LIFE Environment and Resource Efficiency

TECHNICAL APPLICATION FORMS

Part A – administrative information

LIFE 2017

FOR ADMINISTRATION USE ONLY

LIFE17 ENV/ES/000268

LIFE Environment and Resource Efficiency project application

Language of the proposal:

English (en)

Project title:

INTELLIGENT CITY AIR QUALITY MANAGEMENT TOOL FOR POLLUTION ABATEMENT WITH CIVIC PARTICIPATION

Project acronym:

LIFE-CAPACITy

The project will be implemented in the following Member State(s) and Region(s) or other countries:

Spain Cataluña

Expected start date: 01/07/2018 **Expected end date:** 30/06/2022

LIST OF BENEFICIARIES

Name of the **coordinating** beneficiary: Ajuntament de Terrassa

Name of the associated beneficiary:	Barcelona Supercomputing Center - Centro Nacional de Supercomputación
Name of the associated beneficiary:	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS
Name of the associated beneficiary:	MCV, SA
Name of the associated beneficiary:	Universitat Politècnica de Catalunya

LIST OF CO-FINANCERS

PROJECT BUDGET AND REQUESTED EU FUNDING

Total project budget:	3,751,551 Euro	
Total eligible project budget:	3,736,702 Euro	
EU financial contribution requested:	2,242,020 Euro	(= 60.00% of total eligible budget)

SECTOR

Air

Coordinating Beneficiary Profile Information					
Legal Name	Ajuntament de Terrassa				
Short Name	TERRASSA	**Legal Status**			
VAT No		**Public body**	X		
Legal Registration		**Private commercial**			
Registration Date		**Private non- commercial**			
Pic Number					
Legal entity is SME	☐				
Employee number					

Legal address of the Coordinating Beneficiary			
Street Name and No	c/Pantà, 20		
Post Code	08221	**PO Box**	
Town / City	Terrassa		
Member State	Spain		

Coordinating Beneficiary contact person information			
Title	Mr.	**Function**	Environmentall technician
Surname	Sales		
First Name	Pau		
E-mail address	pau.sales@terrassa.cat		
Department /	Environment and sustainability service		
Street Name and No	c/Pantà, 20		
Post Code	08221	**PO Box**	
Town / City	Terrassa		
Member State	Spain		
Telephone No	0034937397000	**Fax No**	

Website of the Coordinating Beneficiary	
Website	www.terrassa.cat/mediambient

Brief description of the Coordinating Beneficiary's activities and experience in the area of the

Terrassa city council is the local government of Terrassa. It is a Spanish city in the east central region of Catalonia, in the province of Barcelona, in the region of Vallès Occidental, of which it is the cocapital along with Sabadell. Terrassa is the fourth largest city populated in Catalonia, with 215.517 hab. (2014).
In the 19th century the city played an important role in the industrial revolution, specializing in woollen fabrics, and today there is a major Modernista legacy as a result of the city's importance at that time.
Terrassa has one of the most prominent industrial audiovisual production complexes of Southern Europe –Parc Audiovisual of Catalunya- that offers facilities, sets and a centre of media production (Audiovisual Living Lab and Terrassa Film Office). And contains the second University City of Catalonia. Terrassa University Campus offers 176 official qualifications which include Aeronautics, Cinema and Audiovisual, Telecommunications, Sound, Image, Photography and Multimedia. Some of them are unique in all the Catalonian University System.
Finally, Terrassa has transformed its textile past and has broken with the conventional knowledge (inertial), bidding for a new way on innovation generating, related to processes. That is looking for projects that provide transformation, particularly those which may influence beyond the local level, in national or global ones.
Terrassa exceeds limits of air pollution as European legislations marks concerning NO2. The aim is to reduce the levels of pollutants to the limits marked by WHO. In 2015, it was approved the last Plan to improve the Air Quality in Terrassa (PMQA 2015-2020), which aims to reduce air pollution. This plan, together with the Urban Mobility Plan (PMU), the Sustainable Energy Action Plan (PAES), and the Noise

Reduction Plan (PRS) creates synergies necessary to improve the welfare of citizen by improving air quality.

LIFE17 ENV/ - A3

COORDINATING BENEFICIARY DECLARATION

The undersigned hereby certifies that:

1. The specific actions listed in this proposal do not and will not receive aid from the European Structural and Investment Funds or other European Union funding programmes. In the event that any such funding will be made available after the submission of the proposal or during the implementation of the project, my organisation will immediately inform the Contracting Authority.

2. My organisation Ajuntament de Terrassa has not been served with bankruptcy orders, nor has it received a formal summons from creditors. My organisation is not in any of the situations listed in Articles 106(1) and 107 of Council Regulation 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 (OJ L298 of 26.10.2012).

3. My organisation (which is legally registered in the European Union) will contribute 590,440.00€ to the project. My organisation will participate in the implementation of the following actions: B1, B2, B4, B5, B6, C1, C2, D1, E1. The estimated total cost of my organisation's part in the implementation of the project is 1,476,099.00 €.

4. My organisation will conclude with the associated beneficiaries and co-financers any agreements necessary for the completion of the work, provided these do not infringe on their obligations, as stated in the grant agreement with the Contracting Authority. Such agreements will be based on the model proposed by the Contracting Authority. They will describe clearly the tasks to be performed by each associated beneficiary and define the financial arrangements.

5. I commit to comply with all relevant eligibility criteria, as defined in the LIFE Multiannual Work Programme 2014-2017 and the LIFE Call for Proposals including the LIFE Guidelines for Applicants.

I am legally authorised to sign this statement on behalf of my organisation.

I have read in full the Model LIFE Grant Agreement with Special and General Conditions and the Financial Guidelines (provided with the LIFE application files).

I certify to the best of my knowledge that the statements made in this proposal are true and the information provided is correct.

At Terrassa on 8th September 2017

Signature of the Coordinating Beneficiary:

Josep Latorre
Status/function of signatory:

* When this form is completed, please print, sign, scan and upload it in eProposal

ASSOCIATED BENEFICIARY PROFILE

Associated Beneficiary profile information					
Legal Name	Barcelona Supercomputing Center - Centro Nacional de Supercomputación				
Short Name	BSC		**Legal Status**		
VAT No	ESS0800099D		**Public body**	X	
Legal Registration			**Private commercial**		
Registration Date			**Private non- commercial**		
Pic Number					
Legal entity is SME	☐				
Employee number					

Legal address of Associated Beneficiary					
Street Name and No	Calle Jordi Girona 31			**PO Box**	
Post Code	08034	**Town/City**	Barcelona		
Member State or other Country	Spain				

Website of Associated Beneficiary	
Website	www.bsc.es

Brief description of the Associated Beneficiary's activities and experience in the area of the

The Barcelona Supercomputing Center (BSC) created in 2005, has the mission to research, develop and manage information technology in order to facilitate scientific progress. At the BSC, more than 350 people from 40 different countries perform and facilitate research into Computer Sciences, Life Sciences, Earth Sciences and Computational Applications in Science and Engineering. The BSC is one of the four hosting members of the European PRACE Research Infrastructure.

The BSC Earth Sciences Department (BSC-ES) conducts multi-facet research in Earth-system modeling. The department is organized around four closely interacting groups (Atmospheric Composition, Climate Prediction, Computational Earth Sciences, and Earth System Services) comprising ~50 employees, including scientific, technical, and support staff. The excellence of the department is illustrated by its high publication rate with more than 150 papers – several of very high impact – in the past 5 years (https://earth.bsc.es/wiki/doku.php?id=publications:publications). Research at BSC-ES focuses on atmospheric emissions, air quality, mineral dust transport, and global and regional climate modeling and prediction. BSC-ES has coordinated and participated in several FP7, H2020, and national projects (e.g. IS-ENES, APPRAISAL, FIELD_AC, PRACE 1IP, PRACE 2iP, Mont-Blanc, ScalaLife, OPTIMIS, PELE, RISC). Currently BSC-ES participates in 20 projects (1 EU-FP7, 7 EU-H2020, 7 EU-Other, 5 National).

The Atmospheric Composition Group within the BSC-ES has a wide experience in high-resolution atmospheric and chemistry modelling and leads an international effort on the development of a multi-scale chemical weather prediction model called the NMMB-MONARCH. The group operates the well-known CALIOPE forecast system (www.bsc.es/caliope), which delivers publicly air quality forecast products with high resolution (12 km for Europe, 4 km for Spain, 1 km for hot spot urban areas).

ASSOCIATED BENEFICIARY PROFILE

Associated Beneficiary profile information					
Legal Name	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS				
Short Name	CSIC		**Legal Status**		
VAT No	ESQ2818002D		**Public body**	**X**	
Legal Registration	173/2007		**Private commercial**		
Registration Date	21/12/2007		**Private non- commercial**		
Pic Number	999991722				
Legal entity is SME	☐				
Employee number					

Legal address of Associated Beneficiary					
Street Name and No	Serrano 117			**PO Box**	
Post Code	28006	**Town/City**	Madrid		
Member State or other Country	Spain				

Website of Associated Beneficiary	
Website	http://www.idaea.csic.es/egar/

Brief description of the Associated Beneficiary's activities and experience in the area of the

The Spanish National Research Council (CSIC, www.csic.es) is the largest public institution dedicated to research in Spain and the third largest in Europe, covering from basic research to advanced technological development. Its research is driven by its centres and institutes (more than 100), which are spread across all the autonomous regions, and its more than 15,000 staff, of whom more than 3,000 are staff researchers and the same number again are graduates and postgraduates. The Group of Environmental Geochemistry and Aerosol Research (EGAR, www.idaea.csic.es/egar) is specialist in atmospheric aerosol monitoring, sampling, characterization and source apportionment. These activities provide scientific knowledge on which assessment of air pollutant effects on different aspects of the environment, from human health to climate, can be based. The team operates several ground based stations in urban, rural and remote areas. The research team provides external expert support to Spanish environmental authorities and participates in the workgroup on particulate matter of the Clean Air For Europe (CAFE) program of the DG Environment for the evaluation of the EU air quality directives. We were included in the Scientific Assessing Committee of WHO REVIHAAP and WHO HRAPIE projects, as well as the APHEKOM and MEDHISS projects to assess on air quality to health related studies. We work on EC and UNECE experts groups to assess policy actions on air quality. The profile of the EGAR team is a perfect match for the proposal, as the team is expert in air air pollution monitoring, testing and developing improvement measures and validating urban scale modelling.

ASSOCIATED BENEFICIARY PROFILE

Associated Beneficiary profile information					
Legal Name	MCV, SA				
Short Name	MCV	**Legal Status**			
VAT No	ESA08795544		**Public body**		
Legal Registration			**Private commercial**	X	
Registration Date			**Private non- commercial**		
Pic Number					
Legal entity is SME	X				
Employee number					

Legal address of Associated Beneficiary					
Street Name and No	Autovia A-2 km, 575			**PO Box**	
Post Code	08293	**Town/City**	Collbató		
Member State or other Country	Spain				

Website of Associated Beneficiary	
Website	http://www.mcvsa.com/

Brief description of the Associated Beneficiary's activities and experience in the area of the

MCV is a company established for more than 30 years in order to design and develop instrumentation, equipment and systems related to the environment, especially in the areas of air quality control and meteorology. The main fields of activity of the company includes the design of equipments, management, control and monitoring systems, data acquisition systems, software and civil works.

MCV due to its experience and leadership in the environmental engineering field offers their clients the development of customise solutions according to their needs.

The facilities of the company allow us to face any kind of project as the construction of mobile units, monitoring stations for automatic networks, radars and meteorological towers, production of equipments for the sampling of gases and particles or data acquisition systems

MCV has the certifications for quality and environmental management systems ISO9001, ISO 14001 and EMAS.

Instrumentation:

MCV develops, manufactures and distributes equipment to measure and control the air quality as: PM10, PM2.5, PM1, TSP, VOC’s, SO2, NOx, O3, CO, BTX, HAP, H2S, PUF.

MCV carries out tasks of maintenance, repairmen, verification and calibration of the measurement instruments both on site or in the company features.

Network Management:

MCV designs, installs and manages air quality monitoring networks, including cabins, measurement instrumentation, remote station (permanent or mobile), meteorological towers and data acquisition systems. Network management is an integral service and it covers different tasks as the development of software applications to enable the tasks of data acquisition, management, validation and control of the information of each network.

ASSOCIATED BENEFICIARY PROFILE

Associated Beneficiary profile information					
Legal Name	Universitat Politècnica de Catalunya				
Short Name	UPC		**Legal Status**		
VAT No	ESQ0818003F		**Public body**	**X**	
Legal Registration			**Private commercial**		
Registration Date			**Private non- commercial**		
Pic Number					
Legal entity is SME	☐				
Employee number					

Legal address of Associated Beneficiary					
Street Name and No	c/ Jordi Girona, 1-3, B6 Building			**PO Box**	
Post Code	08034	**Town/City**	Barcelona		
Member State or other Country	Spain				

Website of Associated Beneficiary	
Website	http://inlab.fib.upc.edu/en

Brief description of the Associated Beneficiary's activities and experience in the area of the

UPC is a public university focused on higher education and research, specialized in the fields of engineering, architecture and science. inLab FIB UPC is an innovation and research lab of the Barcelona School of Informatics at UPC.

InLab FIB UPC specializes in Smart Mobility; Simulation, optimization, and modeling; Data Science & Big Data; Software Engineering; Mobile Solutions; Cybersecurity and ICT learning environments and services.

The ICT & Transports group at inLab FIB UPC has been involved in many projects in the field of smart mobility concerned mainly with the application of data analytics, optimization and simulation models to transportation problems.

The ICT & Transports group is composed by the transport and ICT researchers, of international reference in the use of information technology to improve transport's efficiency and sustainability, active management and information of cities' traffic, and citizens' mobility.

•New generation forecasting models for high quality traffic and travel information, short-term real-time predictions.
•Traffic data analysis: data filtering, completion and fusion, big data, interoperability, floating passenger data.
•New mobility concepts: ridesharing, demand-responsive transportation modes, connected cars.
•Multimodal journey planners, dynamic vehicle routing for fleets.
•Macro, meso and micro traffic simulation.

The most recent technology transfer activity has been focused on different projects, collaborating with SEAT and Volkswagen Research to validate, via simulation, new urban mobility concepts. These projects belong to the initiative CarNET, drove by the Càtedra SEAT of the UPC.

ASSOCIATED BENEFICIARY DECLARATION and MANDATE

I, the undersigned, Mateo Valero Cortés, representing, Barcelona Supercomputing Center - Centro Nacional de Supercomputación BSC, Public body, Calle Jordi Girona 31, Barcelona, 08034, Spain, VAT number ESS0800099D, hereinafter referred to as "the associated beneficiary", for the purposes of the signature and the implementation of the grant agreement INTELLIGENT CITY AIR QUALITY MANAGEMENT TOOL FOR POLLUTION ABATEMENT WITH CIVIC PARTICIPATION with the Contracting Authority (hereinafter referred to as "the grant agreement") hereby:

1. Mandate Ajuntament de Terrassa (TERRASSA), Public body, , c/Pantà, 20, Terrassa, 08221, Spain, VAT number , represented by ..José Antonio Latorre Baez....., (hereinafter referred to as "the coordinating beneficiary") to sign in my name and on my behalf the grant agreement and its possible subsequent amendments with the Contracting Authority.
2. Mandate the coordinating beneficiary to act on behalf of the associated beneficiary in compliance with the grant agreement.

I hereby confirm that the associated beneficiary accepts all terms and conditions of the grant agreement and, in particular, all provisions affecting the coordinating beneficiary and the associated beneficiaries. In particular, I acknowledge that, by virtue of this mandate, the coordinating beneficiary alone is entitled to receive funds from the Contracting Authority and distribute the amounts corresponding to the associated beneficiary"s participation in the action.

I hereby accept that the associated beneficiary will do everything in its power to help the coordinating beneficiary fulfil its obligations under the grant agreement, and in particular, to provide to the coordinating beneficiary, on its request, whatever documents or information may be required.

I hereby declare that the associated beneficiary agrees that the provisions of the grant agreement, including this mandate, shall take precedence over any other agreement between the associated beneficiary and the coordinating beneficiary which may have an effect on the implementation of the grant agreement.

I furthermore certify that:

1. The associated beneficiary has not been served with bankruptcy orders, nor has it received a formal summons from creditors. My organisation is not in any of the situations listed in Articles 106(1) and 107 of Council Regulation 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 (OJ L298 of 26.10.2012).
2. The associated beneficiary will contribute 276,373 € to the project. My organisation will participate in the implementation of the following actions: B2, B3, B4, B6, C1, C2, D1, E1. The estimated total cost of my organisation's part in the implementation of the project is 690,932 €.
3. The associated beneficiary will conclude with the coordinating beneficiary an agreement necessary for the completion of the work, provided this does not infringe on our obligations, as stated in the grant agreement with the Contracting Authority. This agreement will be based on the model proposed by the Contracting Authority. It will describe clearly the tasks to be performed by my organisation and define the financial arrangements.

4. I commit to comply with all relevant eligibility criteria, as defined in the LIFE Multiannual Work Programme 2014-2017 and the LIFE Call for Proposals including the LIFE Guidelines for Applicants.

This declaration and mandate shall be annexed to the grant agreement and shall form an integral part thereof.
I am legally authorised to sign this statement on behalf of my organisation. I have read in full the Model LIFE Grant Agreement with Special and General Conditions and the Financial Guidelines (provided with the LIFE application files). I certify to the best of my knowledge that the statements made in this proposal are true and the information provided is correct.

At ..Barcelona..... on ..28/08/2017.....

Signature of the Associated Beneficiary:

Mateo Valero Cortés
Status/function of signatory: BSC Director

1. When the form is completed, please print, sign, scan and upload it in eProposal

Barcelona Supercomputing Center
Centro Nacional de Supercomputación
Mateo Valero
Director

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

ASSOCIATED BENEFICIARY DECLARATION and MANDATE

I, the undersigned, Cristina de la Puente, representing, AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS CSIC, Public body, 173/2007, Serrano 117, Madrid, 28006, Spain, VAT number ESQ2818002D, hereinafter referred to as "the associated beneficiary", for the purposes of the signature and the implementation of the grant agreement INTELLIGENT CITY AIR QUALITY MANAGEMENT TOOL FOR POLLUTION ABATEMENT WITH CIVIC PARTICIPATION with the Contracting Authority (hereinafter referred to as "the grant agreement") hereby:

1. Mandate Ajuntament de Terrassa (TERRASSA), Public body, , c/Pantà, 20, Terrassa, 08221, Spain, VAT number , represented by .....José Antonio Latorre Raez....., (hereinafter referred to as "the coordinating beneficiary") to sign in my name and on my behalf the grant agreement and its possible subsequent amendments with the Contracting Authority.
2. Mandate the coordinating beneficiary to act on behalf of the associated beneficiary in compliance with the grant agreement.

I hereby confirm that the associated beneficiary accepts all terms and conditions of the grant agreement and, in particular, all provisions affecting the coordinating beneficiary and the associated beneficiaries. In particular, I acknowledge that, by virtue of this mandate, the coordinating beneficiary alone is entitled to receive funds from the Contracting Authority and distribute the amounts corresponding to the associated beneficiary''s participation in the action.

I hereby accept that the associated beneficiary will do everything in its power to help the coordinating beneficiary fulfil its obligations under the grant agreement, and in particular, to provide to the coordinating beneficiary, on its request, whatever documents or information may be required.

I hereby declare that the associated beneficiary agrees that the provisions of the grant agreement, including this mandate, shall take precedence over any other agreement between the associated beneficiary and the coordinating beneficiary which may have an effect on the implementation of the grant agreement.

I furthermore certify that:

1. The associated beneficiary has not been served with bankruptcy orders, nor has it received a formal summons from creditors. My organisation is not in any of the situations listed in Articles 106(1) and 107 of Council Regulation 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 (OJ L298 of 26.10.2012).
2. The associated beneficiary will contribute 401,463 € to the project. My organisation will participate in the implementation of the following actions: B1, B4, B5, B6, C1, C2, D1, E1. The estimated total cost of my organisation's part in the implementation of the project is 981,385 €.
3. The associated beneficiary will conclude with the coordinating beneficiary an agreement necessary for the completion of the work, provided this does not infringe on our obligations, as stated in the grant agreement with the Contracting Authority. This agreement will be based on the model proposed by the Contracting Authority. It will describe clearly the tasks to be performed by my organisation and define the financial arrangements.

4. I commit to comply with all relevant eligibility criteria, as defined in the LIFE Multiannual Work Programme 2014-2017 and the LIFE Call for Proposals including the LIFE Guidelines for Applicants.

This declaration and mandate shall be annexed to the grant agreement and shall form an integral part thereof.
I am legally authorised to sign this statement on behalf of my organisation. I have read in full the Model LIFE Grant Agreement with Special and General Conditions and the Financial Guidelines (provided with the LIFE application files). I certify to the best of my knowledge that the statements made in this proposal are true and the information provided is correct.

