Institute, the deliverable being a CEN Workshop Agreement containing the quality specification for pure plant oil

- **Solid Standards –**

Enhancing the implementation of quality and sustainability standards and certification schemes for solid biofuels. The SolidStandards project addresses the on-going development of standards and certification systems for the quality and sustainability of solid biofuels. The project aimed at enhancing the uptake of standards within the industry by providing training on standards implementation to solid biofuel producers across Europe. Furthermore, the project aimed at providing input to ongoing standardisation processes and policy decisions by gathering and providing industry feedback to standardisation committees and decision makers.

The SolidStandards project is co-funded by the European Union under the Intelligent Energy Europe Programme.

NEN was project partner with deliverables several CEN standards being adopted by ISO, course programme on ISO-CEN standards application. [www.solidstandards.eu](http://www.solidstandards.eu)

*Relevant infrastructure/equipment*

n/a

#### 4.1.8 Arcadis

<b>Organisation full name:</b>	Arcadis Nederland BV
<b>Organisation short name:</b>	Arcadis
<b>URL:</b>	<a href="http://www.arcadis.nl/">http://www.arcadis.nl/</a>

**Arcadis** is an international company (22.000 employees) providing consultancy, design, engineering and management services in the fields of infrastructure, water, environment and buildings. Arcadis' mission is to improve quality of life around the world by creating places of distinction and providing sustainable solutions that enhance the build en natural environment. From this Arcadis has played an important role in developing the national strategy Spatial Adaptation to Climate Change. Arcadis' environmental engineers, scientists and consultants help clients consider complex factors like climate change, aging infrastructure and energy and material costs to manage water resources and keep clean and safe water flowing to future generations.

Arcadis have a leading position in European and worldwide climate adaptation and environmental market. Arcadis is one of the core members of Climate KIC, taking its responsibility as well in the steering committee as in chairing the platform Land and Water Management and Engineering for Adaptation. Currently a relevant focus in this platform is on catalysing climate adaptation of EU and worldwide cities to get them climate resilient in time. Arcadis leads this product development. With a strong focus on and link to the finance sector. Arcadis is also member of the World Business Council for Sustainable Development (WBCSD). One of the strategic lines of Arcadis focusses on the so/calle Big Urban Clients, the delta metropoloes in the world. Being convinced that action towards climate resilience should an will be taken on city level.

With more than 22,000 people worldwide, the company has an extensive international network that is supported by strong local market positions. Arcadis rank among the top 10 management and engineering consultancies in the world. In Europe, Arcadis have a top five position. In the global environmental market, Arcadis are positioned in the top three. Arcadis have local offices in the following European countries: Belgium, Czech Republic, France, Germany, Italy, The Netherlands, Poland, Romania, Spain, Switzerland and United Kingdom. The offices are mainly situated in / nearby the main cities.

Arcadis build on decennia of extensive experience in water management issues. As climate change causes sea levels to rise, precipitation patterns to change and storm systems to intensify, governments face new challenges in water management. Protecting the valuable assets situated in the world's river deltas and flood plains is becoming a new priority. With more than a century of experience in water management in the Netherlands and abroad, Arcadis' water management engineers can provide a broad range of solutions from economically driven hard infrastructure to more tidal-embracing ecologic alternatives.

Arcadis is thinking actively about local solutions and innovations necessary. The new solutions are in fact the combination of knowledge about water, space, environment, infrastructure and construction. Moreover, Arcadis is able to connect these disciplines in engineering design and in the public debate. Arcadis' technical and regulatory expertise enables us to help clients identify and evaluate their options and implement workable, costeffective solutions for both new water sources and wastewater and storm water discharges.

Arcadis' approach is to integrate the analysis of activities that can affect water quantity and quality. The results are integrated solutions for securing long-term water systems in ways that meet current and future requirements while balancing the competing interests of internal and

external stakeholders. A new insight we're working on is the 'marriage' between social engineering, technical engineering and financial engineering.

Arcadis apply a unique perspective on engineering of water infrastructure. Based on Arcadis' comprehensive understanding of the entire water supply system, Arcadis apply a unique perspective to the rehabilitation of existing dams and reservoirs as well as engineering of new dams worldwide. Arcadis has recognised expertise in dam engineering and hydraulics for all types of dams; earthfill, rock fill, concrete gravity, masonry and roller compacted concrete dams. Arcadis provides comprehensive services including detailed environmental impact studies, geotechnical analyses and design, hydrologic and hydraulic analyses; spillway design and rehabilitation, permitting, Emergency Action and Operations and Maintenance Plans, siting and feasibility studies and coordination with regulatory agencies.

#### *Main tasks*

Arcadis will support the development of the impact-vulnerability-risk assessment tools (WP2), the catalogue of adaptation options (WP3), and the DSS (WP6 from the user perspective, ensuring that the products developed can be applied by consultancies.

#### *Persons carrying out the research*

**Eric Schellekens** (male), strategic manager Climate and Innovation, is characterised as an initiator and inspirator of innovative projects. He is able to accelerate processes based on analytic competences, experience with a variety of projects and attendance for mutual gains. His focus is on effectiveness and feasibility. His thoughts and actions are based on a long experience with projects in the field of climate change, water and regional development. Eric Schellekens is the climate change ambassador of ARCADIS on European scale. His extensive network covers nearly all European stakeholders in the knowledge field of climate change. His goal is to define chances for innovations with respect to climate change for ARCADIS and to initiate and stimulate product innovations. Already since 1998 Mr. Schellekens is working on climate related topics. Starting with River Basin Management and Integrated Coastal Zone Management projects. Since 2006 Mr. Schellekens represented the Dutch national consulting companies in the Dutch national climate council of Knowledge for Climate ("Klimaat voor Ruimte"). He contributed to the definition and selection of so called hot spots for climate adaptation research. Since 2011 ARCADIS is core member of the so called Climate KIC consortium. Climate-KIC is one of three Knowledge and Innovation Communities (KICs) created in 2010 by the European Institute of Innovation and Technology (EIT). Its aim is to accelerate and stimulate innovation in climate change mitigation and adaptation, by integrating a network of European partners from the private, public and academic sectors. Eric Schellekens is program manager of Climate KIC within ARCADIS.

**Marie Ernst** (female), consultant Environment & Sustainability, has proven experience in organizing workshops and structuring projects. Delivering work quickly and accurately. Her attitude could be called open-minded regarding group processes. Currently one of the main relevant projects Marie works on is Urbanlab. A project focused on collection all innovative and successful city projects regarding climate change and building a new starter by developing an assessment. Marie Ernst is also experienced in mitigation and data collection and analysis, development of interactive, web-based tools for industrial clients to achieve feasible energy-saving measures.

**Sander van Schijndel** (male), Strategic consultant, urban development and planning, is currently leading multidisciplinary project teams in the carrying out of strategic planning studies, site and location analyses, feasibility studies and urban design master plans. The expertise he provides is in the field of regeneration and revitalization projects, in particular with regards to the adaptive reuse

of existing buildings, 'brownfield' industrial sites and other assets within urban environments that are no longer fit for their current use. Sander is very experienced in organising stakeholder analysis and public participation strategies within various projects. To this project relevant expertise he also gained as project manager to guide various residential, commercial and mixed-use urban projects through the design and planning phases to development approval.

#### *Relevant previous projects/activities*

Within the consortium we have an overview of as well what is going on worldwide, the developed and applied strategies as of developed and applied technical and non-technical solutions. We refer to several worldwide projects. Arcadis partnered in the study **Adaptation Strategies European Cities**. Arcadis designed a new development method for the San Francisco Bay Area (the development of a decision support tool to assist decision makers with shoreline adaptation planning).

Arcadis was selected by the USACE to evaluate innovative alternative concepts and prepare a report to provide a barrier to prevent hurricane storm surge from entering the Harvey Canal and the Algiers Canal, after hurricane Katrina that destroyed parts of New Orleans. To restore the level of protection and provide the additional protection authorized after Hurricane Katrina, the USACE enlisted the services of Arcadis and its partners to assist the Hurricane Protection Office in the New Orleans District in the program management, plan formulation, project development, and program management of a design-build contract for what would become the largest civil works design-build contract ever awarded by the USACE. Post-Katrina, Bioengineering Arcadis, LLC (Team) was contracted to provide engineering services for the planning, design, and construction support for a flood protection closure structure at this location, which would serve as a key element of the New Orleans Hurricane Storm Damage Risk Reduction System.

Two recently started and acquired projects we consider also of main importance regarding the needed expertise. For Climate KIC ARCADIS manages the so-called project **CAFCA** (Climate Adaptation Financing Coastal Areas). A project in which we develop a Resilience Pathway for coastal areas and coastal cities, by focusing on intervention opportunities (multifunctional as well as highly effective measures in a socio-economic perspective) and unlocking finances to develop. As you might know New York choose the BigU as their main project to adapt Barrier Island to climate change. In a consortium led by Big architects we applied the 'Rebuild by Design approach'. An approach which integrates city development and the climate adaptation challenge.

Insights gained doing projects in Asia will also be taken into account; useful examples could be the eco-cities design and the development strategies Yichang, Wuhan City, Center Islands etc.

#### *Relevant infrastructure/equipment*

Arcadis has worldwide offices, covering Europe, Asia, the Middle East, the United States and South America.



#### 4.1.9 BC3

<b>Organisation full name:</b>	BC3 Basque Center for Climate Change – Klima Aldaketa Ikergai
<b>Organisation short name:</b>	BC3
<b>URL:</b>	<a href="http://www.bc3research.org/">http://www.bc3research.org/</a>

The *Basque Center for Climate Change (BC3)* is an excellence research centre created in 2008 as jointly promoted by the Basque government and the Basque University, with the goal of contributing to knowledge on the causes and impacts of climate change, as well as drive advancements in high level research on these issues. Under the leadership of Professor Anil Markandya, BC3 seeks to contribute to solve this great challenge from the Basque Country, summing up efforts with other centres in the world, collaborating towards this ambitious goal.

BC3 relies in a multidisciplinary team of researchers led, under the guidance of an International Scientific Advisory Committee, by the Scientific Director Prof. Anil Markandya, a key contributor in the last reports of the IPCC, who jointly received in 2007 the Nobel Peace Prize. Prof. Anil Markandya is lead author in the IPCC Report for 2014. Currently BC3 counts with 34 excellent researchers (as of 2014) from different countries (Brazil, Italy, France, UK, Germany, Spain etc.) which allow the centre to establish very fruitful links with international institutions that span the five continents. Particularly, BC3 has participated in many FP7 R&D proposals and projects with international universities foreign governments as well as with international institutions. BC3 produces regularly Journal Articles, Books and Book Chapters and a series of BC3 Working Papers and Policy Briefings.

BC3 was awarded winner of 2012 European ICCG Climate Think Tank Ranking and has been recently **awarded second of the 2013 World ICCG Climate Think Tank Ranking**. This honour has nominated BC3 as the second best World Climate Think Tank **in the field of climate change economics and policy** for its scientific productivity, participation in EU projects and consultation processes. Likewise, with the aim of engaging a highly-qualified team of researchers to achieve excellence in research, training and dissemination, BC3 develops attractive research and training programs for junior researchers and participates at international conferences and training courses

In BC3, we work to provide scientific knowledge that enables us to face the challenges posed to our planet by climate change. We believe that those of us in science and the scientific community have the duty to provide the results of our research to better manage the impacts that human activities have on areas such as natural environment, energy and health. Research and the scientific cooperation networks in which we take part allow us to act as generators and disseminators of knowledge and to provide it to society and its public institutions. The evidence on the effect that climate change has on the sustainability of the planet as we know it has pushed governments from all over the world to take policy, economic and social measures, designed to prevent and revert the damages suffered and to put protection and recuperation actions in place. For all this, other key aspect of our work is to contribute, from the scientific standpoint, to enrich these policies and to enable their implementation within a policy framework that is coherent with the protection of the planet. The expert knowledge fields in which our specialists are currently engaged are related to four main lines of research: (1) Low Carbon, (2) Climate and Natural Environment, (3) Health and Climate and (4) Climate Policy.



### *Main tasks*

In the RESIN project, BC3 will contribute to WP 3 and WP4 by providing expertise on the economics of adaptation policies and measures, particularly through cost-benefit analysis, and will participate in the case study of Bilbao.

### *Persons carrying out the research*

**Dr. Ibon Galarraga** (male): Ph.D. in Environmental Economics from the University of Bath is currently Deputy Director and Research Professor at BC3, whose main research lines are Public policies, policy instruments and economic valuation.

**Dr. Joseph Spadaro** (male): Ph.D. in Environmental Engineering by the Centre d'Energétique, Ecole des Mines in Paris, he has been doing research since the mid 1980's in energy analysis in buildings and assessment of the environmental impacts of electricity generation, waste management and transport air pollution, including media modelling, health risk assessment and uncertainty analysis.

**Dr. Marta Olazabal** (female): BSc. in Chemical Engineering and MSc. in Environmental Engineering by the School of Engineering in Bilbao (University of the Basque Country). PhD in Land Economy by the University of Cambridge (viva June 2014). From 2004, her research focuses on urban sustainability in general and particularly on processes of adaptation and transformation in cities both from a social-technical approach and from a social-ecological approach.

### *Relevant publications/products/services/achievements*

- Markandya, A., Galarraga, I. and Sainz de Murieta, E. (2014) (eds), Routledge ***Handbook of the Economics of Climate Change Adaptation***, ROUTLEDGE
- Reckien, D., Flacke, J., Dawson, R., Heidrich, O., Olazabal, M., Foley, A., Hamann, A., Orru, H., Salvia, M., Hurtado, S. D. G., Geneletti, D., and Pietrapertosa, F. 2014. ***Climate change response in Europe: What's the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries***. Climatic Change, 122:1-2, 331-340
- Olazabal, M., S. De Gregorio, E. Olazabal, F. Pietrapertosa, M. Salvia, D. Geneletti, V. D'Alonzo, E. Feliú, S. di Leo, D. Reckien, (2014) ***How are Italian and Spanish Cities tackling climate change? A local comparative study***. BC3 Working Paper Series 2014-03. Basque Centre for Climate Change (BC3). Bilbao, Spain.
- Galarraga, I., Gonzalez-Eguino, M. and Markandya, A. (2011), ***"The Role of Regional Governments in Climate Change Policy"***. Environmental Policy and Governance, vol. 21. 164-182.
- Markandya, A. and Galarraga, I. (2011). ***Technologies for Adaptation: An Economic Perspective***. Perspectives Series 2011: "Technologies for Adaptation: Perspectives and Practical Experience". Denmark. UNEP Risoe Centre.

### *Relevant previous projects/activities*

- **BASE** "Bottom-up Climate Adaptation Strategies towards a Sustainable Europe", FP7-ENV-2012 (European Commission), 10/2012 – 9/2016.
- **ECONADAPT** "Economics of climate change adaptation in Europe", FP7-ENV-2013-two-stage (European Commission), 10/2013 – 9/2016.
- **PREEMPT** "Policy-relevant assessment of socio-economic effects of droughts and

floods”, DG Humanitarian Aid & Civil Protection (European Commission), 01/2011 – 12/2012.

- **K-Egokitzen** “Climate change: impact and adaptation en the Basque Country”, Ertortek 2010 (Basque Government), 01/2009 – 12/2010.
- **Water2Adapt** “resilience enhancement and water demand management for climate change adaptation”, IWRM-NET, 04/2010 – 03/2012.

*Relevant infrastructure/equipment:* n/a



#### 4.1.10 Bratislava

<b>Organisation full name:</b>	Hlavné Mesto Slovenskej Republiky Bratislava
<b>Organisation short name:</b>	Bratislava
<b>URL:</b>	

**Bratislava** is the capital of Slovakia and, with a population of about 420,000, the country's largest city. Bratislava is the political, cultural, and economic centre of Slovakia. Its area is 36 759 ha. The population density is 1,161 inhabitants per km<sup>2</sup> (2007). The city is a target of daily mobility to work and schools (about 150 thousand people per day). Administratively Bratislava is divided into five districts. For self-governance purposes, the city is divided into 17 boroughs. Bratislava is a centre of industry, services and education. The GDP per capita is in Bratislava region 186% (2011) of the EU average and is the highest level of all regions in the new EU member states. There are 350,000 economically active persons, 22% with higher education and 66% in active productive age.

The topic of the adaptation to climate change has been firstly raised up especially by the local environmental NGOs, academic institutions and universities. Gratefull to these initiatives the commitment to start with the discussions and adaptation strategy elaboration has been incorporated into the principal strategical document "The Programme of economic and social development of the city from 2010 to 2020". In 2012, Bratislava has been chosen among other 21 European cities to participate in the project EU Cities Adapt funded through European Commission. The Adaptation Strategy of the city was elaborated and proposed for discussions and approval to the City assembly in 2014.

The continuation of the adaptation process will be ensured through project "Bratislava is adapting itself to climate change (2014-2016)" funded through the EEA and Norway financial mechanism, that will be implemented by the principal beneficiary Bratislava City office with 4 Bratislava boroughs offices, NGOs and Comenius University, Faculty of Natural sciences. The Bratislava city office is running actually a range of international projects, e.g.: EPOUrban (funded through INTERREG Central Europe) aiming on the sustainable urban development, EU GUGLE (FP7) and others.

##### *Main tasks*

Within the RESIN project, the city of Bratislava will not only largely contribute to the testing of the tools developed by the project consortium, but also ensure the use these tools to support the decision-making on municipal level. Based on the experienced staff of Bratislava City involved in the RESIN project, the city will play active role in the research work (along with the Comenius University) co-developing the outcomes of the research in WP2, WP3.

##### *Persons carrying out the research*

**Zuzana Hudekova** (female) graduated with honour from the Mendel Forestry and Agricultural University in Brno (Czech Republic) in the specialization on landscape architecture. She finished the external PhD study in urbanisme and architecture in the Institute of Urban Planning of the Faculty of Architecture (Slovak University of Technology, Bratislava, Slovakia). She has the authorization from the Slovak Ministry of the Environment in qualification and competence for preparation of documents in the field of nature protection (2003). Zuzana Hudekova has more than twenty years of experience managing projects in the environmental field, landscaping, sustainable

development, climate change adaptation and spatial planning. Zuzana Hudekova was spending more than half of her career working for the Regional environmental Center (REC), country office Slovakia as project manager. She was working in the Lead Partner position and leading the several international projects. In the topic of the adaptation to climate change, she had the responsibility for the implementation of the project “Green and Blue spaces Adaptation Strategies (INTERREG IVC)” in Slovakia, led the process of the elaboration of the Adaptation Strategy of Bratislava city, is the author of the Adaptation Strategy to climate change for the town of the Spisska Nova Ves Municipality. She was working as the sub coordinator of the Slovak National Adaptation strategy - responsible for the chapter "Urbanized environment" and in the same time working as consultant for the Slovak Governmental Office with the consultancy in the field of the climate change and adaptation, elaborating and commenting documents in the field of the Programme „Adaptation to Climate Change – Floods and Drought Prevention“. She is the member of the expert working group aiming on adaptation to climate change on National level. On the actual position, in the department of the Chief architect of Bratislava city she is responsible for the implementation of different projects, especially in the field of sustainable urban development and leading the adaptation process on municipal and regional level.

Zuzana Hudekova published numerous articles, publications, is the member of the Monitoring Committee of the Swiss Financial Mechanism, member of the Association of Slovak architects, member of the Regional State management office of Nature protection Advisory committee, member of the board of International Society of arboriculture – Associated Partner Slovakia, member of the City Council Committee for environment, expert of the Union of Slovak cities in the field of the environment.

**Ingrid Konrád** (female) is currently the Chief architect of the City of Bratislava. She studied architecture in Bratislava and Vienna. In Vienna she lectured architecture and public spaces at the Technical University of Vienna and she also ran her own private architectural office, creating and developing many successful projects. In Bratislava, Ingrid Konrad brought positive aspects in the city planning day-to-day work and actively participated in all projects aiming related to sustainable urban development. Her role in the RESIN project will consist especially to contribute to the development of methods for impact and vulnerability analysis for critical infrastructures and built-up areas, as well enabling the testing of tools and the use of these tools to support decision-making at municipal level.

#### *Relevant publications/products/services/achievements*

- 2014, Hegyi, L., Steiner, A., Hudeková, Z. et al: Adaptation to climate change – the urgent task of cities (Adaptácia na zmenu klímy-naliehavá úloha miest), KRI; on line: [http://www.kri.sk/web\\_object/427.pdf](http://www.kri.sk/web_object/427.pdf)
- 2013, Hudeková Z. at all.: “Greenspaces” In „Principles and regulations in territorial planning (Vytvorenie podmienok pre stanovenie zásad a pravidiel územného plánovania)“, client: Ministry of construction, regional development and transport, on line: <http://www.telecom.gov.sk/index/index.php?ids=148397>
- 2012, Hudeková Z.: „Eco-index” the design of the new index for the territorial planning aiming on the rainwater management, client: Urbion, Institute of planning, Ministry of construction, regional development and transport
- 2011, Rebstock, M., Hudekova. Z. et al. Methodology Action Plan for good planning and designing of urban open spaces, REC Slovakia, ISBN 978-80-89320-06-6, on-line [http://www.central2013.eu/fileadmin/user\\_upload/Downloads/outputlib/Urbospace\\_Final\\_Metho](http://www.central2013.eu/fileadmin/user_upload/Downloads/outputlib/Urbospace_Final_Metho)

[dology Plan.pdf](#)

- 2011, Hudeková Z. :Environmental criteria and biodiversity protection in relation to the open urban spaces. In Supuka, J. et al.: Settlement-Park-Landscape, V.- Revitalisation of green urban open spaces with consideration to changing environment, Slovak University of Agriculture in Nitra, p.71, ISBN 978-80-552-0540-3

*Relevant previous projects/activities*

- **“EU Cities Adapt”**

The aims of this project carried out for DG Climate Action was to provide capacity building and assistance for cities in developing and implementing an adaptation strategy, and technical support to DG CLIMA on the state of play of urban adaptation. In the frame of this project the Adaptation Strategy of the Bratislava city was elaborated and proposed for discussions and approval to the City assembly in 2014.

- **“Bratislava is preparing itself to climate change”**

The main objective of the project is to rise the climate resilience of the city. This will be achieved through the following project outcomes: the elaboration of the Adaptation Action Plan on the city level, the concrete realisation of the adaptation measures especially in the field of the sustainable rainwater management, awareness raising, networking and exchange of information. All measures mentioned above will be realised in the different part of Bratislava, with the special focus on those districts, that were already evaluated as the most vulnerable to the climate change impact.. The total project budget is more than 2 millions of EUR (funded through EEA financial mechanism and Norway) and the project will be implemented along with 4 Bratislava boroughs offices, NGOs and Comenius University, Faculty of Natural sciences.

- **„FP7 Project EU GUGLE”**

EU-GUGLE stands for “European cities serving as Green Urban Gate towards Leadership in sustainable Energy” and is funded under the 7th Framework Programme for Research and Technological Innovation. EU-GUGLE aims to demonstrate the feasibility of nearly-zero energy building renovation models in 6 pilot cities in view of triggering large-scale, Europe-wide replication in smart cities and communities by 2020. Taking on the challenge of sustainable renovation in urban areas, the cities of Vienna (AT), Aachen (DE), Milan (IT), Sestao (ES), Tampere (FI) and Bratislava (SK) have committed to renovating a total of 226,000m<sup>2</sup> of living space during the 5 years of the project, with the objective of achieving 40 to 80% primary energy savings per pilot district while increasing the share of renewable energy sources by 25% by 2018. Though the EU GUGLE project is aiming more on “mitigation” aspect, the relevance to the RESIN project is in the fostering of the resilience of infrastructures and built-up areas in Bratislava.

*Relevant infrastructure/equipment*

n/a



#### 4.1.11 UNIMAN

<b>Organisation full name:</b>	University of Manchester
<b>Organisation short name:</b>	UNIMAN
<b>URL:</b>	

The *University of Manchester (UNIMAN)* is one of the world's top 50 universities. Research is at the heart of the University, no fewer than 20 former staff and students have gone on to be Nobel laureates and the university currently has 4 Nobel laureates as members of the academic staff. The University has over 1,800 staff active in research and over £190m of funding for research earned each year. The University participated in participated in 380+ FP7 projects and coordinated 39. The University has also hosted 33 ERC grants and 27 Marie Curie Initial Training Networks. UNIMAN's contribution to the RESIN project will be led by the Centre for Urban Resilience and Energy (CURE), which brings together a diverse group of researchers based in the School of Environment, Education and Development. In total there are over 50 researchers directly involved, including academic members, researchers, honorary staff and PhD students. CURE draws its expertise mainly from the disciplines of geography, environmental science, spatial planning, energy studies and systems studies. Funded by research councils, the European Union, as well as a range of governments, independent charities and agencies, our scholarship covers a wide range of themes with academic and policy relevance. CURE carries out multidisciplinary research, both for scientific understanding and for practical application. Research at CURE focuses on the relationships between sustainability transitions in the energy, urban and environment domains. Urban climate resilience is one of the three main themes that provide a focus for research activity within CURE.

##### *Main tasks*

The University of Manchester will play a central role in the RESIN project and will work directly with all the project partners at different stages of the project. The University's principal roles are:

- *Leading work package 1* – the University will lead this work package on adaptation and resilience concepts and approaches. In addition to leading tasks on developing a research framework and city typology, the University will coordinate the input of RESIN partners to this work package.
- *Contributor to work package 2* – here the University will support Fraunhofer in designing and developing the Impact and Vulnerability Analysis Tool. The University's understanding and experience of working with adaptation and resilience concepts will be valuable here. Connections between the tools developed in this work package and the Manchester case study will be made.
- *Co-partner on work package 3* – the University will work on tasks linked to collating and standardising adaptation measures, making particular inputs linked to fluvial and pluvial flooding and on ecosystem-based approaches. Again, the engagement of the University in this work package will support the process of trailing tools and approaches in the Manchester case study.
- *Co-partner on work package 4d* – our role is to work collaboratively with partners from Manchester to deliver tasks linked to the successful completion of this case study.
- *Contributor to work package 6* – within this work package, our role is to support the development of the decision support system, focusing particularly on decision making processes and possible entry points for adaptation and resilience thinking.

In addition to the contributions outlined above, the University of Manchester will work closely with ICLEI and TNO within work packages 7 and 8, which are focused on dissemination and project management respectively.

*Persons carrying out the research*

**Dr Jeremy Carter** (male) is a Research Fellow working at the University of Manchester. He is Co-Director of the Centre for Urban Resilience and Energy. Jeremy's specific research interests include urban climate change adaptation and resilience, environmental and spatial planning, and scenario planning. He has led research projects, delivered lectures and published peer reviewed academic papers across these fields. He is currently engaged in, and in some cases is managing, several research projects on climate change risk and adaptation. These operate from local to international scales and include the EcoCities and Climate Proof Cities projects (described in the relevant projects list below), and research projects focused on climate change risk and adaptation within the housing and transport infrastructure sectors. These projects connect closely with policy makers and practitioners, and focus on developing collaborative outputs that have impact beyond the academic community. Jeremy's external roles have included acting as adaptation theme lead during the development of Greater Manchester's climate change strategy. He currently chairs the adaptation group of Manchester City Council's climate change strategy and represents the University on the Northwest Climate Change Partnership. He has also been appointed as an international expert to support the Committee of the Regions on their submission to the European Commission on the EU Adaptation Strategy.

**Professor John Handley** (male) is an environmental scientist and spatial planner who has worked in Universities, Local Government and the NGO sector. He worked for seven years as a Principal Planning Officer with responsibilities for all facets of natural resource management in a large UK metropolitan conurbation. John has special expertise in landscape planning, climate change impacts and adaptation, restoration ecology and the dynamics of urban systems. He is a member of the UK Man and the Biosphere Urban forum of UNESCO and the United Nations Environment Program Global 500. John has held senior positions at the University of Manchester including Director of the Centre for Urban and Regional Ecology (CURE) and Head of the School of Planning and Landscape at the University of Manchester. He has directed several major climate change risk and adaptation projects including EcoCities and ASCCUE (described in the relevant projects list below). John also provided the urban planning input to the influential UK government Office of Science and Technology, Foresight project on "Future Flooding", which was carried out by a team of 60 experts. John is currently an Emeritus Professor working with the University of Manchester's School of Environment, Education and Development.

**Dr Angela Connelly** (female) holds a PhD in Architecture and is a Research Associate at the Manchester Architecture Research Centre at The University of Manchester. She has been a researcher for eight years with extensive experience in qualitative interviewing, policy analysis and co-production of research with non-academic partners, particularly to explore issues around sustainability and the built environment. During the EU-FP7 SMARTeST she worked closely with public agencies, community organisations, manufacturers and policy makers to develop best practice guidance on the installation and maintenance of flood protection measures. She also provided research support, particularly around the theme of buildings, on climate change adaptation as part of the EcoCities project at the University of Manchester. More recently, she has been involved in monitoring and evaluation for Rochdale Metropolitan Borough Council's Community Flood Resilience Pathfinder Scheme. Other projects of relevance to RESIN include research undertaken within the Joseph Rowntree Foundation and Environment Agency *Climate Just* project, in which she helped to develop and test the materials for an online portal to help local authorities deliver socially just responses to climate change.

**Dr Stephen Hincks** (male) is a Senior Lecturer in Planning and Environmental Management at the University of Manchester. He is a member of the university's cross-disciplinary Centre for Urban



Policy Studies. Stephen's research covers two broad themes. The first theme focuses on conceptualising, measuring and analysing the dynamics of spatial development in cities and urban areas. This area of research involves developing and applying different analytical frameworks and methodologies to understand complex spatial structures and processes. He has developed related urban typologies using secondary datasets to understand commuting, migration, neighbourhood structures and their dynamics of change, and urban housing market functionality. This technical area of research has subsequently informed a second area of policy-applied research focused on analysing and evaluating urban spatial and territorial policies. This involves understanding the drivers of spatial and territorial policies; the processes, practices and governance arrangements underpinning policy development and implementation; and the spatial, economic and social impacts of different policy interventions. Stephen's research has been undertaken for a range of clients in the UK, including the Department for Communities and Local Government, the Royal Town Planning Institute, Regional Development Agencies, the Joseph Rowntree Foundation, the Engineering and Physical Sciences Research Council, and the Economic and Social Research Council.

**Dr Andrew Karvonen** (male) is a Lecturer in Architecture and Urbanism in the School of Environment, Education and Development at the University of Manchester. He conducts research on sustainable urban development with a specific focus on the governance of water and energy infrastructures. He has completed projects funded by the US National Science Foundation, UK EPSRC, UK ESRC, the Scottish Government, and the UK Government on the politics of urban drainage, the emergence of low-carbon living laboratories, and innovations in energy efficient housing. His research findings have been published in urban planning and geography journals such as *Environment and Planning A*, *International Journal of Urban and Regional Research*, and *Progress in Planning*. He also published a single-authored monograph, *Politics of Urban Runoff: Nature, Technology, and the Sustainable City* (MIT Press, 2011). He currently serves as co-director of the Centre for Urban Resilience and Energy as well as co-director of the EPSRC Doctoral Training Centre in Power Networks at the University of Manchester. In addition to his academic experience, he worked for a decade as an environmental and sustainability consultant in the US and is a licensed engineer in the State of Washington.

*Relevant publications/products/services/achievements*

- Carter, J.G., Cavan, G., Connelly, A., Guy, S., Handley, J., and Kazmierczak, A. (2014). Climate Change and the City: Building Capacity for Urban Adaptation. *Progress in Planning*. (in press).
- Carter, J.G. Connelly, A., Handley, J., Lindley, S. (2012). *European cities in a changing climate: exploring climate change hazards, impacts and vulnerabilities*. Manchester: The University of Manchester.
- Carter, J.G. (2011). Climate change adaptation in European Cities, *Current Opinion in Environmental Sustainability* 3 (3) 193-198.
- Gill, S., Handley, J., Ennos, A., & Pauleit, S. (2007). Adapting Cities for Climate Change: The Role of the Green Infrastructure. *Built Environment*, 33(1), 115–133.
- Deas, I. and Hincks, S. "Migration, Mobility and the Role of European Cities and Regions in Redistributing Population." *European Planning Studies* (In-press)

*Relevant previous projects/activities*

The University of Manchester has been active in the field of urban climate change adaptation since 1998. Involvement in research projects blending applied research, decision support and stakeholder engagement, either as project leader or as an active consortium member, has placed the University at the forefront of the debate. Concerning urban adaptation and resilience, the RESIN University of

Manchester team hold particular expertise in fields including climate change risk assessment, urban adaptation responses, landscape and urban planning, policy analysis, developing urban typologies using secondary datasets and the co-production of research with end user groups. There follows a summary of several significant ongoing and completed research projects directly linked to climate change risk and adaptation, within which the research skills noted above have been developed.

- **EcoCities (funded by Bruntwood Limited and the Oglesby Charitable Trust):**

EcoCities is an inter-disciplinary research programme which utilises the Greater Manchester conurbation as a test-bed for developing climate adaptation strategies at nested levels of scale, from building, through local to city-region. This involves implementing a research strategy guided by principles centred on managing climate change risks. EcoCities is also developing and engaging with a network of key stakeholders in the field (regionally, nationally and internationally) with the aim of informing and supporting ongoing planning and strategy making relevant to adaptation to climate change. The key output of this project can be viewed at: <http://www.adaptingmanchester.co.uk/>. Ongoing from 6/08.

- **Climate Proof Cities**

This project sits within the Dutch Knowledge for Climate Research Programme. The aim of Climate Proof Cities is to build a multi-scale quantitative knowledge base on urban climate, the vulnerability of cities to climate change, and expected impacts of possible future changes in climate. The consortium consists of Dutch research institutes, Dutch cities and international research partners. The University of Manchester is undertaking research into adaptation planning and governance in addition to providing collaborative research support across the consortium. Ongoing (3/11 to 10/14)

- **Adaptation Strategies for European Cities project (EU Cities Adapt) (funded by the European Commission's DG Climate Action).**

This project provided capacity building and assistance to a group of 21 European cities engaged in developing climate change adaptation strategies. Within this project the University of Manchester team completed a major report on European Cities in a Changing Climate, which is referenced in the relevant publications below. Details of the project can be found at: <http://eucities-adapt.eu/cms/>. Completed (4/12 to 6/13).

- **Green and Blue Space Adaptation for Urban Areas and Eco Towns project (GRaBS) (funded by INTERREG IVC).**

This project facilitated exchange of knowledge and experience and transfer of good practice on climate change adaptation strategies to local and regional planning authorities from eight European Member States. In June 2012 GRaBS won the European Commission's DG for Regional Policy 'RegioStars Award' as the best project in the Sustainable Growth category. The key project findings are available at: <http://www.grabs-eu.org/>. Completed (6/08 to 6/11).

- **Adaptation Strategies for Climate Change in the Urban Environment (ASCCUE) (funded by the UK government's Engineering and Physical Sciences Research Council).**

The ASCCUE project explored adaptation strategies to climate change impacts such as coastal and riverine flooding, ground instability and thermal comfort, through strategic planning and urban design. ASCCUE sat within a wider program of projects (Building Knowledge for Climate Change - BKCC), which explored climate change impacts on the built environment, transport and infrastructure. Completed (2003-2006).



*Relevant infrastructure/equipment*

n/a



#### 4.1.12 UNIBA

<b>Organisation full name:</b>	Univerzita Komenskeho V Bratislave
<b>Organisation short name:</b>	UNIBA
<b>URL:</b>	<a href="http://www.uniba.sk/?en">http://www.uniba.sk/?en</a>

**Comenius University in Bratislava (UNIBA)** is the oldest university in the Slovak Republic. UNIBA with its 13 faculties and several specialised centres is the largest university in Slovakia. The University has over 18% of the total number of third-level students in Slovakia. In several fields of study, the university is the only institution providing higher education in the country. The University traditions are binding – above all to seek, to discover and to think innovatively. The Faculty of Natural Sciences of the Comenius University, among the top faculties of the university, will contribute to the RESIN project. The scientific focus of the staff of this faculty (especially Environmental Section) is currently mainly aimed at the study of landscape and urban systems, with an emphasis on the assessment of environmental quality, landscape-ecological planning in the cities (landscape-ecological plans, blue and green infrastructure, adaptive measures of climate change), evaluation of land use and environmental quality, structural and functional ecological relations in the landscape (urban and natural), sustainable development, environmental impact assessment, strategic environmental assessment, assessment of the impacts of activities on the environment, environmental assessment of concepts, plans and programmes, application of principles, criteria and indicators of sustainable development in environmental planning and creation of the local Agenda 21, geographic information systems applicable in environmental planning.

##### *Main tasks*

In WP2, UNIBA will contribute to RESIN by testing IVAVIA. UNIBA will assist in the inventory of measures and developing of adaptation library/catalogue of potential adaptation measures based on the typology of cities (especially in the part of policy formulation, monitoring and evaluation) (WP3). In WP4 UNIBA will conduct research in the city of Bratislava for testing and co-developing the outcomes of the research in WP2, WP3 and WP 6, and support the city authorities and other stakeholders by providing guidance on when and how to use the tools to ensure grounding of the results in the decision-making process of Bratislava. In WP7 UNIBA will help with the “circle of sharing and learning” in Bratislava and the help during preparation of stakeholder dialogues and developing the yearly policy brief.

The potential of UNIBA is not only in theoretical and methodology level, we also offer cooperation in the field GIS, modelling, data processing, creation cartographic outputs. We can offer also the potential of our PhD students or post-doc who can realised special measurements, collect data etc.

##### *Persons carrying out the research*

**Eva Pauditsova** (female) – landscape ecologist and environmentalist graduated from the Faculty of Natural Sciences Comenius University in Bratislava, Slovakia in 1994, she obtained her PhD in Environmental planning and management in 2005, her Habilitation (in 2012) was in the field of Spatial planning, management and GIS. From 1994 to date she works at the Faculty of Natural Sciences Comenius University in Bratislava (from 2011 to date – head of the Dept. of Landscape ecology). Her research work and teaching activities is related to the field of landscape ecology, environmental planning and management, GIS, mapping, modelling; she is specialised in spatial planning, green infrastructure (incl. evaluation of greenery in the context of climate change), environmental impact assessment, evaluation of environmental changes. She is the author/or co-author of more than 150 scientific and professional publications, co-author of 8 monographs and 7 textbooks for university students. She is also supervisor of PhD students and supervised 48 MSc

and Bc theses. She is co-worker 30 scientific, research and also education projects. In 2004-2007 she cooperated with the Regional Environmental Centre Slovakia (as an methodical advisor, creator of methodical approaches) in the 6<sup>th</sup> FP EC, LIFE III Environment – Sustainable development of the cities and mitigation of the negative impacts of climate change on the quality of life and the state of the urban environment (UrbEco); in 2009-2011 she was engaged (as an deputy of main coordinator) in the project supported by the European Regional Development Fund – Centre of Excellence No. 26240120002 – Development of Settlement Infrastructure of Knowledge Economy and in 2013-2015 she was engaged in Research and Development Operational Programme, ERDF, Grant No. ITMS 26240220086 – Comenius University in Bratislava Science Park.

**Maria Kozova** (female), physical and regional geographer graduated from the Faculty of Natural Sciences Comenius University in Bratislava, Slovakia in 1972, she obtained her PhD in Regional Geography in 1981, her Habilitation (in 1997) was in the field of Human and Regional Geography. Since 2006 she is Professor of Environmental Sciences. From 1972 to 1992 she worked at the Institute of Landscape Ecology Slovak Academy of Sciences and from 1992 to date she works at the Faculty of Natural Sciences Comenius University in Bratislava (1992-2003, head of the Department of Landscape Ecology, 2003-2011 depute head of the Dept.). Her research work and teaching activities is related to the field of landscape ecology, environmental planning and management; she is specialised in environmental impact assessment, assessment of environmental changes (incl. climate change), sustainable development and environmental governance. She is the author/or co-author of more than 60 scientific and 110 professional publications, co-author of 6 monographs and 12 textbooks for university students. She already supervised 10 PhD and more than 50 MSc theses. She was principal investigator of 16 scientific and research oriented projects a co-worker other 40 projects. In 2008-2011 she cooperated with the Regional Environmental Centre Slovakia in the INTERREG IVC – GRaBS project (Green and Blue Space Adaptation for Urban Areas and Eco Towns) and in 2012-2013 she was engaged (as an advisor) in the Project EU implemented by Bratislava City Hall – Adaptation Strategies to Climate Change for European cities, case study: Bratislava.

#### *Relevant publications/products/services/achievements*

- **Kozová, M., Pauditšová, E.:** Development current state and trends of further improvement of landscape planning (comparative analysis of different approaches) In: Landscape Ecology – methods, applications and interdisciplinary approach. – Bratislava: Institute of Landscape Ecology SAS (2010) pp. 29-40. ISBN 978-80-89325-16-0
- **Kozová, M., Hudeková, Z.** An Integrated Approach to the Adaptation Climate Change Strategies in Visegrad Cities: A Tool for Common Environmental Policy. In: Visegrad Conference on Common Environmental Problems - 2013. Banská Bystrica: UMB, (2013) pp. 67-74. [Visegrad Conference on Common Environmental Problems - 2013. Praha, 4.-5.3.2013]
- **Kozová, M., Hudeková, Z.:** Climate Change Adaptation Strategies for Cities in Visegrad Countries, In: Visegrad Countries: Environmental Problems and Policies – Cenia, (2013). pp. 186-202, ISBN 978-80-85087-16-1
- **Reháčková, T., Pauditšová, E.** Evaluation of urban green spaces in Bratislava. In: Boreal Environment Research. Vol. 9, No. 6 (2004), pp. 469-477.
- **Hrnčiarová, T., Izakovičová, Z., Pauditšová, E.** et al. Landscape-ecological conditions for development of Bratislava, Bratislava: VEDA, Slovak Academy of Sciences, 2006. 316 p.

ISBN 80-224-0910-3

*Relevant previous projects/activities*

- **INTERREG IVC – GRaBS project** (Green and Blue Space Adaptation for Urban Areas and Eco Towns) co-financed by ERDF (2008-2011)

The GRaBS project established a network of leading pan-European organisations involved in integrating climate change adaptation into regional planning and development. Slovakia was represented by a non-governmental organisation Regional Environmental Centre Slovakia and Comenius University cooperated (as co-partner and advisor) in elaboration of the case study for Bratislava city. During the project life five students CU worked out the doctoral and master theses related to the climate change in urban areas in relation to the methodology of GRaBS project.

- **Centre of Excellence No. 26240120002** – Development of Settlement Infrastructure of Knowledge Economy” supported by the European Regional Development Fund (2009-2011)

The project was focused on the preparation of the contracting the 6 technological platforms for 4 participating partners (incl. Comenius University in Bratislava). Simultaneously with preparation of technological platforms, the other measurable indicators of the project were fulfilled: have been supplied 6 international project, 4 of them were approved (AKK Centropo, Vital Landscapes, EcoFINDERS, Responder) – object of the interest of these projects was urbanized landscape and research the changes in urban areas; have been issued 2 monographs (Housing and housing policy; Landscape planning), 2 textbooks (Spatial planning; Environmental planning and management), 29 articles and several scientific reviews. The most of outputs was the result mutual collaboration of project partners.

- **Project EU implemented by Bratislava City Office** – Adaptation Strategies to Climate Change for European cities (2012-2013)

In 2012 Bratislava was chosen among 21 European cities for the capacity building program funded through the project EU Cities Adapt. Comenius University cooperated with the City Hall of Bratislava in identification of main climate change related hazards, elaboration of the Adaptation strategy to Climate Change for Bratislava city and a draft of strategic action plan.

- **6<sup>th</sup> FP EC, LIFE III Environment – UrbEco Footprint – Sustainable Development of Cities and Mitigation of Impacts of Climate Change on Quality of Life and on Environment in Urban Areas LIFE04 ENV/SK/000797** (2004-2007)

The goal of project was to develop and implement strategic urban planning tools, tailored to Slovak conditions, that used proven sustainable development indicators to assess the ecological footprint of 10 different cities in Slovakia. Outcomes from the project aimed to strengthen cooperation between urban areas on tackling climate change issues and increase awareness among politicians, decision makers and the general public about environmental and sustainable development (SD) issues in urban areas.

- **Comenius University in Bratislava Science Park, Research and Development Operational Programme, ERDF, Grant No. ITMS 26240220086** (2013-2015)

The main project objective is to build the Comenius University in Bratislava Science Park in the fields of molecular medicine, environmental medicine and bio-technologies. Researchers from the Dept. of Landscape ecology participate at the activity No. 2.4 Enviro-Medicine for 21<sup>st</sup> century – biotic and abiotic factors of landscape and their impacts. The research activities are concentrated on such environmental factors that represent serious environmental risks to human health. Objectives of the activities are not only focused on the environmental components, but also on

somatometrical and molecular-anthropological screening of human populations and diagnosis of various diseases and health risk indicators. Important objective is the analysis and dissemination of environmental data and public data about indicators and health status of the population and evaluate the impact of environmental risk factors on health, through geographic information systems.

*Relevant infrastructure/equipment*

- standard IT environment (i.e. workstations, servers, software tool)
- standard office equipment (laptops, computers, printers, plotter, large format scanner)
- standard GIS software (for dataprocessing, modelling)

#### 4.1.13 Bilbao

<b>Organisation full name:</b>	Ayuntamiento de Bilbao
<b>Organisation short name:</b>	Bilbao
<b>URL:</b>	<a href="http://www.bilbao.net/">http://www.bilbao.net/</a>

**Bilbao** is located within an old industrialized region that is now developing new technology –based industrial structures. Along these lines, since the 1990s, the metropolitan area of Bilbao has experienced a steady social, economic, and aesthetic revitalization process that is still on-going. The main challenge was to transform the river into an axis for social and urban re-integration, to replace heavy industry by an emerging multifaceted network of design, first-class technology and innovation centers.

Bilbao has managed to improve its overall environment and urban quality by focusing on the following priorities:

- Reduction of atmospheric pollution.
- Treatment of solid waste (incineration plant and composting plant).
- Decontamination of industrial land.

Nowadays Bilbao is working with various research, social, business and policy agents in building of the new ‘Basque Strategy against climate change’.

Bilbao aims to keep in line with the EU, regional and state policies aiming to promote technological innovation and to increase the share of renewable energy. In this sense, the municipality plans to apply, adapt and improve the tools that enhance its implementation on both the administrative and service related level as well as in the own residential buildings of the municipality. Bilbao is part of the European association EUROCITIES that aims to strengthen the urban dimension to the integration process through innovative projects of common interest. In 2012, Bilbao signed the “Covenant of Mayors” and also elaborated the Sustainable Energy Action Plan (SEAP). Within the SEAP, Bilbao developed measures in the six following areas: energy efficiency, renewable energies, sustainable mobility, waste, water and green zones. In terms of energy efficiency and climate change, Bilbao’s main goal is to meet the measures included in the SEAP and to reach the target of 30.8% reduction of green house gas emissions (GHG). During the last years the City Council has been developing several actions of awareness, with a good reception of citizens. On the other hand our social media strategy is focused to awareness to all the citizens through our website [www.biobilbao.org](http://www.biobilbao.org) and social media campaigns.