At MADRID on - 7 SET. 2017

Signature of the Associated Beneficiary:

Cristina de la Puente
Status/function of signatory: Vice-President for Scientific and Technical Research
By the President P.D (Resolution 20-04-2017, Spanish Official Journal 28-04-2017)

1. When the form is completed, please print, sign, scan and upload it in eProposal

LIFE17 ENV/ - A4

ASSOCIATED BENEFICIARY DECLARATION and MANDATE

I, the undersigned, Josep Maria Martínez Trepat, representing, MCV, SA MCV, Private commercial, , Autovia A-2 km, 575, Collbató, 08293, Spain, VAT number ESA08795544, hereinafter referred to as "the associated beneficiary", for the purposes of the signature and the implementation of the grant agreement INTELLIGENT CITY AIR QUALITY MANAGEMENT TOOL FOR POLLUTION ABATEMENT WITH CIVIC PARTICIPATION with the Contracting Authority (hereinafter referred to as "the grant agreement") hereby:

1. Mandate Ajuntament de Terrassa (TERRASSA), Public body, , c/Pantà, 20, Terrassa, 08221, Spain, VAT number , represented by ....., (hereinafter referred to as "the coordinating beneficiary") to sign in my name and on my behalf the grant agreement and its possible subsequent amendments with the Contracting Authority.
2. Mandate the coordinating beneficiary to act on behalf of the associated beneficiary in compliance with the grant agreement.

I hereby confirm that the associated beneficiary accepts all terms and conditions of the grant agreement and, in particular, all provisions affecting the coordinating beneficiary and the associated beneficiaries. In particular, I acknowledge that, by virtue of this mandate, the coordinating beneficiary alone is entitled to receive funds from the Contracting Authority and distribute the amounts corresponding to the associated beneficiary''s participation in the action.

I hereby accept that the associated beneficiary will do everything in its power to help the coordinating beneficiary fulfil its obligations under the grant agreement, and in particular, to provide to the coordinating beneficiary, on its request, whatever documents or information may be required.

I hereby declare that the associated beneficiary agrees that the provisions of the grant agreement, including this mandate, shall take precedence over any other agreement between the associated beneficiary and the coordinating beneficiary which may have an effect on the implementation of the grant agreement.

I furthermore certify that:

1. The associated beneficiary has not been served with bankruptcy orders, nor has it received a formal summons from creditors. My organisation is not in any of the situations listed in Articles 106(1) and 107 of Council Regulation 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 (OJ L298 of 26.10.2012).
2. The associated beneficiary will contribute 80,039 € to the project. My organisation will participate in the implementation of the following actions: B1, B5, C1, C2, D1, E1. The estimated total cost of my organisation's part in the implementation of the project is 200,097 €.
3. The associated beneficiary will conclude with the coordinating beneficiary an agreement necessary for the completion of the work, provided this does not infringe on our obligations, as stated in the grant agreement with the Contracting Authority. This agreement will be based on the model proposed by the Contracting Authority. It will describe clearly the tasks to be performed by my organisation and define the financial arrangements.

4. I commit to comply with all relevant eligibility criteria, as defined in the LIFE Multiannual Work Programme 2014-2017 and the LIFE Call for Proposals including the LIFE Guidelines for Applicants.

This declaration and mandate shall be annexed to the grant agreement and shall form an integral part thereof.
I am legally authorised to sign this statement on behalf of my organisation. I have read in full the Model LIFE Grant Agreement with Special and General Conditions and the Financial Guidelines (provided with the LIFE application files). I certify to the best of my knowledge that the statements made in this proposal are true and the information provided is correct.

At COLLBATÓ on 12/09/17

Signature of the Associated Beneficiary:

MCV, S.A.
CTRA. N-II, KM. 575
CAMÍ DE "CAN DOLCET"
08293 COLLBATÓ
BARCELONA
Tel. 93 777 05 00 - 76
Fax 93 777 05 50

Josep Maria Martínez Trepat
Status/function of signatory: PROJECT MANAGER

1. When the form is completed, please print, sign, scan and upload it in eProposal

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ASSOCIATED BENEFICIARY DECLARATION and MANDATE

I, the undersigned, Miquel Soriano Ibánez, representing, Universitat Politècnica de Catalunya UPC, Public body, , c/ Jordi Girona, 1-3, B6 Building, Barcelona, 08034, Spain, VAT number ESQ0818003F, hereinafter referred to as "the associated beneficiary", for the purposes of the signature and the implementation of the grant agreement INTELLIGENT CITY AIR QUALITY MANAGEMENT TOOL FOR POLLUTION ABATEMENT WITH CIVIC PARTICIPATION with the Contracting Authority (hereinafter referred to as "the grant agreement") hereby:

1. Mandate Ajuntament de Terrassa (TERRASSA), Public body, , c/Pantà, 20, Terrassa, 08221, Spain, VAT number , represented by ....., (hereinafter referred to as "the coordinating beneficiary") to sign in my name and on my behalf the grant agreement and its possible subsequent amendments with the Contracting Authority.
2. Mandate the coordinating beneficiary to act on behalf of the associated beneficiary in compliance with the grant agreement.

I hereby confirm that the associated beneficiary accepts all terms and conditions of the grant agreement and, in particular, all provisions affecting the coordinating beneficiary and the associated beneficiaries. In particular, I acknowledge that, by virtue of this mandate, the coordinating beneficiary alone is entitled to receive funds from the Contracting Authority and distribute the amounts corresponding to the associated beneficiary''s participation in the action.

I hereby accept that the associated beneficiary will do everything in its power to help the coordinating beneficiary fulfil its obligations under the grant agreement, and in particular, to provide to the coordinating beneficiary, on its request, whatever documents or information may be required.

I hereby declare that the associated beneficiary agrees that the provisions of the grant agreement, including this mandate, shall take precedence over any other agreement between the associated beneficiary and the coordinating beneficiary which may have an effect on the implementation of the grant agreement.

I furthermore certify that:

1. The associated beneficiary has not been served with bankruptcy orders, nor has it received a formal summons from creditors. My organisation is not in any of the situations listed in Articles 106(1) and 107 of Council Regulation 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 (OJ L298 of 26.10.2012).
2. The associated beneficiary will contribute 161,216 € to the project. My organisation will participate in the implementation of the following actions: B2, B3, B4, B6, C1, C2, D1, E1. The estimated total cost of my organisation's part in the implementation of the project is 403,038 €.
3. The associated beneficiary will conclude with the coordinating beneficiary an agreement necessary for the completion of the work, provided this does not infringe on our obligations, as stated in the grant agreement with the Contracting Authority. This agreement will be based on the model proposed by the Contracting Authority. It will describe clearly the tasks to be performed by my organisation and define the financial arrangements.

4. I commit to comply with all relevant eligibility criteria, as defined in the LIFE Multiannual Work Programme 2014-2017 and the LIFE Call for Proposals including the LIFE Guidelines for Applicants.

This declaration and mandate shall be annexed to the grant agreement and shall form an integral part thereof.
I am legally authorised to sign this statement on behalf of my organisation. I have read in full the Model LIFE Grant Agreement with Special and General Conditions and the Financial Guidelines (provided with the LIFE application files). I certify to the best of my knowledge that the statements made in this proposal are true and the information provided is correct.

At Barcelona on 6th September 2017

Signature of the Associated Beneficiary:

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Miquel Soriano Ibánez
Status/function of signatory: Vice-rector for Teaching and Research Staff

Acting rector (Art. 72 of the UPC Statutes published in the Official Gazette of the Catalan Government of 1 June 2012)

1. When the form is completed, please print, sign, scan and upload it in eProposal

OTHER PROPOSALS SUBMITTED FOR EUROPEAN UNION FUNDING

Please answer each of the following questions:

- Have you or any of your associated beneficiaries already benefited from previous LIFE cofinancing? (please cite LIFE project reference number, title, year, amount of the co-financing, duration, name(s) of coordinating beneficiary and/or partners involved):

TERRASSA

Terrassa has not been benefited from previous LIFE co-financing.

CSIC

The group of Environmental Geochemistry and Aerosol Research has the following approved LIFE actions:

AIRUSE (LIFE11 ENV/ES/000584)

Duration: 01-OCT-2012 to 30-SEP -2016

Total budget: 2,368,719.00 €

EU contribution: 1,138,861.00 €

Coordinator: CSIC

Partners:N.C.S.R. Demokritos, University of Aveiro,Universita di Firenze, Asociación de Investigación de las Industrias Cerámicas, University of Birmingham

UPC

The UPC department inLAB FIB has not been benefited from previous LIFE co-financing

BSC

The BSC Earth Science Department has not been benefited from previous LIFE co-financing.

- Have you or any of the associated beneficiaries submitted any actions related directly or indirectly to this project to other European Union funding programmes? To whom? When and with what results?

None of the associated beneficiaries have submitted any action to other European Union Financial Instruments.

- For those actions which fall within the eligibility criteria for financing through other European Union funding programmes, **please explain in full detail** why you consider that those actions are better suited to financing through LIFE and are therefore included in the current project:

The actions proposed in this project could not be included in any other financial instrument, either national or European Commission, because of the project and participants special nature as it will be explained bellow.

CDTI (Centro para el Desarrollo Tecnológico Industrial), Spanish Centre for Industrial Technology Development, provides funding for R & D projects developed by companies. The present project contains innovation and demonstration activities and therefore, no R&D activities are envisaged in this proposal, making it not eligible for CDTI.

The **European Social Fund** promotes employment opportunities and professional and geographic mobility to workers and facilitates their adaptation to changes on industry and production systems, especially through training and retraining opportunities. Therefore, present project’s objectives do not

fit these requirements.

Cohesion Fund is a financial instrument for developing regions; however, Cataluña do not meet this condition.

In addition, Horizon2020 supports mainly R&D activities and this action is a demonstrative project. Furthermore, eligibility criteria for Horizon 2020 in a general basis indicate that only cooperative projects with at least three participants for three different projects are eligible. In the case of SME Instrument of Horizon 2020, this action also couldn´t be submitted in this call due to the beneficiary is not an SME.

- Has this proposal been submitted before? Yes ☐ No ☒

LIFE17 ENV/ES/000268

TECHNICAL APPLICATION FORMS

Part B - technical summary and overall context of the project

SUMMARY DESCRIPTION OF THE PROJECT (Max. 3 pages; to be completed in English)

Project title:

INTELLIGENT CITY AIR QUALITY MANAGEMENT TOOL FOR POLLUTION ABATEMENT WITH CIVIC PARTICIPATION

Project objectives:

Air quality is a current problem not only for big cities but also for small and medium European urban centers. The European Directive 2008/50/EC of 21 May 2008 on air quality and a cleaner atmosphere in Europe, envisages the development of plans and programs aimed at reducing the limit values of pollutants present in urban agglomerations.

The overall goal of the LIFE-CAPACITy project is **to increase air quality in European urban areas through an integral policy management approach for local administrators based on:**

-An intelligent **air quality modelling tool** for the assessment of air quality measures.

-An active citizen participation model to promote social consciousness and engagement.

LIFE-CAPACITy system will be able to provide reliable quantitative information for pollution abatement embedded in citizen participation model. This new approach will be implemented and validated in the municipality of Terrassa (Spain).

The success of LIFE-CAPACITy project will provide the city of Terrassa with a new management approach for the implementation of innovative mobility measures with the aim of setting the pollutants level below the limits marked by the World Health Organization (WHO) and European legislation.

The fulfilment of the main goal is subject to the accomplishment of the following specific objectives:

-To test and demonstrate a reduction of the most important air pollutants coming from road traffic in Terrassa:

-PM_{10}: 13%: 2,70 t/year/ PM_{10}

-NOx 12%: 67,37 t/year/NOx

-To achieve the active participation of at least 10.000 citizens in the air quality data monitoring and management decision making.

-To identify the most suitable areas where actions on air quality should be implemented so as to increase environmental impact and social acceptance and engagement.

-To deploy four environmental policies oriented to improve the air quality of the city of Terrassa.

-To enable the subsequent European scale replication and transfer to other European cities.

-To build the appropriate channels and conduct comprehensive actions to generate traction and awareness in the key stakeholders..

-To replicate in 20 hot spots in Europe, mostly middle-urban areas.

-To reduce health problems caused by air quality in urban areas.

-To improve the quality and availability of data and statistics of urban air quality in Europe for decision-making at local, regional, national and EU level.

-To increase the citizen participation in environmental decision making processes in European cities.

Actions and means involved:

B1. Air quality assessment. The operational tasks within this action involve air quality

measurements withfixed and mobile measurements to obtain spatial variability. Additionally, local citizens will be requested to participate in the measurement campaigns for obtaining air quality data. The information obtained by this air quality monitoring network will be the key input to feed the modelling tools, the evaluation and the citizen involvement and awareness tasks.

B2. Implementation of the LIFE-CAPACITy monitoring and forecasting tool. The general objective of this action is the adaptation and calibration of a modelling tool to monitor and forecast air quality in Terrassa based on both urban road traffic parameters and traffic emissions.

B3. Modelling tool evaluation and set-up for forecasting mode. This phase involves the adjustment and calibration of the tool using as inputs the results of the reference measurements taken in B1 and during the implementation of the new mobility measures in B5. Therefore, the resulting set-up of the modelling tool will be deployed in forecast mode to provide 48h predictions of NO_2 and PM_{10}.

B4. Definition of sustainable mobility strategies with active citizen participation. The aim is to achieve a quality democratic process pursuing the active involvement of citizens in the management of public affairs and decision making related to air quality.

B5. Implementation and evaluation of sustainable mobility strategies. Four mobility strategies will be implemented and experimentally evaluated. It is worth mentioning that the implementation of these measures will be defined according to the citizen inputs obtained on B4.

B6 Replicability and Transferability action This action is focused on developing the best strategy to replicate and transfer the project results during and after its implementation.

C1-C2 Monitoring of the impact of the project actions. Based on the evaluation of B4, monitoring will have a twofold approach: environmental benefits and socioeconomic impact of the project.

D1 Dissemination planning and execution.

E.1 Overall project management.

The project will be developed by a well-formed consortium .It must be noted that the action plan includes a buffer time of extra 6 months so as to deal with unforeseen delays that could arise during the project development (1/7/18-1/7/22).

Expected results (outputs and quantified achievements):

LIFE-CAPACITy project focuses on the reduction of air pollutant concentrations caused by road traffic. In this line, the project will prove how an intelligent management tool, capable of performing air quality forecasting, and a civic participation model can help European cities to follow a viable transformation path towards zero emission scenarios. This is a challenging target as reaching significant emission reduction will require a new technical (accurate real-time monitoring and reliable forecast) and procedural (new decision making strategies involving active citizen participation) approach.

The expected results are:

1. Real time air quality monitoring network to register observed values by using mobile and fixed sensors, and using citizen participation.

2. A protocol for engaging citizens in the air quality measurements campaigns.

3. Urban-scale modelling tool to assess and forecast the air quality of the city. The system will integrate meteorology, emission and air quality information to provide 48h forecasts (it is important to be able to inform people with this time in advance) of NO_2 and PM_{10} at street level.

4. A new democratic decision-making procedure for air quality plans.

5. Quantification and assessment of the impact of a set of pollution abatement measurements implemented in Terrassa. In this regard, the following measures will be applied:

a. To identify protected-atmosphere urban areas (ZUAP) and reduce the density of traffic in these areas.

b. To improve the public bus network and to improve the fleet

c. To redesign some streets by reducing a lane of circulation by expanding sidewalks. These measures seek to hinder traffic circulation, encouraging indirectly citizens to reach those areas on foot rather than by private car.

d.To encourage alternative non-motorised modes of transport in urban areas:

- Promoting bicycle use.
- Establishing bicycle itineraries in the municipality, preferably not on pavements.

6. An analysis of the advantages and socio-economic benefits of the new civic-participation methodology and forecasting tool.

7. Validated Replication Plan.

8. A methodology framework at European Scale.

Is your project significantly climate-related? Yes ☐ No ☒

Is your project significantly biodiversity-related? Yes ☐ No ☒

The proposal addresses the following project topic(s):

- Projects implementing integrated and comprehensive policies for sustainable urban planning and design through innovative approaches regarding urban public transport and mobility, sustainable buildings, energy efficiency or urban biodiversity conservation

Reasons why the proposal falls under the selected project topic(s):

The identified project topic is urban environment, specifically: *Projects implementing integrated and comprehensive policies for sustainable urban planning and design through innovative approaches regarding urban public transport and mobility, sustainable buildings, energy efficiency or urban biodiversity conservation.*

In this sense, LIFE-CAPACITy aims **to ensure better air quality and public awareness in urban areas through an innovative decision making approach, supporting local administrators to create effective air quality strategies**.

This project is aligned with this priority because it will contribute to improve the following key points regarding the implementation of air quality plans and sustainable mobility measures in urban areas:

-Technical accuracy: To improve air quality in urban areas, local administrations need to use decision-making tools that perform objective analysis. In this line, LIFE-CAPACITy will demonstrate the accuracy and effectiveness of the developed tool, which will provide the following benefits:

-Modelling sustainable mobility policies impact on air quality.

-Air quality forecasting capabilities so as to allow the local authorities to foresee days with air pollutants exceedances.

-Social acceptance and participation: Involving citizens in urban planning helps to ensure sustainable and successful results regarding the measures to be taken. LIFE-CAPACITy project will promote social consciousness and engagement in air quality decision-making. To that purpose, this project will create an active participation model supported by workshops, an environmental informers team and a digital platform; thus, allowing:

-To assess public perception about air pollution in different districts.

-To train citizens about air pollution in order to increase critical thinking.

-Transparency sharing air quality related information.

-Public participation in environmental decision-making.

ENVIRONMENTAL PROBLEM TARGETED

Air quality is an EU major concern as the human toll for its poor quality is worse than for road traffic accidents, making it the first environmental cause of premature death in the EU. As a matter of fact, every year more than 400.000 people in the EU die prematurely due to the consequences of air pollution. Another 6.5 million people fall sick as air pollution causes diseases such as strokes, asthma and bronchitis. Air pollution also harms the natural environment, impacting both vegetation and wildlife: almost two-thirds of Europe's ecosystems are threatened by the effects of air pollution. The economic cost related only to health issues is significant, being estimated at €330-940 billion (3-9% of EU GDP). In short, air pollution is not only unhealthy but also expensive.

Air quality not only has an overwhelming impact on health but also has socio-economic derivatives, that is, air pollution causes lost working days, and high healthcare costs, with vulnerable groups such as children, asthmatics and the elderly the worst affected; it also causes damages to the environment, affecting the quality of fresh water, soil, and ecosystems as a result of nitrogen pollution (eutrophication) and acid rain. Additionally, air pollution can cause damages to materials and buildings, and some of these air pollutants may affect climate change due to their greenhouse gas-like behavior. In this sense, the society is bearing the costs related to air pollution (including damage to crops and buildings) which are quantified in €23 billion per year.

Essentially, air pollution is the result of economic activities such as industry, transport, energy and agriculture, along with some domestic household activities like heating. The major pollutants in the air are listed in Table 1.

Pollutants are typically concentrated in large urban areas where the main industrial activities take place. The EU is densely populated, and over 70 % of its citizens live in urban and peri-urban areas. As a result, air pollution becomes a major concern in these urban areas, where according to the European Environment Agency (EEA), more than 80 % of the EU's urban population is exposed to PM levels above the 2005 WHO Air Quality Guidelines (see Figure 1), which is estimated to shorten more than eight months of life on average, reaching up to two years reduction in life expectancy in the most polluted places. In this line, and according to the Organisation for Economic Co-operation and Development (OECD), should these trends do not change by 2050 urban air pollution will become the primary cause of mortality worldwide. For illustrative purposes, in Figure 2 and 3 it is shown a European map displaying the degree of exposure to PM_{10} and NO_2 pollutants.

Among the different sources of pollutants in urban areas, the transport sector is the largest contributor to NOx emissions, resulting in 46 % of total EU-28 emissions in 2014. Despite of all the efforts made introducing policies such as the vehicle emissions standards (European standards), NOx emissions from road transport have not been reduced as much as expected. In addition, transport is also a significant source of greenhouse gases which increased as much as 13 % in the EU-28 between 1990 and 2014. Moreover, transport contributed to 13 % and 15 % of total PM_{10} and $PM_{2.5}$ primary emissions, respectively, in the EU-28 in 2014.

In this context, the European Parlament and the Council of the European Union set the seventh Environment Action Programme (EAP) to 2020: Living well, within the limits of our planet. In order to enhance the sustainability of Union cities, the 7^{th} EAP shall ensure that by 2020 the majority of cities must implement policies for sustainable urban planning and design. These policies include innovative approaches for urban public transport and mobility, sustainable buildings, energy efficiency and urban biodiversity conservation.