The city of Bilbao has the firm conviction of carrying out its third transformation towards of Knowledge City in which policy decisions were fed from the different sectors involved in the same participatory way, valued and supported on studies with scientific rigor helping the city to position itself as an international leader in environmental and sustainability and promoting science as the focus of growth and transformation.

The strong presence in Bilbao of research and innovation centers related to renewable energy, climate change, and communication institutions such as BC3, Tecnalia, Factor CO2, Naider, Aclima association, etc., as well as the solid structure of regional and local public agencies related to climate change, energy and R & D (EVE Ihobe, UPV, Innobasque, BIO etc.), presents a unique opportunity for the city.

The already existing strategic partnership with BC3 is an unquestionable benefit to Bilbao by joining a center of excellence and international reputation in research on climate change from

socio-economic perspective, led by a recognized authority on this subject, Professor Anil Markandya. Joint work between Bilbao and BC3 will be aimed at finding solutions to ensure resilience and reducing vulnerability to climate change and development of strategies and tools for adaptation of the city, and thus among others, will develop an ad hoc study on the economic effects of the adaptation measures necessary for the risk of flooding in the urban environment.

#### *Main tasks*

With the collaboration of BC3 the city will try to become a true urban laboratory, world reference in the development and implementation of sustainability efforts on climate change, its economic impact and adaptation, as in the implementation of measures and energy efficiency policies. The RESIN project also provides another opportunity to strengthen the collaboration between BC3 and Bilbao.

#### *Persons carrying out the research*

**Estíbaliz Sanz Gogekoetxea** got a degree in law from the UPV/EHU and in planning for graduate school in Basque regional and urban studies. She currently works as a consultant to the Mayorality of Bilbao in the transversal projects focused on urban sustainability and especially in environmental related issues. She has coordinated and is responsible for implementing the sustainable energy strategic plan in Bilbao (PAES) fruit of the European Covenant of Mayors and exercised by the BIO Directorate Office on Climate Change Bilbao, since its foundation in 2009. BIO (Climate Change office in Bilbao) was the first office in Spain working on training, awareness and dissemination of Climate Change phenomenon achieving a recognized awareness and participation statewide.

During 5 years (2007-2012) was the advisor to the area of urban planning and environment of the City of Bilbao, coordinating environmental projects especially related to the city.

**Rincón Mayor Enrique** is Assistant Director of Environment in the City Council. Responsible Service of Environment since 2008, with liability in the action of noise, atmosphere and pollution, industrial wastes and with attributions on the city brownfields. Service Coordinator Project. Activity License Analysis. 1998-2008 City Council Spokesman at Environment Issues and courses at the Basque Public Administration Institute IVAP. Bilbao Biodiversity office. Coordinator 2006-2010. General coordinator BRODISE, project funded by the European Union under the Horizon 2020, about brown field decontamination in Southern Europe.

#### *Relevant publications/products/services/achievements*

Relevant achievements of the City:

2002– Cities Awards for Excellence

2003 – European Healthy City Award

2004 – European Urban and Regional Planning Awards

2006 – European Urban and Regional Planning Awards

2011 – Sustainable City Awards (Third city of Spain)

#### *Relevant previous projects/activities*

- **RAMSES** Reconciling Adaptation, Mitigation and Sustainable Development for Cities.

The municipality of Bilbao is working as case study in the framework of FP7 project RAMSES, with the objective of developing general guidelines for integrating adaptation criteria in urban



planning, specifically related to Urban Heat Island effect, Floods and Storm water Use by Planning and Design.

- **BIO (Office on Climate Change Bilbao)**

In 2009 Office on Climate Change Bilbao (BIO) was created to sensitize the citizenship of Bilbao. Communication is done through the official municipality's website: [www.bilbao.org](http://www.bilbao.org). This web updates the most important news on climate change, and channels the presence of BIO in social networks (Facebook, Twitter and Flickr).

BIO has so far developed the following projects:

- Cinema-forums. Working on climate change and energy efficiency skills, with the assistance of industry experts. Holding public events to promote energy conservation, such as "Day Without Money," "Trueke Markets" "Markets Crafts" or fairs to promote habits and techniques that help reduce energy consumption.
- Biotrueke. Promoting reuse and responsible consumption, where users can exchange or selling second-hand.
- Green Homes Program. Monitoring of emissions generated by households, thematic training in sustainability and savings, meeting point for families.
- Behaviour change campaigns.

- **ICE-WISH**

Co-financed by the European Commission (7 th Framework Programme ICT PSP) and in partnership with 10 other European cities, companies and universities, aims to encourage the use of ICT to promote energy efficiency and savings. (2012)

- **FREILOT**

The FREILOT service has as its main objective to drastically increase energy efficiency in road goods transport in urban areas through a holistic and integrated treatment of traffic management, fleet management, the delivery vehicle and the driver, and demonstrate in four linked pilot locations that up to 25% reduction of fuel consumption and CO2 emissions in urban areas is achievable through FREILOT service. (2012)

*Relevant infrastructure/equipment*

n/a



#### 4.1.14 Manchester

<b>Organisation full name:</b>	OC Oldham Metropolitan District Council
<b>Organisation short name:</b>	Manchester
<b>URL:</b>	

**Oldham Metropolitan Borough Council (OMBC)** will be the lead authority on behalf of the Greater Manchester Low Carbon Hub. OMBC has extensive experience of participating in EU Partnership projects and is accountable body on behalf of Greater Manchester Regions 4 Green Growth project. We also participate in LIFE+, IEE II, TREN and Culture projects

OMBC has experience of delivering and managing ESF and ERDF projects and Action Plans (local ERDF programmes) through the Objective 2 Programmes 1997-99, 2000-06 and the current Competitiveness & Employment programme 2007-13, of over £21m. Projects include both large capital projects, business support, managed workspace, inward investment, environmental, training and community economic development projects. OMBC has been both project applicant and managing/accountable body for these programmes and has both project delivery and financial/project/programme management experience within the organization

David Catheral, has managed the Oldham Council EU funded programmes for the past 14 years. He currently manages all external funding programmes, he will be working closely with the relevant project stakeholders in the town to ensure maximum levels of dissemination at a Greater Manchester level.

Dave will be working closely with the delivery partners from the GM Low Carbon Hub (GMLCH) as it delivers relevant parts of RESIN work packages and the outline of hub, its remit and role is included below.

#### **Greater Manchester Low Carbon Hub –**

The (GMLCH) is part of the Association of Greater Manchester Authorities (AGMA) [http://www.agma.gov.uk/low\\_carbon\\_hub/index.html](http://www.agma.gov.uk/low_carbon_hub/index.html). It is the GMLCH within AGMA which acts as the voice of the ten local authorities of Greater Manchester around the CC and resilience agenda. The GMLCH and the wider AGMA governance and working arrangements aim to boost economic performance and help deliver a brighter and more resilient future for Greater Manchester. The primary role of the GMLCH is to work to help Greater Manchester and its partners deliver the recently refreshed Greater Manchester Strategy and associated Climate Change Strategy, both of which have the development of a low carbon and resilient economy at their heart and **more details on the GMLCH can be found on;** [http://www.agma.gov.uk/cms\\_media/files/low\\_carbon\\_hub\\_bulletin\\_final.pdf](http://www.agma.gov.uk/cms_media/files/low_carbon_hub_bulletin_final.pdf)

The GMLCH integrates the delivery of multiple carbon-reduction and resilience activities, representing a shift from strategy development to prioritised delivery. As a result, GM has embedded the GMLCH within the network of Greater Manchester Centres of Excellence and created strong private and voluntary sector partnership support as well as working to harness the knowledge of our universities alongside the innovation of our businesses who share our vision for Greater Manchester of “*Reducing our carbon emissions and adapting to the impacts of a rapidly changing climate*”. Delivery is also supported by strong links to government through formal Memoranda of Understanding with the Departments for Energy and Climate Change (DECC) and the Department for Environment Food and Rural Affairs (DEFRA).

The GMLCH aims to deliver the GM Climate Change Strategy that has four primary objectives:

1. We will make a rapid transition to a low carbon economy.
2. Our collective CO2 emissions will have been reduced by 48%.
3. We will be prepared for and actively adapting to a rapidly changing climate.
4. 'Carbon literacy' will have become embedded into the culture of our organisations, lifestyles and behaviours.

#### *Main tasks*

In terms of RESIN, GMLCH provides, at a Greater Manchester City Region scale, a governance, communication and delivery platform which will enable standardized climate change impact and vulnerability mapping techniques to be trialled and tested with a range of public and private partners with the learning fed back. The strong goal of GMLCH to move from strategy to prioritised delivery across its 4 complementary objectives will also allow exposure, testing and feedback of potential Cities and Infrastructure climate adaptation solutions within the RESIN project.

#### *Persons carrying out the research*

**Matt Ellis (male).** Matt is currently GM's Climate Resilience Officer. Matt is currently working within the Low Carbon Hub on secondment from the Environment Agency. Matt is a qualified Town Planner who has worked for over 15 years around the issues of environmental and climate related constraints on growth and development, with a particular focus on flood risk, future climate change and infrastructure capacity. Matt's current role is supporting GMLCH to understand how GM needs to respond to various climate resilience issues, particularly those being driven by DEFRA as part of actions identified within the UK's National Adaptation Programme

**Sophie Sheil (female).** Sophie is an Environmental Strategy Officer within Manchester City Council (one of the 10 districts within Greater Manchester). Sophie sits within the Environmental Strategy team in the Growth and Neighborhoods Directorate and has a lead on climate change adaptation at a Manchester City Council level. Sophie is currently increasingly working around adaptation within Manchester City Council's climate change strategy 'Manchester: A Certain Future' <http://www.manchesterclimate.com> and her role in terms of RESIN is envisaged to be to provide direct support to test the operation of and embedding of vulnerability / impact mapping and solution development from within other RESIN work packages across a single municipal authority

**Mark Atherton (male).** Is Greater Manchester's Director of Environment. Mark leads the Greater Manchester Environment Team and would provide RESIN with senior level input including ensuring continued resourcing and priority given to participation in and delivery of the project within individual local stakeholders, convening of Greater Manchester wide multi partner meetings/events; hosting any RESIN wide case study or other partner visits; participating if required in other events/visits with other project partners.

#### *Relevant publications/products/services/achievements*

- **The Greater Manchester Green Infrastructure Framework**  
[http://www.agma.gov.uk/cms\\_media/files/110506\\_final\\_gi\\_framework\\_may\\_20112.pdf?stactic=1](http://www.agma.gov.uk/cms_media/files/110506_final_gi_framework_may_20112.pdf?stactic=1) This GI Framework reviews the evidence base produced to date regarding GI priorities

at a GM level in order to evidence, explain and position the role of green infrastructure in delivering the aspirations of the City Region including delivery of climate resilience to the city and its infrastructures.

- **The Greater Manchester Ecosystems Services study** was commissioned to develop an overview of Ecosystem Services (ESS) within Greater Manchester; identify the priority Ecosystem Services (particularly ones relating to climate change mitigation and adaptation, and identify key ESS **pinch point** locations within Greater Manchester and **interventions** that are required to alleviate these.
- The **Evidencing and spatially prioritising CC in GM** report evidences, and where possible spatially prioritises, weather and climate change risks to GM and the delivery of the wider Greater Manchester Strategy (GMS) by; identifying and reporting on weather and climate change impacts in GM, using this data to assess associated risks to the delivery of the GMS and using the outputs to identify and engage with GM organisations and structures with a key role in responding to the risks to the GMS.  
[http://www.agma.gov.uk/cms\\_media/files/gmccra\\_final\\_1\\_.pdf](http://www.agma.gov.uk/cms_media/files/gmccra_final_1_.pdf)
- **The Greater Manchester Natural Capital Group** <http://gmlnp.org/index.php/about-us> who form the formal Local Nature Partnership in the Greater Manchester area which brings together partners to coordinate and strengthen local action to protect and improve their area's natural environment, including the key climate adaptation services it provides.

#### *Relevant previous projects/activities*

- **Greater Manchester Climate Change Strategy (GMCCS)**  
[http://www.claspinfo.org/sites/default/files/gm\\_climate\\_change\\_strategy\\_final1.pdf](http://www.claspinfo.org/sites/default/files/gm_climate_change_strategy_final1.pdf) sets out the need to increase our resilience to a changing climate and the challenges and opportunities this presents by creating a common framework to provide direction and co-ordination for plans and programmes already in place at Greater Manchester and district level, linking them to all the priorities in the Greater Manchester Strategy.
- **The Greater Manchester CC implementation plan 2013-2015**  
[http://www.agma.gov.uk/cms\\_media/files/5\\_climate\\_change\\_strategy\\_implementation\\_plan\\_20151.pdf](http://www.agma.gov.uk/cms_media/files/5_climate_change_strategy_implementation_plan_20151.pdf) In 2011, the GMCCS set a stretching target for CO2 emissions reduction – 48% on 1990 levels – as well as setting the strategic agenda for other actions on climate change adaptation. This Implementation Plan sets out the actions to be taken in pursuit of GMCCS during the period from approval in 2011 to 2015.
- **Greater Manchester's Local Resilience forum** <http://www.agma.gov.uk/greater-manchester-prepared/> and the partners represented within it are already actively considering and managing risks to GM, including climate related ones. Climate risks are already contained with the GM's Community risk register  
[http://www.agma.gov.uk/cms\\_media/files/published\\_copy\\_2012\\_v6\\_july\\_2013.pdf](http://www.agma.gov.uk/cms_media/files/published_copy_2012_v6_july_2013.pdf) and the GMLRF and supporting officers are starting to actively consider longer term changes to those risks as a result as our climate changes

#### *Relevant infrastructure/equipment:*

n/a



#### 4.1.15 Siemens AT

<b>Organisation full name:</b>	Siemens Aktiengesellschaft (AG) Österreich
<b>Organisation short name:</b>	Siemens AT
<b>URL:</b>	<a href="http://siemens.com/">http://siemens.com/</a>

**Siemens AG Oesterreich** is operating in electronics and electrical engineering, structured in the four Siemens Sectors: Industry, Energy, Healthcare and Infrastructure & Cities. Siemens AG Oesterreich is part of Siemens AG that has stood for technological excellence, innovation, quality, reliability and internationality for over 160 years. Siemens AG holds leading market positions in all its business areas.

Siemens AG Oesterreich has around 8,000 employees (in continuing operations) working to develop and manufacture products, design and install complex systems and projects, and tailor a wide range of solutions for individual requirements. In fiscal year 2013, Siemens AG Oesterreich had a turnover of 2.7 billion Euros.

Innovation is Siemens' most important growth and productivity driver. In fiscal year 2013, Siemens AG Oesterreich invested 166.7 million Euros in research and development to stay at the forefront of technological progress. Collaborations are an indispensable means of developing strategically important technologies. By discussing, sharing and implementing ideas with scientists from outside the company, Siemens researchers keep abreast of the latest findings resulting from fundamental and applied research all over the world.

Siemens AG Oesterreich's Corporate Technology Central Eastern Europe (CT CEE) plays a key role in R&D at Siemens. The organization provides expertise regarding strategically important areas to ensure the company's technological future, and to acquire patent rights that safeguard the company's business operations. Against the background of megatrends such as climate change, urbanization, globalization, and demographic change, CT focuses on innovations that have the potential to change the rules of the game over the long term in business areas that are of interest to Siemens. The fields of research at CT CEE include biotech, biosensors, configuration technologies, electronic design, video analytics, RF technology, industrial networks, as well as SW architecture review, recovery & improvement.

Siemens AG Oesterreich provides innovative technologies and comprehensive know-how to benefit customers. For exploitation Siemens AG Oesterreich primarily targets Austria and its "Assigned Countries": Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Israel, Kosovo, Montenegro, Republic of Moldova, Romania, Serbia, Slovakia, Slovenia and Ukraine.

##### *Main tasks*

Contributions to the WP6, consulting for the decision support tool (consulting for design, development and test).

##### *Persons carrying out the research*

Dr. **Bernd Wachmann** has received his master degree in 1995 in Physics from the University of Technology Graz, Graz, Austria, and the PhD degree in 1999 in Theoretical Physics from the University of Stuttgart, Stuttgart, Germany. In the same year he joined Siemens in Austria working in the areas of biometrics and bioinformatics for technology and product development. In 2004 he moved to Princeton, NJ, USA, working for Siemens Corporate Research in the area of data mining and knowledge discovery applied to biomedical, industrial and financial solutions. In 2009 he moved from Princeton to Erlangen, Germany, to expand the global technology field condition monitoring within Siemens Corporate Technology in Europe; in the same year he moved to Tokyo

to head the group of Corporate Technology of Siemens Japan, working in the areas of smart grid and electric vehicles with Japanese academia. In 2011 he relocated to Vienna, Austria, where he is leading since then the technology development of Siemens Corporate Technology for Sustainable Cities with global responsibility, addressing topics in the area of resource and energy efficiency.

*Relevant publications/products/services/achievements*

- C. Schwingenschloegl and B. Wachmann, Article on the City Intelligence Platform, [http://www.siemens.com/innovation/apps/pof\\_microsite/\\_pof-fall-2013/\\_html\\_en/city-intelligence-platform.html](http://www.siemens.com/innovation/apps/pof_microsite/_pof-fall-2013/_html_en/city-intelligence-platform.html), 2013, Siemens Picture of the Future
- J. Etienne, B. Wachmann, L. Zhang, ,A component based framework for knowledge discovery in bioinformatics‘, Proceedings of the 12th ACM SIGKDD international conference on Knowledge discovery and data mining, pages 916-921

*Relevant previous projects/activities*

- **City Intelligence Platform**, development of a versatile pilot solution for monitoring and reasoning infrastructure utilization data and deriving actionable tasks from it
- **Urban 3D Models**, development of an algorithm pipeline for the modelling of urban infrastructure automatically based on conventional digital 2D images
- **Smart Building in Smart Grid**, smart electrical integration of buildings in the urban power grid, enhancing self consumption optimization and energy procurement

*Relevant infrastructure/equipment*

n/a



#### 4.1.16 Siemens DE

<b>Organisation full name:</b>	Siemens Aktiengesellschaft (AG)
<b>Organisation short name:</b>	Siemens DE
<b>URL:</b>	<a href="http://siemens.com/">http://siemens.com/</a>

**Siemens AG** is a global powerhouse in electronics and electrical engineering, operating in the industry, energy, infrastructure and cities, and healthcare sectors. The company has around 405,000 employees working to develop and manufacture products, design and install complex systems and projects, and tailor a wide range of solutions for individual requirements. In fiscal 2010, Siemens had revenue of €75.9 billion.. Innovation is Siemens' most important growth and productivity driver. The company employs 31,800 researchers worldwide. With 3,000 employees worldwide, Corporate Technology (CT) plays a key role in R&D at Siemens and is responsible for over 7 percent of Siemens' total R&D expenditure. CT works closely with the R&D teams in the Siemens' business units. CT provides expertise regarding strategically important areas, such as materials, microsystems, production methods, software, engineering, power, sensors, automation, medical informatics and imaging, information and communication, raw material extraction and processing, and off-grid energy.

Siemens will contribute to RESIN with its City Intelligence Platform (CIP). This system will be provided to the consortium to collect, store and process relevant information from the partner cities. It offers an open API to use available datasets, analytics- and user interface modules to realize new applications (e.g. decision support modules).

##### *Main tasks*

Based on experience in the area of different urban infrastructure domains, contributions will be made to WP2. City-specific applications of the CIP will be the focus of our work in WP4 (City Cases). In WP6, work is planned to host decision support modules based on the data and functionality of CIP. Siemens will lead the task on Data Acquisition, Handling and Presentation/Visualisation.

##### *Persons carrying out the research*

**Dr. Christian Schwingenschlögl** (male) received his master degree in Information Science from the Munich University of Technology in 1999 and his PhD from the Department of Electrical Engineering and Information Technology, Munich University of Technology in 2005. In the same year, he joined Siemens AG where he started to work as research scientist in the field of self-organizing wireless mesh networks. In 2010 he took over responsibility for a research team at Siemens Corporate Technology with a focus on

Internet of Things. Research areas included Software-Defined Radio, Radio Localization and application-oriented topics in the field of urban infrastructure like intelligent lightning, building automation, smart water grids and intelligent traffic solutions. In 2012, he joined the New Technology Field Sustainable Cities where he is now responsible for topics in the area of "City Intelligence" and the development of the City Intelligence Platform.

##### *Relevant publications/products/services/achievements*

- C. Schwingenschloegl and B. Wachmann, Article on the City Intelligence Platform, [http://www.siemens.com/innovation/apps/pof\\_microsite/\\_pof-fall-2013/\\_html\\_en/city-intelligence-platform.html](http://www.siemens.com/innovation/apps/pof_microsite/_pof-fall-2013/_html_en/city-intelligence-platform.html), 2013, Siemens Picture of the Future



- C. Schwingenschloegl, D. Schall, M. Hoedlmoser, C. Windisch, B. Wachmann: „City Intelligence“, accepted for VDE Kongress „Smart Cities“, 20.-21.10.2014, Frankfurt, Germany

*Relevant previous projects/activities*

- **City Intelligence Platform**, development of a versatile pilot solution for monitoring and reasoning infrastructure utilization data and deriving actionable tasks from it
- **Urban 3D Models**, development of an algorithm pipeline for the modelling of urban infrastructure automatically based on conventional digital 2D images
- **Smart Building in Smart Grid**, smart electrical integration of buildings in the urban power grid, enhancing self-consumption optimization and energy procurement
- **Safety in the City**, European Institute of Technology, Action Line Digital Cities
- **ICeWater** (ICT Solutions for efficient Water Resources Management), FP7-ICT-2011-8: A holistic approach to manage the water energy nexus. Pilots in Milano and Timisoara.

*Relevant infrastructure/equipment*

n/a



#### 4.1.17 Uniresearch

<b>Organisation full name:</b>	Uniresearch
<b>Organisation short name:</b>	Uniresearch
<b>URL:</b>	<a href="http://www.uniresearch.com">www.uniresearch.com</a>

**Uniresearch B.V.** is a SME (founded in 1994) which is specialised in supplying project management and consultancy services in the field of national and European research projects and innovation activities. Uniresearch is and has been involved in many research projects. For example in the field of automotive safety such as ASSESS, COVER, THORAX and AsPeCSS, in the field of the electrification of road transport such as FUEREX, OPTIMORE, ASTERICS, in the field of urban mobility (CityMobil, CIVITAS). Next to this, Uniresearch is involved in the field of security (SECTRONIC), in the maritime domain (NAVTRONIC), and sustainable energy (CO2 capture (CESAR), Solar cell developments (SE-PowerFoil, Fasttrack, SuMMiT). More examples of EU research projects managed by Uniresearch can be found at [www.uniresearch.com](http://www.uniresearch.com).

Uniresearch has a team of qualified consultants, bringing together a mix of technical, scientific and business administration backgrounds. Based on the management experience gained in over 120 R&D projects, a web based project management and transparent communication tool has been developed that provides a central archive of all project related files, an online reporting function, up-to-date performance and progress overviews (both technical and financial), a shared webserver that enables the uploading/sorting of project files by all partners, a platform for (technical) discussions, and a public domain for dissemination purposes (window to the outside).

Second key activity of Uniresearch is in the dissemination of project results and facilitation of technology and market uptake. Activities involve the design, setup and maintenance of Project websites, organisation of workshop and (final) project events, creation of project flyers and newsletters and the organisation of exploitation strategy seminars.

##### *Main tasks*

In the RESIN project, Uniresearch has been assigned the task of project manager (WP8), assisting TNO.

##### *Persons carrying out the research*

**Mrs. Anna Molinari** (Ph.D. in physics, Delft University of Technology): experience in experimental research and theoretical experience on molecular electronics, field effect transistors and organic semiconductors. Since 2010 project manager for Uniresearch involved in 7th Framework projects and the preparation thereof. Project responsibility: day-to-day project management and coordination dissemination activities.

**Mr. Ernst Verschragen** (M.Sc). Ernst has a degree in Aerospace Engineering (Technical University of Delft). From 2005 to 2008, he was employed at TNO Automotive, where he was a researcher in traffic accident analysis and internal project leader for the FP5 project Safetynet. He joined Uniresearch in 2008 as project manager. He is involved in project management and administration of several 7th Framework projects such as CityMobil, Pointer-Civitas, Civitas-Wiki and Acquafit4Use. Project responsibility: day-to-day project management.

**Mrs. Jacqueline Heintz.** After her study, Jacqueline worked for a number of years in the retail (own shop). Later on she worked as management assistant for International companies like Fugro (engineering) and Shell (oil company). She joined Uniresearch in December 2007 as project & management assistant. Jacqueline will be involved in the project providing management assistance,



assist in online progress monitoring and project administration.

*Relevant publications/products/services/achievements*

-

*Relevant previous projects/activities*

In following projects, Uniresearch was responsible for project management and dissemination support.

<b>Project acronym</b>	<b>Funding source/ period</b>	<b>Topic and website</b>	<b>Instrument</b>
AcquaFit4Use	FP7- Environment 2008-2012	Sustainable water use in industry <a href="http://www.aquaFit4use.eu">http://www.aquaFit4use.eu</a>	Large-scale integrated project
CityMobil	FP6- Transport 2006-2011	Towards advanced road transport for the urban environment <a href="http://www.citymobil-project.eu/">http://www.citymobil-project.eu/</a>	Large-scale integrated project
Civitas-Pointer	FP7- Transport 2008-2013	Coordination & support action for CIVITAS Plus, sustainable mobility within urban environments <a href="http://www.civitas.eu/">http://www.civitas.eu/</a>	Coordination & support action
Civitas-WIKI	FP7- Transport 2012-2016	Coordination & support action for CIVITAS Plus II, sustainable mobility within urban environments <a href="http://www.civitas.eu/">http://www.civitas.eu/</a>	Coordination & support action
Elastic	FP7-Security 2013-2016	Enhanced Large scale Architecture with Safety and Security Technologies and special Information Capabilities <a href="http://www.elastic.eu">http://www.elastic.eu</a>	Collaborative project

*Relevant infrastructure/equipment*

n/a

## **4.2. *Third parties involved in the project (including use of third party resources)***

### **4.2.1 TNO**

No third parties involved

### **4.2.2 Fraunhofer**

No third parties involved

### **4.2.3 TecNALIA**

No third parties involved

### **4.2.4 ICLEI**

No third parties involved

### **4.2.5 EIVP**

No third parties involved

### **4.2.6 ITTI**

No third parties involved

### **4.2.7 NEN**

No third parties involved

### **4.2.8 Arcadis**

No third parties involved

### **4.2.9 BC3**

No third parties involved

### **4.2.10 Bratislava**

No third parties involved

### **4.2.11 UNIMAN**

No third parties involved

### **4.2.12 UNIBA**

No third parties involved

### **4.2.13 Bilbao**

No third parties involved

### **4.2.14 Manchester**

No third parties involved

### **4.2.15 Siemens AT**

No third parties involved

### **4.2.16 Siemens DE**

No third parties involved

### **4.2.17 Uniresearch**

No third parties involved

## Section 5: Ethics and Societal Impact

### 5.1 Ethics

The RESIN project seems to be quite simple with regard to ethics issues. Clinical trials are out of the scope. The project does neither require to collect nor to use personal data, apart from contact information. No animals are to be used. We do not foresee to implement dual use technologies.

- No Classified information, materials or techniques are to be used in the research. However note the remarks in Section 6 on the possible security aspects of gathering information on vital infrastructures in the RESIN project.
- No Dangerous or restricted materials e.g. explosives are to be used in the research
- The specific results of the research do not present a danger to participants, or to society as a whole, if they were improperly disseminated
- The research does not involve processing of genetic information or personal data (e.g. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction), or the tracking and observation of people.

The RESIN project will comply with all European standards pertaining to the conduct of research, and the protection of any personal or proprietary data acquired during this process. The Project Coordinator will ensure strict adherence to legal and ethical standards at all times. If under national legislation an ethical approval for a certain part of the research will be necessary, then a copy of the report by the competent Ethics Committee will be submitted to the EU Commission.

The project involves a strong involvement of an external community of end-users. These are all professionals employed by various layers of government and by companies in services and consultancy, that are or could be involved in urban climate adaptation. Respondents will be invited through our contact points in the participating cities, through the contact points of the ‘second tier’ of cities, and through ICLEI’s city contact points.

The RESIN project will not use existing databases for inviting participants for interviews or research workshops. However, we will make use of the ICLEI address database for organising the dissemination tasks in WP7, for which data protection procedures will be employed.

Information gathered from the respondents will be limited to data pertinent to the execution of their jobs and not include personal data. The names and functions of participants in workshops or interviews will remain strictly confidential, for both security and ethical reasons. Only the partner in charge of the interviews or the organisation of the workshops (TNO, ICLEI) will have access to these data. The people invited to participate in the project will do so on a voluntary basis, with a permanent right of review or withdrawal of the contact database. In addition, an informed consent procedure will be used for all interviews and workshops with End-users, consisting of:

-beforehand provision of written information on the aims of the RESIN project, and the use of the information to be provided;

-informed consent registration and consequent documentation will as far as possible be organised through, for instance, the electronic registration process for workshops. If such means are not possible or practical an informed consent form to be signed by the interviewee will be used.

-at the start of the interview or workshop oral information on the aims of the RESIN project, and the use of the information to be provided;

-providing the opportunity to withdraw from the interview or the workshop at the start or at any moment later.

Detailed information will be provided to the Commission on the procedures that will be implemented for data collection, storage, protection, retention and destruction and confirmation that they comply with national and EU legislation.

We refer to the COUNCIL REGULATION (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items. No human embryos are to be used.

## **5.2 Societal Impact**

Due to climate change an increase in frequencies and intensities of extreme weather events is predicted. In Europe and worldwide the consequences of climate change are increasingly being felt. The severity of their consequences strongly depends on the level of exposure and the sensitivity of human and natural systems to these climate change impacts. With most of its population and capital goods concentrated in urban areas, cities are key to European economy and society. Climate change stands out as one of the major challenges cities face and cities worldwide have to be proactive in increasing their resilience to disasters.

For this reason, RESIN aims at providing a well-structured approach to increase the resilience of Europe's cities with supporting tools and methodologies for well-informed decision making and to support the development and market deployment of innovative climate adaptation technologies. The development of these tools will advance knowledge on urban adaptation to climate change in the fields of urban vulnerability (combining sectors and structures) (WP2), the appropriateness and effectiveness of adaptation measures (WP3), and their integration into best performance adaptation strategies tailored to a specific city (WP4 and 6).

Overall RESIN aims to deliver a substantial contribution to the progress of local policy making for climate change by supporting [city] stakeholders in being prepared for the challenges of climate change and associated risk: collecting and exchanging approaches and experiences in the field of planning for climate change adaptation, increasing awareness and understanding of adaptation options and interdependencies, and supporting robust adaptation strategies for the (case) cities.

RESIN will assess the impact by following and documenting the policy progress in its case cities and the tier-2 cities during the running time of the project. The information will be gathered in meetings with these city groups and regular contacts.

## Section 6: Security

Overall the RESIN project is not very security sensitive. As it is conceived, no security sensitive information will be used in or produced by the project. However, in gathering data on objects and vital infrastructures that are vulnerable to the impacts of climate change, the project may encounter information that might be misused. The project will collect and bring together existing practices and data, which at a certain level of detail might include security sensitive elements. Hence the consortium is mindful of the importance of proper management and regulation for security sensitive data and products, and will take proper action if necessary.

Because of the possibility that the project at some moment may have to deal with security- or sensitivity-related information, proper precautions will be taken. In its data and information handlings RESIN will take into account whether and how information may be used, conforming to appropriate legislation. Starting point for the project is that all information produced and presented will be traceable, either to open source information or, and with their permission, directly linked to interviewees. Any security sensitive information is strictly limited to partners whose work in RESIN depends on the access to the information or who produce the information, and who have the appropriate security clearances.

### Dual use

The consortium is aware of the potential abuse of vulnerability and risk assessment tools for criminal or terrorist activities. The RESIN Suite of Decision Support Tools can be used for assessing risk for the impacts of climate change and for exploring different courses of action. The knowledge gained by using these tools (if detailed enough) could potentially be employed for planning terrorist or destructive actions that may harm citizens or cause or increase damages to cities and their infrastructures.

In order to prevent abuse of its results, the consortium will perform a number of measures.

- RESIN will establish an Ethics and Security Advisory Group (ESAG) in order to assess that the deliverables and dissemination materials produced do not contain classified information (foreground).
- A security assessment procedure will be included in the quality management procedure for all deliverables.
- RESIN tooling, containing security sensitive information of specific locations, will not be made accessible online.
- RESIN will train all project staff in identifying sensitive project-related information and to deal with such information, particularly when producing dissemination material.
- Any results of the project (be it in reports or on websites or in tools) will be screened before publication not only by the ESAG, but also by city representatives on the possible presence of security sensitive information.
- The ESAG will further advise on RESIN procedures for selection of interview participants, informed consent procedures, data protection and authorization from competent authorities.

RESIN will document the process of dealing with security sensitive information and the responsibilities of the internal actors in a project manual in detail. The work of the ESAG will be reported regularly to the Commission..



The ESAG will be established by RESIN's decision-making body at the beginning of the project. It shall consist of specially qualified or trained staff, and it shall include at least one end user representative. Specially qualified staff could include persons that have personal security clearance.

The composition and role of the ESAG will be communicated to the Commission by M4 of the project.

In the long run, European Cities and Infrastructures shall benefit from the research by becoming more resilient (to climate change). Most of RESIN's efforts are dedicated to integrate results, and provide new capabilities. These capabilities will be made available using a two-fold scheme:

- Public parts, like publications and glossaries, models, databases with adaptation options, are available to all public users.
- Private parts, such as location specific data and information, will be made available only under certain controlled access conditions.

Some activities of RESIN may require access to classified or sensitive data (e.g. geo-referenced data). If so required, a case-by-case mutual agreement, e.g. a non-disclosure and protection agreement between the owner and the partners involved in the access to the data, may be needed. To be of value for the long-term objectives of the RESIN project, in such cases the involved partner(s) will make an effort to create a 'one-way' transformed data set to retain realistic information without revealing sensitive/operational details and in a way acceptable to the specific owners.

The consortium considers this sufficient mechanisms to prevent unauthorised access to technology, data and results.

Let us finally remark that the Coordinator TNO is well aware of security and security management (major operator and player in the Netherlands in the security field) and is able to manage the consortium efficiently if unexpected sensitive issues appear in the course of the project. TNO's the Hague location has a facility security clearance for dealing with classified information, a trust basis for third parties and governments dealing with proprietary and sensitive information.

## Annex 1 Relevant projects and their outcome for RESIN

Initiative	Results (or aim if not completed yet)	How the results will be used by RESIN
<b>ADAPTATIO</b> – ( 2012-2014) French Ministry of Ecology, Sustainable Development and Energy)	Adaptatio is dedicated to the question of adaptation to CC (direct or indirect consideration) within the design process of a Parisian urban planning project	Adaptatio's results will be used as knowledge base notably for WP1, WP3 WP4, WP5, WP6 Climate change impacts on energy and water and relevant adaptation options Case Study of urban planning projects in Paris: assessment of energy and water consumption vulnerability of a chosen Parisian urban planning project and identification of suitable adaptation options related to public spaces and buildings.  Partners involved: EIVP
<b>BASE</b> (FP7) (2012-) Bottom-Up Climate Adaptation Strategies for a Sustainable Europe	BASE makes experiential and scientific information on adaptation meaningful, transferable and easily accessible to decision-makers at all levels	Mainly two elements will be used as knowledge base for WP3: The identified climate change impacts on health Results from the assessment of co-benefits of cross-sectorial adaptation measures related to the health impacts of heat waves in the city of Madrid.  Partners involved: BC3
<b>Blue Green dream</b> (EIT/Climate-KIC) (2012-)	To decrease the impact of extreme temperatures in cities, Blue Green Dream (BGD) aims to develop the service infrastructure to implement the use of integrated 'blue' and 'green' infrastructure.	Basic information for WP3 (knowledge on adaptation options, and the interaction between drought and heat) and WP8 (development of the climate adaptation app, a first on line decision support aid) .  Direct contacts through TNO (with Deltares, Imperial college)
<b>Climate Proof Cities/INCAH</b> (KfC) (2011-2014)	CPC is a Dutch research programme aiming at strengthening the adaptive capacity and reducing the vulnerability of the urban system against climate change and to develop strategies and policy instruments for adapting our cities and buildings.  The objective of INCAH is to gain insight into the effects of climate change on the Dutch transport, energy and drinking water infrastructures, and to develop	The knowledge and methodology developed in CPC to assess the vulnerability of neighbourhoods to heat stress and water nuisance and to determine the effectiveness of adaptation measures will be elaborated in WP2 and 3 of RESIN.  INCAH has brought together multiple domains and focus on (1) to establish how climate change will impact the different infrastructures (2) to construct models to simulate the effects on the operation of infrastructures, i.e. the reliability, availability, capacity and socio-economic productivity and (3) adopt a network perspective and

	robust strategies to allow these networks to maintain their function, adapting to the effects of climate change.	explore how we can avoid congestion, service interruption, system breakdown and systemic crisis through reinforcing effects rippling through interconnected infrastructures by network design and asset management strategies. These insights provide valuable input for the RESIN project.  Partners involved: TNO, University of Manchester
<b>ECONADAPT</b> (FP7) (2013-2016)	The aim of the ECONADAPT project is to provide user-orientated methodologies and evidence relating to economic appraisal criteria to inform the choice of climate change adaptation actions using analysis that incorporates cross-scale governance under conditions of uncertainty.	One of the case studies of the project ECONADAPT will be performed in the city of Bilbao, in a particular district area under development. Costs and benefits of potential alternatives to strengthen the adaptive capacity of the area will be analysed. This information will be used in WP3 as complementary also to WP4.  Partners involved: BC3
<b>EU Cities Adapt</b> (2012-2013) Adaptation Strategies for European Cities	This project provided capacity building and assistance to a group of 21 European cities engaged in developing climate change adaptation strategies.	This project, which engaged a range of diverse cities from across Europe in adaptation planning exercises, generated valuable learning on adaptation planning via the application of ICLEI's IMS. It also developed a strong network of cities, some of whom will be engaged in the RESIN project as case study and second tier cities. EU Cities Adapt also brought together a number of the partners who are collaborating on the RESIN proposal. Partners involved: UniMan, ICLEI, Tecnia, Arcadis, UniBA
<b>FLOODPROBE</b> (FP7) (2009-2013)	Within FLOODPROBE technologies have been developed for cost effective flood protection of the built environment.	Mainly two elements will be used as knowledge base for WP1, WP2, WP5 and WP6: Advanced Analysis tool, defining the interdependencies of infrastructure networks Specific indicators were identified to assess the Redundancy of urban mobility networks (application on city of Orleans)  Partners involved: EIVP
<b>FloodResilientCity</b> (Interreg B, 2007-2013)	the FRC project has enabled responsible public authorities in eight cities in North West Europe to better cope with floods in urban areas, through a combination of transnational cooperation and regional investments	A GIS tool to improve urban area reconstruction with an application on city of Dublin Guidance and training for risk management aimed at professionals, public and local authorities  Partner involved : EIVP

<b>GRaBS</b> (INTERREG IVC) (2008-2011) Green and Blue Space Adaptation for Urban Areas and Eco Towns project	This project facilitated exchange of knowledge and experience and transfer of good practice on climate change adaptation strategies to local and regional planning authorities from eight European Member States.	An adaptation planning cycle was developed and applied within the GRaBS project. Learning from this approach to supporting adaptation strategy development and decision making in practice will be applied within the RESIN project.  Partners involved: Univ of Manchester, Comenius University, TNO (expert panel)
<b>IMPETUS</b> (2011-2014), French Research Agency	Impetus project focus on the integration of urban planning projects within the frame of transformation towards the sustainable city	This will be used as knowledge base notably for WP1, WP4, WP5, WP6 Development of tools and methods for local authorities and decision makers in order to develop urban planning projects that integrate urbanization & building processes as well as mobility & travels Design and assessment criterions for urban planning projects Dynamic modelling and decision making tools in order to assess the impacts of urban planning projects toward city transformation Case studies in in Paris, Bordeaux.  Partners involved: EIVP
<b>INTACT</b> (FP7) (2014-2017 ) on the Impact of Extreme Weather on Critical Infrastructures	Identify and classify on a Europe wide basis Critical Infrastructures, assess their resilience to the impact of EWE and identify potential measures and technologies	Contributions from INTACT are expected Notably for WPs 2, 3 and 6 concerning vulnerability and risk assessment methods, adaptation options and decision support tooling, whereas the approaches towards and feedback from INTACT case studies will provide guidance for the RESIN city cases (WP4).  Partners involved: TNO
<b>PREDICT</b> (FP7) (2014-2017) Making Sense of the Domino Effect in Crisis Situations	Developing software system models to offer a new quality in understanding of crisis situations cascade effects	PREDICT will propose and deliver cohesive and comprehensive models and dependencies, cascading effects that include causal relations, multisectoral infrastructure elements and environmental parameters; concepts and approaches will be used to guide the approaches for urban environments RESIN is challenged with (WP2, 3, and 6).  Partners involved: TNO, ITTI, Fraunhofer
<b>RAMSES</b> (FP7) (2013-..) Reconciling Adaptation, Mitigation and Sustainable Development for Cities	Developing a rigorous, analytical framework for the implementation of adaptation strategies and measures in EU and international cities. RAMSES will provide the evidence basis	The municipality of Bilbao is working as case study in the framework of FP7 project RAMSES, with the objective of developing general guidelines for integrating adaptation criteria in urban planning, specifically related to Urban Heat Island effect, Floods and

	that leads to reduced adaptation costs as well as better understanding and acceptance of adaptation measures in cities.	Storm water Use by Planning and Design.  Partners involved: Tecnalía, ICLEI, city of Bilbao
<b>RESILIS</b> (2010-2013), French Research Agency	The main objective was to design methods and tools dedicated to local authorities, networks managers and populations in order to prepare to, adapt and design social and technical systems able to cope with and absorb disturbances. Several cases has been studied, especially city of Paris.	RESILIS results may be used as knowledge base and framework model for vulnerability assessment tools conception and implementation, for WP1, WP2, WP4, WP5 and WP6 Description of cities as system of systems Identify interdependencies of urban technical networks at a global scale in city of Paris, collaborative workshops to discuss problems and solutions in managing these interdependencies Assess the resilience of urban technical networks and urban services at a local scale (2 districts in city of Paris)  Partner involved : EIVP
<b>STREST</b> (FP7) (2013-2016)	Developing a harmonised approach to stress tests for critical infrastructures against natural hazards (earthquakes, tsunamis, geotechnical effects and floods)	Though the type of impact and infrastructure differs, RESIN can learn from the STREST approach in performing risk assessments and determining the vulnerability of various Critical Infrastructure items, especially with regards to defining vulnerability indicators and developing models. Of particular interest is one of the case studies in STREST which involves an urban environment.  Partners involved: TNO
<b>WEATHER</b> (FP7) (2009-2012) Weather Extremes: Impacts on Transport Systems and Hazards for European Regions	The WEATHER project aims at analysing the economic costs of more frequent and more extreme weather events on transport and on the wider economy and explores adaptation strategies for reducing them in the context of sustainable policy design.	The EU FP7 project WEATHER has investigated the vulnerability of the transport sector in the EU to extreme weather events. For this purpose, WEATHER has subdivided the EU into eight different climate zones, as recommended by the PRUDENCE project. WEATHER considered the time dimension and estimated short to long-term economic effects, using the ARIIO model for capturing also inter-industrial effects. By means of “what-if” scenarios WEATHER investigated the estimated annual losses produced by negative impacts of disasters on the transport infrastructures, varying the frequency, intensity and type of disaster. This state of the art approach needs to be considered by RESIN  Partners involved: Fraunhofer

## Annex 2 Letters of Support

The consortium received letters supporting the Resin project signed by 15 cities/institutes that can be considered important end users. The list of cities/institutes and copies of the letters are presented in Table A1 and in this annex.