Large efforts have been made in EU-28 for improving air quality by reducing air pollutants; for instance, the European Commission set the European Air Quality Directive 2008/50/EC (AQD) in 2008, whose main aim is to improve the implementation of air quality policies by EU member states. However, major efforts are still required to meet the current WHO guidelines, and in many cities, even the legally binding limit values from the EU air quality legislation. This situation is in part due to a complex scenario driven by the following facts:

-Large emission reductions are attained for pollutants arising from industrial sites, power generation, public transport, or even private cars in the case of PM, among others; but not so much for most pollutants arising from exhaust (NOx) and non-exhaust vehicle emissions.

-There is a scientific consensus that in most large urban areas a decrease of the number of circulating vehicles is required (of course complemented by technological and other non-technological measures) to attain air quality standards. This goal requires changes on the urban mobility habits, which are always delicate form the local policy point of view.

-The changes of mobility habits required in most cities to attain WHO air quality guidelines require intensive information for citizens and this is enhanced when appropriate citizen involvement in the policy decisions is reached; and this is a difficult task.

-Urban scale tools showing with high scale (high detail) the time and spatial intra-urban pollution variability, as well as the external (extra-urban, regional, and transboundary inputs of pollution) are required for the diagnosis and selection of cost-effective air quality measures, as well as for forecasting air pollution episodes.

-Modelling tools at urban scale are complex due to the high spatial resolution of the meteorological, and specially, emission data, they usually do not include extra-urban contributions of pollutants (out of collecting boundary conditions), that are mostly supplied by regional scale models (and then source apportionment data for the diagnosis is not adequate), neither have enough spatially resolved measurement data to validate (and correct) real time modelling outputs.

Taking into account the aforementioned points, it is plain that modelling/simulation tools are mandatory in order to assess policies and their expected outcomes before their implementation. In this line, LIFEOPERA project had as a goal to define and implement a methodology in a software tool (RIAT+), to support regional/local authorities in the definition, application and evaluation of air quality plans policies, devoted to the reduction of population exposure to PM_{10}, $PM_{2.5}$, NO_2 and O_3. In the present LIFE-CAPACITy proposal, the aim is not only to provide a modelling tool for policy evaluation purposes, but also to incorporate predictive capabilities to allow air quality forecasts for the next 24/48h at very high spatial (10m) and temporal (1h) resolution for the city of Terrassa.

Common links could be found within other energy and environmental projects reported in Table 2. But so far no project has addressed the problem as LIFE-CAPACITy does.

Therefore, the main objective of LIFE-CAPACITy project is to provide the local authorities of Terrassa with a twofold capacity tool: on the one hand, impact assessment on the city's air quality by modelling and simulating different environmental policies; and on the other hand, air quality forecast based on a mesoscale forecasting system coupled with an urban-scale dispersion model. The predictive capabilities will allow the local authorities to foresee days with exceeding air pollutants and act accordingly. The new intelligent tool will be based on reference air quality measurements, smart state-of-the-art measurements of both air quality and urban road traffic parameters, coupled with two state-of-the-art and high resolution urban (10 m) and regional (1 km) air quality models. The participation/involvement of citizens will be key during both the development and operation of the tool, through one citizens-empowerment scientific measurement campaign and a citizens consultation during the last stage where one urban-scale air quality measure will be tested, validated with the model, and subject to public consultation for permanent application.

PROJECT PILOT / DEMONSTRATION CHARACTER OF THE PROJECT

The project involves the deployment of several environmental policies oriented to improve the air quality of the city of Terrassa. These measures are gathered in the Air Quality Improvement Plan developed by Terrassa's City Council, where it has been also identified the specific contribution of transport (public and private) to global emissions as can be observed in Table 3, Figure 4 and Figure 5.

The methodology applied in CAPACITy's project will serve to validate a twofold capacity tool: on the one hand, impact assessment on the city's air quality by modelling and simulating different environmental policies; and on the other hand, air quality forecast based on a mesoscale forecasting system coupled with an urban-scale dispersion model.

To the best of the authors' knowledge, there is no reference to projects dealing with **air quality forecasting at such high resolution (at street scale) combining very detailed traffic input data**. Moreover, another innovative aspect of the project is the incorporation, from the beginning, **of the social aspect through the citizen participation, as a main key inside a scientific project**. Therefore, the present project will apply a method that has not been tested before, offering potential environmental advantages; thus, and according LIFE requirements, this projects fits into the pilot projects category.

Before the execution of the present project, several work has been done by the members of the consortium regarding air quality diagnosis and forecast. For instance, the BSC developed and maintains the CALIOPE air quality system. This tool performs air quality forecast, providing real-time predictions for Europe, Spain, and some hot-spot regions of Spain at high spatial (up to 1x1 km^2) and temporal (1h) resolution. The air quality impacts are predicted using a state-of-the-art air quality model. The meteorological conditions for the photochemistry are generated by a high-resolution mesoscale meteorological model whereas the BSC in-house emission model (HERMES) provides the natural and anthropogenic emissions for the chemistry model. The system is complemented with a model that integrates mineral dust dynamics in the total PM. The system is comprehensively evaluated with near-real time observations from air quality stations. Those air quality observations are used at the same time to apply bias-correction techniques to adjust model simulations for the forthcoming 24 and 48 hours for the main air quality indicators described in the air quality Directive (2008/50/EC) and WHO guidelines. It must be raised that CALIOPE is a consolidated tool, as evidenced by the fact that, in recent air pollution episodes, the system has been used by different Spanish media such as Antena3, TVE and La Sexta in order to predict the NO_2 levels and its duration.

The technical feasibility of the present project is evidenced by the current success of the CALIOPE system. It must be raised that, in the specific case of this project, CALIOPE will be adjusted to the particularities of the city of Terrassa and **will be coupled with an urban-scale dispersion model with the aim of obtaining an air quality tool that integrates the different modelling scales (regional and urban)**. Altogether, the present project's outcome will result in a powerful tool capable of performing air quality diagnosis and forecasting, together with prior-to-deployment assessments of environmental policies.

LIFE-CAPACITy proposes a comprehensive way of assessing environmental policies by modelling the street traffic emissions and its impact on the air quality; thus, allowing the local authorities to ponder which measure will provide the best scenario with a high spatial (10 m) and temporal (1h) resolution. In order to achieve this ambitious goal, two main technical sub-goals must be accomplished.

On the one hand, **development and integration of an accurate microscopic traffic model and street scale emission models** will be particularly relevant and innovative (figure 6). A real circulation vehicle fleet distribution profile for the city of Terrassa must be obtained. This will be done by setting up traffic cameras with automatic plate recognition capabilities. Additionally, a calibrated microscopic traffic simulation model will be developed. This model will be fed with the Terrassa's traffic particularities (road network, traffic lights, etc.), real data collected from different sources and the data provided by the automatic plate recognition. Furthermore, the model will be specifically developed to allow adjustments coming from the mobility policies to be evaluated. Altogether, and taking into account the emission factors per vehicle category, will support the development of the street scale traffic emissions model, which will be able to estimate hourly traffic emissions.

On the other hand, **the mesoscale air quality forecasting system (CALIOPE) will be adapted and implemented for Terrassa, which will include the street scale traffic emission tool as well as other anthropogenic (i.e. industry, energy, etc.) and natural sources (figure 7)**. Besides, a near-road source urban dispersion model (R-Line) will be implemented and adapted to Terrassa's urban geometry in order to provide air quality estimations at street level (10m). Therefore, **by coupling the mesoscale forecasting system and the urban-scale dispersion model, it will be developed an integrated urban air quality modelling tool able to estimate hourly concentration at street level for the following pollutants: NO_2 and PM_{10}.**

The proposed solution aims to undertake the ambitious task of going a step beyond with regard to the implementation of pollutants abatement policies. The LIFE-CAPACITy tool will not only perform actual diagnosis of air quality and forecasting, but will allow the impact assessment of different policies. Thus, this simulation and forecasting will boost the efficiency of the process by means of providing the information required to select for its deployment the most relevant measures in terms of performance. Indeed, this efficiency improvement will lead to economic saves, as there will no longer be required to deploy different measures to check their performance; in addition, there will also be an impact on the air quality by means of a faster deployment of the best policy, suppressing trial and error practices. Moreover, LIFE-CAPACITy will make possible to tackle situations that currently are of great complexity. For instance, should a particular day with high pollutants be forecasted 48h away, different measures can be automatically simulated in order to deploy the most suitable in advance.

Therefore, the accomplishment of LIFE-CAPACITy project will yield not only a powerful tool for air quality diagnosis and forecast, and prior-to-deployment assessment of environmental policies, but solid

evidences of its effectiveness by the implementation and evaluation of four different policies in the city of Terrassa. These policies implementation serves to different purposes and among them it must be underlined the tool validation for its continuous usage after the project's ending.

The benefits of the project's accomplishment are beyond a doubt: pollutants will be reduced impacting on environment; efficiency of policies deployment will be increased impacting on economy; as the air quality will be improved, social and health issues will be tackled**; and, by involving the citizens in the process, social concern will be effectively treated.** Although the present project will be specific for Terrassa, the methodology developed is equally valid for any other European city. In order to provide a scalable and replicable solution, the inputs and adjustments required to transfer LIFE-CAPACITy to other cities will be properly identified (such as geometry, traffic particularities, etc.).

The execution of LIFE-CAPACITy project will inevitably involve fieldwork by means of spreading sensors, itinerant measurements, measures implementation, etc. In this regard, the Terrassa City Council has already approved an urbanistic plan that guarantees the absence of obstacles along the project's realization. Yet, it must be mentioned that some NO_2 contrast measurements require the positioning of tubes on the fixed monitoring site of the local air quality network, belonging to the Generalitat de Catalonia. Therefore, permissions will be needed to perform this action; however, a negative resolution is highly unlikely as the project has already the support of Generalitat de Catalonia (see letter of support of Ministry of Territory and Sustainability).

Eventually, the novelty introduced by LIFE-CAPACITy project is evidenced by the following points:

- Creating the first database of reference for itinerant measurements for air quality across the city.

- Generating and applying a protocol for citizen empowerment to collect air quality data.

- Tracking traffic and mobility patterns with cell phones.

- Coupling of a calibrated microscopic traffic simulation model with a multi-scale air quality modelling system from meso- to street scale level for diagnostic and forecasting applications.

- Coupling an online meteorological, chemistry and mineral dust system with a street scale dispersion model.

- Implementation of an integrated urban air quality forecasting system.

- Experimental validation of an air quality model performance on a real-world mobility measure.

- In situ evaluation of air quality mitigation strategies with experimental and numerical techniques.

- Offering a validated tool to citizens for their engagement in decision making.

- Incorporation, from the beginning, the social aspect, as a main key inside a scientific project.

- Citizen involvement in building up the air pollution model.

Name of the picture: Figure 1.Percentage of the urban population in the EU-28 exposed to air pollutant concentrations above certain EU and WHO reference concentrations (2012-2014)

Pollutant	EU reference value (a)	Exposure estimate (%)	WHO AQG (a)	Exposure estimate (%)
$PM_{2.5}$	Year (25)	8–12	Year (10)	85–91
PM_{10}	Day (50)	16–21	Year (20)	50–63
O_3	8-hour (120)	8–17	8-hour (100)	96–98
NO_2	Year (40)	7–9	Year (40)	7–9
BaP	Year (1)	20–24	Year (0.12) (RL)	88–91
SO_2	Day (125)	< 1	Day (20)	35–49

Key: < 5 % | 5–50 % | 50–75 % | > 75 %

Notes: (a) In $\mu g/m^3$; except BaP, in ng/m^3.

The reference concentrations include EU limit or target values, WHO air-quality guidelines (AQGs) and estimated reference levels (RLs).

For some pollutants, EU legislation allows a limited number of exceedances. This aspect is considered in the compilation of exposure in relation to EU air-quality limit and target values.

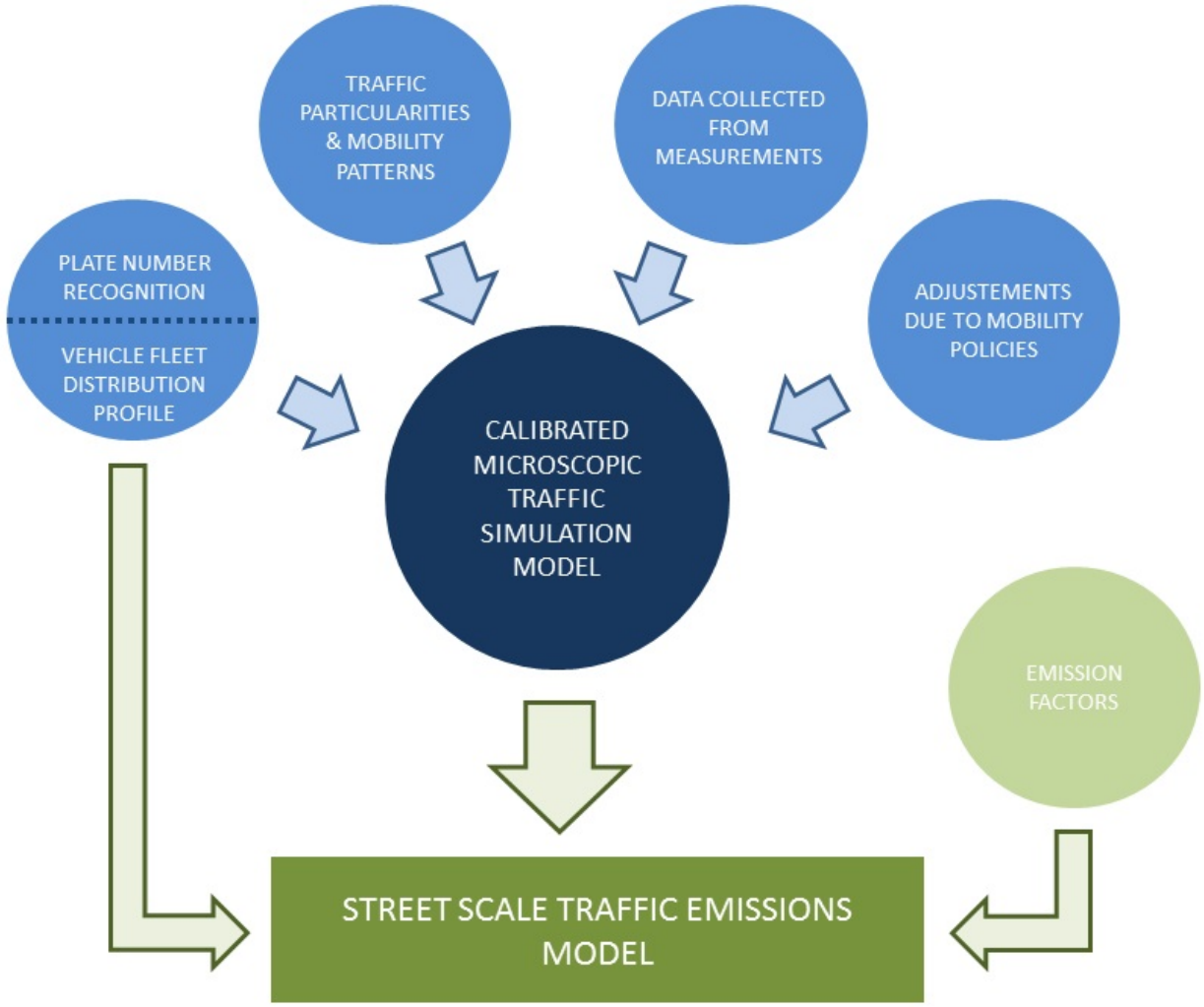
The comparison is made for the most stringent EU limit or target values set for the protection of human health. For PM_{10}, the most stringent limit value is for 24-hour mean concentration, and for NO_2 it is the annual mean limit value.

The estimated exposure range refers to a recent 3-year period (2012–2014) and includes variations attributable to meteorology, as dispersion and atmospheric conditions differ from year to year.

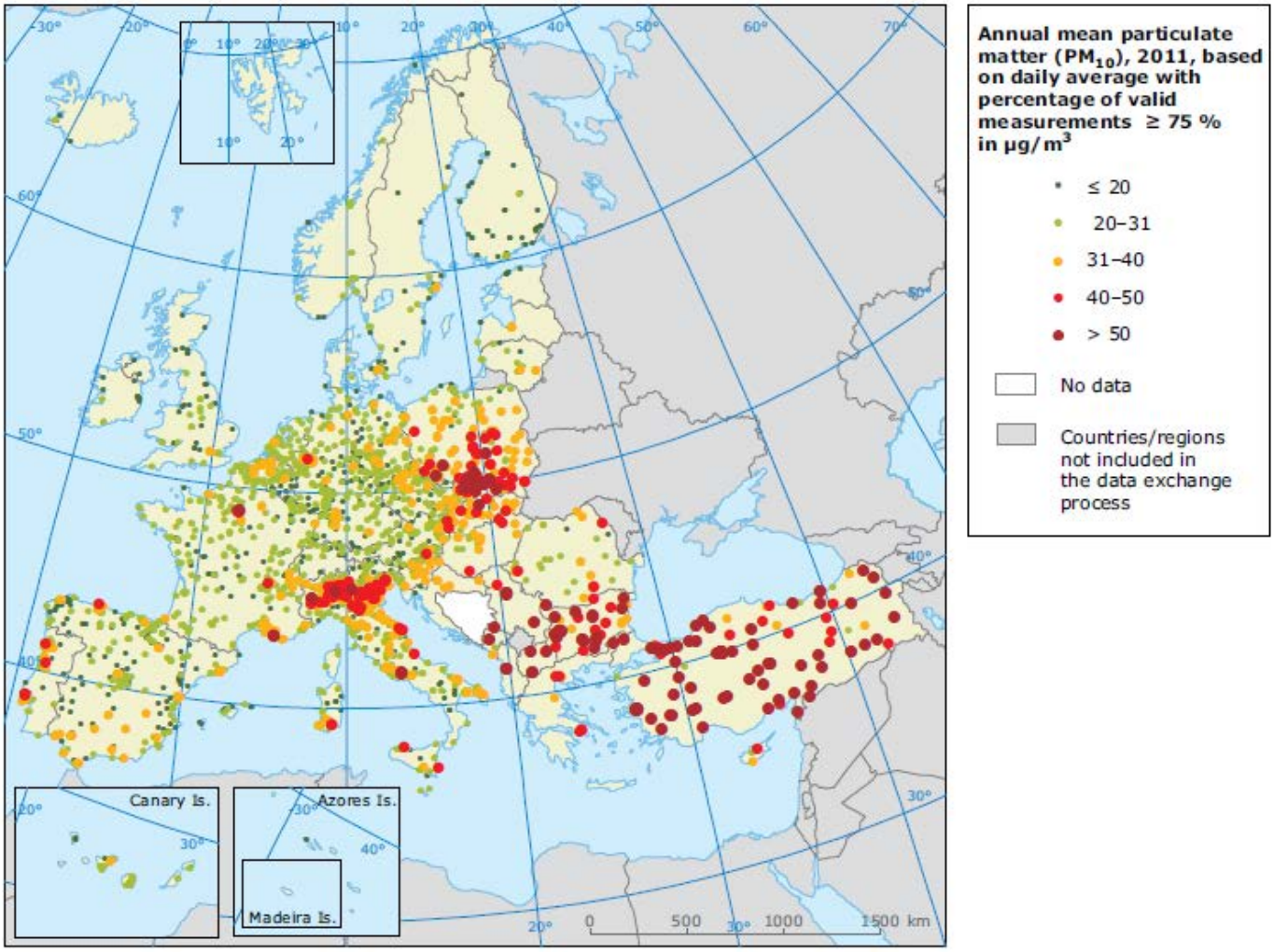
As the WHO has not set AQGs for BaP, the reference level in the table was estimated assuming WHO unit risk for lung cancer for PAH mixtures, and an acceptable risk of additional lifetime cancer risk of approximately 1 in 100 000.

Sources: EEA, 2016f.