**Table A-2 List of support letters**

Nr	City/Institute (country)	Signed by	Position
1	European Committee for Standardization (CEN)	Andreea Gulacsi	CEN unit manager, research integration
2	City of Paris - Urban Ecology Agency (FR)	Bernard Viel	Head of the Urban Ecology Agency
3	City of Paris - Crisis Management Department (FR)	Eric Defretin	Director Crisis Management Department
4	Municipality of Padova – Environment department	Daniela Luise	Officer with organisational position
5	City of Zadar – Administrative Department for Physical Planning & Construction / Administrative Department for EU Funds (HR)	Božidar Kalmeta	Function Mayor
6	City of Ghent (BE)	Tine Heyse	Deputy Mayor for Environment, Climate, Energy and North-South
		Paul Teerlinck	City Manager
7	City of Alba (IT)	Maurizio Marelllo	Mayor
8	Municipality of Sfântu Gheorghe (RO) Environmental Protection Agency of Covasna County (RO)	Antal Árpád András	Mayor
		Gheorghe Neagu	Executive director
9	Spanish Climate Change Office (ES)	Eduardo González	Deputy Director
10	City of Vilnius – Environment and Energy department (LT)	Virginijus Dastikas	Director
11	Union of Towns and Cities of Slovakia (SK)	Marián Minarovič	General Secretary
12	The Basque Environment Agency (ES)	Javier Agirre Orcajo	General Director
13	City of Alamada – Sustainable Environmental Management and Planning Department	Catarina Freitas	Head
14	Municipality of Arnhem (NL)	Hans van Ammers	Principal Advisor Public Space
15	Barcelona City Council	Manuel Valdes Lopez	Director Infrastructures
16	City of Rotterdam – Department of Urban Development	W. J. de Raaf	Programmanager Sustainability/RCI

ESTIMATED BUDGET FOR THE ACTION (page 1 of 2)

	Estimated eligible <sup>1</sup> costs (per budget category)									EU contribution			Additional information		
	A. Direct personnel costs				B. Direct costs of subcontracting	[C. Direct costs of fin. support]	D. Other direct costs	E. Indirect costs <sup>2</sup>	Total costs	Reimbursement rate %	Maximum EU contribution <sup>3</sup>	Maximum grant amount <sup>4</sup>	Information for indirect costs	Information for auditors	Other information:
	A.1 Employees (or equivalent) A.2 Natural persons under direct contract A.3 Seconded persons [A.6 Personnel for providing access to research infrastructure]		A.4 SME owners without salary A.5 Beneficiaries that are natural persons without salary				D.1 Travel D.2 Equipment D.3 Other goods and services D.4 Costs of large research infrastructure								
Form of costs <sup>6</sup>	Actual	Unit <sup>7</sup>	Unit <sup>8</sup>		Actual	Actual	Actual	Flat-rate <sup>9</sup>							
								25%							
	(a)	Total (b)	No hours	Total (c)	(d)	(e)	(f)	(g)=0,25x ((a)+(b)+(c)+(f) +[(h1)+(h2)]-(m))	(i)= (a)+(b)+(c)+(d)+(e)+(f)+ (g)+(h1)+(h2)+(h3)	(j)	(k)	(l)	(m)	Yes/No	
1. TNO	551218.00	0.00			0.00	0.00	195732.00	186737.50	933687.50	100.00	933687.50	933687.50	0.00	No	
2. Fraunhofer	0.00	615200.00			0.00	0.00	63100.00	169575.00	847875.00	100.00	847875.00	847875.00	0.00	No	
3. TECNALIA	460600.00	0.00			0.00	0.00	52700.00	128325.00	641625.00	100.00	641625.00	641625.00	0.00	No	
4. ICLEI	427500.00	0.00	0.00	0.00	0.00	0.00	268200.00	173925.00	869625.00	100.00	869625.00	869625.00	0.00	No	
5. EIVP	528000.00	0.00			0.00	0.00	35900.00	140975.00	704875.00	100.00	704875.00	704875.00	0.00	No	
6. ITTI	277200.00	0.00	0.00	0.00	0.00	0.00	34900.00	78025.00	390125.00	100.00	390125.00	390125.00	0.00	No	
7. NEN	164268.00	0.00			0.00	0.00	24000.00	47067.00	235335.00	100.00	235335.00	235335.00	0.00	No	
8. Arcadis	111930.00	0.00			0.00	0.00	15900.00	31957.50	159787.50	100.00	159787.50	159787.50	0.00	No	
9. BC3	186901.00	0.00			0.00	0.00	20200.00	51775.00	258876.00	100.00	258876.00	258876.00	0.00	No	
10. Bratislava	147791.00	0.00			0.00	0.00	21000.00	42197.75	210988.75	100.00	210988.75	210988.75	0.00	No	
11. UNIMAN	653888.00	0.00			0.00	0.00	38700.00	173147.00	865735.00	100.00	865735.00	865735.00	0.00	No	
12. UNIBA	91875.00	0.00			0.00	0.00	28500.00	30093.75	150468.75	100.00	150468.75	150468.75	0.00	No	
13. Bilbao	159088.00	0.00			0.00	0.00	16800.00	43972.00	219860.00	100.00	219860.00	219860.00	0.00	No	
14. Manchester	169670.00	0.00			0.00	0.00	16800.00	46617.50	233087.50	100.00	233087.50	233087.50	0.00	No	
15. Siemens AT	33482.00	0.00			0.00	0.00	4800.00	9570.50	47852.50	100.00	47852.50	47852.50	0.00	No	
16. Siemens DE	0.00	425828.00			0.00	0.00	3000.00	107207.00	536035.00	100.00	536035.00	536035.00	0.00	No	
17. Uniresearch	102000.00	0.00	0.00	0.00	0.00	0.00	26133.00	32033.00	160166.00	100.00	160166.00	160166.00	0.00	No	
Total consortium	4065411.00	1041028.00		0.00	0.00	0.00	866365.00	1493200.50	7466004.50		7466004.50	7466004.50	0.00		0.00



ESTIMATED BUDGET FOR THE ACTION (page 2 of 2)

- (1) See Article 6 for the eligibility conditions
- (2) The indirect costs covered by the operating grant (received under any EU or Euratom funding programme; see Article 6.5.(b)) are ineligible under the GA. Therefore, a beneficiary that receives an operating grant during the action's duration cannot declare indirect costs for the year(s)/reporting period(s) covered by the operating grant (see Article 6.2.E).
- (3) This is the theoretical amount of EU contribution that the system calculates automatically (by multiplying all the budgeted costs by the reimbursement rate). This theoretical amount is capped by the 'maximum grant amount' (that the Commission/Agency decided to grant for the action) (see Article 5.1).
- (4) The 'maximum grant amount' is the maximum grant amount decided by the Commission/Agency. It normally corresponds to the requested grant, but may be lower.
- (5) Depending on its type, this specific cost category will or will not cover indirect costs. Specific unit costs that include indirect costs are: costs for energy efficiency measures in buildings, access costs for providing trans-national access to research infrastructure and costs for clinical studies.
- (6) See Article 5 for the forms of costs
- (7) Unit : hours worked on the action; costs per unit (hourly rate) : calculated according to beneficiary's usual accounting practice
- (8) See Annex 2a 'Additional information on the estimated budget' for the details (costs per hour (hourly rate)).
- (9) Flat rate : 25% of eligible direct costs, from which are excluded: direct costs of subcontracting, costs of in-kind contributions not used on premises, direct costs of financial support, and unit costs declared under budget category F if they include indirect costs
- (10) See Annex 2a 'Additional information on the estimated budget' for the details (units, costs per unit).
- (11) See Annex 2a 'Additional information on the estimated budget' for the details (units, costs per unit, estimated number of units, etc)
- (12) Only specific unit costs that do not include indirect costs
- (13) See Article 9 for beneficiaries not receiving EU funding
- (14) Only for linked third parties that receive EU funding



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV (Fraunhofer) EV**, VR4461, established in HANSASTRASSE 27C, MUENCHEN 80686, Germany, DE129515865, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('2')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled 'Climate Resilient Cities and Infrastructures (RESIN)'.**

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**FUNDACION TECNALIA RESEARCH & INNOVATION (TECNALIA)** ES3, F69, established in PARQUE TECNOLOGICO DE MIRAMON PASEO MIKELETEGI 2, DONOSTIA-SAN SEBASTIAN 20009, Spain, ESG48975767, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('3')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled 'Climate Resilient Cities and Infrastructures (RESIN)'.**

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**ICLEI EUROPEAN SECRETARIAT GMBH (ICLEI EUROPASEKRETARIAT GMBH)\***  
**(ICLEI)** GMBH, HRB4188, established in Leopoldring 3, Freiburg 79098, Germany, DE153445986,  
(‘the beneficiary’), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary** (‘4’)

**in Grant Agreement No 653522** (‘the Agreement’)

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST  
NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and  
Medium-sized Enterprises (EASME) (‘the Agency’), under the power delegated by the European  
Commission (‘the Commission’),*

**for the action entitled** ‘Climate Resilient Cities and Infrastructures (RESIN)’.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement,  
in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant  
in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**EIVP (EIVP )**, 200000693 , established in F  nelon 15, Paris 75010 , France, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('5')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled 'Climate Resilient Cities and Infrastructures (RESIN)'.**

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**ITTI SP ZOO (ITTI)** SP(ZOO), 0000186080/630400909, established in RUBIEZ 46, POZNAN 61 612, Poland, PL7811019801, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('6')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST  
NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and  
Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European  
Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**STICHTING NEDERLANDS NORMALISATIE - INSTITUUT (NEN)** NL6, 41150051, established in VLINDERWEG 6, DELFT 2623 AX, Netherlands, NL002814237B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('7')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary





## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**ARCADIS NEDERLAND BV (Arcadis)** BV, 09036504, established in PIET MONDRIAANLAAN 26, AMERSFOORT 3812 GV, Netherlands, NL001830041B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('8')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**BC3 BASQUE CENTRE FOR CLIMATE CHANGE - KLIMA ALDAKETA IKERGAI (BC3)**  
ES5, ASB140762008, established in ALAMEDA DE URQUIJO 4 4A PLANTA, BILBAO 48008,  
Spain, ESG95532826, ('the beneficiary'), represented for the purpose of signing this Accession Form  
by the undersigned,

**hereby agrees**

**to become beneficiary ('9')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST  
NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and  
Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European  
Commission ('the Commission'),*

**for the action entitled 'Climate Resilient Cities and Infrastructures (RESIN)'.**

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement,  
in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant  
in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**HLAVNE MESTO SLOVENSKEJ REPUBLIKY BRATISLAVA (Bratislava)**, 00603481, established in PRIMACIALNE NAMESTIE 1, BRATISLAVA 814 99, Slovakia, SK2020372596 , ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('10')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**THE UNIVERSITY OF MANCHESTER (UNIMAN)**, RC000797 , established in OXFORD ROAD, MANCHESTER M13 9PL, United Kingdom, GB849738956, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('11')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**UNIVERZITA KOMENSKEHO V BRATISLAVE (UNIBA)**, 00397865, established in SAFARIKOVO NAM 6, Bratislava 1 81499, Slovakia, SK2020845332, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('12')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**AYUNTAMIENTO DE BILBAO (Bilbao)**, 01480209, established in URIBITARTE 18-4 DCHA, BILBAO 48001, Spain, ESP4802400D, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('13')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**OLDHAM METROPOLITAN BOROUGH COUNCIL (Manchester)**, established in WEST STREET CIVIC CENTRE, OLDHAM OL1 1UL, United Kingdom, GB149167054, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('14')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary





## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**SIEMENS AKTIENGESELLSCHAFT OESTERREICH (Siemens AT)** AG, FN 60562 M, established in SIEMENSSTRASSE 90, WIEN 1210, Austria, ATU14715405, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('15')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**SIEMENS AKTIENGESELLSCHAFT (Siemens DE) AG**, HRB6684/CF1431037021, established in WITTELSBACHERPLATZ 2, MUNCHEN 80333, Germany, DE129274202, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('16')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary



## ANNEX 3

### ACCESSION FORM FOR BENEFICIARIES

**UNIRESEARCH BV (Uniresearch)** BV, 27236872, established in Elektronikaweg 16c, DELFT 2628XG, Netherlands, NL810590372B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

**hereby agrees**

**to become beneficiary ('17')**

**in Grant Agreement No 653522 ('the Agreement')**

**between** NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO **and** *the Executive Agency for Small and Medium-sized Enterprises (EASME) ('the Agency'), under the power delegated by the European Commission ('the Commission'),*

**for the action entitled** 'Climate Resilient Cities and Infrastructures (RESIN)'.

**and mandates**

**the coordinator** to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement the grant in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

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MODEL ANNEX 4 FOR H2020 GENERAL MGA — MULTI

FINANCIAL STATEMENT FOR [BENEFICIARY [name]/ LINKED THIRD PARTY [name]] FOR REPORTING PERIOD [reporting period]

	Eligible <sup>1</sup> costs (per budget category)												Receipts	EU contribution				Additional information	
	A. Direct personnel costs				B. Direct costs of subcontracting	[C. Direct costs of fin. support]	D. Other direct costs		E. Indirect costs <sup>2</sup>		[F. Costs of ... ]		Total costs	Receipts	Reimbursement rate %	Maximum EU contribution <sup>3</sup>	Requested EU contribution	Information for indirect costs :  Costs of in-kind contributions not used on premises	
	A.1 Employees (or equivalent)		A.4 SME owners without salary				D.1 Travel	[D.4 Costs of large research infrastructure]		[F.1 Costs of ...]			Receipts of the action, to be reported in the last reporting period, according to Article 5.3.3						
	A.2 Natural persons under direct contract		A.5 Beneficiaries that are natural persons without salary				D.2 Equipment												
	A.3 Seconded persons						D.3 Other goods and services												
[A.6 Personnel for providing access to research infrastructure]																			
Form of costs <sup>4</sup>	Actual	Unit	Unit		Actual	Actual	Actual	Actual	Flat-rate <sup>5</sup>	Unit		Unit							
									25%										
	a	Total b	No hours	Total c	d	[e]	f	[g]	h=0,25 x (a+b+c+f+[g] + [i1] <sup>6</sup> +[i2] <sup>6</sup> - o)		No units	Total [i1]	Total [i2]	j = a+b+c+d+[e] +f+[g] +h+[i1] +[i2]	k	l	m	n	o
[short name beneficiary/linked third party]																			

The beneficiary/linked third party hereby confirms that:  
The information provided is complete, reliable and true.  
The costs declared are eligible (see Article 6).  
The costs can be substantiated by adequate records and supporting documentation that will be produced upon request or in the context of checks, reviews, audits and investigations (see Articles 17, 18 and 22).  
For the last reporting period: that all the receipts have been declared (see Article 5.3.3).

📌 Please declare all eligible costs, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Only amounts that were declared in your individual financial statements can be taken into account lateron, in order to replace other costs that are found to be ineligible.

<sup>1</sup> See Article 6 for the eligibility conditions

<sup>2</sup> The indirect costs claimed must be free of any amounts covered by an operating grant (received under any EU or Euratom funding programme; see Article 6.2.E). If you have received an operating grant during this reporting period, you cannot claim any indirect costs.

<sup>3</sup> This is the *theoretical* amount of EU contribution that the system calculates automatically (by multiplying the reimbursement rate by the total costs declared). The amount you request (in the column 'requested EU contribution') may have to be less (e.g. if you and the other beneficiaries are above budget, if the 90% limit (see Article 21) is reached, etc).

<sup>4</sup> See Article 5 for the form of costs

<sup>5</sup> Flat rate : 25% of eligible direct costs, from which are excluded: direct costs of subcontracting, costs of in-kind contributions not used on premises, direct costs of financial support, and unit costs declared under budget category F if they include indirect costs (see Article 6.2.E)

<sup>6</sup> Only specific unit costs that do not include indirect costs

H2020 Model Grant Agreements: H2020 General MGA — Multi: September 2014

## ANNEX 5

### MODEL FOR THE CERTIFICATE ON THE FINANCIAL STATEMENTS

- For options [*in italics in square brackets*]: choose the applicable option. Options not chosen should be deleted.
- For fields in [grey in square brackets]: enter the appropriate data

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**Terms of Reference for an Independent Report of Factual Findings on costs declared under a Grant Agreement financed under the Horizon 2020 Research and Innovation Framework Programme**

This document sets out the ‘**Terms of Reference (ToR)**’ under which

[OPTION 1: [insert name of the beneficiary] (*‘the Beneficiary’*)] [OPTION 2: [insert name of the linked third party] (*‘the Linked Third Party’*), third party linked to the Beneficiary [insert name of the beneficiary] (*‘the Beneficiary’*)]

agrees to engage

[insert legal name of the auditor] (*‘the Auditor’*)

to produce an independent report of factual findings (*‘the Report’*) concerning the Financial Statement(s)<sup>1</sup> drawn up by the [Beneficiary] [Linked Third Party] for the Horizon 2020 grant agreement [insert number of the grant agreement, title of the action, acronym and duration from/to] (*‘the Agreement’*), and

to issue a Certificate on the Financial Statements’ (*‘CFS’*) referred to in Article 20.4 of the Agreement based on the compulsory reporting template stipulated by the Commission.

The Agreement has been concluded under the Horizon 2020 Research and Innovation Framework Programme (H2020) between the Beneficiary and [OPTION 1: *the European Union, represented by the European Commission (‘the Commission’)*][OPTION 2: *the European Atomic Energy Community (Euratom,) represented by the European Commission (‘the Commission’)*][OPTION 3: *the [Research Executive Agency (REA)] [European Research Council Executive Agency (ERCEA)] [Innovation and Networks Executive Agency (INEA)] [Executive Agency for Small and Medium-sized Enterprises (EASME)] (‘the Agency’), under the powers delegated by the European Commission (‘the Commission’).*]

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<sup>1</sup> By which costs under the Agreement are declared (see template ‘Model Financial Statements’ in Annex 4 to the Grant Agreement).

H2020 Model Grant Agreements: H2020 General MGA — Multi: September 2014

The *[Commission]* *[Agency]* is mentioned as a signatory of the Agreement with the Beneficiary only.  
The *[European Union]**[Euratom]**[Agency]* is not a party to this engagement.

### 1.1 Subject of the engagement

The coordinator must submit to the *[Commission]**[Agency]* the final report within 60 days following the end of the last reporting period which should include, amongst other documents, a CFS for each beneficiary and for each linked third party that requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices (see Article 20.4 of the Agreement). The CFS must cover all reporting periods of the beneficiary or linked third party indicated above.

The Beneficiary must submit to the coordinator the CFS for itself and for its linked third party(ies), if the CFS must be included in the final report according to Article 20.4 of the Agreement..

The CFS is composed of two separate documents:

- The Terms of Reference ('the ToR') to be signed by the *[Beneficiary]* *[Linked Third Party]* and the Auditor;
- The Auditor's Independent Report of Factual Findings ('the Report') to be issued on the Auditor's letterhead, dated, stamped and signed by the Auditor (or the competent public officer) which includes the agreed-upon procedures ('the Procedures') to be performed by the Auditor, and the standard factual findings ('the Findings') to be confirmed by the Auditor.

If the CFS must be included in the final report according to Article 20.4 of the Agreement, the request for payment of the balance relating to the Agreement cannot be made without the CFS. However, the payment for reimbursement of costs covered by the CFS does not preclude the *[Commission]*,*[Agency]*, the European Anti-Fraud Office and the European Court of Auditors from carrying out checks, reviews, audits and investigations in accordance with Article 22 of the Agreement.

### 1.2 Responsibilities

The *[Beneficiary]* *[Linked Third Party]*:



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- must draw up the Financial Statement(s) for the action financed by the Agreement in compliance with the obligations under the Agreement. The Financial Statement(s) must be drawn up according to the *[Beneficiary's] [Linked Third Party's]* accounting and book-keeping system and the underlying accounts and records;
- must send the Financial Statement(s) to the Auditor;
- is responsible and liable for the accuracy of the Financial Statement(s);
- is responsible for the completeness and accuracy of the information provided to enable the Auditor to carry out the Procedures. It must provide the Auditor with a written representation letter supporting these statements. The written representation letter must state the period covered by the statements and must be dated;
- accepts that the Auditor cannot carry out the Procedures unless it is given full access to the *[Beneficiary's] [Linked Third Party's]* staff and accounting as well as any other relevant records and documentation.

The Auditor:

- *[Option 1 by default: is qualified to carry out statutory audits of accounting documents in accordance with Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC or similar national regulations].*
- *[Option 2 if the Beneficiary or Linked Third Party has an independent Public Officer: is a competent and independent Public Officer for which the relevant national authorities have established the legal capacity to audit the Beneficiary].*
- *[Option 3 if the Beneficiary or Linked Third Party is an international organisation: is an [internal] [external] auditor in accordance with the internal financial regulations and procedures of the international organisation].*

The Auditor:

- must be independent from the Beneficiary *[and the Linked Third Party]*, in particular, it must not have been involved in preparing the *[Beneficiary's] [Linked Third Party's]* Financial Statement(s);
- must plan work so that the Procedures may be carried out and the Findings may be assessed;
- must adhere to the Procedures laid down and the compulsory report format;
- must carry out the engagement in accordance with this ToR;
- must document matters which are important to support the Report;
- must base its Report on the evidence gathered;
- must submit the Report to the *[Beneficiary] [Linked Third Party]*.

The Commission sets out the Procedures to be carried out by the Auditor. The Auditor is not responsible for their suitability or pertinence. As this engagement is not an assurance engagement, the Auditor does not provide an audit opinion or a statement of assurance.

### 1.3 Applicable Standards

## H2020 Model Grant Agreements: H2020 General MGA — Multi: September 2014

The Auditor must comply with these Terms of Reference and with<sup>2</sup>:

- the International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as issued by the International Auditing and Assurance Standards Board (IAASB);
- the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). Although ISRS 4400 states that independence is not a requirement for engagements to carry out agreed-upon procedures, the [Commission][Agency] requires that the Auditor also complies with the Code's independence requirements.

The Auditor's Report must state that there is no conflict of interests in establishing this Report between the Auditor and the Beneficiary *[and the Linked Third Party]*, and must specify - if the service is invoiced - the total fee paid to the Auditor for providing the Report.

### 1.4 Reporting

The Report must be written in the language of the Agreement (see Article 20.7).

Under Article 22 of the Agreement, the [Commission] [Agency], the European Anti-Fraud Office and the Court of Auditors have the right to audit any work that is carried out under the action and for which costs are declared from [the European Union] [Euratom] budget. This includes work related to this engagement. The Auditor must provide access to all working papers (e.g. recalculation of hourly rates, verification of the time declared for the action) related to this assignment if the [Commission] [Agency], the European Anti-Fraud Office or the European Court of Auditors requests them.

### 1.5 Timing

The Report must be provided by [dd Month yyyy].

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<sup>2</sup> Supreme Audit Institutions applying INTOSAI-standards may carry out the Procedures according to the corresponding International Standards of Supreme Audit Institutions and code of ethics issued by INTOSAI instead of the International Standard on Related Services ('ISRS') 4400 and the Code of Ethics for Professional Accountants issued by the IAASB and the IESBA.

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## 1.6 Other terms

*[The [Beneficiary] [Linked Third Party] and the Auditor can use this section to agree other specific terms, such as the Auditor's fees, liability, applicable law, etc. Those specific terms must not contradict the terms specified above.]*

[legal name of the Auditor] [legal name of the [Beneficiary][Linked Third Party]]

[name & function of authorised representative] [name & function of authorised representative]

[dd Month yyyy]

[dd Month yyyy]

Signature of the Auditor

Signature of the [Beneficiary][Linked Third Party]

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**Independent Report of Factual Findings on costs declared under Horizon 2020 Research and  
Innovation Framework Programme**

*(To be printed on the Auditor's letterhead)*

To

[ name of contact person(s)], [Position]

[ *Beneficiary's* *Linked Third Party's* name ]

[ Address]

[ dd Month yyyy]

Dear [Name of contact person(s)],

As agreed under the terms of reference dated [dd Month yyyy]

with [OPTION 1: *insert name of the beneficiary*] ('the Beneficiary')] [OPTION 2: *insert name of the  
linked third party*] ('the Linked Third Party'), third party linked to the Beneficiary [*insert name of the  
beneficiary*] ('the Beneficiary'),

we

[name of the auditor] ('the Auditor'),

established at

[full address/city/state/province/country],

represented by

[name and function of an authorised representative],

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have carried out the procedures agreed with you regarding the costs declared in the Financial Statement(s)<sup>3</sup> of the [Beneficiary] [Linked Third Party] concerning the grant agreement

[insert grant agreement reference: number, title of the action and acronym] ('the Agreement'),

with a total cost declared of

[total amount] EUR,

and a total of actual costs and 'direct personnel costs declared as unit costs calculated in accordance with the [Beneficiary's] [Linked Third Party's] usual cost accounting practices' declared of

[sum of total actual costs and total direct personnel costs declared as unit costs calculated in accordance with the [Beneficiary's] [Linked Third Party's] usual cost accounting practices] EUR

and **hereby provide our Independent Report of Factual Findings ('the Report')** using the compulsory report format agreed with you.

### **The Report**

Our engagement was carried out in accordance with the terms of reference ('the ToR') appended to this Report. The Report includes the agreed-upon procedures ('the Procedures') carried out and the standard factual findings ('the Findings') examined.

The Procedures were carried out solely to assist the [Commission] [Agency] in evaluating whether the [Beneficiary's] [Linked Third Party's] costs in the accompanying Financial Statement(s) were declared in accordance with the Agreement. The [Commission] [Agency] draws its own conclusions from the Report and any additional information it may require.

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<sup>3</sup> By which the Beneficiary declares costs under the Agreement (see template 'Model Financial Statement' in Annex 4 to the Agreement).

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The scope of the Procedures was defined by the Commission. Therefore, the Auditor is not responsible for their suitability or pertinence. Since the Procedures carried out constitute neither an audit nor a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, the Auditor does not give a statement of assurance on the Financial Statements.

Had the Auditor carried out additional procedures or an audit of the *[Beneficiary's] [Linked Third Party's]* Financial Statements in accordance with International Standards on Auditing or International Standards on Review Engagements, other matters might have come to its attention and would have been included in the Report.

### **Not applicable Findings**

We examined the Financial Statement(s) stated above and considered the following Findings not applicable:

*Explanation (to be removed from the Report):*

*If a Finding was not applicable, it must be marked as 'N.A.' ('Not applicable') in the corresponding row on the right-hand column of the table and means that the Finding did not have to be corroborated by the Auditor and the related Procedure(s) did not have to be carried out.*

*The reasons of the non-application of a certain Finding must be obvious i.e.*

- i) if no cost was declared under a certain category then the related Finding(s) and Procedure(s) are not applicable;*
- ii) if the condition set to apply certain Procedure(s) are not met the related Finding(s) and those Procedure(s) are not applicable. For instance, for 'beneficiaries with accounts established in a currency other than euro' the Procedure and Finding related to 'beneficiaries with accounts established in euro' are not applicable. Similarly, if no additional remuneration is paid, the related Finding(s) and Procedure(s) for additional remuneration are not applicable.*

**List here all Findings considered not applicable for the present engagement and explain the reasons of the non-applicability.**

....

### **Exceptions**

Apart from the exceptions listed below, the *[Beneficiary] [Linked Third Party]* provided the Auditor all the documentation and accounting information needed by the Auditor to carry out the requested Procedures and evaluate the Findings.

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### Explanation (to be removed from the Report):

- If the Auditor was not able to successfully complete a procedure requested, it must be marked as 'E' ('Exception') in the corresponding row on the right-hand column of the table. The reason such as the inability to reconcile key information or the unavailability of data that prevents the Auditor from carrying out the Procedure must be indicated below.
- If the Auditor cannot corroborate a standard finding after having carried out the corresponding procedure, it must also be marked as 'E' ('Exception') and, where possible, the reasons why the Finding was not fulfilled and its possible impact must be explained here below.

**List here any exceptions and add any information on the cause and possible consequences of each exception, if known. If the exception is quantifiable, include the corresponding amount.**

....

### Example (to be removed from the Report):

1. The Beneficiary was unable to substantiate the Finding number 1 on ... because ....
2. Finding number 30 was not fulfilled because the methodology used by the Beneficiary to calculate unit costs was different from the one approved by the Commission. The differences were as follows: ...
3. After carrying out the agreed procedures to confirm the Finding number 31, the Auditor found a difference of \_\_\_\_\_ EUR. The difference can be explained by ...

### Further Remarks

In addition to reporting on the results of the specific procedures carried out, the Auditor would like to make the following general remarks:

### Example (to be removed from the Report):

1. Regarding Finding number 8 the conditions for additional remuneration were considered as fulfilled because ...
2. In order to be able to confirm the Finding number 15 we carried out the following additional procedures: ....

### Use of this Report

This Report may be used only for the purpose described in the above objective. It was prepared solely for the confidential use of the [Beneficiary] [Linked Third Party] and the [Commission] [Agency], and only to be submitted to the [Commission] [Agency] in connection with the requirements set out in Article 20.4 of the Agreement. The Report may not be used by the [Beneficiary] [Linked Third Party] or by the [Commission] [Agency] for any other purpose, nor may it



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be distributed to any other parties. The [Commission] [Agency] may only disclose the Report to authorised parties, in particular to the European Anti-Fraud Office (OLAF) and the European Court of Auditors.

This Report relates only to the Financial Statement(s) submitted to the [Commission] [Agency] by the [Beneficiary] [Linked Third Party] for the Agreement. Therefore, it does not extend to any other of the [Beneficiary's] [Linked Third Party's] Financial Statement(s).

There was no conflict of interest<sup>4</sup> between the Auditor and the Beneficiary [and Linked Third Party] in establishing this Report. The total fee paid to the Auditor for providing the Report was EUR [ ] (including EUR [ ] of deductible VAT).

We look forward to discussing our Report with you and would be pleased to provide any further information or assistance.

[legal name of the Auditor]

[name and function of an authorised representative]

[dd Month yyyy]

Signature of the Auditor

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<sup>4</sup> A conflict of interest arises when the Auditor's objectivity to establish the certificate is compromised in fact or in appearance when the Auditor for instance:

- was involved in the preparation of the Financial Statements;
- stands to benefit directly should the certificate be accepted;
- has a close relationship with any person representing the beneficiary;
- is a director, trustee or partner of the beneficiary; or
- is in any other situation that compromises his or her independence or ability to establish the certificate impartially.

**Agreed-upon procedures to be performed and standard factual findings to be confirmed by the Auditor**

The European Commission reserves the right to i) provide the auditor with additional guidance regarding the procedures to be followed or the facts to be ascertained and the way in which to present them (this may include sample coverage and findings) or to ii) change the procedures, by notifying the Beneficiary in writing. The procedures carried out by the auditor to confirm the standard factual finding are listed in the table below.

If this certificate relates to a Linked Third Party, any reference here below to 'the Beneficiary' is to be considered as a reference to 'the Linked Third Party'.

The 'result' column has three different options: 'C', 'E' and 'N.A.':

- 'C' stands for 'confirmed' and means that the auditor can confirm the 'standard factual finding' and, therefore, there is no exception to be reported.
- 'E' stands for 'exception' and means that the Auditor carried out the procedures but cannot confirm the 'standard factual finding', or that the Auditor was not able to carry out a specific procedure (e.g. because it was impossible to reconcile key information or data were unavailable),
- 'N.A.' stands for 'not applicable' and means that the Finding did not have to be examined by the Auditor and the related Procedure(s) did not have to be carried out. The reasons of the non-application of a certain Finding must be obvious i.e. i) if no cost was declared under a certain category then the related Finding(s) and Procedure(s) are not applicable; ii) if the condition set to apply certain Procedure(s) are not met then the related Finding(s) and Procedure(s) are not applicable. For instance, for 'beneficiaries with accounts established in a currency other than the euro' the Procedure related to 'beneficiaries with accounts established in euro' is not applicable. Similarly, if no additional remuneration is paid, the related Finding(s) and Procedure(s) for additional remuneration are not applicable.

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A	ACTUAL PERSONNEL COSTS AND UNIT COSTS CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICE		

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>The Auditor draws a sample of persons whose costs were declared in the Financial Statement(s) to carry out the procedures indicated in the consecutive points of this section A.</p> <p><i>(The sample should be selected randomly so that it is representative. Full coverage is required if there are fewer than 10 people (including employees, natural persons working under a direct contract and personnel seconded by a third party), otherwise the sample should have a minimum of 10 people, or 10% of the total, whichever number is the highest)</i></p> <p>The Auditor sampled [ ] people out of the total of [ ] people.</p>		
A.1	<p><b>PERSONNEL COSTS</b></p> <p><u>For the persons included in the sample and working under an employment contract or equivalent act (general procedures for individual actual personnel costs and personnel costs declared as unit costs)</u></p> <p>To confirm standard factual findings 1-5 listed in the next column, the Auditor reviewed following information/documents provided by the Beneficiary:</p> <ul style="list-style-type: none"> <li>○ a list of the persons included in the sample indicating the period(s) during which they worked for the action, their position (classification or category) and type of contract;</li> <li>○ the payslips of the employees included in the sample;</li> <li>○ reconciliation of the personnel costs declared in the Financial Statement(s) with the accounting system (project accounting and general ledger) and payroll system;</li> <li>○ information concerning the employment status and employment conditions of personnel included in the sample, in particular their employment contracts or equivalent;</li> </ul>	1) The employees were i) directly hired by the Beneficiary in accordance with its national legislation, ii) under the Beneficiary's sole technical supervision and responsibility and iii) remunerated in accordance with the Beneficiary's usual practices.	
		2) Personnel costs were recorded in the Beneficiary's accounts/payroll system.	
		3) Costs were adequately supported and reconciled with the accounts and payroll	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> <li>the Beneficiary's usual policy regarding payroll matters (e.g. salary policy, overtime policy, variable pay);</li> <li>applicable national law on taxes, labour and social security and</li> <li>any other document that supports the personnel costs declared.</li> </ul> <p>The Auditor also verified the eligibility of all components of the retribution (see Article 6 GA) and recalculated the personnel costs for employees included in the sample.</p>	records.	
		4) Personnel costs did not contain any ineligible elements.	
		5) There were no discrepancies between the personnel costs charged to the action and the costs recalculated by the Auditor.	
	<p><i>Further procedures if 'additional remuneration' is paid</i></p> <p>To confirm standard factual findings 6-9 listed in the next column, the Auditor:</p> <ul style="list-style-type: none"> <li>reviewed relevant documents provided by the Beneficiary (legal form, legal/statutory obligations, the Beneficiary's usual policy on additional remuneration, criteria used for its calculation...);</li> <li>recalculated the amount of additional remuneration eligible for the action based on the supporting documents received (full-time or part-time work, exclusive or non-exclusive dedication to the action, etc.) to arrive at the applicable FTE/year and pro-rata rate (see data collected in the course of carrying out the procedures under A.2 'Productive hours' and A.4 'Time recording system').</li> </ul>	6) The Beneficiary paying "additional remuneration" was a non-profit legal entity.	
		7) The amount of additional remuneration paid corresponded to the Beneficiary's usual remuneration practices and was consistently paid whenever the same kind of work or expertise was required.	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p><i>IF ANY PART OF THE REMUNERATION PAID TO THE EMPLOYEE IS NOT MANDATORY ACCORDING TO THE NATIONAL LAW OR THE EMPLOYMENT CONTRACT ("ADDITIONAL REMUNERATION") AND IS ELIGIBLE UNDER THE PROVISIONS OF ARTICLE 6.2.A.1, THIS CAN BE CHARGED AS ELIGIBLE COST TO THE ACTION UP TO THE FOLLOWING AMOUNT:</i></p> <p>(A) <i>IF THE PERSON WORKS FULL TIME AND EXCLUSIVELY ON THE ACTION DURING THE FULL YEAR: UP TO EUR 8 000/YEAR;</i></p> <p>(B) <i>IF THE PERSON WORKS EXCLUSIVELY ON THE ACTION BUT NOT FULL-TIME OR NOT FOR THE FULL YEAR: UP TO THE CORRESPONDING PRO-RATA AMOUNT OF EUR 8 000, OR</i></p> <p>(C) <i>IF THE PERSON DOES NOT WORK EXCLUSIVELY ON THE ACTION: UP TO A PRO-RATA AMOUNT CALCULATED IN ACCORDANCE TO ARTICLE 6.2.A.1.</i></p>	8) The criteria used to calculate the additional remuneration were objective and generally applied by the Beneficiary regardless of the source of funding used.	
		9) The amount of additional remuneration included in the personnel costs charged to the action was capped at EUR 8,000 per FTE/year (up to the equivalent pro-rata amount if the person did not work on the action full-time during the year or did not work exclusively on the action).	
	<p><i>Additional procedures in case “unit costs calculated by the Beneficiary in accordance with its usual cost accounting practices” is applied:</i></p> <p>Apart from carrying out the procedures indicated above to confirm standard factual findings 1-5 and, if applicable, also 6-9, the Auditor carried out following procedures to confirm standard factual findings 10-13 listed in the next column:</p>	10) The personnel costs included in the Financial Statement were calculated in accordance with the Beneficiary's usual cost accounting practice. This methodology was consistently used in all H2020 actions.	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> <li>obtained a description of the Beneficiary's usual cost accounting practice to calculate unit costs;</li> <li>reviewed whether the Beneficiary's usual cost accounting practice was applied for the Financial Statements subject of the present CFS;</li> <li>verified the employees included in the sample were charged under the correct category (in accordance with the criteria used by the Beneficiary to establish personnel categories) by reviewing the contract/HR-record or analytical accounting records;</li> <li>verified that there is no difference between the total amount of personnel costs used in calculating the cost per unit and the total amount of personnel costs recorded in the statutory accounts;</li> <li>verified whether actual personnel costs were adjusted on the basis of budgeted or estimated elements and, if so, verified whether those elements used are actually relevant for the calculation, objective and supported by documents.</li> </ul>	11) The employees were charged under the correct category.	
		12) Total personnel costs used in calculating the unit costs were consistent with the expenses recorded in the statutory accounts.	
		13) Any estimated or budgeted element used by the Beneficiary in its unit-cost calculation were relevant for calculating personnel costs and corresponded to objective and verifiable information.	
	<p><u>For natural persons included in the sample and working with the Beneficiary under a direct contract other than an employment contract, such as consultants (no subcontractors).</u></p> <p>To confirm standard factual findings 14-18 listed in the next column the Auditor reviewed following information/documents provided by the Beneficiary:</p> <ul style="list-style-type: none"> <li>the contracts, especially the cost, contract duration, work description, place of work, ownership of the results and reporting obligations to the Beneficiary;</li> </ul>	14) The natural persons reported to the Beneficiary (worked under the Beneficiary's instructions).	
		15) They worked on the Beneficiary's premises (unless otherwise agreed with the Beneficiary).	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> <li>the employment conditions of staff in the same category to compare costs and;</li> <li>any other document that supports the costs declared and its registration (e.g. invoices, accounting records, etc.).</li> </ul>	16) The results of work carried out belong to the Beneficiary.	
		17) Their costs were not significantly different from those for staff who performed similar tasks under an employment contract with the Beneficiary.	
		18) The costs were supported by audit evidence and registered in the accounts.	
	<p><u>For personnel seconded by a third party and included in the sample (not subcontractors)</u></p> <p>To confirm standard factual findings 19-22 listed in the next column, the Auditor reviewed following information/documents provided by the Beneficiary:</p> <ul style="list-style-type: none"> <li>their secondment contract(s) notably regarding costs, duration, work description, place of work and ownership of the results;</li> <li>if there is reimbursement by the Beneficiary to the third party for the resource made available (in-kind contribution against payment): any documentation that supports the costs declared (e.g. contract, invoice, bank payment, and proof of registration in its accounting/payroll, etc.) and reconciliation of the Financial Statement(s) with the accounting system (project accounting and general ledger) as well as any proof that the amount invoiced by the third party did not include any profit;</li> </ul>	19) Seconded personnel reported to the Beneficiary and worked on the Beneficiary's premises (unless otherwise agreed with the Beneficiary).	
		20) The results of work carried out belong to the Beneficiary.	
		<p><i>If personnel is seconded against payment:</i></p> <p>21) The costs declared were supported with documentation and recorded in the</p>	



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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> <li>○ if there is no reimbursement by the Beneficiary to the third party for the resource made available (in-kind contribution free of charge): a proof of the actual cost borne by the Third Party for the resource made available free of charge to the Beneficiary such as a statement of costs incurred by the Third Party and proof of the registration in the Third Party's accounting/payroll;</li> <li>○ any other document that supports the costs declared (e.g. invoices, etc.).</li> </ul>	<p>Beneficiary's accounts. The third party did not include any profit.</p> <p><i>If personnel is seconded free of charge:</i></p> <p>22) The costs declared did not exceed the third party's cost as recorded in the accounts of the third party and were supported with documentation.</p>	
<b>A.2</b>	<p><b>PRODUCTIVE HOURS</b></p> <p>To confirm standard factual findings 23-28 listed in the next column, the Auditor reviewed relevant documents, especially national legislation, labour agreements and contracts and time records of the persons included in the sample, to verify that:</p> <ul style="list-style-type: none"> <li>○ the annual productive hours applied were calculated in accordance with one of the methods described below,</li> <li>○ the full-time equivalent (FTEs) ratios for employees not working full-time were correctly calculated.</li> </ul>	<p>23) The Beneficiary applied method <i>[choose one option and delete the others]</i></p> <p><b>[A: 1720 hours]</b></p> <p><b>[B: the 'total number of hours worked']</b></p> <p><b>[C: 'annual productive hours' used correspond to usual accounting practices]</b></p>	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>If the Beneficiary applied method B, the auditor verified that the correctness in which the total number of hours worked was calculated and that the contracts specified the annual workable hours.</p> <p>If the Beneficiary applied method C, the auditor verified that the 'annual productive hours' applied when calculating the hourly rate were equivalent to at least 90 % of the 'standard annual workable hours'. The Auditor can only do this if the calculation of the standard annual workable hours can be supported by records, such as national legislation, labour agreements, and contracts.</p> <p><i>BENEFICIARY'S PRODUCTIVE HOURS' FOR PERSONS WORKING FULL TIME SHALL BE ONE OF THE FOLLOWING METHODS:</i></p> <p><i>A. 1720 ANNUAL PRODUCTIVE HOURS (PRO-RATA FOR PERSONS NOT WORKING FULL-TIME)</i></p> <p><i>B. THE TOTAL NUMBER OF HOURS WORKED BY THE PERSON FOR THE BENEFICIARY IN THE YEAR (THIS METHOD IS ALSO REFERRED TO AS 'TOTAL NUMBER OF HOURS WORKED' IN THE NEXT COLUMN). THE CALCULATION OF THE TOTAL NUMBER OF HOURS WORKED WAS DONE AS FOLLOWS: ANNUAL WORKABLE HOURS OF THE PERSON ACCORDING TO THE EMPLOYMENT CONTRACT, APPLICABLE LABOUR AGREEMENT OR NATIONAL LAW PLUS OVERTIME WORKED MINUS ABSENCES (SUCH AS SICK LEAVE OR SPECIAL LEAVE).</i></p>	24) Productive hours were calculated annually.	
		25) For employees not working full-time the full-time equivalent (FTE) ratio was correctly applied.	
		<p><i>If the Beneficiary applied method B.</i></p> <p>26) The calculation of the number of 'annual workable hours', overtime and absences was verifiable based on the documents provided by the Beneficiary.</p>	
		<p><i>If the Beneficiary applied method C.</i></p> <p>27) The calculation of the number of 'standard annual workable hours' was verifiable based on the documents provided by the Beneficiary.</p>	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p><i>C. THE STANDARD NUMBER OF ANNUAL HOURS GENERALLY APPLIED BY THE BENEFICIARY FOR ITS PERSONNEL IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICES (THIS METHOD IS ALSO REFERRED TO AS 'TOTAL ANNUAL PRODUCTIVE HOURS' IN THE NEXT COLUMN). THIS NUMBER MUST BE AT LEAST 90% OF THE STANDARD ANNUAL WORKABLE HOURS.</i></p> <p><i>'ANNUAL WORKABLE HOURS' MEANS THE PERIOD DURING WHICH THE PERSONNEL MUST BE WORKING, AT THE EMPLOYER'S DISPOSAL AND CARRYING OUT HIS/HER ACTIVITY OR DUTIES UNDER THE EMPLOYMENT CONTRACT, APPLICABLE COLLECTIVE LABOUR AGREEMENT OR NATIONAL WORKING TIME LEGISLATION.</i></p>	28) The 'annual productive hours' used for calculating the hourly rate were consistent with the usual cost accounting practices of the Beneficiary and were equivalent to at least 90 % of the 'annual workable hours'.	
<b>A.3</b>	<p><b>HOURLY PERSONNEL RATES</b></p> <p><u>I) For unit costs calculated in accordance to the Beneficiary's usual cost accounting practice (unit costs):</u></p> <p>If the Beneficiary has a "Certificate on Methodology to calculate unit costs " (CoMUC) approved by the Commission, the Beneficiary provides the Auditor with a description of the approved methodology and the Commission's letter of acceptance. The Auditor verified that the Beneficiary has indeed used the methodology approved. If so, no further verification is necessary.</p> <p>If the Beneficiary does not have a "Certificate on Methodology" (CoMUC) approved by the</p>	<p>29) The Beneficiary applied [choose one option and delete the other]:</p> <p>[Option I: "Unit costs (hourly rates) were calculated in accordance with the Beneficiary's usual cost accounting practices"]</p> <p>[Option II: Individual hourly rates were applied]</p>	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>Commission, or if the methodology approved was not applied, then the Auditor:</p> <ul style="list-style-type: none"> <li>○ reviewed the documentation provided by the Beneficiary, including manuals and internal guidelines that explain how to calculate hourly rates;</li> <li>○ recalculated the unit costs (hourly rates) of staff included in the sample following the results of the procedures carried out in A.1 and A.2.</li> </ul> <p><u>II) For individual hourly rates:</u></p> <p>The Auditor:</p> <ul style="list-style-type: none"> <li>○ reviewed the documentation provided by the Beneficiary, including manuals and internal guidelines that explain how to calculate hourly rates;</li> <li>○ recalculated the hourly rates of staff included in the sample following the results of the procedures carried out in A.1 and A.2.</li> </ul>	<p><i>For option I concerning unit costs and if the Beneficiary applies the methodology approved by the Commission (CoMUC):</i></p> <p>30) The Beneficiary used the Commission-approved methodology to calculate hourly rates. It corresponded to the organisation's usual cost accounting practices and was applied consistently for all activities irrespective of the source of funding.</p>	
	<p><u>“UNIT COSTS CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICES”:</u></p> <p><i>IT IS CALCULATED BY DIVIDING THE TOTAL AMOUNT OF PERSONNEL COSTS OF THE CATEGORY TO WHICH THE EMPLOYEE BELONGS VERIFIED IN LINE WITH PROCEDURE A.1 BY THE NUMBER OF FTE AND THE ANNUAL TOTAL PRODUCTIVE HOURS OF THE SAME CATEGORY CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH PROCEDURE A.2.</i></p> <p><u>HOURLY RATE FOR INDIVIDUAL ACTUAL PERSONAL COSTS:</u></p> <p><i>IT IS CALCULATED BY DIVIDING THE TOTAL AMOUNT OF PERSONNEL COSTS OF AN EMPLOYEE VERIFIED IN LINE WITH</i></p>	<p><i>For option I concerning unit costs and if the Beneficiary applies a methodology not approved by the Commission:</i></p> <p>31) The unit costs re-calculated by the Auditor were the same as the rates applied by the Beneficiary.</p>	
		<p><i>For option II concerning individual hourly rates:</i></p>	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<i>PROCEDURE A.1 BY THE NUMBER OF ANNUAL PRODUCTIVE HOURS VERIFIED IN LINE WITH PROCEDURE A.2.</i>	32) The individual rates re-calculated by the Auditor were the same as the rates applied by the Beneficiary.	
<b>A.4</b>	<b>TIME RECORDING SYSTEM</b>  To verify that the time recording system ensures the fulfilment of all minimum requirements and that the hours declared for the action were correct, accurate and properly authorised and supported by documentation, the Auditor made the following checks for the persons included in the sample that declare time as worked for the action on the basis of time records: <ul style="list-style-type: none"> <li>○ description of the time recording system provided by the Beneficiary (registration, authorisation, processing in the HR-system);</li> <li>○ its actual implementation;</li> <li>○ time records were signed at least monthly by the employees (on paper or electronically) and authorised by the project manager or another manager;</li> <li>○ the hours declared were worked within the project period;</li> <li>○ there were no hours declared as worked for the action if HR-records showed absence due to holidays or sickness (further cross-checks with travels are carried out in B.1 below) ;</li> </ul>	33) All persons recorded their time dedicated to the action on a <b>daily/ weekly/ monthly</b> basis using a <b>paper/computer-based</b> system. <i>(delete the answers that are not applicable)</i>	
		34) Their time-records were authorised at least monthly by the project manager or other superior.	
		35) Hours declared were worked within the project period and were consistent with the presences/absences recorded in HR-records.	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> <li>the hours charged to the action matched those in the time recording system.</li> </ul> <p><i>ONLY THE HOURS WORKED ON THE ACTION CAN BE CHARGED. ALL WORKING TIME TO BE CHARGED SHOULD BE RECORDED THROUGHOUT THE DURATION OF THE PROJECT, ADEQUATELY SUPPORTED BY EVIDENCE OF THEIR REALITY AND RELIABILITY (SEE SPECIFIC PROVISIONS BELOW FOR PERSONS WORKING EXCLUSIVELY FOR THE ACTION WITHOUT TIME RECORDS).</i></p>	36) There were no discrepancies between the number of hours charged to the action and the number of hours recorded.	
	<p><u>If the persons are working exclusively for the action and without time records</u></p> <p>For the persons selected that worked exclusively for the action without time records, the Auditor verified evidence available demonstrating that they were in reality exclusively dedicated to the action and that the Beneficiary signed a declaration confirming that they have worked exclusively for the action.</p>	37) The exclusive dedication is supported by a declaration signed by the Beneficiary's and by any other evidence gathered.	
<b>B</b>	<b>COSTS OF SUBCONTRACTING</b>		
<b>B.1</b>	<p><b>The Auditor obtained the detail/breakdown of subcontracting costs and sampled [ ] cost items selected randomly</b> (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest</i>).</p> <p>To confirm standard factual findings 38-42 listed in the next column, the Auditor reviewed the</p>	38) The use of claimed subcontracting costs was foreseen in Annex 1 and costs were declared in the Financial Statements under the subcontracting category.	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<p>following for the items included in the sample:</p> <ul style="list-style-type: none"> <li>○ the use of subcontractors was foreseen in Annex 1;</li> <li>○ subcontracting costs were declared in the subcontracting category of the Financial Statement;</li> <li>○ supporting documents on the selection and award procedure were followed;</li> <li>○ the Beneficiary ensured best value for money (key elements to appreciate the respect of this principle are the award of the subcontract to the bid offering best price-quality ratio, under conditions of transparency and equal treatment. In case an existing framework contract was used the Beneficiary ensured it was established on the basis of the principle of best value for money under conditions of transparency and equal treatment).</li> </ul> <p>In particular,</p> <ul style="list-style-type: none"> <li>i. if the Beneficiary acted as a contracting authority within the meaning of Directive 2004/18/EC or of Directive 2004/17/EC, the Auditor verified that the applicable national law on public procurement was followed and that the subcontracting complied with the Terms and Conditions of the Agreement.</li> <li>ii. if the Beneficiary did not fall under the above-mentioned category the Auditor verified that the Beneficiary followed their usual procurement rules and respected the Terms and Conditions of the Agreement..</li> </ul> <p>For the items included in the sample the Auditor also verified that:</p> <ul style="list-style-type: none"> <li>○ the subcontracts were not awarded to other Beneficiaries in the consortium;</li> </ul>	<p>39) There were documents of requests to different providers, different offers and assessment of the offers before selection of the provider in line with internal procedures and procurement rules. Subcontracts were awarded in accordance with the principle of best value for money.</p> <p><i>(When different offers were not collected the Auditor explains the reasons provided by the Beneficiary under the caption “Exceptions” of the Report. The Commission will analyse this information to evaluate whether these costs might be accepted as eligible)</i></p> <p>40) The subcontracts were not awarded to other Beneficiaries of the consortium.</p>	



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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	<ul style="list-style-type: none"> <li>○ there were signed agreements between the Beneficiary and the subcontractor;</li> <li>○ there was evidence that the services were provided by subcontractor;</li> </ul>	41) All subcontracts were supported by signed agreements between the Beneficiary and the subcontractor.	
		42) There was evidence that the services were provided by the subcontractors.	
<b>C</b>	<b>COSTS OF PROVIDING FINANCIAL SUPPORT TO THIRD PARTIES</b>		
<b>C.1</b>	<p><b>The Auditor obtained the detail/breakdown of the costs of providing financial support to third parties and sampled [ ] cost items selected randomly</b> (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest</i>).</p> <p>The Auditor verified that the following minimum conditions were met:</p> <ul style="list-style-type: none"> <li>a) the maximum amount of financial support for each third party did not exceed EUR 60 000, unless explicitly mentioned in Annex 1;</li> <li>b) the financial support to third parties was agreed in Annex 1 of the Agreement and the other provisions on financial support to third parties included in Annex 1 were</li> </ul>	43) All minimum conditions were met	

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Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	respected.		