Name of the picture: FIGURE 6 Development and integration of accurate traffic simulation and emission models



Name of the picture: Figure 2. Annual mean particulate matter (PM10) concentrations in monitoring stations with valid measurements 75 % in the EEA reporting countries in 2011



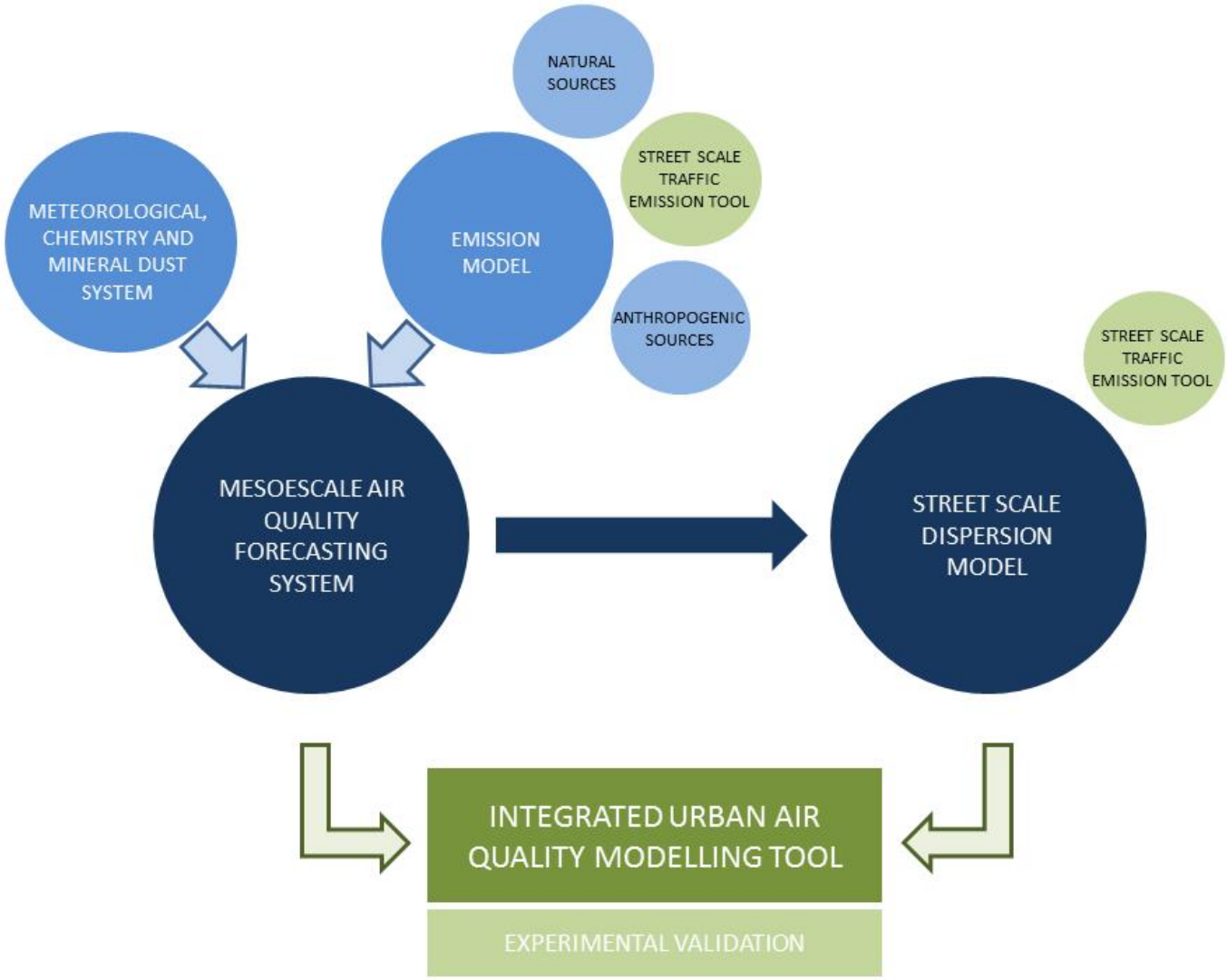
Note: If the value is > 40 µg/m³, the station is in exceedance of the annual limit value for PM_{10}.

* Not accounting for subtractions of natural contributions and/or of contributions of winter-sanding and salting (see Box 2.2).

Name of the picture: Table 1. Major air pollutants.

Pollutant	Source	Health Impact
Particulate matter (PM)	PM Is fine dust, emitted by road vehicles, shipping, power generation and households, and also from natural sources such as sea salt, wind-blown solid and sand. In particular, those with less than 10 µm (PM_{10}) in diameter are considered harmful (especially those of less than 2.5 µm ($PM_{2.5}$)).	Some of the illnesses related to this pollutant are respiratory disease, cardiovascular disease, and lung cancer.
Ground-level ozone (O_3)	This pollutant is the result of complex chemical reactions of NOx and VOCs (including methane) in sunlight.	Some of the health consequences associated with this pollutant are lung function decrease, aggravate asthma and other lung diseases; it also damages agriculture crops, forests, and plants, by reducing their growth rates.
Sulphur dioxide (SO_2)	It is mainly produced as a result of power generation, industry, shipping and households.	Its hazardousness for human health is associated with the fact that it may form secondary PM and contributes to acidification of soils and inland waters.
Nitrogen oxides (NOx)	This pollutant is mainly the result of road vehicles, shipping, power generation, industry and households emissions.	As in the case of SO_2, NOx also produces secondary PM and contribute to acid rain, but in addition it causes eutrophication and also boosts the levels of O_3.
Ammonia (NH_3)	NH3 is basically related to the agriculture sector, it is a derivative of activities linked to manure and fertilizers management and their use.	Concerning human health, NH_3 is a building block for secondary PM, and contributes to acidification and eutrophication.
Volatile organic compounds (VOC)	VOC are emitted from solvents in products and industry, road vehicles, household heating and power generation.	Regarding human health, VOCs have a strong influence in the formation of O_3.
Methane (CH_4)	Methane is the result of emissions from natural sources such as wetlands, and also human activities such as leakage from natural gas systems and the raising of livestock.	Concerning human health, Methane eases the formation of ozone, and is a powerful greenhouse gas.

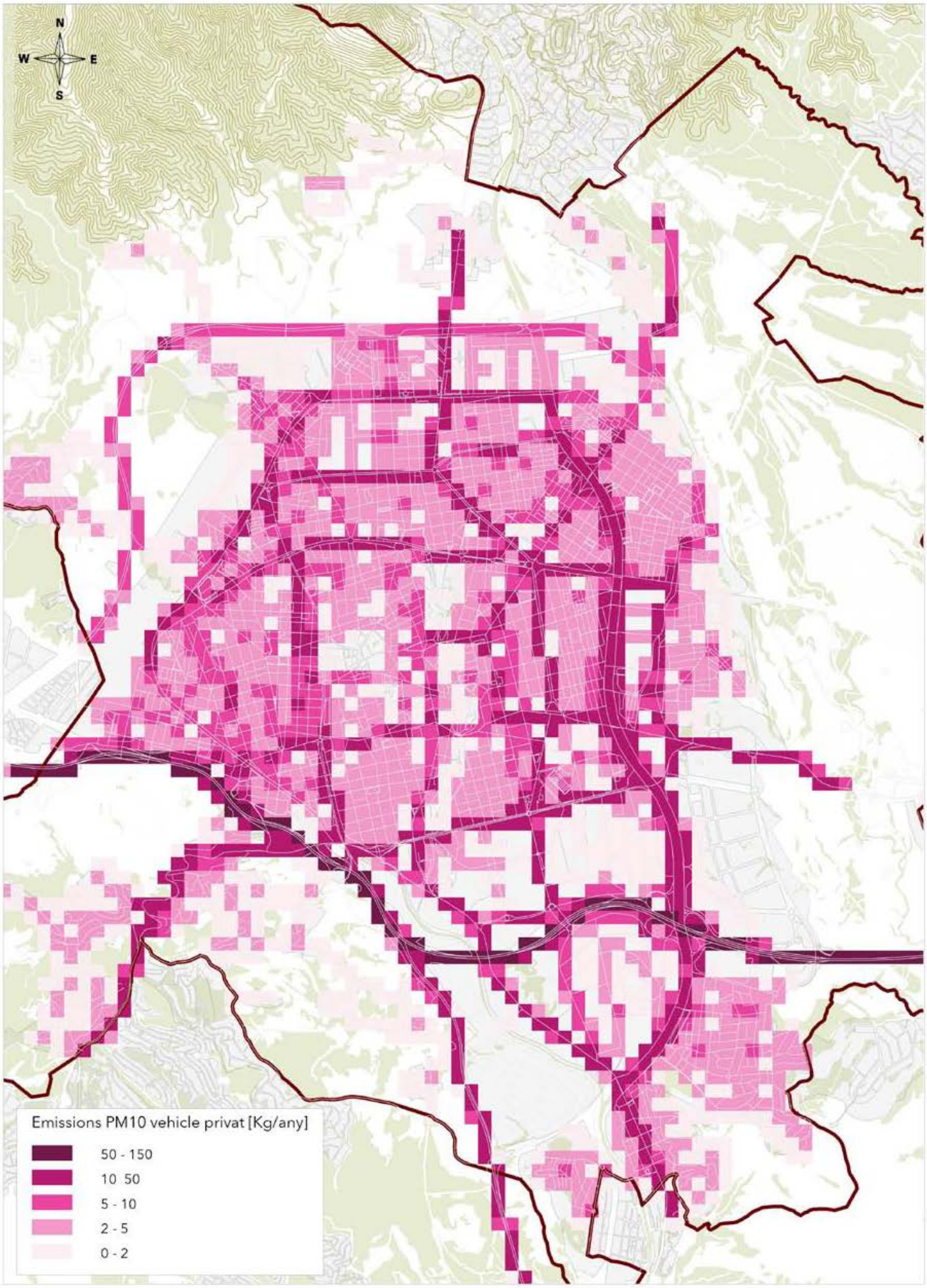
Name of the picture: Figure 7. Integrated urban air quality modelling tool



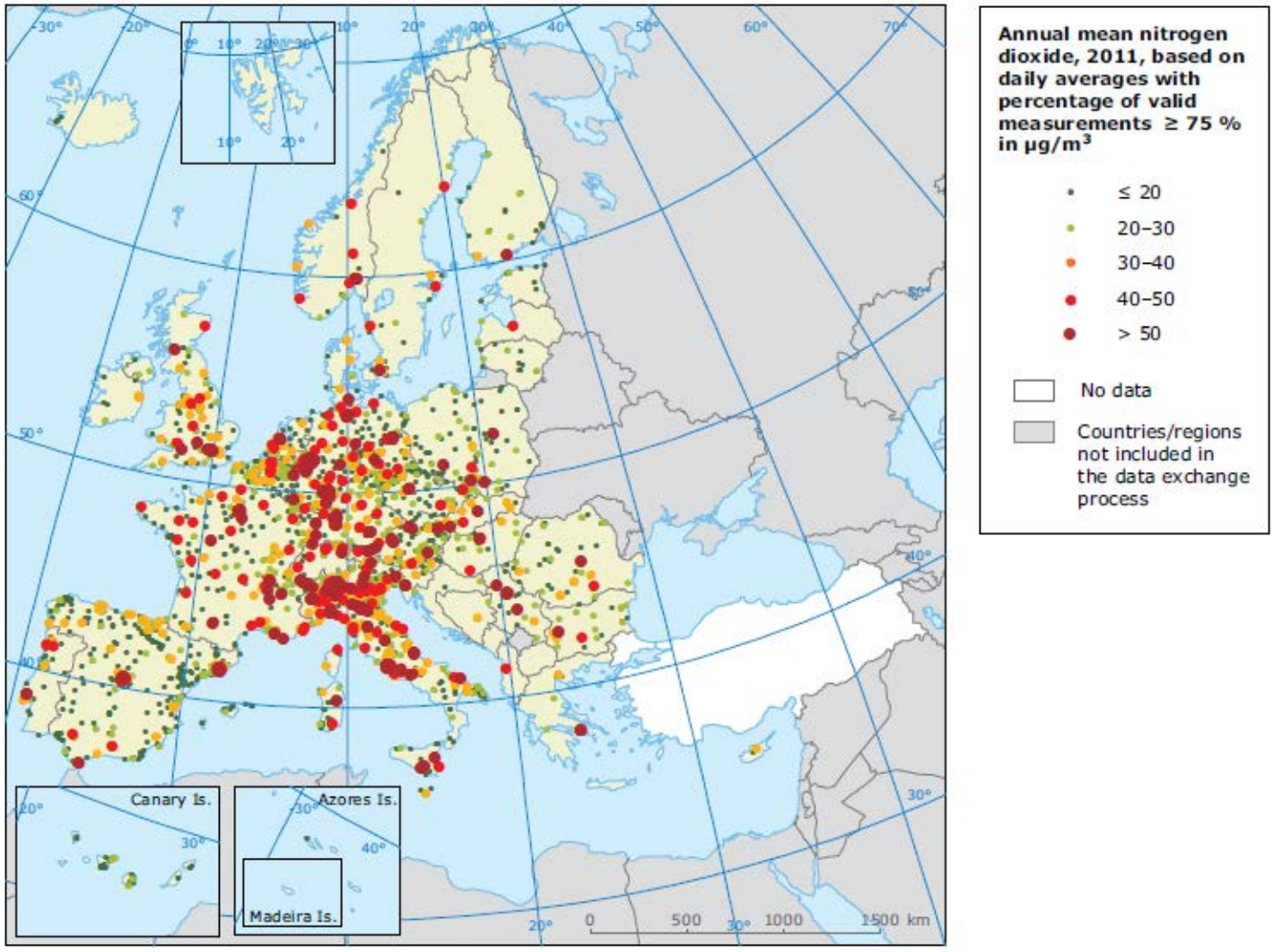
Name of the picture: Table 3. Transport contribution to NOx and PM10 emissions

	NOx [t] (2008)	PM_{10} [t] (2008)	NOx [t] (2011)	PM_{10} [t] (2011)
Private car	530,28	20,20	549,44	20,93
Public transport	31,38	0,58	31,38	0,58
Total	561,66	20,78	580,82	21,51

Name of the picture: Figure 5. Transport contribution to PM10 emissions per cell [kg PM10/year] in the city of Terrassa (Source: http://www.terrassa.cat/pla-de-millora-de-la-qualitat-de-l-aire-de-terrassa-2015-2020-).



Name of the picture: Figure 3. Annual mean nitrogen dioxide (NO2) concentrations in monitoring stations with valid measurements 75 % in the EEA reporting countries in 2011

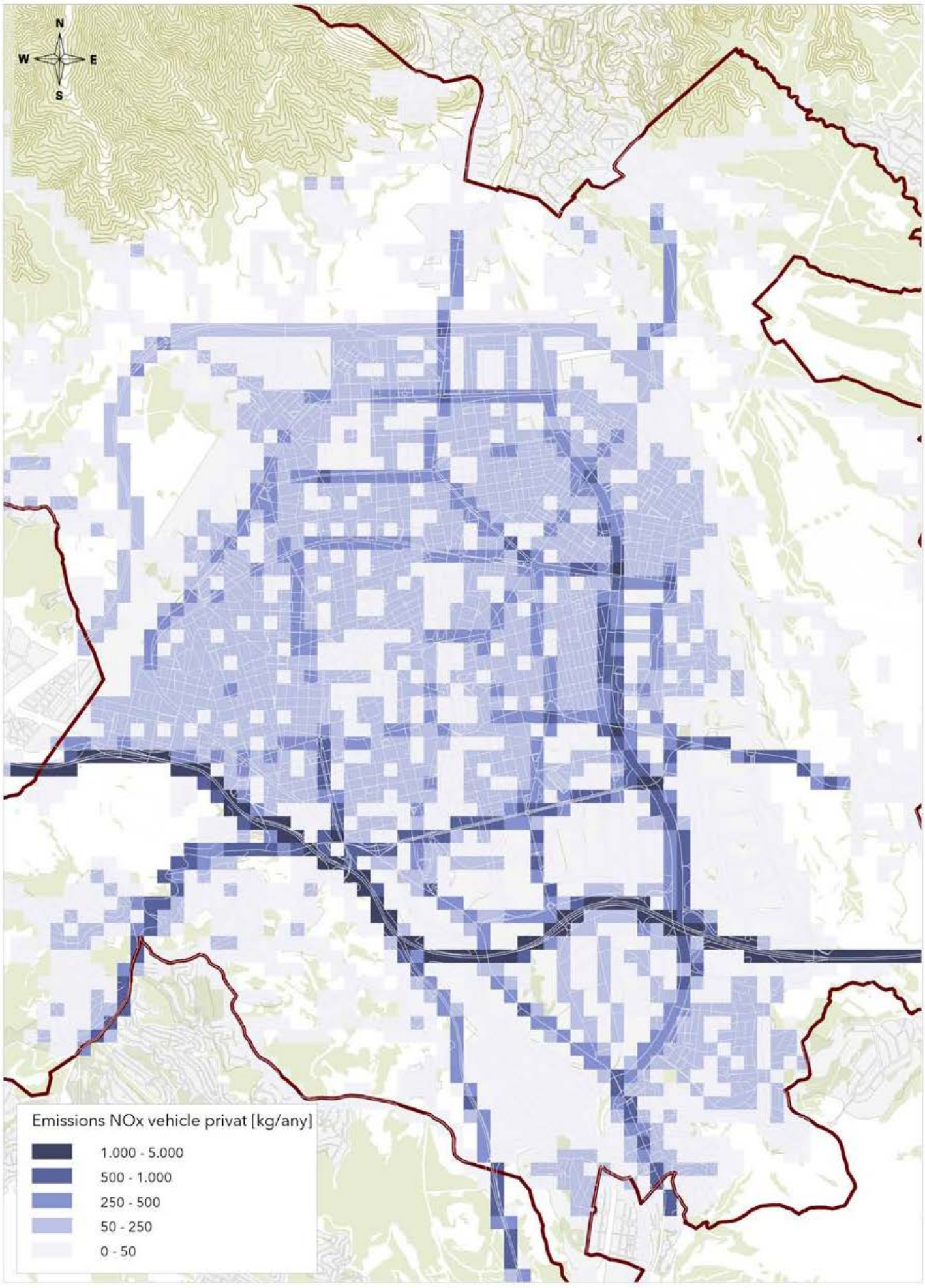


Note: If the value is > 40 µg/m³, the station is in exceedance of the annual limit value for NO_2.

Name of the picture: Table 2. LIFE projects linked wit LIFE-CAPACITy

LIFE project	Description	Contribution
LIFE+ RESPIRA - Reduction of exposure of cyclists to urban pollutants **LIFE13 ENV/ES/000417**	The RESPIRA Project develops a high resolution modelling of urban air quality to assess the improvement of a series of measures.	LIFE-CAPACITy also involves the citizen and informs him, but not only in the measurement, but also in decision making in the long term to manage the city. Regarding modelling, RESPIRA proposes a high resolution modelling of urban air quality. In the present project we go a step further demonstrating the predictive capacity of the system.
OPERA - An integrated assessment methodology to plan local cost-effective air quality policies harmonized with national and European actions. **LIFE09 ENV/IT/000092**	The project proposes a methodology to evaluate the efficiency of measures to improve air quality. They do it through a software tool (RIAT +) that they use as a support system for decision making.	RIAT + is designed to work on a regional scale. Here you want to go more detail at street level.
ATMOSYS - Policy support system for atmospheric pollution hot spots **LIFE09 ENV/BE/000409**	The project proposes a modelling system to evaluate air quality, including not only diagnosis but also predictions.	In our case, in addition to going to local scale, we also combine it with a traffic model. This is a very novel point when moving from static descriptions of traffic to dynamics from micro models.
LIFE-APIS/PL - Air Pollution and biometeorological forecast and Information System **LIFE12 ENV/PL/000056**	Link The project aims to provide information and warnings about air quality to both authorities and citizens. To achieve this, consortium uses a tool that combines meteorological models and methods of risk assessment. The project also mentions predictive capabilities.	LIFE-CAPACITy also involves the citizen and informs him but does so by involving him in making long-term decisions to manage the city.

Name of the picture: Figure 4. Transport contribution to NOx emissions per cell [kg NOx/year] in the city of Terrassa (Source: http://www.terrassa.cat/pla-de-millora-de-la-qualitat-de-l-aire-de-terrassa-2015-2020-)



EU ADDED VALUE OF THE PROJECT AND ITS ACTIONS

Air pollution seriously damages human health and the environment in Europe; respiratory problems, premature deaths, eutrophication and damage to ecosystems due to nitrogen deposition and acidic substances are some of the dramatic consequences of this worldwide spread concern.

Air quality has been improved in the past 20 years, but some pollutant concentrations as PM and NO_2 have stagnated in recent years and concentrations temporarily exceed legal thresholds in nearly half of the Member States; this situation is especially severe in urban areas, which are now home to a majority of Europeans. According to WHO, 40 million people in the 115 largest cities in the EU are exposed to air exceeding for at least one pollutant.

PM and NO_2 standards are not met mostly due to local emissions (road traffic, heating and industry). In this sense, road traffic has been commonly pointed as the greatest source of air pollution in cites, not only as a result of the large (PM and NOx) emissions but also because their proximity to the receptors.

Therefore, in spite of the significant emissions reduction achieved by the implementation of Intergovernmental Panel on Climate Change (IPCC) and EURO emissions control, another effort from local administration is needed.

At **European level**, the main policy instruments on air pollutions include **Directive 2008/50/EC on ambient air quality and cleaner air for Europe, and Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air**. The framework directive describes common assessment criteria and defines threshold values for the following 13 components:

1. Sulphur dioxide

2. Nitrogen dioxide

3. Fine Particulate matter such as soot

4. Suspended particulate matter

5. Lead

6. Ozone

7. Benzene

8. Carbon monoxide

9. Poly-aromatic hydrocarbons

10. Cadmium

11. Arsenic

12. Nickel

13. Mercury

Moreover, in late 2013, the European Commission proposed a new Clean Air Policy Package for Europe, which aims to ensure compliance with existing legislation by 2020 and to further improve Europe's air quality by 2030 and thereafter. Definitely, the framework set seeks to protect the health of people living in urban areas by means of not surpassing at any time the threshold levels of air pollutants.