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D	OTHER ACTUAL DIRECT COSTS		
D.1	<p><b>COSTS OF TRAVEL AND RELATED SUBSISTENCE ALLOWANCES</b></p> <p><b>The Auditor sampled [ ] cost items selected randomly</b> <i>(full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is the highest).</i></p> <p>The Auditor inspected the sample and verified that:</p> <ul style="list-style-type: none"> <li>○ travel and subsistence costs were consistent with the Beneficiary's usual policy for travel. In this context, the Beneficiary provided evidence of its normal policy for travel costs (e.g. use of first class tickets, reimbursement by the Beneficiary on the basis of actual costs, a lump sum or per diem) to enable the Auditor to compare the travel costs charged with this policy;</li> <li>○ travel costs are correctly identified and allocated to the action (e.g. trips are directly linked to the action) by reviewing relevant supporting documents such as minutes of meetings, workshops or conferences, their registration in the correct project account, their consistency with time records or with the dates/duration of the workshop/conference;</li> <li>○ no ineligible costs or excessive or reckless expenditure was declared.</li> </ul>	44) Costs were incurred, approved and reimbursed in line with the Beneficiary's usual policy for travels.	
		45) There was a link between the trip and the action.	
		46) The supporting documents were consistent with each other regarding subject of the trip, dates, duration and reconciled with time records and accounting.	
		47) No ineligible costs or excessive or reckless expenditure was declared.	
D.2	<p><b>DEPRECIATION COSTS FOR EQUIPMENT, INFRASTRUCTURE OR OTHER ASSETS</b></p> <p><b>The Auditor sampled [ ] cost items selected randomly</b> <i>(full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is the highest).</i></p> <p>For “equipment, infrastructure or other assets” [from now on called “asset(s)”] selected in the</p>	48) Procurement rules, principles and guides were followed.	
		49) There was a link between the grant agreement and the asset charged to the action.	

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	<p>sample the Auditor verified that:</p> <ul style="list-style-type: none"> <li>○ the assets were acquired in conformity with the Beneficiary's internal guidelines and procedures;</li> <li>○ they were correctly allocated to the action (with supporting documents such as delivery note invoice or any other proof demonstrating the link to the action)</li> <li>○ they were entered in the accounting system;</li> <li>○ the extent to which the assets were used for the action (as a percentage) was supported by reliable documentation (e.g. usage overview table);</li> </ul> <p>The Auditor recalculated the depreciation costs and verified that they were in line with the applicable rules in the Beneficiary's country and with the Beneficiary's usual accounting policy (e.g. depreciation calculated on the acquisition value).</p> <p>The Auditor verified that no ineligible costs such as deductible VAT, exchange rate losses, excessive or reckless expenditure were declared (see Article 6.5 GA).</p>	50) The asset charged to the action was traceable to the accounting records and the underlying documents.	
		51) The depreciation method used to charge the asset to the action was in line with the applicable rules of the Beneficiary's country and the Beneficiary's usual accounting policy.	
		52) The amount charged corresponded to the actual usage for the action.	
		53) No ineligible costs or excessive or reckless expenditure were declared.	
<b>D.3</b>	<p><b>COSTS OF OTHER GOODS AND SERVICES</b></p> <p><b>The Auditor sampled [ ] cost items selected randomly</b> (<i>full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest</i>).</p> <p>For the purchase of goods, works or services included in the sample the Auditor verified that:</p> <ul style="list-style-type: none"> <li>○ the contracts did not cover tasks described in Annex 1;</li> </ul>	54) Contracts for works or services did not cover tasks described in Annex 1.	
		55) Costs were allocated to the correct action and the goods were not placed in the inventory of durable equipment.	

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	<ul style="list-style-type: none"> <li>○ they were correctly identified, allocated to the proper action, entered in the accounting system (traceable to underlying documents such as purchase orders, invoices and accounting);</li> <li>○ the goods were not placed in the inventory of durable equipment;</li> <li>○ the costs charged to the action were accounted in line with the Beneficiary's usual accounting practices;</li> <li>○ no ineligible costs or excessive or reckless expenditure were declared (see Article 6 GA).</li> </ul> <p>In addition, the Auditor verified that these goods and services were acquired in conformity with the Beneficiary's internal guidelines and procedures, in particular:</p> <ul style="list-style-type: none"> <li>○ if Beneficiary acted as a contracting authority within the meaning of Directive 2004/18/EC or of Directive 2004/17/EC, the Auditor verified that the applicable national law on public procurement was followed and that the procurement contract complied with the Terms and Conditions of the Agreement.</li> <li>○ if the Beneficiary did not fall into the category above, the Auditor verified that the Beneficiary followed their usual procurement rules and respected the Terms and Conditions of the Agreement.</li> </ul> <p>For the items included in the sample the Auditor also verified that:</p> <ul style="list-style-type: none"> <li>○ the Beneficiary ensured best value for money (key elements to appreciate the respect of this principle are the award of the contract to the bid offering best price-quality ratio, under conditions of transparency and equal treatment. In case an existing framework contract was used the Auditor also verified that the Beneficiary ensured it was established on the basis of the principle of best value for money under conditions of transparency and equal treatment);</li> </ul> <p><i>SUCH GOODS AND SERVICES INCLUDE, FOR INSTANCE, CONSUMABLES AND SUPPLIES, DISSEMINATION (INCLUDING OPEN ACCESS), PROTECTION OF RESULTS, SPECIFIC EVALUATION OF THE ACTION IF IT IS REQUIRED BY THE</i></p>	<p>56) The costs were charged in line with the Beneficiary's accounting policy and were adequately supported.</p> <p>57) No ineligible costs or excessive or reckless expenditure were declared. For internal invoices/charges only the cost element was charged, without any mark-ups.</p> <p>58) Procurement rules, principles and guides were followed. There were documents of requests to different providers, different offers and assessment of the offers before selection of the provider in line with internal procedures and procurement rules. The purchases were made in accordance with the principle of best value for money.</p> <p><i>(When different offers were not collected the Auditor explains the reasons provided by the Beneficiary under the</i></p>	
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	<p>AGREEMENT, CERTIFICATES ON THE FINANCIAL STATEMENTS IF THEY ARE REQUIRED BY THE AGREEMENT AND CERTIFICATES ON THE METHODOLOGY, TRANSLATIONS, REPRODUCTION.</p>	<p><i>caption “Exceptions” of the Report. The Commission will analyse this information to evaluate whether these costs might be accepted as eligible)</i></p>	
D.4	<p><b>AGGREGATED CAPITALISED AND OPERATING COSTS OF RESEARCH INFRASTRUCTURE</b></p> <p>The Auditor ensured the existence of a positive ex-ante assessment (issued by the EC Services) of the cost accounting methodology of the Beneficiary allowing it to apply the guidelines on direct costing for large research infrastructures in Horizon 2020.</p> <p><i><b>In the cases that a positive ex-ante assessment has been issued</b> (see the standard factual findings 59-60 on the next column),</i></p> <p>The Auditor ensured that the beneficiary has applied consistently the methodology that is explained and approved in the positive ex ante assessment;</p> <p><i><b>In the cases that a positive ex-ante assessment has NOT been issued</b> (see the standard factual findings 61 on the next column),</i></p> <p>The Auditor verified that no costs of Large Research Infrastructure have been charged as direct costs in any costs category;</p>	<p>59) The costs declared as direct costs for Large Research Infrastructures (in the appropriate line of the Financial Statement) comply with the methodology described in the positive ex-ante assessment report.</p>	
		<p>60) Any difference between the methodology applied and the one positively assessed was extensively described and adjusted accordingly.</p>	
		<p>61) The direct costs declared were free from any indirect costs items related to the Large Research Infrastructure.</p>	

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	<p><b><i>In the cases that a draft ex-ante assessment report has been issued with recommendation for further changes (see the standard factual findings 61 on the next column),</i></b></p> <ul style="list-style-type: none"> <li>The Auditor followed the same procedure as above (when a positive ex-ante assessment has NOT yet been issued) and paid particular attention (testing reinforced) to the cost items for which the draft ex-ante assessment either rejected the inclusion as direct costs for Large Research Infrastructures or issued recommendations.</li> </ul>		
<b>E</b>	<b>USE OF EXCHANGE RATES</b>		
<b>E.1</b>	<p><b>a) For Beneficiaries with accounts established in a currency other than euros</b></p> <p><b>The Auditor sampled [ ] cost items selected randomly and verified that the exchange rates used for converting other currencies into euros were in accordance with the following rules established in the Agreement ( full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest):</b></p> <p><i>COSTS INCURRED IN ANOTHER CURRENCY SHALL BE CONVERTED INTO EURO AT THE AVERAGE OF THE DAILY EXCHANGE RATES PUBLISHED IN THE C SERIES OF OFFICIAL JOURNAL OF THE EUROPEAN UNION (<a href="https://www.ecb.int/stats/exchange/eurofxref/html/index.en.html">https://www.ecb.int/stats/exchange/eurofxref/html/index.en.html</a> ), DETERMINED OVER THE CORRESPONDING REPORTING PERIOD.</i></p> <p><i>IF NO DAILY EURO EXCHANGE RATE IS PUBLISHED IN THE OFFICIAL JOURNAL OF THE EUROPEAN UNION FOR THE CURRENCY IN QUESTION, CONVERSION SHALL BE MADE AT THE AVERAGE OF THE MONTHLY ACCOUNTING RATES ESTABLISHED BY THE COMMISSION AND PUBLISHED ON ITS WEBSITE (<a href="http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm">http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm</a> ),</i></p>	62) The exchange rates used to convert other currencies into Euros were in accordance with the rules established of the Grant Agreement and there was no difference in the final figures.	



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	DETERMINED OVER THE CORRESPONDING REPORTING PERIOD.		
	<p><u>b) For Beneficiaries with accounts established in euros</u></p> <p><b>The Auditor sampled [ ] cost items selected randomly and verified that the exchange rates used for converting other currencies into euros were in accordance with the following rules established in the Agreement ( full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest):</b></p> <p><i>COSTS INCURRED IN ANOTHER CURRENCY SHALL BE CONVERTED INTO EURO BY APPLYING THE BENEFICIARY'S USUAL ACCOUNTING PRACTICES.</i></p>	63) The Beneficiary applied its usual accounting practices.	

**[legal name of the audit firm]****[name and function of an authorised representative]****[dd Month yyyy]****<Signature of the Auditor>**

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## ANNEX 6

### MODEL FOR THE CERTIFICATE ON THE METHODOLOGY

- For options [*in italics in square brackets*]: choose the applicable option. Options not chosen should be deleted.
- For fields in [grey in square brackets]: enter the appropriate data.

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**Terms of reference for an audit engagement for a methodology certificate in connection with one or more grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme**

This document sets out the ‘**Terms of Reference (ToR)**’ under which

[OPTION 1: *[insert name of the beneficiary]* (‘the Beneficiary’)] [OPTION 2: *[insert name of the linked third party]* (‘the Linked Third Party’), third party linked to the Beneficiary *[insert name of the beneficiary]* (‘the Beneficiary’)]

agrees to engage

**[insert legal name of the auditor]** (‘the Auditor’)

to produce an independent report of factual findings (‘the Report’) concerning the *[Beneficiary’s]* *[Linked Third Party’s]* usual accounting practices for calculating and claiming direct personnel costs declared as unit costs (‘the Methodology’) in connection with grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme.

The procedures to be carried out for the assessment of the methodology will be based on the grant agreement(s) detailed below:

**[title and number of the grant agreement(s)]** (‘the Agreement(s)’)

The Agreement(s) has(have) been concluded between the Beneficiary and [OPTION 1: *the European Union, represented by the European Commission* (‘the Commission’)] [OPTION 2: *the European Atomic Energy Community (Euratom), represented by the European Commission* (‘the Commission’)] [OPTION 3: *the [Research Executive Agency (REA)] [European Research Council Executive Agency (ERCEA)] [Innovation and Networks Executive Agency (INEA)] [Executive Agency for Small and Medium-sized Enterprises (EASME)]* (‘the Agency’), under the powers delegated by the European Commission (‘the Commission’)].

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The *[Commission] [Agency]* is mentioned as a signatory of the Agreement with the Beneficiary only.  
The *[European Union] [Euratom] [Agency]* is not a party to this engagement.

### 1.1 Subject of the engagement

According to Article 18.1.2 of the Agreement, beneficiaries *[and linked third parties]* that declare direct personnel costs as unit costs calculated in accordance with their usual cost accounting practices may submit to the *[Commission] [Agency]*, for approval, a certificate on the methodology ('CoMUC') stating that there are adequate records and documentation to prove that their cost accounting practices used comply with the conditions set out in Point A of Article 6.2.

The subject of this engagement is the CoMUC which is composed of two separate documents:

- the Terms of Reference ('the ToR') to be signed by the *[Beneficiary] [Linked Third Party]* and the Auditor;
- the Auditor's Independent Report of Factual Findings ('the Report') issued on the Auditor's letterhead, dated, stamped and signed by the Auditor which includes; the standard statements ('the Statements') evaluated and signed by the *[Beneficiary] [Linked Third Party]*, the agreed-upon procedures ('the Procedures') performed by the Auditor and the standard factual findings ('the Findings') assessed by the Auditor. The Statements, Procedures and Findings are summarised in the table that forms part of the Report.

The information provided through the Statements, the Procedures and the Findings will enable the Commission to draw conclusions regarding the existence of the *[Beneficiary's] [Linked Third Party's]* usual cost accounting practice and its suitability to ensure that direct personnel costs claimed on that basis comply with the provisions of the Agreement. The Commission draws its own conclusions from the Report and any additional information it may require.

### 1.2 Responsibilities

The parties to this agreement are the *[Beneficiary] [Linked Third Party]* and the Auditor.

The *[Beneficiary] [Linked Third Party]*:

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- is responsible for preparing financial statements for the Agreement(s) ('the Financial Statements') in compliance with those Agreements;
- is responsible for providing the Financial Statement(s) to the Auditor and enabling the Auditor to reconcile them with the [Beneficiary's] [Linked Third Party's] accounting and bookkeeping system and the underlying accounts and records. The Financial Statement(s) will be used as a basis for the procedures which the Auditor will carry out under this ToR;
- is responsible for its Methodology and liable for the accuracy of the Financial Statement(s);
- is responsible for endorsing or refuting the Statements indicated under the heading 'Statements to be made by the Beneficiary/ Linked Third Party' in the first column of the table that forms part of the Report;
- must provide the Auditor with a signed and dated representation letter;
- accepts that the ability of the Auditor to carry out the Procedures effectively depends upon the [Beneficiary] [Linked Third Party] providing full and free access to the [Beneficiary's] [Linked Third Party's] staff and to its accounting and other relevant records.

### The Auditor:

- *[Option 1 by default: is qualified to carry out statutory audits of accounting documents in accordance with Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC or similar national regulations].*
- *[Option 2 if the Beneficiary or Linked Third Party has an independent Public Officer: is a competent and independent Public Officer for which the relevant national authorities have established the legal capacity to audit the Beneficiary].*
- *[Option 3 if the Beneficiary or Linked Third Party is an international organisation: is an [internal] [external] auditor in accordance with the internal financial regulations and procedures of the international organisation].*

### The Auditor:

- must be independent from the Beneficiary *[and the Linked Third Party]*, in particular, it must not have been involved in preparing the Beneficiary's *[and Linked Third Party's]* Financial Statement(s);
- must plan work so that the Procedures may be carried out and the Findings may be assessed;
- must adhere to the Procedures laid down and the compulsory report format;
- must carry out the engagement in accordance with these ToR;
- must document matters which are important to support the Report;
- must base its Report on the evidence gathered;
- must submit the Report to the *[Beneficiary] [Linked Third Party]*.

The Commission sets out the Procedures to be carried out and the Findings to be endorsed by the Auditor. The Auditor is not responsible for their suitability or pertinence. As this engagement is not an assurance engagement the Auditor does not provide an audit opinion or a statement of assurance.

### 1.3 Applicable Standards

The Auditor must comply with these Terms of Reference and with<sup>1</sup>:

- the International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as issued by the International Auditing and Assurance Standards Board (IAASB);
- the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). Although ISRS 4400 states that independence is not a requirement for engagements to carry out agreed-upon procedures, the Commission requires that the Auditor also complies with the Code's independence requirements.

The Auditor's Report must state that there was no conflict of interests in establishing this Report between the Auditor and the Beneficiary [*and the Linked Third Party*] that could have a bearing on the Report, and must specify – if the service is invoiced - the total fee paid to the Auditor for providing the Report.

### 1.4 Reporting

The Report must be written in the language of the Agreement (see Article 20.7 of the Agreement).

Under Article 22 of the Agreement, the Commission, [*the Agency*], the European Anti-Fraud Office and the Court of Auditors have the right to audit any work that is carried out under the action and for which costs are claimed from [*the European Union*] [*Euratom*] budget. This includes work related to this engagement. The Auditor must provide access to all working papers related to this assignment if the Commission, [*the Agency*], the European Anti-Fraud Office or the European Court of Auditors requests them.

### 1.5 Timing

The Report must be provided by [dd Month yyyy].

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<sup>1</sup> Supreme Audit Institutions applying INTOSAI-standards may carry out the Procedures according to the corresponding International Standards of Supreme Audit Institutions and code of ethics issued by INTOSAI instead of the International Standard on Related Services ('ISRS') 4400 and the Code of Ethics for Professional Accountants issued by the IAASB and the IESBA.

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## 1.6 Other Terms

*[The [Beneficiary] [Linked Third Party] and the Auditor can use this section to agree other specific terms, such as the Auditor's fees, liability, applicable law, etc. Those specific terms must not contradict the terms specified above.]*

[legal name of the Auditor]

[legal name of the [Beneficiary] [Linked Third Party]]

[name & title of authorised representative]

[name & title of authorised representative]

[dd Month yyyy]

[dd Month yyyy]

Signature of the Auditor Signature

Signature of the [Beneficiary] [Linked Third Party]



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**Independent report of factual findings on the methodology concerning grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme**

*(To be printed on letterhead paper of the auditor)*

To

[ name of contact person(s)], [Position]

[[Beneficiary's] [Linked Third Party's] name]

[ Address]

[ dd Month yyyy]

Dear [Name of contact person(s)],

As agreed under the terms of reference dated [dd Month yyyy]

with [OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')],

we

[ name of the auditor] ('the Auditor'),

established at

[full address/city/state/province/country],

represented by

[name and function of an authorised representative],

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have carried out the agreed-upon procedures ('the Procedures') and provide hereby our Independent Report of Factual Findings ('the Report'), concerning the *[Beneficiary's] [Linked Third Party's]* usual accounting practices for calculating and declaring direct personnel costs declared as unit costs ('the Methodology').

You requested certain procedures to be carried out in connection with the grant(s)

[title and number of the grant agreement(s)] ('the Agreement(s)').

## The Report

Our engagement was carried out in accordance with the terms of reference ('the ToR') appended to this Report. The Report includes: the standard statements ('the Statements') made by the *[Beneficiary] [Linked Third Party]*, the agreed-upon procedures ('the Procedures') carried out and the standard factual findings ('the Findings') confirmed by us.

The engagement involved carrying out the Procedures and assessing the Findings and the documentation requested appended to this Report, the results of which the Commission uses to draw conclusions regarding the acceptability of the Methodology applied by the *[Beneficiary] [Linked Third Party]*.

The Report covers the methodology used from [dd Month yyyy]. In the event that the *[Beneficiary] [Linked Third Party]* changes this methodology, the Report will not be applicable to any Financial Statement<sup>2</sup> submitted thereafter.

The scope of the Procedures and the definition of the standard statements and findings were determined solely by the Commission. Therefore, the Auditor is not responsible for their suitability or pertinence.

Since the Procedures carried out constitute neither an audit nor a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, we do not

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<sup>2</sup> Financial Statement in this context refers solely to Annex 4 of the Agreement by which the Beneficiary declares costs under the Agreement.

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give a statement of assurance on the costs declared on the basis of the *[Beneficiary's] [Linked Third Party's]* Methodology. Had we carried out additional procedures or had we performed an audit or review in accordance with these standards, other matters might have come to its attention and would have been included in the Report.

## Exceptions

Apart from the exceptions listed below, the *[Beneficiary] [Linked Third Party]* agreed with the standard Statements and provided the Auditor all the documentation and accounting information needed by the Auditor to carry out the requested Procedures and corroborate the standard Findings.

**List here any exception and add any information on the cause and possible consequences of each exception, if known. If the exception is quantifiable, also indicate the corresponding amount.**

....