Additionally, recent scientific evidence has shown that merely complying with EU standards is inadequate to protect human health, as air quality causes illness and death at levels well below current EU standards. Thus, it is needed to go beyond current EU limit values towards WHO guidelines in order to reduce the public health burden of poor air quality. In this regard, the most troublesome pollutants in terms hazardousness to human health are PM, nitrogen dioxide NO_2 and ground-level ozone O_3. The European air quality standards and the WHO air quality guidelines for these pollutants are displayed in Table 4.

EU ambient air quality Directive (2008/50/EC) states that air quality plans establishing emission abatement measures should be implemented by local administrators where the levels of pollutants in ambient air exceed any limit value or target value. In addition, local administrations must report on; the measures to be implemented, their timetable, the estimated improvement of air quality, and the expected time required to attain these objectives.

However, besides the societal obligation of meeting air quality standards, local administrators face technical and social challenges taking efficient and effective decisions regarding measures that affect citizen daily life. Therefore, these plans must be based on appropriate management tools able, on the one hand, to well-simulate the implications of the decisions taken so as to avoid regret-actions and, on the other hand, to promote social consciousness and engagement.

These difficulties are hampered in middle-sized municipalities (50,000 to 500,000 inhabitants) due to the general lack of high-quality management tools available at their scale. The typical drawbacks of the existing tools, which are in fact a major obstacle for a proper simulation of air quality scenarios, include:

- Obsolete emission inventory, mostly for non-exhaust and NOx emissions.

- Lack of knowledge on the circulating vehicle fleet composition (intra-urban and inter-urban). Middle-size municipalities use a top-down approach from the national register, which is not representative of the local emissions.

- Lack of spatial representativeness of measurements with sufficient quality for air quality management.

- Lack of assimilation of experimental data in the modelling tool, to validate simulations at street and background level.

- Lack of citizens' engagement in the air quality data collection and management decision-making.

Moreover, in Southern Europe, the space for action by local administration is very limited because citizenship is prone to refuse mobility measures, as they consider them an inconvenience rather than a benefit. Therefore, this project will undertake the task of changing this situation, bringing scientist, policymakers and citizens together in order to create a powerful collective driving force to improve the environment and human health.

The LIFE-CAPACITy project main objective is to assist air quality decision making in middle-size urban areas, as Terrassa. Using meteorology, traffic emissions and air quality information, a new urban-scale modelling tool will assess and forecast the most harmful air pollutants: O_3, NO_2, and PM_{10}. Hence, this tool will allow experts to rely on a set of air quality models to test the effectiveness of certain measures and take final actions.

According to the data of the 2016 Air Quality Yearbook, Terrassa is one of the municipalities with the highest atmospheric pollution in Catalonia failing to meet the levels set by the European Union (EU) and WHO, at least with respect to nitrogen dioxide and PM_{10} particles; as a matter of fact, 736,81 tones of NOx and 25,85 tones of PM_{10} are estimated that were emitted in 2015.

An Action Plan has been proposed for the Air Quality Improvement, where it has been also identified the specific contribution of transport (public and private) to global emissions as can be observed in Table 3, Figure 4 and Figure 5.

Private vehicles are the main source of NOx emission in Terrassa (71.9%) and PM_{10} (78.1%) and public transport (the bus network) accounts for 4.3% NOx and 2.3% PM_{10} of the total emissions; thus, transit is the sector with the strongest contribution to emissions. Due to the complexity of the sector, which includes displacements in private vehicles, public transport and other modes of active mobility, only the progressive implementation of all measures related to mobility can attain the emissions reduction and the restoration of quality air levels.

In recent years, several measures have been implemented to improve air quality; yet, they have proven not being enough to reach the desired emissions reduction. In order to increase the impact and the citizens' acceptance of these measures, a new and open approach for the management and planning is necessary.

By achieving the project's goal, LIFE-CAPACITy is going to contribute in a significant way to

the consecution of European's targets with regard to pollutants abatement. In this line, the measures to be implemented aim at reducing the PM_{10} concentration level attributed to road traffic in Terrassa from 29 µg/m3 till less than 20µg/m3 and the NO_2 from 42 µg/m3 till less than 40 µg/m3.

With such ambitious goals, LIFE-CAPACITy is perfectly aligned with the Urban Agenda for the EU, which represents is an integrated and coordinated approach to deal with the urban dimension of EU and national policies and legislation. In this line, both LIFE-CAPACITy and the Urban Agenda for the EU have a common target: improve the quality of life in urban areas.

It is worth mentioning that, there are others directives dealing with the regulation of road emissions and the proper way to reduce them in urban areas such as:

Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles.

Action Plan on urban mobility [COM(2009) 490]. This plan proposes a set of 20 measures intended to ensure more efficient and more sustainable urban mobility. In this regard, within LIFE-CAPACITy, a set of four sustainable urban mobility measures will be demonstrated.

LIFE-CAPACITy consortium will adopt the most sustainable and energy efficient **"green practices"** for the implementation of the project, including purchasing and outsourcing requirements. To that purpose, actions will be thoroughly processed, implemented and monitored along the complete life of the project. It must be underlined that practices with high energy efficiency, maximum material recovery and minimum packaging material will be preferred over less responsible options. Furthermore, **green procurement will be promoted**, considering issues as local outsourcing to providers with ISO Certification and using the tools provided by the EC.

Regarding up-take, it is worth mentioning that the projects identified in Table 2 will be studied thoroughly to take advantage of their results and avoid unnecessary efforts. Moreover, potential research partners will be invited to attend LIFE-CAPACITy workshops and conferences once the results are consistent, so as to evaluate strategic partnerships. Besides, partners will look for opportunities for collaborating and feeding LIFE-CAPACITy technology with further innovations in order to maximise its efficiency and capacity. In this regard, an effective strategy has been described in Action D1.

REPLICABILITY AND TRANSFERABILITY

LIFE-CAPACITy project will provide two main outcomes: a powerful tool for air quality diagnosis and forecasting, and prior-to-deployment assessment of environmental policies; and, the actual assessment of four different policies focused on reducing air pollutants by implementing mobility strategies and a pilot deployment of a particular policy. Although the whole project turns around the city of Terrassa, the methodology where LIFE-CAPACITy underpins can be translated to other European cities. In order to do so, the consortium will undertake the task of identifying the required considerations that must taken into account should any other city be willing to implement LIFE-CAPACITy.

The minimum necessary data to start LIFE-CAPACITy modelling in other European cities will be:

- Characterization of real city fleets: use of traffic cameras.

- Street geometry, traffic control plan and public transport plan.

- Characterization of anthropogenic emission sources: industry, energy, use of solvent, residential combustion, waste management, agriculture.

- Regional modelling system for air quality.

- Air quality monitoring network.

Regarding the fine tune of the street scale traffic emissions model, it will be required to modify the traffic particularities according to the destination city's own scenario, **a specific vehicle fleet distribution profile will be needed as well as the emission factors per vehicle category.** In the case of the urban air quality modelling tool, the **CALIOPE tool must be adapted to the particularities of the destination city along with pollutants' anthropogenic and natural**

sources; besides, this modelling tool includes the street scale traffic emission tool as well; thus **traffic profile and road geometry must be well known** in order to properly adapt the LIFE-CAPACITy tool.

Furthermore, **itinerant measurements** are far from trivial. The set-up must be carefully prepared in order to get valid results, unaffected by the vehicle. In this line, the consortium will undertake the task of defining: the vehicle's requirements that are most suitable for the task; the best equipment distribution to obtain valid measurements; and, the proper equipment calibration. By doing so, interested entities will be able to replicate itinerant measurements in the targeted cities.

Therefore, a strong effort will be made not only to disseminate the results achieved throughout the project but to standardize the process; thus, making the methodology available for those cities interested in implement the LIFE-CAPACITy solution. All the relevant information regarding this standardization process will be gathered in the form of a deliverable as stated in Action B6. In addition**, a report containing the guidelines describing the methodology and how to implement it will be available in the project's webpage**.

In order to guarantee transferability, the market will be continuously surveyed with the aim of finding potential stakeholders that may sustain the continuity of the project. In this sense, technological center LEITAT has already shown their interest on replicate the LIFE-CAPACITy system in other European cities (see letter of support). LEITAT is a private non profit Technological Center with extensive experience in urban areas and smart cities projects at National and International level.

Potential technical partners will be invited to evaluate LIFE-CAPACITy system once the results are consistent in order to evaluate strategic partnerships and negotiate licensing agreements for transferring the proposed solution.

Oher European cities will be important stakeholders to replicate the project results. Air quality is a **transboundary challenge** as high PM and NO_2 concentrations, including the contributions from road transport of air pollutants, have significant health effects in terms of morbidity and mortality in worldwide urban areas. **These difficulties are hampered in middle-sized municipalities (50,000 to 500,000 inhabitants) due to the general lack of high-quality management tools available at their scale**

For instance, on March 2017 40 Catalan municipalities (including Terrassa), belonging to the "Areas of Special Protection of the Atmospheric Environment", committed themselves to reducing pollution (http://www.diba.cat/web/sala-de-premsa/-/acord-per-a-la-millora-de-la-qualitat-de-l-aire-a-la-conurbacio-de-barcelona). This project will be a demonstration for its subsequent implementation in these municipalities that are affected with the same problem.

Additionally, the project has already the support of important European cities as Roma, Barcelona or Madrid (see letter of support).

The main goal of this replicability and transferability strategy is the further replication of the system in at least other 20 European hot spots.

Brief technical reports, together with the transferability and replicability strategy will be sent to LEITAT or other potential stakeholders. Business cases will be supported with technical results obtained during LIFE-CAPACITy operational demonstration; hence extrapolation strategy will be based on first-hand/real-time scientific inputs.

In addition to the aforementioned tasks, which are mandatory to guarantee a proper tool adjustment to the city of interest, the consortium will undertake several actions in order to boost the replicability and transferability of the LIFE-CAPACITy project:

- ***A think-tank exercise to evaluate the outcomes of the project:*** this will serve to the purpose of pondering the environmental and socio-economic impact of the project's outcomes, which in turn will determine the permanent deployment of the evaluated policies.

- ***To develop a dissemination strategy:*** preparing an outstanding dissemination strategy is critical regarding the project's transferability and continuity. As it is detailed in Action E, this strategy will include: dissemination activities in specific fairs and conferences; promoting actions via printed press, radio and television; spreading promotional material (including the LIFE logo) among trade associations, companies, environmental bodies, schools, etc.; keeping alive the project's website once the project has finished, publishing the latest news; and, demonstration visits and seminars aiming to reach a wider audience.

- ***To define an Advisory Board (AB):*** the aim is to identify strategic partners that will contribute to the replicability and transferability of LIFE-CAPACITy technology. As the air quality modeling replicability is limited to the availability of high-resolution emission inventories, the entities targeted to join the AB are: European cities, European associations (urban transport associations, citizen associations and environmental associations), and European projects conducting traffic and air quality modelling in other European cities. The main aim of this AB is to work together in a Replicability and Transferability assessment. In addition, all these entities will be invited to the dissemination events that will be held during the project scope in order to keep them updated with regard to the project advances and outcomes. **The AB will be formed by minimum 5 European cities**.

The projection of CAPACITy's project has already aroused the interest of different public and private entities. Next, the details of each one are provided:

Local administrators and governments:

-Diputació de Barcelona (Barcelona Provincial Council).

-Balearic Island Government.

-Ministry of Territory and Sustainability of the Government of Catalonia.

-Madrid City Council.

-Barcelona City Council.

-Metropolitan Area of Barcelona (AMB).

Traffic managers:

-Directorate General of Traffic (DGT).

European associations:

-Promotion of Operational Links with Integrated Services (POLIS).

Research centers:

-University of Birmingham.

-Department of Biology, University of Bari (Italy).

Private research center:

-LEITAT Technological center

Environmental and health agencies:

-Department of Epidemiology (DEP) in Rome.

-Meteorological and Hydrological Service of Croatia.

-Institute for Global Health (IS Global).

-ARPA, environmental agency of the Lombardy region (Italy).

-AIRPARIF, local environmental agency in charge of Paris Area.

Others:

-Diari de Terrassa (Terrassa newspaper).

-*"Plataforma per la Qualitat de l'Aire"*, a local environmental association, a local NGO.

-Association for the Defense and Study of Nature (ADENC), a local environmental association.

-"Promoció del Transport Públic (PTP), a local NGO that supports the collective public transport.

SOCIO-ECONOMIC EFFECTS OF THE PROJECT

The presence of pollutants in the air people breath is directly related to several diseases that not only cause temporary inconveniences but actually shortens people's life; as a matter of fact, every year more than 400.000 people in the EU die prematurely due to the consequences of air pollution. Indeed, there are also economic derivatives being estimated at €330-940 billion (3-9% of EU GDP). As a consequence of the high socio-economic toll traceable to pollutants, air quality has become an issue of major concern for the EU.

In many European urban areas the legal air quality standards are widely exceeded: in 17-21 of the EU-28 Member states PM and NO_2 standards are not met mostly due to local emissions (road traffic, heating and industry). In particular, road traffic is one of the major contributors to the air quality worsening due to the large emissions of PM and NOx.

PM air pollution refers to microscopic airborne particles that can travel into the lungs and cause a variety of respiratory problems. These particulates are 10 microns or less in size and are found both outdoors and in homes and work places. They are referred to as 'PM_{10}' (particulate matter 10 microns or less in diameter) and even smaller particles ' $PM_{2.5}$ ' (less than 2.5 microns in diameter) which can penetrate even more deeply into the lungs.

Fine particles are strongly associated with mortality and hospitalization for cardio-pulmonary disease. $PM_{2.5}$ is believed to be more health relevant than the courser fraction in terms of mortality and cardiovascular and respiratory endpoints, what not implies that the coarse fraction of PM_{10} is innocuous. As it has being previously mentioned, long term exposure to current ambient PM concentrations may lead to life expectancy reduction.

NOx consist of a mixture of Nitrogen dioxide (NO_2) and nitrogen monoxide (NO), and its main source is fuel combustion. In this sense, traffic, industry (mainly fossil fuel powered electrical power plants) and households (heating) are the major contributors to NOx emissions. Usually, the larger part of the emission consists of NO; yet, it must be noted that, under ambient conditions, NO_2 is formed from NO. Moreover, NOx is a precursor for a number of secondary air pollutants, including nitric acid (the nitrate part of secondary inorganic aerosols) and photo oxidants including ozone.

LIFE-CAPACITy project aims to provide a tool that eases the design of sustainable mobility strategies that pursue a dramatic reduction of air pollutants coming from road emissions. In this line, one of the main purposes of LIFE-CAPACTy project is to reverse the health problems that currently affect people living in European urban areas by improving air quality.

Another social impact expected through the project is employment. The execution of LIFE-CAPACITy project will require hiring people to carry out mandatory actions, which in turn will contribute to the local employment. In particular, a group of environmental informers will be hired by the City Council for the first three years of the project to serve in information and communication tasks, workshops, and information gathering. It must be raised that the hiring process will be carried out through Labour Exchange, and that some considerations will be taken into account such as: favoring unemployed people, woman positive discrimination (by gender policies), knowledge and skills suitable to perform the assigned tasks, people engaged in neighbourhood associations and people with previous experience in social work. Given the critical task that the environmental informers are entrusted with, technical specialists and scientists related to the field of interest will be hired in order to train them.

On the other hand, the implementation of the mobility strategies will generate work with regard to the construction activities in the city of Terrassa, which in turn may lead to the creation of job opportunities.

With regards to the cross-cutting nature of LIFE-CAPACITy project, it must be raised that it will not only attack EU Environmental policies but will have a significant impact in EU Transport policy as well.

As stated in European Transport policy, Europe needs strong transport connections as they contribute to drive trade and economic growth, and to create employment and prosperity. As well as being a key sector of the economy, transport is a major contributor to the economy (4.8% or €548 bn in gross value added overall for the 28 EU countries), and sustains over 11 million jobs in Europe. Moreover, transport networks serve a twofold purpose allowing goods to be distributed and people to travel. As the common trend worldwide is to become even more mobile, the EU Transport policy aims to overcome the main drawbacks of the current transport system:

-Congestion: it not only affects road traffic but air traffic as well. Currently, it costs Europe around 1% of annual GDP.

-Oil dependency: although significant improvements have been made in the field of energy efficiency, the oil dependency of the current transport systems still remains very high (96%). It is expected that oil sources will lessen in future, causing the price to increase dramatically; as a matter of fact, it is foreseen that, by 2050, the price will be more than double compared to 2005.

-Greenhouse gas emissions: currently, transport systems are a significant source of pollutants that contribute to the increase of greenhouse gas emissions. In order to keep global warming below 2ºC, by 2050 the EU must cut transport emissions by 60% compared with 1990 levels.

-Infrastructure: the quality of transport infrastructure across the EU members is uneven what may lead to issues when dealing with transport between countries.

-Competition: other regions are investing in developing their transports systems beyond the status-quo; thus, the EU's transport sector must face this growing competition.

Then, it can be inferred that EU Transport policy is concerned about improving the sustainability of urban mobility, promoting initiatives for low-emission vehicles, improved safety and reduced congestion. In this line, LIFE-CAPACTITy project will also contribute by means of urban mobility strategies implementation. For instance, Terrassa's plans to improve air quality already considers the improvement of the public bus network and vehicle fleet, which will in turn result in a more efficient public transport in terms of convenience and pollutant emissions. In addition, some streets will be redesigned reducing the lanes and expanding the sidewalks; by doing so, traffic circulation will be hindered, encouraging indirectly the citizenship to use public transport or going on foot to reach those areas. Besides, LIFE-CAPACITy project will promote non-motorised modes of transport such as bicycles by establishing bicycle itineraries in the municipality, preferably not on pavements.

In terms of reference market, it must be noted that the market targeted by LIFE-CAPACITy project is Smart Cities and Transport Benefits. The project's outcomes will provide a powerful tool for air quality diagnosis and forecasting as well as prior-to-deployment assessment of environmental policies; and, the actual assessment of four different policies focused on reducing air pollutants by implementing mobility strategies. The EU environmental policies are strongly encouraging the EU members to implement sustainable mobility strategies in order to tackle air pollutants in urban areas. In this line, LIFE-CAPACITy's results are of special interest for the City Councils of those cities planning to develop and deploy new and sustainable mobility strategies: LIFE-CAPACITy tool will provide them with a tool for designing their own strategy, allowing them to simulate the proposed measures and quantify their impact so just the ones that are more effective are deployed, leading to savings in time and costs.

In addition, EU directives attribute considerable importance to transparency and citizen participation. In this regard, the directives require Member States to ensure that up-to-date information on ambient concentrations of the different pollutants is routinely made available to the public. Following this line, LIFE-CAPACITy will create a participatory digital platform, which in turn will not only provide open access to air quality measurements, but also 48h air quality forecasts with particular regard to alerts about exceeding the permissible values of air quality indicators. Hence, this information will increase social awareness and engagement helping citizens to gain a better understanding of how well their own specific areas are doing under new air quality measures.

Citizen participation serves to take decisions more appropriate to the needs, and to address complex problems incorporating multiple perspectives, enriching the decision process. Also, participation serves to achieve a more efficient implementation, creating complicities, and facilitating to have dynamic collaborations, so important and essential to ensure efficiency in the deployment of municipal actions.

Citizens' participation is not foreseen in the elaboration of air quality plans. However, this participation is ensured via Annex I(f) of Directive 2003/35/EC which explicitly refers to EU ambient air legislation. Thus, the present project will develop a democratic process supported by a digital platform and an environmental committee that will allow municipal transparency and public participation regarding the drawing up of air quality plans. By doing so, LIFE-CAPACITy aims at achieving a quality democratic process that seeks the active involvement of citizens in the management of decision making related with air quality.

EFFORTS FOR REDUCING THE PROJECT'S "CARBON FOOTPRINT"

Reducing human's carbon footprint towards lessening the impact on climate is a responsibility that must be undertaken be each individual by making different lifestyle decisions. There are many quotidian activities, which people have deeply internalised, that generate a huge amount of greenhouse gas emissions. Many of these actions are highly dispensable, yet they have become a habit. For instance, the energy used to produce, deliver and dispose of junk mail produces more greenhouse gas emissions than 2.8 million cars. Waste generation is also an important source of carbon that can be lessened by recycling and promoting circular economy.

It is beyond a doubt that each individual is in charge of its own carbon footprint. In this line, it must be raised that the efforts LIFE-CAPACITY consortium will make on reducing the project's carbon footprint will not be only focused on the technology, as all participants will apply best practices during project management and execution. Next, the measures that will be applied are briefly detailed:

-Being efficient in making daily decisions is a huge step towards reducing emissions; that is, the miles that people drive can be easily reduced by identifying better opportunities. Therefore, efforts will be made to avoid face-to-face meetings whenever possible, using teleconferences or videoconferences; thus, avoiding carbon emissions from transport. Should it be unavoidable to meet in person, combination of trips will be considered out of efficiency; in addition, the selected location will be as equidistant as possible to all parties and the selection criterion of transportation will be the less polluting transport, choosing first walking or biking for short distances and bus or train (rather than plane) for longer distances.

-The number of attendees to the project meetings will be limited to the necessary minimum (avoiding the use of several vehicles) and only essential trips will be done during the project implementation. In cases where more than one person per consortium member must attend a meeting, and should driving be unavoidable, carpooling will be the chosen option whenever possible. Hence, the annual meeting and other required meetings will be planned in order to minimize carbon dioxide emissions.

-The information exchanged during the project will be made by electronic means (email, phone, etc.), the use of paper and printing will be avoided whenever possible. Although some documents derived from the project's implementation (leaflets, brochures and layman's report) will be printed, the consortium has among its priorities to use electronic format whenever possible in order to reduce paper consumption. In case paper is required, documents will be printed double-sided using recycled paper.

-Green Procurement principles and other green practices will be applied regarding measurement acquisition equipment and electric car. The purchase of products and services that cause minimal adverse environmental impacts and human health considerations will be taken into account towards high quality products and services at competitive prices.

-While working in the office the following rules shall be followed: turn off the lights when the room is empty, turn off computers when not being used, use of highly efficient lamps and avoid air conditioning and heaters abuse by keeping a reasonable (environmental whenever possible) temperature throughout the year.

-Catering Services Footprint Reduction:

-Food service must be organically produced according to Regulation (EC) No 834/2007. Suppliers owning a type I ecolabel certificate for restaurants will be presumed to comply with the criteria if they specify the percentage of organic food. Alternatively, suppliers must indicate how they intend to meet the obligation within the proposed offer. In addition, products carrying a community or national organic label will be deemed to comply. Besides, the main fruit, vegetables and marine products to be used in carrying out the service shall, whenever possible, be selected according to the season.

-Packaging, Transport and Waste generation will be also considered. Suppliers must certify that food is provided in secondary and/or transport packaging with more than 45% recycled content, in packaging materials based on renewable raw materials and not supplied in individual portions (single-unit packages). Regarding the transport, it has been already mentioned that the current transport systems are a significant source of greenhouse gas emissions; thus, whenever possible locally-produced and organic food will be preferred. When consuming non locally-produced food, the vehicles to be used in carrying out the service shall at least fulfil the exhaust emission requirements of EURO 4 or IV. In order to reduce waste generation, food and beverages must be served using cutlery, glassware, crockery and tablecloths which are renewable or based on renewable raw materials. Moreover, waste produced in carrying out the service will be collected separately according to the collecting system of the public administration.

Name of the picture: Table 4. European air quality standards and WHO air quality guidelines.

		Air Quality Directive		WHO guidelines	
Pollutant	**Averaging period**	**Objective and legal nature and concentration**	**Comments**	**Concentration**	**Comments**
$PM_{2.5}$	One day			25 µg/m³ (*)	99th percentile (3 days/year)
$PM_{2.5}$	Calendar year	Target value, 25 µg/m³	The target value has become a limit value since 1 January 2015	10 µg/m³	
PM_{10}	One day	Limit value, 50 µg/m³	Not to be exceeded on more than 35 days per year.	50 µg/m³ (*)	99th percentile (3 days/year)
PM_{10}	Calendar year	Limit value, 40 µg/m³ (*)		20 µg/m³	
O_3	Maximum daily 8–hour mean	Target value, 120 µg/m³	Not to be exceeded on more than 25 days per year, averaged over three years	100 µg/m³	
NO_2	One hour	Limit value, 200 µg/m³ (*)	Not to be exceeded more than 18 times a calendar year	200 µg/m³ (*)	
NO_2	Calendar year	Limit value, 40 µg/m³		40 µg/m³	

STAKEHOLDERS INVOLVED AND MAIN TARGET AUDIENCE OF THE PROJECT (OTHER THAN PROJECT PARTICIPANTS)

Stakeholders

The involvement of the relevant stakeholders associated to the project will be very important for accomplishing the implementation and replicability of the results. The stakeholders groups are decision-makers, citizens, traffic managers and environmental and citizen associations.

Decision-makers and local administrators

Air quality is one of the major challenges for the EU in the new millennium. Public administrations at every level and within their range of competences must ensure air quality in urban areas.

In general, this stakeholder group can take advantage of the project results by proving to the general public their involvement and support to environmentally friendly measures which are well accepted among citizenship. Also the public budget will be benefited as air quality impacts directly on public health cost and public infrastructure maintenance. LIFE-CAPACITy cost-effectiveness will lead to lower maintenance budgets, releasing public funds for other purposes.

Replicability and transferability will start during project execution. European cities will be contacted in order to collect information about their specific constrains regarding air quality. Hence, the information collected will contribute to develop a standard solution able to be adapted to other middle urban areas as Terrassa.

In order to work with this stakeholder group, the project will set up an AB to assure replicability. The AB will be appointed to review Replicability and Transferability strategy, overall progress and the environmental achievements of LIFE-CAPACITy project. The AB will be formed by minimum 5 European cities. However, regional governments could also be involved in the development of the project Replicability and Transferability strategy by providing the availability air quality network data.

Currently the project has received the support of the following local administrators to actively participate as stakeholders in the development of the CAPACITy project participating in the meetings, workshops any other dissemination activity (see letter of interest):

-Government of Catalonia.

-City Council of Madrid

-Barcelona City Council

-Balearic Islands Government.

-Barcelona Provincial Council

-AMB

Additionally, POLIS, a network of European cities and regions cooperating for innovative transport solutions, will be involved as stakeholder of the project (see letter of support). This entity will be kept informed about the project’s progress, specifically during the demonstration phase where operational results can be provided. POLIS will be invited to participate in the AB for transfer and replication, and in the final project workshop.

Traffic managers

It is worthy to highlight the participation of Spanish Department of Traffic (DGT) that has expressly demonstrated the support to the project with a letter. DGT will support LIFE CAPACITY project during the action B2, where vehicle circulation in Terrassa will be recorded using traffic cameras, to obtain specific vehicle fleet distribution profiles in Terrassa. Specifically, DGT will perform a data cross-checking between the list of plate numbers and the Spanish national registry of vehicles; by doing so, each vehicle will be linked with their specific characteristics (i.e. Vehicle and Euro category, fuel, engine capacity, weight). This information will allow the consortium to have the specific fleet distribution profiles which constitutes an essential input for the air quality forecasting system.

Citizens

As citizenship is a key stakeholder, this project aims to demonstrate that citizen participation on environmental decision-making contributes to better environmental results. The citizens' participation is expected in the following phases:

-Measurement campaigns.

-Gather citizens' perceptions.

-Gather citizens' proposals to act against air pollution.

-Participation in public workshops and public consultations.

LIFE-CAPACITy project will ensure citizen engagement through the use of an extensive communication campaign, a team of environmental informers and an open digital platform for civic participation. Actions to increase citizens' engagement will be done through B.4 along the project's time span.

LIFE-CAPACITy project has received the support of the "Diari de Terrassa"(see letter of support). They have expressed their interest in the project and in participating in dissemination activities. Being supported by the main local newspaper will boost the dissemination activities, ensuring a greater impact.

Environmental and citizen associations

The organizations driving its activity to the environment protection represent a very relevant lobby regarding the public administration and competent organisms in environmental subjects.

Moreover, citizen associations have the potential to impact thousands of citizens leveraging its prescription power through its own communication channels; as a matter of fact, they are in charge of keeping citizenship updated regarding city's issues.

The communication campaign will also target both environmental and citizen association in order to maximize the impacts of its results.

The Air Quality Platform, a local environmental association, has confirmed their interest in participating actively in the project (see letter of support). Also, Department of Epidemiology (DEP) in Rome will participate actively in the project evaluating the project impacts.

Target audience

The aforementioned stakeholders are those strictly involved during project execution, but there are large groups of entities that are affected by the project results. These entities compose the target audience of this project, which include from local administrators and air quality agencies to research scientists and engineers in the field of air quality modelling, as well as the general public.

Central governments (e.g. national or regional ministries or departments).

They are responsible of implementing and reinforcing the compliance of EC policies, legislation related to air quality as well as providing guidance about the air quality plans.

Local governments and city/regional planner

This group is composed by the metropolitan planning organizers and decision makers responsible for the creation and implementation of air quality plans.

Environmental and health agencies/authorities.

They are responsible for maintaining or improving the environment in their region. Given its direct relation with the topic being treated, they will participate actively in a number of dissemination activities and workshops organized by Terrassa.

It is deemed that these entities will help raising awareness regarding the project's potential, accelerating its acceptance and implementation; therefore, their participation is considered of high priority.

See letter of support of Regional Agency for the Protection of the Environment in Lombardy, AIRPARIF organization and Institute for Global Health (ISGlobal) .

Research centres/institutes and universities

LIFE-CAPACITy's outcomes will be disseminated in national and international scientific conferences to make the available among this target audience. In this regards, the consortium has extensive experience as technical staffs of scientific partners (CSIC, UPC and BSC) regularly attend conventions organized by modelling and air quality organizations (HARMO, ITM, European Aerosol Conference, among others) at the national and international level to present their research results and do networking.

See letter of support of two research centers: LEITAT, University of Bari and University of Birmingham.

Environmental consultancies and air quality experts

They work on a contractual basis for private and public sector clients, addressing environmental issues such as air quality; thus, they can be prescribed of the LIFE-CAPACITy innovative process. In this sense, they will be invited to participate in the workshops carried out during and after the project.

General public

The increasing demand by citizens and environmental organisations for cleaner air has been plain. When asked to list the five main environmental issues that Europeans are worried about, averaged results for the EU show that air pollution is the second highest concern across the EU-25. This demand by citizens is one of the main reasons why the EC has made water protection one of the priorities of its work.

Therefore, LIFE-CAPACITY will take part in community outreaching activities to provide information to the public about the novel technology and its beneficial impact on society.

How to involve such variety of actors is a key challenge to apply and transfer the outcomes of the present project. To this end, a dissemination plan will be carefully elaborated describing each target audience, the main stakeholders of the project, the purpose of addressing them or the message to communicate and how. See Table 5 and Table 6 for further detail.

EXPECTED CONSTRAINTS AND RISKS RELATED TO THE PROJECT IMPLEMENTATION AND MITIGATION STRATEGY

The management process will identify and monitor, during project implementation, internal and external risks as well as any other issues that might affect the project progress towards its objectives, in order to carry out mitigating actions as early as possible. Each partner has the responsibility to report immediately to project coordinator any risky situation that may arise and affect the project objectives or their successful completion. In the event of problem or delays, the consortium will establish mitigation plans based on: 1) Strengthened supervision; 2) Adjustments to Project strategy; 3) Changes to implementation arrangements; and 4) Changes in budget allocations.

LIFE-CAPACITy partners have enough experience in project implementation as to establish in advance the inherent risks related to the project that will lead to delays in the activities. Such experience will allow partners to accurately track the development of all actions as well as to implement the corrective measures or contingency plan, should it be necessary. Yet, preventive countermeasures have been defined beforehand so, in case that any issue takes place, the implementation of the project will not be compromised.

According to the above, critical risks relating to project implementation have been defined and divided into the following categories:

Technical risks

Low correlation between NO_2 concentrations obtained with passive dosimeters and reference instruments. In case of finding mismatches between measures taken by passive dosimeters and reference instruments (action B1) the measurement campaign would be repeated.

Probability: Low

Impact: High

Low quality data of PM concentrations obtained with low-cost sensors (action B1). Quality is ensured by a periodic inter-comparison with reference instrumentation (DIGITEL). In case of failure, sensors would be sent to manufacturers for calibration.

Probability: Low

Impact: High

Delay on the implementation of the modelling tool. Although the resources for the project have been assessed as accurately as possible, it will be necessary to closely monitor the implementation of the microscopic traffic simulation model, street scale traffic emission model and air quality systems (action B2).

Probability: Low

Impact: High

Availability of supercomputing resources to run model simulations (action B3). BSC hosts Mare Nostrum, the most powerful supercomputer in Spain and the operations group will help to use it in a proper and efficient way.

Probability: Low

Impact: High

Methodological risks

Permits for the implementation of mobility measures. This will not represent a major concert due to the fact that Terrassa City Council is the project coordinator and the mobility measures are already included in the current air quality plan.

Probability: Low

Impact: High

Poor citizen engagement. Citizen participation is a key element in achieving the success of the project. Task B.4 has the main objective of reaching citizens through two key tools: a comprehensive and well-organized communication campaign and a digital open platform to inform and contact citizens in an understandable way.

Moreover, thanks to the active participation of Terrassa City Council and the engagement of four Environmental informers dedicated full-time to inform citizens and encourage their participation, it is expected to achieve project goals.

However, in the different phases shall be guaranteed not only a high participation rate but the equal participation of the different profile group of citizens. Thus, Environmental Informers will be trained at the beginning of the project to become active agents in promoting citizen participation, and transmit the values of participation and its importance in the process of building up the city.

Additionally, a committee will be created to monitor the process of participation, to define the methodology, to establish calendars, to participate in the communication strategy, and to analyze results and create feedback; as a matter of fact, tasks regarding reaching citizens will start at the beginning of the project (action B4). Since the beginning, all activities will be closely monitored by this committee so, in case of low citizen participation, the necessary corrective measures can be applied, such as reviewing the communication strategy, increasing the resources.

Probability: Low

Impact: High

Adaptation of the project's results to the situation of other cities. Air quality is a main concern for European cities and towns**.** In this line, the replication of the project results will be reinforced through the replicability and transferability strategy (action B6) as well as the communication strategy. Yet, in the event of any problem, the consortium will ask for feedback from other external stakeholders in order to list the factors that may not make possible to extend the LIFE-CAPACITy tool to other metropolitan areas. In this regard, the participation of the POLIS platform, a network of European cities and regions, in the AB will facilitate this assessment.

Probability: Low

Impact: High

Communication and dissemination problems. Dissemination of project's results and outcomes to the identified target audience is essential to promote the implementation of LIFE-CAPACITy innovative process. Due to the general interest of European urban regions and central governments on reducing air pollution, it is expected that the project will attract the interest of relevant stakeholders; however, if it happens otherwise, appropriate measures have been already established, like defining tasks to develop effective communication tools (see action D).

Probability: Low

Impact: High

Managerial risks

Internal communication problems, poor quality of the deliverables and failing to accomplish deadlines are the three most relevant managerial risks that may happen. High priority and attention will be given to the crucial area of project management. The project partners are fully committed and agree to work together with the utmost co-operation for the timely fulfilment of their responsibilities. To ensure that the project deliverables are met in an integrated and timely fashion, an efficient and transparent management structure will be implemented. To this end, deadlines will be met, all reports will be properly written and technically accurate, and every responsible will assist to the technical meetings. Should any of these assumptions would not be fulfilled, the project coordinator will take the appropriate measures to make the project proceed in a smooth manner.

Name of the picture: Table 6. Dissemination actions

ACTIONS	INDICATORS
1 Website, social network and newsletter	30,000 visits to the website 3,000 followers in social networking accounts 15 newsletters
2. Project Materials	10,000 leaflets distributed 1,000 posters 50 project information panels 2 video - 3,000 video visits on YouTube
3. Relationships with communication media	100 media impacts 500 records in media database 2 press conferences 6 press releases 1 media visit
4. Organization and attendance at events	1 day of launch (75 attendees) 10 visits to institutions and policy makers 15 participations in seminars and conferences 1 final seminar (100 attendees)
5. Technical publications	5 articles published
6. Layman Report	500 distributed in paper 500 downloads from the website
7.Networking	5 related project contacted 5 local administrators within the Advisory board for transfer and replication (Action B6.1)
8. Advertising campaign	100,000 people informed about the project 1 dossier with campaign evaluation 50 insertions in online and written press 100 radio wedges

Name of the picture: Table5. Target Audience

Target Audience	Goal	Dissemination and communication actions
Central Governments	1. Acting as prescribers of the modelling tool and the new methodology of citizen consultation on environmental issues.	1.Project website, social media and newsletter 3.Communications in mass media 4. Project conference & events 5. Technical publications
Environmental agencies	1. Use of the modelling tool 2. Prescribers of the strategy of citizen consultation on environmental issues 3. Replication of results in other sectors	1.Project website, social media and newsletter 3.Communications in mass media 4. Project conference & events 5. Technical publications
Local administrators (City Councils)	1. Replicate the tool and the process of citizen participation in other cities.	1. Project website, social media and newsletter 2. Dissemination material 3. Communications in mass media 4. Project conference & events 5. Networking
Technical consultancies	1. Use of the tool to offer consulting services on air quality. 2. Prescribers of the modelling tool.	1.Project website, social media and newsletter 3.Communications in mass media 4. Project conference & events 5. Technical publications
Research Centres	1. Prescribers of the modelling tool 2. Use of emission, traffic and air quality prediction models for research.	1.Project website, social media and newsletter 4. Project conference & events 5. Technical publications
Air quality and environmental associations	1. Contribution to the dissemination and communication of the modelling and prediction tool and to the new methodology of citizen participation. 2. Participate in the tasks of dissemination of digital tools and events for citizen participation.	1.Project website, social media and newsletter 2.Dissemination material 3.Communications in mass media 5. Technical publications 6. Layman report 8. Communication campaign (B.4)
General public	1. Awareness raising and promotion on air quality issues in cities	1.Project website, social media and newsletter 2.Dissemination material 3.Communications in mass media 4. Project conference & events 6. Layman report 8. Communication campaign (B.4)
General media and environmental and scientific journalists	Transmission to the other public of: 1. Environmental problems and solutions related to air quality 2. The benefits of the modelling tool to put solutions. 3. Project progress and results.	1.Project website, social media and newsletter 3.Communications in mass media 4. Project conference & events

CONTINUATION / VALORISATION AND LONG TERM SUSTAINABILITY OF THE PROJECT'S RESULTS AFTER THE END OF THE PROJECT

Which actions will have to be carried out or continued after the end of the project?

In March 2017, Government of Catalonia together with Terrassa City Council and other 40 local representatives approved the commitments to cut traffic emissions by 30% within 15 years to gradually achieve the levels recommended by WHO. This agreement commits Terrassa to implement and develop continuously local measures related to sustainable mobility.

As a result, Terrassa will integrate the LIFE-CAPACITy management approach in their decision- making process related with new air quality measurements. LIFE-CAPACITy tool for air quality diagnosis and forecasting will be used for prior-to-deployment assessment of next environmental policies. Moreover, the predictive capabilities will be used for monitoring purposes allowing the local authorities to foresee days with exceeding air pollutants and act accordingly.

In addition, it is expected that this methodology and tools will be enriched in the future, as new improvements are identified (new parameters, critical points) and incorporated to guarantee that air quality objectives are achieved.

It has to be underlined that the March 2017 agreement affects 40 municipalities which belonged to the "Areas of Special Protection of the Atmospheric Environment". In this regard, this project will be a demonstration for its subsequent implementation in those areas.

In particular, several project actions will be continued after LIFE project conclusion.

Tools deployed during **Action B4**. **Definition of sustainable mobility strategies** will be living tools:

- The digital platform will stay active after the project so citizens can use it to access air quality information or contribute to measurements.

- A team of environmental informers will be active in order to increase awareness and gather proposals regarding different environmental problems in the municipality of Terrassa.

Additionally, measures and proposals selected by citizens during the public consultation will be considered for implementation when designing the next sustainable mobility plan.

Due to the big potential of application in other EU cities, the project could significantly contribute to the change of the current global air quality trends in EU urban environments. In the current socio economical context many EU cities have taken a very pro-active role to improve their carbon footprint moving to more efficient and sustainable behaviour. To that end, an important activity that will continue once the project is finished will be **Action B6 Replicability and Transferability Strategy** which aims to ensure the replication of the proposed solution. The replication conditions will be assessment within task B6. In this sense, after the project the initial replicability and transferability strategy will be updated and several networking tasks will be done to disseminate this strategy and increase results replication. Finally, there will also be a periodic review of other European projects regarding replicability of new mobility solutions in different European cities, in order to make the results as compatible as possible.

Direct involvement from different municipal departments of European cities will be needed, as well as the involvement from the technological partners within the project (BSC, UPC and CSIC) to support technically the municipal bodies.

A continuous monitoring of the environmental and socioeconomic indicators will be performed; thus, Actions **C1 Monitoring the project impact on the environmental problem addressed** and **C2 Assessing the socio-economic impact** will continue after the end of the project in order to elaborate a dossier showing the positive impacts of the technological solution and support the replications specifically in those regions with tight social and environmental concerns.