*Explanation of possible exceptions in the form of examples (to be removed from the Report):*

- i. the [Beneficiary] [Linked Third Party] did not agree with the standard Statement number ... because...;*
- ii. the Auditor could not carry out the procedure ... established because .... (e.g. due to the inability to reconcile key information or the unavailability or inconsistency of data);*
- iii. the Auditor could not confirm or corroborate the standard Finding number ... because ....*

## Remarks

We would like to add the following remarks relevant for the proper understanding of the Methodology applied by the *[Beneficiary] [Linked Third Party]* or the results reported:

*Example (to be removed from the Report):*

*Regarding the methodology applied to calculate hourly rates ...*

*Regarding standard Finding 15 it has to be noted that ...*

*The [Beneficiary] [Linked Third Party] explained the deviation from the benchmark statement XXIV concerning time recording for personnel with no exclusive dedication to the action in the following manner:*

...

## Annexes

[H2020 Model Grant Agreements: H2020 General MGA — Multi: September 2014](#)

Please provide the following documents to the auditor and annex them to the report when submitting this CoMUC to the Commission:

1. Brief description of the methodology for calculating personnel costs, productive hours and hourly rates;
2. Brief description of the time recording system in place;
3. An example of the time records used by the [Beneficiary] [Linked Third Party];
4. Description of any budgeted or estimated elements applied, together with an explanation as to why they are relevant for calculating the personnel costs and how they are based on objective and verifiable information;
5. A summary sheet with the hourly rate for direct personnel declared by the [Beneficiary] [Linked Third Party] and recalculated by the Auditor for each staff member included in the sample (the names do not need to be reported);
6. A comparative table summarising for each person selected in the sample a) the time claimed by the [Beneficiary] [Linked Third Party] in the Financial Statement(s) and b) the time according to the time record verified by the Auditor;
7. A copy of the letter of representation provided to the Auditor.

### Use of this Report

This Report has been drawn up solely for the purpose given under Point 1.1 Reasons for the engagement.

### The Report:

- is confidential and is intended to be submitted to the Commission by the [Beneficiary] [Linked Third Party] in connection with Article 18.1.2 of the Agreement;
- may not be used by the [Beneficiary] [Linked Third Party] or by the Commission for any other purpose, nor distributed to any other parties;
- may be disclosed by the Commission only to authorised parties, in particular the European Anti-Fraud Office (OLAF) and the European Court of Auditors.
- relates only to the usual cost accounting practices specified above and does not constitute a report on the Financial Statements of the [Beneficiary] [Linked Third Party].

No conflict of interest<sup>3</sup> exists between the Auditor and the Beneficiary [and the Linked Third Party] that could have a bearing on the Report. The total fee paid to the Auditor for producing the Report was EUR [ ] (including EUR [ ] of deductible VAT).

<sup>3</sup> A conflict of interest arises when the Auditor's objectivity to establish the certificate is compromised in fact or in appearance when the Auditor for instance:

- was involved in the preparation of the Financial Statements;

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We look forward to discussing our Report with you and would be pleased to provide any further information or assistance which may be required.

Yours sincerely

[legal name of the Auditor]

[name and title of the authorised representative]

[dd Month yyyy]

Signature of the Auditor

- 
- stands to benefit directly should the certificate be accepted;
  - has a close relationship with any person representing the beneficiary;
  - is a director, trustee or partner of the beneficiary; or
  - is in any other situation that compromises his or her independence or ability to establish the certificate impartially.

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**Statements to be made by the Beneficiary/Linked Third Party ('the Statements') and Procedures to be carried out by the Auditor ('the Procedures') and standard factual findings ('the Findings') to be confirmed by the Auditor**

The Commission reserves the right to provide the auditor with guidance regarding the Statements to be made, the Procedures to be carried out or the Findings to be ascertained and the way in which to present them. The Commission reserves the right to vary the Statements, Procedures or Findings by written notification to the Beneficiary/Linked Third Party to adapt the procedures to changes in the grant agreement(s) or to any other circumstances.

If this methodology certificate relates to the Linked Third Party's usual accounting practices for calculating and claiming direct personnel costs declared as unit costs any reference here below to 'the Beneficiary' is to be considered as a reference to 'the Linked Third Party'.

<b>Please explain any discrepancies in the body of the Report.</b>	
<b>Statements to be made by Beneficiary</b>	<b>Procedures to be carried out and Findings to be confirmed by the Auditor</b>
<b>A. Use of the Methodology</b>  I. The cost accounting practice described below has been in use since [dd Month yyyy].  II. The next planned alteration to the methodology used by the Beneficiary will be from [dd Month yyyy].	<b>Procedure:</b>  ✓ The Auditor checked these dates against the documentation the Beneficiary has provided.  <b>Factual finding:</b>  1. The dates provided by the Beneficiary were consistent with the documentation.
<b>B. Description of the Methodology</b>  III. The methodology to calculate unit costs is being used in a consistent manner and is reflected in the relevant procedures.  <i>[Please describe the methodology your entity uses to calculate <u>personnel</u> costs, productive hours and hourly rates, present your description to the Auditor and annex it to this certificate]</i>  <i>[If the statement of section "B. Description of the methodology" cannot be endorsed by the Beneficiary or there is no written methodology to calculate unit costs it should be listed here below and reported as exception by the Auditor in the main Report of</i>	<b>Procedure:</b>  ✓ The Auditor reviewed the description, the relevant manuals and/or internal guidance documents describing the methodology.  <b>Factual finding:</b>  2. The brief description was consistent with the relevant manuals, internal guidance and/or other documentary evidence the Auditor has reviewed.  3. The methodology was generally applied by the Beneficiary as part of its usual costs accounting practices.

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Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<b>Factual Findings:</b> - ...]	
<b>C. Personnel costs</b> <u>General</u> IV. The unit costs (hourly rates) are limited to salaries including during parental leave, social security contributions, taxes and other costs included in the remuneration required under national law and the employment contract or equivalent appointing act; V. Employees are hired directly by the Beneficiary in accordance with national law, and work under its sole supervision and responsibility; VI. The Beneficiary remunerates its employees in accordance with its usual practices. This means that personnel costs are charged in line with the Beneficiary's usual payroll policy (e.g. salary policy, overtime policy, variable pay) and no special conditions exist for employees assigned to tasks relating to the European Union or Euratom, unless explicitly provided for in the grant agreement(s); VII. The Beneficiary allocates its employees to the relevant group/category/cost centre for the purpose of the unit cost calculation in line with the usual cost accounting practice; VIII. Personnel costs are based on the payroll system and accounting system. IX. Any exceptional adjustments of actual personnel costs resulted from relevant budgeted or estimated elements and were based on objective and verifiable information. <i>[Please describe the 'budgeted or estimated elements' and their relevance to personnel costs, and explain how they were reasonable and based on objective and verifiable information, present your explanation to the Auditor and annex it to this certificate].</i> X. Personnel costs claimed do not contain any of the following ineligible costs: costs related to return on capital; debt and debt service charges; provisions for future losses	<b>Procedure:</b> <i>The Auditor draws a sample of employees to carry out the procedures indicated in this section C and the following sections D to F.</i>  <i>[The Auditor has drawn a random sample of 10 full-time equivalents made up of employees assigned to the action(s). If fewer than 10 full-time equivalents are assigned to the action(s), the Auditor has selected a sample of 10 full-time equivalents consisting of all employees assigned to the action(s), complemented by other employees irrespective of their assignments.]. For this sample:</i> <ul style="list-style-type: none"> <li>✓ the Auditor reviewed all documents relating to personnel costs such as employment contracts, payslips, payroll policy (e.g. salary policy, overtime policy, variable pay policy), accounting and payroll records, applicable national tax, labour and social security law and any other documents corroborating the personnel costs claimed;</li> <li>✓ in particular, the Auditor reviewed the employment contracts of the employees in the sample to verify that: <ul style="list-style-type: none"> <li>i. they were employed directly by the Beneficiary in accordance with applicable national legislation;</li> <li>ii. they were working under the sole technical supervision and responsibility of the latter;</li> <li>iii. they were remunerated in accordance with the Beneficiary's usual practices;</li> <li>iv. they were allocated to the correct group/category/cost centre for the purposes of calculating the unit cost in line with the Beneficiary's usual cost accounting practices;</li> </ul> </li> <li>✓ the Auditor verified that any ineligible items or any costs claimed under other costs categories or costs covered by other types of grant or by other grants financed from the European Union budget have not been taken</li> </ul>

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<b>Statements to be made by Beneficiary</b>	<b>Procedures to be carried out and Findings to be confirmed by the Auditor</b>
<p>or debts; interest owed; doubtful debts; currency exchange losses; bank costs charged by the Beneficiary's bank for transfers from the Commission/Agency; excessive or reckless expenditure; deductible VAT or costs incurred during suspension of the implementation of the action.</p> <p>XI. Personnel costs were not declared under another EU or Euratom grant (including grants awarded by a Member State and financed by the EU budget and grants awarded by bodies other than the Commission/Agency for the purpose of implementing the EU budget).</p> <p><u>If additional remuneration as referred to in the grant agreement(s) is paid</u></p> <p>XII. The Beneficiary is a non-profit legal entity;</p> <p>XIII. The additional remuneration is part of the beneficiary's usual remuneration practices and paid consistently whenever the relevant work or expertise is required;</p> <p>XIV. The criteria used to calculate the additional remuneration are objective and generally applied regardless of the source of funding;</p> <p>XV. The additional remuneration included in the personnel costs used to calculate the hourly rates for the grant agreement(s) is capped at EUR 8 000 per full-time equivalent (reduced proportionately if the employee is not assigned exclusively to the action).</p> <p><i>[If certain statement(s) of section "C. Personnel costs" cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor in the main Report of</i></p>	<p>into account when calculating the personnel costs;</p> <ul style="list-style-type: none"> <li>✓ the Auditor numerically reconciled the total amount of personnel costs used to calculate the unit cost with the total amount of personnel costs recorded in the statutory accounts and the payroll system.</li> <li>✓ to the extent that actual personnel costs were adjusted on the basis of budgeted or estimated elements, the Auditor carefully examined those elements and checked the information source to confirm that they correspond to objective and verifiable information;</li> <li>✓ if additional remuneration has been claimed, the Auditor verified that the Beneficiary was a non-profit legal entity, that the amount was capped at EUR 8000 per full-time equivalent and that it was reduced proportionately for employees not assigned exclusively to the action(s).</li> <li>✓ the Auditor recalculated the personnel costs for the employees in the sample.</li> </ul> <p><b>Factual finding:</b></p> <ol style="list-style-type: none"> <li>4. All the components of the remuneration that have been claimed as personnel costs are supported by underlying documentation.</li> <li>5. The employees in the sample were employed directly by the Beneficiary in accordance with applicable national law and were working under its sole supervision and responsibility.</li> <li>6. Their employment contracts were in line with the Beneficiary's usual policy;</li> <li>7. Personnel costs were duly documented and consisted solely of salaries, social security contributions (pension contributions, health insurance, unemployment fund contributions, etc.), taxes and other statutory costs included in the remuneration (holiday pay, thirteenth month's pay, etc.);</li> <li>8. The totals used to calculate the personnel unit costs are consistent with those registered in the payroll and accounting records;</li> <li>9. To the extent that actual personnel costs were adjusted on the basis of budgeted or estimated elements, those elements were</li> </ol>



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<b>Statements to be made by Beneficiary</b>	<b>Procedures to be carried out and Findings to be confirmed by the Auditor</b>
<p><b>Factual Findings:</b></p> <p>- ...]</p>	<p>relevant for calculating the personnel costs and correspond to objective and verifiable information. The budgeted or estimated elements used are: — (indicate the elements and their values).</p> <p>10. Personnel costs contained no ineligible elements;</p> <p>11. Specific conditions for eligibility were fulfilled when additional remuneration was paid: a) the Beneficiary is registered in the grant agreements as a non-profit legal entity; b) it was paid according to objective criteria generally applied regardless of the source of funding used and c) remuneration was capped at EUR 8000 per full-time equivalent (or up to up to the equivalent pro-rata amount if the person did not work on the action full-time during the year or did not work exclusively on the action).</p>
<p><b>D. Productive hours</b></p> <p>XVI. The number of productive hours per full-time employee applied is <i>[delete as appropriate]</i>:</p> <p>A. 1720 productive hours per year for a person working full-time (corresponding pro-rata for persons not working full time).</p> <p>B. the total number of hours worked in the year by a person for the Beneficiary</p> <p>C. the standard number of annual hours generally applied by the beneficiary for its personnel in accordance with its usual cost accounting practices. This number must be at least 90% of the standard annual workable hours.</p> <p><u>If method B is applied</u></p> <p>XVII. The calculation of the total number of hours worked was done as follows: annual workable hours of the person according to the employment contract, applicable labour agreement or national law plus overtime worked minus absences (such as sick leave and special leave).</p> <p>XVIII. 'Annual workable hours' are hours</p>	<p><b>Procedure (same sample basis as for Section C: Personnel costs):</b></p> <ul style="list-style-type: none"> <li>✓ The Auditor verified that the number of productive hours applied is in accordance with method A, B or C.</li> <li>✓ The Auditor checked that the number of productive hours per full-time employee is correct and that it is reduced proportionately for employees not exclusively assigned to the action(s).</li> <li>✓ If method B is applied the Auditor verified i) the manner in which the total number of hours worked was done and ii) that the contract specified the annual workable hours by inspecting all the relevant documents, national legislation, labour agreements and contracts.</li> <li>✓ If method C is applied the Auditor reviewed the manner in which the standard number of working hours per year has been calculated by inspecting all the relevant documents, national legislation, labour agreements and contracts and verified that the number of productive hours per year used for these calculations was at least 90% of the standard number of working hours per year.</li> </ul>

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Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	Procedures to be carried out and Findings to be confirmed by the Auditor
<p>during which the personnel must be working, at the employer's disposal and carrying out his/her activity or duties under the employment contract, applicable collective labour agreement or national working time legislation.</p> <p>XIX. The contract (applicable collective labour agreement or national working time legislation) do specify the working time enabling to calculate the annual workable hours.</p> <p><u>If method C is applied</u></p> <p>XX. The standard number of productive hours per year is that of a full-time equivalent; for employees not assigned exclusively to the action(s) this number is reduced proportionately.</p> <p>XXI. The number of productive hours per year on which the hourly rate is based i) corresponds to the Beneficiary's usual accounting practices; ii) is at least 90% of the standard number of workable (working) hours per year.</p> <p>XXII. Standard workable (working) hours are hours during which personnel are at the Beneficiary's disposal performing the duties described in the relevant employment contract, collective labour agreement or national labour legislation. The number of standard annual workable (working) hours that the Beneficiary claims is supported by labour contracts, national legislation and other documentary evidence.</p> <p><u>[If certain statement(s) of section "D. Productive hours" cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor:</u></p> <p>- ...]</p>	<p><b>Factual finding:</b></p> <p><u>General</u></p> <p>12. The Beneficiary applied a number of productive hours consistent with method A, B or C detailed in the left-hand column.</p> <p>13. The number of productive hours per year per full-time employee was accurate and was proportionately reduced for employees not working full-time or exclusively for the action.</p> <p><u>If method B is applied</u></p> <p>14. The number of 'annual workable hours', overtime and absences was verifiable based on the documents provided by the Beneficiary and the calculation of the total number of hours worked was accurate.</p> <p>15. The contract specified the working time enabling to calculate the annual workable hours.</p> <p><u>If method C is applied</u></p> <p>16. The calculation of the number of productive hours per year corresponded to the usual costs accounting practice of the Beneficiary.</p> <p>17. The calculation of the standard number of workable (working) hours per year was corroborated by the documents presented by the Beneficiary.</p> <p>18. The number of productive hours per year used for the calculation of the hourly rate was at least 90% of the number of workable (working) hours per year.</p>
<p><b>E. Hourly rates</b></p> <p>The hourly rates are correct because:</p> <p>XXIII. Hourly rates are correctly calculated since they result from dividing annual personnel</p>	<p><b>Procedure</b></p> <p>✓ The Auditor has obtained a list of all personnel rates calculated by the Beneficiary in accordance with the methodology used.</p> <p>✓ The Auditor has obtained a list of all the relevant employees, based on which the</p>

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<b>Statements to be made by Beneficiary</b>	<b>Procedures to be carried out and Findings to be confirmed by the Auditor</b>
<p>costs by the productive hours of a given year and group (e.g. staff category or department or cost centre depending on the methodology applied) and they are in line with the statements made in section C. and D. above.</p> <p><i>[If the statement of section 'E. Hourly rates' cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor:</i></p> <p>- ...]</p>	<p>personnel rate(s) are calculated.</p> <p>For 10 full-time equivalent employees selected at random (same sample basis as Section C: Personnel costs):</p> <ul style="list-style-type: none"> <li>✓ The Auditor recalculated the hourly rates.</li> <li>✓ The Auditor verified that the methodology applied corresponds to the usual accounting practices of the organisation and is applied consistently for all activities of the organisation on the basis of objective criteria irrespective of the source of funding.</li> </ul> <p><b>Factual finding:</b></p> <p>19. No differences arose from the recalculation of the hourly rate for the employees included in the sample.</p>
<p><b>F. Time recording</b></p> <p>XXIV. Time recording is in place for all persons with no exclusive dedication to one Horizon 2020 action. At least all hours worked in connection with the grant agreement(s) are registered on a <b>daily/weekly/monthly</b> basis <i>[delete as appropriate]</i> using a <b>paper/computer-based system</b> <i>[delete as appropriate]</i>;</p> <p>XXV. For persons exclusively assigned to one Horizon 2020 activity the Beneficiary has either signed a declaration to that effect or has put arrangements in place to record their working time;</p> <p>XXVI. Records of time worked have been signed by the person concerned (on paper or electronically) and approved by the action manager or line manager at least monthly;</p> <p>XXVII. Measures are in place to prevent staff from:</p> <ul style="list-style-type: none"> <li>i. recording the same hours twice,</li> <li>ii. recording working hours during absence periods (e.g. holidays, sick leave),</li> <li>iii. recording more than the number of productive hours per year used to calculate the hourly rates, and</li> </ul>	<p><b>Procedure</b></p> <ul style="list-style-type: none"> <li>✓ The Auditor reviewed the brief description, all relevant manuals and/or internal guidance describing the methodology used to record time.</li> </ul> <p>The Auditor reviewed the time records of the random sample of 10 full-time equivalents referred to under Section C: Personnel costs, and verified in particular:</p> <ul style="list-style-type: none"> <li>✓ that time records were available for all persons with not exclusive assignment to the action;</li> <li>✓ that time records were available for persons working exclusively for a Horizon 2020 action, or, alternatively, that a declaration signed by the Beneficiary was available for them certifying that they were working exclusively for a Horizon 2020 action;</li> <li>✓ that time records were signed and approved in due time and that all minimum requirements were fulfilled;</li> <li>✓ that the persons worked for the action in the periods claimed;</li> <li>✓ that no more hours were claimed than the productive hours used to calculate the hourly</li> </ul>

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<b>Statements to be made by Beneficiary</b>	<b>Procedures to be carried out and Findings to be confirmed by the Auditor</b>
<p>iv. recording hours worked outside the action period.</p> <p>XXVIII. No working time was recorded outside the action period;</p> <p>XXIX. No more hours were claimed than the productive hours used to calculate the hourly personnel rates.</p> <p><i>[Please provide a brief description of the <u>time recording system</u> in place together with the measures applied to ensure its reliability to the Auditor and annex it to the present certificate<sup>4</sup>].</i></p> <p><i>[If certain statement(s) of section “F. Time recording” cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor:</i></p> <p>- ...]</p>	<p>personnel rates;</p> <ul style="list-style-type: none"> <li>✓ that internal controls were in place to prevent that time is recorded twice, during absences for holidays or sick leave; that more hours are claimed per person per year for Horizon 2020 actions than the number of productive hours per year used to calculate the hourly rates; that working time is recorded outside the action period;</li> <li>✓ the Auditor cross-checked the information with human-resources records to verify consistency and to ensure that the internal controls have been effective. In addition, the Auditor has verified that no more hours were charged to Horizon 2020 actions per person per year than the number of productive hours per year used to calculate the hourly rates, and verified that no time worked outside the action period was charged to the action.</li> </ul> <p><b>Factual finding:</b></p> <ol style="list-style-type: none"> <li>20. The brief description, manuals and/or internal guidance on time recording provided by the Beneficiary were consistent with management reports/records and other documents reviewed and were generally applied by the Beneficiary to produce the financial statements.</li> <li>21. For the random sample time was recorded or, in the case of employees working exclusively for the action, either a signed declaration or time records were available;</li> <li>22. For the random sample the time records were signed by the employee and the action manager/line manager, at least monthly.</li> <li>23. Working time claimed for the action occurred in the periods claimed;</li> <li>24. No more hours were claimed than the number productive hours used to calculate the hourly</li> </ol>

<sup>4</sup> The description of the time recording system must state among others information on the content of the time records, its coverage (full or action time-recording, for all personnel or only for personnel involved in H2020 actions), its degree of detail (whether there is a reference to the particular tasks accomplished), its form, periodicity of the time registration and authorisation (paper or a computer-based system; on a daily, weekly or monthly basis; signed and countersigned by whom), controls applied to prevent double-charging of time or ensure consistency with HR-records such as absences and travels as well as its information flow up to its use for the preparation of the Financial Statements.

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<b>Please explain any discrepancies in the body of the Report.</b>	
<b>Statements to be made by Beneficiary</b>	<b>Procedures to be carried out and Findings to be confirmed by the Auditor</b>
	<p>personnel rates;</p> <p>25. There is proof that the Beneficiary has checked that working time has not been claimed twice, that it is consistent with absence records and the number of productive hours per year, and that no working time has been claimed outside the action period.</p> <p>26. Working time claimed is consistent with that on record at the human-resources department.</p>

**[official name of the [Beneficiary] [Linked Third Party]]**

**[official name of the Auditor]**

**[name and title of authorised representative]**

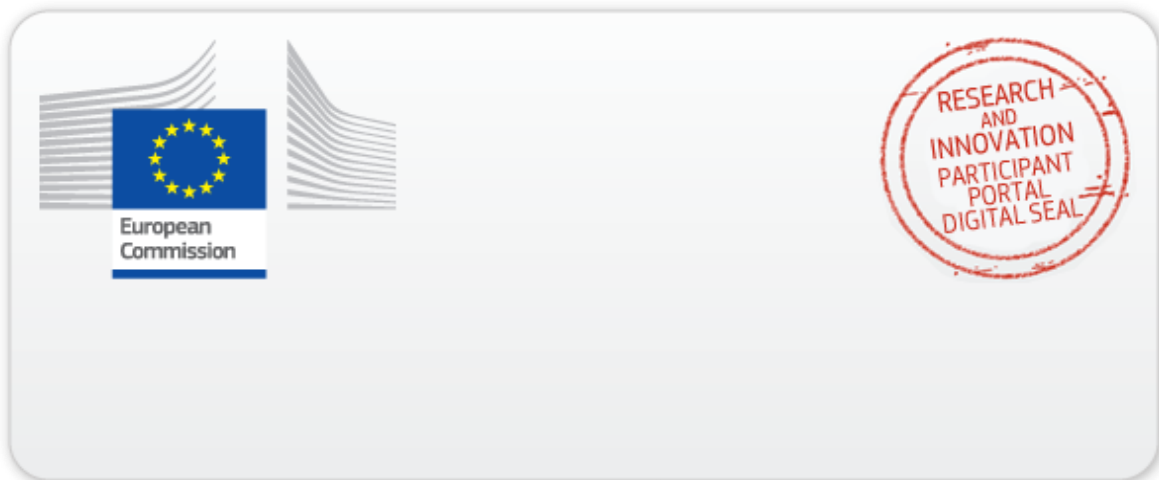
**[name and title of authorised representative]**

**[dd Month yyyy]**

**[dd Month yyyy]**

**<Signature of the [Beneficiary] [Linked Third Party]>**

**<Signature of the Auditor>**



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