Indeed, dissemination and communication will be necessary to support replication and transferability of the project results. In this regard, Action **D1 Dissemination planning and execution** will continue to raise awareness of project's results among other European regions and governments, environmental associations and general public. To that purpose, the consortium will attend forums and congresses, so as to make available the results and final conclusions of the project. Besides, the project's website will be updated with the most results.

Moreover, as can be observed in **section E,** the consortium will elaborate an After-Life communication Plan which will allow extending the benefits of the project after its completion. The main goal of this plan will be the incorporation of the results into European policies and their replicability. This document will gather dissemination actions towards citizens but also towards other public institutions and organisations. The consortium will hold a meeting once the project is over so as to analyses the After-LIFE evolution.

How will this be achieved? What resources will be necessary to carry out these actions?

As it has been explained before, the continuation and valorisation of the project's results after the end of the project will be based on the following actions:

-The LIFE-CAPACITy tool will be deployed in Terrassa for future assessment of air quality mitigation measures and as a forecasting tool to inform the population on future air pollution episodes.

-The demonstration of the proper performance of the LIFE-CAPACITy tool during the project will justify the transferability to other urban areas after the end of the project. Actions to disseminate these results and enhance results replicability will continue.

-New methodologies on street-scale air quality model will be derived from LIFE-CAPACITy methodology: coupling microscale traffic models with street-scale air quality
models.

These actions will require a mix of resources; both from private and public organizations.

Regarding the use of LIFE-CAPACITy tool, Terrassa City Council agrees on keeping LIFE-CAPACITy technology in operation in their internal environmental decision making processes. To that end, they will need the following resources: one environmental technician, a team of informers and BSC support.

On the other hand, in order to replicate the technological results in other municipalities the following resources will be needed for each municipality: a team of environmental informants, an environmental technician, BSC and UPC services in order to calibrate the model and CSIC services to perform the measures of the contaminants in the city area.

Although the actions will be promoted by Terrassa City Council, CSIC, UPC, BSC or MCV will use their own resources and networks so as to identify any chance to apply for public/private funding.

This supporting funding will be requested at different levels (regional, national or European), depending on the nature of the actions and the expected impact. It should be indicated that the most adequate option to consider will be the next Framework programme (FP9), in particular Topics for Social Challenge related with Smart, Green and Integrated Transport, in order to create a multidisciplinary and multisectorial project. Nonetheless, other public funding sources will be evaluated at European level such as: European Regional Development Fund (ERDF), European Social Fund (ESF), Cohesion Fund (CF), other Horizon 2020 such as Smart Cities and INTERREG.

On the other hand, collaboration within similar environmental project networks, new actions and future related projects involving a continuation of the current project will be also considered.

To what extent will the results and lessons of the project be actively disseminated after the end of the project to those persons and/or organisations that could best make use of them (please identify these persons/organisations)?

Dissemination activities will continue once the project has finished in order to maximize the project's impact. These actions are described in the Communication Plan of Action D. After-LIFE Plan communication activities will be carried out according to the methodology described in Action E, but could be re-planned depending on the results of the project, especially regarding the results of the dissemination activities foreseen to be conducted during the development of the project itself. Should these activities become a huge success, then these subsequent dissemination activities will not need to be modified; otherwise, new efforts will be made to readdress them.

The organizations expected to be the most interested in the results of the project are other European cities, mobility departments and environmental agencies. They can be summarized as follows:

-Regions, as entities responsible for the decision-making and the planning function.

-Municipalities, as local decision makers and responsible for the territorial planning at local level.

-Regional agencies and clusters whose mission is the environmental protection, transport management and reduction of emissions.

In addition to public entities, companies and/or R&D centres could also be interested. Usually, these entities become triggers of new implementation possibilities.

Some of the tasks that are expected to continue after the project are:

-Project's results will still be presented at international conferences. In addition, further scientific and technical publications will be released along with scientific publications that will be sent to journals with impact factor and there will be reviewed by researchers who will evaluate their interest. It is wort mentioning that the technical publications will be submitted at regional, national or European levels.

-Further work will be done to improve the replicability of the results obtained through doctoral theses.

-LIFE-CAPACITy project's website will be kept active and it will be updated with the latest news concerning the technology and possible post-LIFE news of interest related to the advances of the technology and the environmental and social achievements. Public access to the web and video of the project will be maintained, newsletters will be developed and communications will be made on the project in social networks such as LinkedIn, Twitter, Facebook, etc. These activities will help to stimulate dialogue and interaction between stakeholders and encourage exchange and dissemination in an exponential way. These activities will be carried out at least in Spanish and English.

-Sharing data/results with other related projects or European initiatives/databases and entities with a direct interest in the project results such as:

-POLIS Network.

-The European Innovation Partnership on Smart Cities and Communities (EIP-SCC).

-European Federation of Clean Air and Environmental Protection Associations (EFCA)

-Health and Environment Alliance.

-AirBase- The European air quality database.

-In case of succeeding with LIFE-CAPACITy project, it will be seriously considered to attend the European Week of Regions and Cities (which is held every year in Brussels) to expose the project.

LIFE17 ENV/ES/000268

TECHNICAL APPLICATION FORMS

Part C – detailed technical description of the proposed actions

LIST OF ALL PROPOSED ACTIONS

A. Preparatory actions (if needed)

B. Implementation actions (obligatory)

B1 Air quality assessment

B2 Implementation of the capacity monitoring tool

B3 Modelling tool evaluation and set-up for forecasting mode

B4 Definition of sustainable mobility strategies with active citizen participation

B5 Implementation and evaluation of sustainable mobility strategies

B6 Replicability and transferability action

C. Monitoring of the impact of the project actions (obligatory)

C1 Monitoring the project impact on the environmental problem addressed

C2 Assessing the socio-economic impact

D. Public awareness and dissemination of results (obligatory)

D1 Public awareness and dissemination of results

E. Project management (obligatory)

E1 Project Management

DETAILS OF PROPOSED ACTIONS

B. Implementation actions (obligatory)

ACTION B.1: Air quality assessment

Description and methods employed (what, how, where, when and why):

This first action will consist of obtaining experimental inputs, allowing the consortium to assess the air quality conditions based on operational tasks involving classic air quality measurements as well as state-of-the-art fixed and mobile measurements to obtain spatial variability. The monitoring campaigns to fulfill these objectives will include:

-**B1.1. Equipment assembly on the electric car (MCV, CSIC).** In order to carry out itinerant measurements through the city, an especially prepared car is required. As the presence of the car has to be transparent to the measurements, it must be electric rather than petrol-fueled. This task will undertake the actions needed to assemble all the equipment required for the task.

It must be raised that all the equipment is active; and, in addition, an acquisition system will be required in order to treat the gathered data.

Besides, the electric car will be equipped with extra batteries and with an AC unit in order to guarantee a properly climate conditions for the instruments. Specific anti-vibration systems will be used so as to avoid malfunction during the peripatetic measurements.

-**B1.2 Intensive campaigns with fixed equipment (CSIC)**. In this task, intensive measurement campaigns will be carried out to collect data related to NO2 and Particulate Matter (PM2.5) concentrations.

In the **case of NO_2**, more than 300 passive diffusion tubes will be placed in a grid fashion covering the entire city area and they will be collected after two weeks for later analysis; the idea is to cover the whole city and specifically those areas where there is already planned urbanistic actions (a higher density of passive diffusion tubes will be placed in these zones); this will allow a comparison of the situation before and after the actions taken. In addition, some tubes will be also placed around the outskirt in order to gain insight regarding the actual air quality in and out the urbanistic area. This operation will be repeated twice along the year, specifically in summer and winter.

In addition, **$PM_{2.5}$ sensors** will be distributed in the same area in order to obtain a more dense spatial resolution for the PM concentrations. In particular, 20 of these sensors will be deployed to perform measurements each minute. It should be noted that $PM_{2.5}$ sensors will require to be powered and they will be able to store the collected data.

A condensation particle counter and a miniaetholometer will be placed in Terrassa's Air Quality Cabin , one of the official cabins in Terrassa for measuring air pollution (http://dtes.gencat.cat/icqa/), throughout the whole project, in order to calibrate Ultrafine Particles (UFP) and Black Carbon (BC) measurements taken by the itinerant vehicle (action B1.3) and provide the first data series of these two health relevant pollutants in Terrassa city.These pollutants will be relevant to analyse the traffic emission source (Diesel vehicles are a source of black carbon (BC) emissions, a light-absorbing component of particulate matter (PM)).

-**B1.3 Intensive campaigns with itinerant electric vehicle (CSIC).** Peripatetic measurements will be done with an itinerant electric vehicle that will be equipped with instruments to measure PM_1, $PM_{2.5}$ and PM_{10} concentrations (GRIMM spectrometers), NO_2, and other atmospheric parameters that are not legislated, such as Black Carbon (BC) (determined with mini-Aethalometer Magee AE51) and UFP (determined with Condensation Particle Counter).

The vehicle will follow a previously defined route, with the idea of covering the whole city, and will stop at

selected points in order to build a concentrations background map of the city, as well as traffic concentrations during its movement; as in the case of fixed measurements, outskirts will be also covered in order to gather comprehensive data about the actual situation of the city. The car will move along fixed routes and stop at selected points where measurements will be made at high temporal resolution over short periods; **the tour will last about 4 hours total and will be repeated every four days during two months for each season in order to ensure enough data collection.** During the progress of this B1 action decisions will be taken regarding the preference of more static or itinerant routes, as the quality of the itinerant ones might be sensitive to the vehicle's vibrations.

One of the measurement points where the vehicle will stop will be the Terrassa's Air Quality Cabin. By doing so, it will be possible to compare and verify the data obtained from the mobile instruments with the measurements obtained by reference methods in the cabins (gravimetric equipments for PM concentrations, fixed photometer multi-angle-MAAP for BC, or fix condensation particle counter-CPC for UFP).

It must be noted that the electric vehicle, and the equipment within, must be frequently checked. To that purpose, maintenance and calibration tasks will be performed throughout the campaign so as to assure the quality of the measured data. These actions will be scheduled once a week or each two weeks; yet, should any failure be detected it will be repaired immediately.

-B1.4 Citizen participation (CSIC, TERR). 300 Citizens will be recruited using social network media, and will be trained to install in their houses a low cost sensor (the one mentioned in B1.2) in order to measure NO_2. The idea is to achieve an homogeneous representation of the city; yet, special attention will be paid in those areas where environmental policies are to be applied.

Once the measurement campaign is over, they will be invited to a meeting where they will be informed about (and allowed to discuss) the results obtained.

-**B1.5 Integrated assessment source apportionment of PM_{10} (CSIC)**. A measuring campaign of a whole year will be carried out at the fixed monitoring site of the local air quality network in order to perform a complete chemical characterization of PM_{10}, and source apportionment by means of receptor modelling. More specifically, 120 samples (every third day) of PM_{10} will be collected by means of a high volume sampler; after weighing the filter, they will be analyzed in the CSIC laboratories for the determination of about 60 components:

-Mayor and trace elements by means of Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) and Mass Spectrometry (ICP-MS), respectively.

-Water soluble ions by High Performance Liquid Cromatography.

-Organic and elemental carbon by thermos-optical analysis.

-Ammonium by specific electrode.

Once the concentrations of these components are determined, a positive matrix factorization technique will be applied in order to determine the main source categories and their daily contributions to PM_{10} levels. These results will be used to prioritize the emission sources to be targeted in the air quality measures to be modelled.

Beneficiary responsible for implementation:

CSIC

MCV, TERR

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

-281 working days of MCV to assembly the **car equipment and to carry out the maintenance and calibration tasks.**

-210 working days **of Terrassa City Council Environmental informers in order** to engage the citizens to join in the measurement campaign and 10 working days of Environmental technicians in order to coordinate the Environmental informers.

-560 working days of **CSIC researchers** to collect the measurements and analyze and evaluate them; in particular, 128 of those working days will be destined for driving the vehicle.

This is the major equipment cost of the project due to the cost of **measurement equipment** and the **itinerant electric vehicle** prototype that will be needed for the measurement campaigns:

The prototype will include:

Electric vehicle:

-Electric car.

Mobile sensors: Specifically, the car must equip the following sensors:

-Black carbon - Aethaleometro Magee Scientfic (AE31 model).

-NO_2- API Teledyne (CAPS T500U model).

-PM_{10}, $PM_{2.5}$ and PM_1 - Grimm; (180D model).

-Ultrafine particles – TSI (EPC3783 model).

-Data acquisition system.

The measurement equipment will include:

Fixed sensors:

-20 PM sensors DYLOS

-1 Condensation Particle Counter

-1 Miniaethalometer

Low-cost sensors for citizens:

300 Passive tubes of NO_2

Moreover, for engaging citizens in the measurement campaigns it is envisage the **purchase of specific dissemination material**:

-Leaflets, radio advertisements, presence in local newspapers, Optical Point of Information (OPIs).

B1's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
A source apportionment of PM10 study	06/2019
Protocol for a citizens empowerment to collect air quality data	12/2018
Protocol for a citizens empowerment to collect air quality data	06/2019
Map of spatial distribution of air quality pollutants including NOx, PM, BC and UFP	06/2019

B1's PROJECT MILESTONES

Milestone name	Deadline
Emission sources defined and classified	06/2019
High spatial and temporal resolution of air pollutants concentrations including NOx, PM, BC and UFP	06/2019
First database of reference itinerant measurements for air quality across the city	06/2019
300 citizens recruited to install the passive dosimeters and to gather the results	11/2018

B. Implementation actions (obligatory)

ACTION B.2: Implementation of the capacity monitoring tool

Description and methods employed (what, how, where, when and why):

The general objective of this task is the **development and calibration of a modelling tool to monitor and forecast air quality in Terrassa,** based on both urban road traffic parameters and traffic emissions (see Figure 8).

-B2.1. Street traffic models and emission traffic models. The main goal of this task is the implementation of the street scale traffic emission model assimilating the traffic data provided by the microscopic traffic simulation model.

-To define real circulation vehicle fleet distribution profiles (TERR). Two traffic cameras with automatic plate recognition system will be set up in Terrassa during one month. The information registered by the cameras (plate numbers) will be collected by TERR . A cross-checking data between the list of plate numbers and the Spanish national registry of vehicles will be performed by the DGT, which has already shown its interest in this project, in order to link each registry with the specific vehicles' characteristics (i.e. Vehicle and Euro category, fuel, engine capacity, weight). As a result, specific vehicle fleet distribution profiles will be obtained for each monitoring point where the cameras have been installed and for each hour/day of the week.

-To calibrate a microscopic traffic simulation model of Terrassa (UPC). A calibrated microscopic traffic simulation model will be developed for the city of Terrassa. In addition to the road network geometry, the traffic lights control plan and the public transport plans, an updated traffic mobility pattern must be considered as a mandatory input of the developed model. For this purpose, a new estimation procedure that will combine the results of an existing mobility survey (2014) and the result of an ongoing innovative project in Terrassa[1], which analyzes the anonymized tracking of citizen volunteers' phones to obtain the city mobility patterns, will be developed. Furthermore, the calibration process will consider not only the available real data from existing traffic sensors installed already on Terrassa but also the data provided by automatic plate recognition system.

-To develop a street scale traffic emissions model (BSC). A detailed bottom-up street scale traffic emissions model will be developed for the city of Terrassa. The model will be capable of estimating hourly traffic emissions (exhaust and non-exhaust) taking into account the following information at the link level: (i) vehicle fleet composition profiles obtained from the traffic camera system; (ii) traffic flow, traffic speed and level of congestion obtained from the traffic simulation model; and (iii) emission factors per vehicle category, technology, fuel. For the exhaust traffic emissions, a revision and adjustment of available traffic emission factors (i.e. COPERT), a software tool used world-wide to calculate air pollutant and greenhouse gas emissions from road transport. The development of COPERT is coordinated by the European Environment Agency (EEA), in the framework of the activities of the European Topic Centre for Air Pollution and Climate Change Mitigation. In the case of non-exhaust resuspension emissions, available measurements from previous campaigns performed in similar Mediterranean cities will be used and a parametrization to estimate the effect of rain events will be also implemented. The model will estimate emissions individually for each specific vehicle category and the following pollutants: NOx (NO and NO_2), NMVOC, CO, SO_2, NH_3, PM_{10} and $PM_{2.5}$ (organic carbon and black carbon).

-B2.2. Urban air quality modelling tool development. The combination of regional air quality models with urban street scale models is needed to successfully obtain an air quality modelling tool that simulate the dispersion of road sources emissions and, at the same time, estimate air quality at the street level. The specific actions to be developed are:

-To adapt mesoscale air quality forecasting system (**BSC**). The CALIOPE air quality system will be adapted and implemented for the region of Terrassa in order to simulate high spatial and temporal resolution (1km^2, 1h) air quality concentrations. The system will integrate an online meteorological, chemistry and mineral dust system (NMMB-MONARCH) and an emission model (HERMES). **The emission model will include the street scale traffic emission tool developed in B2.1 as well as other anthropogenic (i.e. industry, energy, use of solvent, residential combustion, waste management, agriculture) and natural sources (i.e. biogenic and fire emissions).** The working domain of CALIOPE will include not only the urban area of Terrassa but also other nearby urban regions such as the Barcelona Metropolitan region to take into account the regional influence of these pollutant source regions to Terrassa's local air pollution. The CALIOPE system will simulate background levels and regional contributions to Terrassa's air pollutant concentrations of several pollutants regulated in the Directive 2008/50/EC, including**: NO_2, SO_2, CO, O_3, PM_{10}, $PM_{2.5}$ and C_6H_6.**

-To implement a street scale dispersion model (**BSC**). A near-road source urban dispersion model (R-Line) will be implemented and adapted to Terrassa's urban geometry conditions to provide air quality estimations at street level (10m). The dispersion model will use and adapt the meteorological outputs obtained from the mesoscale system in order to include the influence of urban geometry features such as orientation and geometry of streets (i.e. width and height building). A NO-NO_2-O_3 chemical reaction scheme for the formation of NO_2 will also be used in order to capture the formation of this pollutant at the street level. Traffic emission outputs obtained with the model developed in B2.1 will be coupled with R-Line.

-To integrate the urban air quality modelling tool (**BSC**). The mesoscale forecasting system will be coupled with the urban-scale dispersion model with the objective of obtaining an air quality tool that integrates the different modelling scales (regional and urban). A methodology to avoid double-counting of road transport emissions (i.e. these emissions are considered in both models) will be implemented. The double-counting strategy will consist on subtracting the concentrations calculated with the street scale dispersion model (i.e. traffic emissions contribution) to the mesoscale model simulation (i.e. all sources contribution) and then add the street scale concentrations to the new estimated background concentrations. The final modelling tool will allow estimating hourly concentration at the street level for: NO_2, and PM_{10} pollutants.

[1] Project conducted by Professor Larriba (UPC) entitled: *"Projecte de recerca i desenvolupament d'un sistema Big Data aplicat a la confecció d'enquestes de mobilitat de municipis, aplicat a la ciutat de Terrassa."*

Beneficiary responsible for implementation:

BSC

TERR, UPC

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

-566 working days of BSC researchers (a senior researcher and a junior researcher) and an IT engineer to undertake the tasks of developing the street scale traffic emissions model and the urban air quality modelling tool, which will involve: the adaptation of the mesoscale air quality forecasting system; the implementation of a street scale dispersion; and, the integration of the urban air quality modelling tool.

-385 working days of UPC researchers to undertake the tasks of calibrating a microscopic traffic simulation model of Terrassa which will involve the accurate definition of critical inputs along with the development of a new estimation procedure to obtain the city mobility patterns.

-70 working days of TERR staff: two environment technician for the participation and coordination of the task

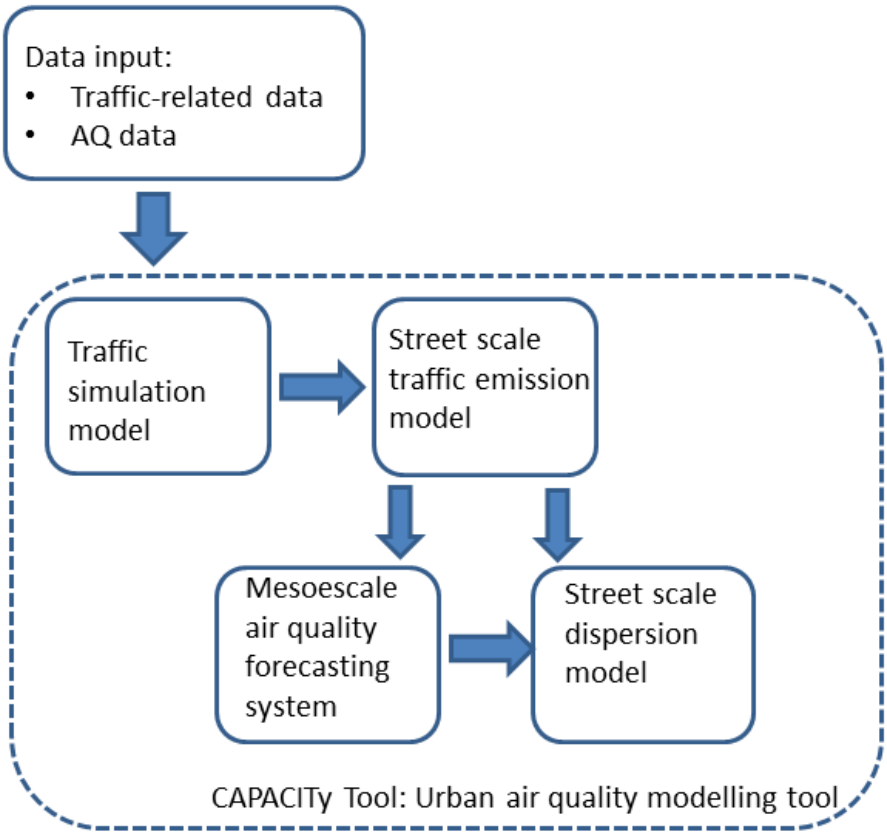
of locating the itinerant traffic cameras for the characterization of vehicles and for the definition of system requirements.

The success of the tasks described above requires the acquisition of specific equipment; next, the most relevant are listed:

-Two traffic cameras.

-Storage system 90TB to gather air quality and traffic measurements and information to calibrate models.

Name of the picture: Figure 8.Integrated urban air quality modelling tool



B2's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
A street traffic model and emission traffic model developed for Terrassa	06/2019
Integrated urban air quality forecasting modelling tool developed	06/2019

B2's PROJECT MILESTONES

Milestone name	Deadline
Availability of the integrated urban air quality modelling tool	06/2019
Availability of the street scale traffic emission model	04/2019
Traffic camera network installed and monitoring road transport in Terrassa	08/2018
Availability of the calibrated microscopic traffic simulation model	01/2019

B. Implementation actions (obligatory)

ACTION B.3: Modelling tool evaluation and set-up for forecasting mode

Description and methods employed (what, how, where, when and why):

This phase involves the adjustment and calibration of the tool using as inputs the results of the measurements taken in B1 and the mobility measures deployed in B5.1. The LIFE-CAPACITy tool will be ready then for monitoring the impact of specific mobility measures. Afterwards, the system will be deployed in forecasting mode to provide daily forecast of NO_2 and PM_{10} at street level for the city of Terrassa.

The subtasks included in this action are:

-B3.1. Adaptation of urban air quality modelling tool using real measurements from B1 (BSC, UPC).

The results of the mesoscale and street level air quality coupled system will be evaluated using the observations obtained from the intensive campaigns with fixed and mobile equipment performed in B1. Simulated and observed concentrations for NO_2 and PM_{10} will be contrasted in order to analyze the effectiveness of the modelling system to capture street level concentrations. **The a priori modelling tool calibration will be reevaluated to improve the matching with the observations performed in B1**. This process will significantly enhance the model performance. Unidentified emission sources may be included in this task thanks to the detailed data collected in B1.

For the evaluation procedures, an automatic evaluation system for the air quality modelling tool will be deployed. The evaluation will be used throughout the whole project to quantify the performance and skills of the air quality modelling tool. Classical and categorical statistics will be calculated using the observations gathered during the project.

For this task, the LIFE-CAPACITy tool will be applied in hindcast or diagnose mode. This implies that the best meteorology and emissions will be applied for each scenario or episode under analysis. Such approach provides the best estimate of the modelling tool minimizing the uncertainties related with the meteorology and emissions. However, even using the best meteorological and emission conditions, there will always be some deviations from the reality. Such deviations will be minimized with the work undertaken in this task.

-B3.2. Model accuracy assessment of different policy mobility measures implemented in B5 (BSC).

The integrated tool will be **adapted and calibrated using the observations obtained from the intensive campaigns with fixed and mobile equipment performed in B5**, where some different policy mobility measures will be implemented. **This task will assess the skills of the air quality modelling tool to replicate the actual results of a specific mobility measure implemented in Terrassa.** The integrated urban air quality system will be applied for the different sustainable mobility strategies to provide air quality model results at very high spatial (10 m) and temporal (1h) resolution for Terrassa.

Simulated and observed concentrations for NO_2 and PM_{10} will be contrasted in order to analyze the effectiveness of the modelling system to capture street level concentrations. B5 observations will provide excellent information on the real impact of each measure that will be modelled afterwards with the LIFE-CAPACITy tool. The evaluation package of B3.1 will be used to objectively quantify the performance of the tool.

In the same fashion as B3.1, the LIFE-CAPACITy tool will be applied in hindcast or diagnose mode.

-B3.3. Evaluation and adjustment of LIFE-CAPACITy tool for operational forecast mode (BSC,

UPC).

This task will prepare and deploy the forecasting capability of the LIFE-CAPACITy tool; in this regard, the main model configuration will be based on B2 and the previous work of B3. It must be noted that the transition to a forecasting mode will require the use of initial and boundary conditions of a meteorological forecast. Moreover, the LIFE-CAPACITy tool will use the global meteorological analysis and forecasts from a Global meteorological center to run the main mesoscale driver CALIOPE. The system will be set-up to automatically execute a daily forecast of 48h in length and transfer the results to TERR partner for their assessment. In task B4, TERR will carry out this assessment. The results obtained with the system will provided as a set of products to inform the general public, representatives from administrators, local organization and associations involved in the reduction of pollution of Terrassa (B4).

The forecasting system will be daily executed in the MareNostrum IV Supercomputer, hosted by the BSC. Regarding the forecasted pollutants, the following will be included: NO_2, O_3, PM_{10} and $PM_{2.5}$ at the regional scale, and NO_2 and PM_{10} at the street scale for Terrassa. The results obtained with the operational air quality system will be continuously evaluated with the local air quality monitoring network and the street level air quality data collected with the itinerant vehicle (Task B5.2) using a near-real time evaluation system based on B3.1. Besides, the observational data of previous days to the forecast will be also used to apply a post-processing technique (i.e. Kalman Filter technique) in order to correct the bias of the system and reduce its uncertainty in the simulated forecasts.

In order to properly deploy the forecast mode, it is necessary to evaluate the LIFE-CAPACITy tool during an annual cycle; this is because the system must be evaluated under all the typical conditions that occur during a whole year. Then, once the LIFE-CAPACITy forecasting mode is ready, the tool will provide daily forecast for a complete annual cycle.

Beneficiary responsible for implementation:

BSC

UPC

Assumptions related to major costs of the action:

B3's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Report on the performance of the LIFE-CAPACITy tool in forecasting mode.	06/2022
Report on the validation of the LIFE-CAPACITY model for air quality measures evaluation.	01/2020

B3's PROJECT MILESTONES

Milestone name	Deadline
Integrated tool adapted and calibrated	06/2021
Availability of LIFE-CAPACITy tool in forecasting mode	06/2022

B. Implementation actions (obligatory)

ACTION B.4: Definition of sustainable mobility strategies with active citizen participation

Description and methods employed (what, how, where, when and why):

B4.1 Definition of a methodology for a new democratic decision-making procedure for air quality plans (TERR). An innovative decision making process will be defined and implemented by Terrassa City Council involving all partners but mostly the citizens. The aim is to achieve a quality democratic process that seeks the active involvement of citizens in the management of public affairs and decision making related to air quality. The transparency of information and public participation are essential to carry out the necessary corrective measures to improve the air quality of the city with maximum citizen consensus.

B4.2 Innovative tools for citizenship participation (TERR, CSIC, UPC). This task will comprehend those activities related with the citizenship. These tools will be used to inform citizens about the air quality forecast obtained with the LIFE-CAPACITy system. Next, a list of the specific tasks is provided.

-Formation of Environmental Informers (TERR). First of all, an environmental group of informers will be hired by the City Council for the first three years of the project in order to carry out information and communication tasks, workshops, and information gathering. this team will undertake the following activities:

-Street and door-to-door surveys in order to be close to citizens and collect their perception regarding the pollution in different city areas.

-To announce the LIFE-CAPACITy project among the citizens.

-To assist in the workshops realization: acting as moderators, collecting information, helping in the preparation of web reports, etc.

-**Digital platform for civic participation (TERR).** The project includes a digital tool that allows assessment, public participation and municipal transparency to improve governance. Moreover, it includes a code of democratic guarantees to ensure that the use of the platform respects the principles of transparency, traceability, and universal access to information and participation with free and open character. The main objectives of this platform will be:

-Provide reliable air quality information and formation in an open and transparent way.

-Gather public perceptions about air pollution in different districts through surveys, forums and direct messaging for proposals and complains.

-Provide a space to discuss with other citizens or with air quality experts.

-Provide a digital platform for citizen consultations by allowing the citizens to vote on their preferred solution via anonymous polls.

-Submit proposals.

-Communication Campaign for air quality awareness (TERR). A communication campaign must be carefully designed. Moreover, all the tools within the City Council’s reach will be considered: local communication media, Environmental Informers,municipal website, letters to neighbourhood associations and other local entities, schools, information points in local fairs (such as the environmental fair and the electric vehicle fair), local conferences (such as Ecofórum), politicians press conferences, social networks, specific campaigns such as photographic contests, etc.

-Door to door communication actions (TERR). The Environmental Informers will inform, door to door, the neighbours and various district neighbourhood entities about the ongoing work within LIFE-CAPACITy project; besides, they will encourage people to use the digital platform to express their perception about the level of air pollution in their area/street.

This phase is parallel to Experimental Input (B1), where there is a Citizen Participation (B1.4) providing measurements of air pollution with passive samplers. Thus, the main target of this action will be involving citizens in these measurements. Thanks to this action it will be possible to analyse the impact of their implication on air quality measurements.

-Public training workshops (TERR, CSIC). This phase of the process will consist in training workshops about air pollution; in this regard, workshops will start shortly after the implementation of the first measure. The main aim of these public workshops, led by a mix of environmental specialists and the Environmental Informers, will be to inform about the LIFE-CAPACITy air quality modelling tool along with the results obtained during the project. In addition, and based on the simulation results of difference hypothetical scenarios, the causes and origins of pollution will be analysed during workshops in order to create awareness. It must be raised that Citizens registered on the digital platforms will be invited to participate on these workshops.

Another interesting point of these workshops is that they will allow discussion so participants can express their ideas so as to generate useful knowledge for the implementation of the next mobility measures.

All workshops will be also streamed through the digital platform, and the video will be recorded on the open digital platform for further consultation.

-Characterization of Citizenship (TERR, CSIC, UPC). The main goal of this task will be to gather information about the citizens' perception regarding pollution; by doing so, it will be possible to develop a heat map that will define which areas of the town have a higher level of sensation/perception of air pollution.

All these data will be recorded on the open digital platform available for the citizens to consult at anytime.

-Comparison and Analysis Zones (TERR, UPC, CSIC). With the characterization of the city's immissions (which show the actual level of pollution in each street) (B1) and the citizenship's feedback, a comparison will be made to find those areas with high levels of contamination (data from measurements) that match with the citizens' perception. These will be the areas where the mobility sustainable measures will be deployed first during B5, as it is expected a higher citizenship's willingness.

-Citizen's proposals gathering (TERR). This phase aims to generate proposals from citizens. In this regard, workshop participants will be invited to submit their proposals to act against air pollution in their neighbourhood to the digital platform.

-**B4.3 Public Consultation (TERR, BSC, UPC)**. Finally, at the end of the project, a public consultation will be performed in order to obtain a final air quality measure chosen by citizens.

-The set of ideas that citizen had proposed, as well as others who may propose experts will be evaluated using LIFE-CAPACITy tool by means of traffic and emission scenarios by the BSC; in this sense, it is worth mentioning that the results of this evaluation will be of public access. Once the results are analysed, those measures that combine the highest degree of feasibility and effectiveness will be selected for the public consultation.

-The proposals selected for the public consultation will be voted in a final workshop, where the measure favoured by the citizens will be considered for implementation when designing the next sustainable mobility plan.

Beneficiary responsible for implementation:

TERRASSA

CSIC, BSC, UPC

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

- An estimation of the expected dedication of the Terrassa City Council personnel included in this action has been made (3804 person-day) considering their capacities and experience in order to achieve the objectives of the action.

- 6 working days of BSC researchers to assist in the evaluation of the gathered proposals as a result of the public consultation.

- 68 working days of CSIC which will assist in: training actions such as workshops, seminars, etc.; and, the evaluation of the gathered proposals as a result of the public consultation.

- 50 working days of UPC to participate in: the development of a heat map from citizens' perception; the comparison between citizens' perception and the actual characterization; and, the evaluation of the gathered proposals as a result of the public consultation.

This action has strong dissemination component; thus, it is necessary to invest in a communication campaign and in a digital platform for civic participation:

-**Communication campaign (49.610€).**

1. Design of the campaign briefing.

2. Editing materials: Infographics, making/buying photos, videos for social media, roll-ups, power point presentations design, development and delivery of newsletters, merchandising, a media package for journalists and TV reporters, coordination and production of exhibitions (poster, leaflets).

3. Coordination and supervision of the creativity strategy.

4. Coordination of digital marketing campaigns.

5. Media planning: broadcasts on radio, television and in press and specialized editions.

6. Organization of events: workshops and press conferences.

7. Results evaluation report.

-Digital platform for civic participation (39.930€).

1. Design of the platform.

2. Metrics monitoring and evaluation reports.

3. Updating contents.

4. Specific web pages for events such as congresses (design and update).

B4's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Report on the conclutions of the Public Training Workshops	07/2021
Communication campaign	06/2019
Digital platform for civic participation	01/2019
Map of citizens’ perception with atmospheric characterization	12/2019

B4's PROJECT MILESTONES

Milestone name	Deadline
4 environmental Informers hired and trained	09/2018
5.000 active users on the digital platform	06/2019
10.000 citizens contacted by door-to-door actions	12/2018
2500 citizens actively participating in proposing measures	02/2022
Measure favored by public consultation	06/2022
10.000 citizens registered on the digital platform	06/2019
20 public training workshops	03/2022
Contrast between measurement and citizens’ pollution perception	12/2019

A. Preparatory actions (if needed)

ACTION B.5: Implementation and evaluation of sustainable mobility strategies

Description and methods employed (what, how, where, when and why):

B5.1. Deployment of policies under evaluation (TERR):

The Terrassa City Council has already prepared a battery of policies to be deployed aiming at two objectives: on the one hand, to quantify their environmental and socio-economic impact; and, on the other hand, to provide the modelling tools with real data, allowing their adjustment and calibration. The selected policies are measures mentioned in the Plan to improve air quality in Terrassa 2015-2020:

a. To identify protected-atmosphere urban areas (ZUAP) and reduce the traffic's density by restricting the access in these areas. This measure is expected to have a great impact as it points to areas with high population density and with poor air quality. Yet, several assessments have been performed in different cities, where NO_2 and PM_{10} values exceed the threshold limit, proving that traffic density must be reduced between 30-40% in order to achieve an effective air quality improvement. Besides, this measure not only aims to reduce the traffic density but to forbid the traffic of the most polluting vehicles.

b. To improve the public bus network and to improve the fleet.

c. To redesign some streets by reducing a lane of circulation by expanding sidewalks. This measure seeks to hinder traffic circulation, encouraging indirectly citizens to reach those areas on foot rather than by private car.

d. To encourage non-motorised modes of transport. Encouraging alternative, non-motorised modes of transport in urban areas:

-Promoting bicycle use.

-Establishing bicycle itineraries in the municipality, preferably not on pavements.

It must be raised that, according to the emissions inventory, the private vehicle is responsible of the 71,9% NOx emissions and of the 78,1% PM_{10} emissions within the city; thus, the deployment of this measures becomes critical when aiming for reducing emissions.

Before implementing the measures, operative details along with the feedback gathered as a result of training workshops (action B4) will be considered. Regarding, the selection of the area and the scope of each measure, they will be based on the following criteria:

-Degree of (modelled) effectiveness in the short term.

-Feasibility of implementation.

-Citizens' acceptance.

B5.2 Experimental evaluation of measures impact on air quality. (CSIC):

Within this task, air quality monitoring will be carried out during the implementation of the four different policies. As the mobility measures will be deployed in specific areas, measurements have to be taken in the following fashion: prior to the policies deployment to stablish a valid reference; and, afterwards for a direct comparison that will yield the actual efficacy of the mobility policies.

CSIC will be responsible of the four measurement campaigns conducted during this task. Particularly, each campaign will start one month before the measure implementation in order to define the air quality initial state and to assess the evolution after the implementation of the measure.

The instrumental set-up will be the same of B1:

-Measurements with fixed equipment.

-Measurements with itinerant electric equipment.

-Voluntary citizens will be recruited to join in the data collection.

Prior to carry out air quality monitoring, several considerations have to be taken into account in order to define a proper measurement plan. Next, some of these factors are listed:

-Selection of pollutants.

-Number and distribution of monitoring locations.

-Sampling duration and frequency.

-Measurement Methods.

-Meteorology plays a significant role in study of air pollution and it is necessary to measure meteorological parameters. The essential meteorological parameters that should be measured are wind speed and direction, ambient air temperature, relative humidity, rainfall, atmospheric pressure and mixing height.

Beneficiary responsible for implementation:

TERRASSA

CSIC, MCV

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

-TERRASSA human resources estimation assumes 955 working days for mobility strategies implementation. The staff involved in the evaluation and implementation of the mobility strategies is:

-Technician for the implantation of mobility measures.

-Environmental technician.

-Planning technician for mobility measures.

-1237 working days of CSIC for the measurement campaigns. In this specific action, CSIC will be in charge of conducting the four measurement campaigns associated with each of the policies deployed. In this sense, CSIC will undertake the following tasks: set-up definition; measurements collection; and, results assessment. It must be noted that, 250 of those working days will be destined for driving the vehicle.

-40 working days of MCV for car maintenance tasks.

B5's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Report on the impact of the mobility and air quality planning measures on the air quality levels of Terrassa.	03/2022

B5's PROJECT MILESTONES

Milestone name	Deadline
Availability of the operational urban air quality forecasting system	06/2022

B. Implementation actions (obligatory)

ACTION B.6: Replicability and transferability action

Description and methods employed (what, how, where, when and why):

LIFE-CAPACITY project will ensure the replicability and transferability of its results through a set of substantial activities aiming at making tangible use of project results in different contexts. These activities will go beyond dissemination, transfer of knowledge and networking as they will be focused on facilitating the replication and/or transfer of the project's results and experiences to other European cities or regions.

-B6.1 Advisory Board for transfer and replication (TERR, BSC, CSIC, UPC).

The consortium will identify strategic partners required for replicability and transferability of LIFE-CAPACITY technology. In this regard, the priority entities to be engaged to join the AB are:

-European cities.

-European associations: urban transport associations, citizen associations and environmental associations.

-European projects conducting traffic and air quality modelling in other European cities.

These AB will closely work together with project partners to prepare a **Replicability and transferability assessment.** To that purpose, specific workshops will be organized at the start, midterm and project completion.

Moreover, all these entities will be invited to the dissemination events that will be held during the project scope to let them know about the project advance and benefits, and especially to the final conferences where the steps and basis for the establishment of the exploitation plan will be set up**.**

-B6.2. Replicability and transferability assessment (CSIC, TERR, BSC, UPC)

This task will be mainly focused on analyzing how the project results will be transferred to other cities in other geographical areas. The scope of this report will point at:

-How to properly adjust the street scale traffic emissions model, by including the traffic particularities, the vehicle fleet distribution profile and the emissions factors per vehicle category of the destination city.

-How to properly adjust the urban air quality modelling tool by adapting the CALIOPE tool to the particularities of the destination city along with pollutants' anthropogenic and natural sources. In addition, traffic profile and road geometry must be well known as the modelling tool includes the street scale traffic emission tool as well.

-How to perform the itinerant measurements in order to obtain valid results. This includes identifying the proper vehicle's characteristics, the equipment distribution and their calibration.

-A guideline with best practices for implementing citizen participation in decision making at local level.

Beneficiary responsible for implementation:

CSIC

All the partners

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

-200 working days of TERR’s personnel involved in the AB activities and the implementation of a guide to increase citizen participation.

-36 working days of BSC’s personnel involved in the AB related activities, including: contacting potential entities to join in; working towards the project’s replicability and transferability by means of participating in the specific workshops and dissemination events.

-24 working days of UPC’s personnel involved in the AB related activities, including: contacting potential entities to join in; working towards the project’s replicability and transferability by means of participating in the specific workshops and dissemination events.

-804 working days of CSIC which will be involved in the activities associated to the AB as well; yet, its main contribution will consist on identifying in detail which are they key aspects (from a technical point of view) to guarantee a proper replicability and transferability of project’s results in other cities.

B6's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Replicability and transferability plan	06/2022

B6's PROJECT MILESTONES

Milestone name	Deadline
AB for transfer and replication: 5 European cities, 1 European urban association	12/2021
3 Workshops: one at the beginning of the task, middle and at the end of the tasks	06/2022

C. Monitoring of the impact of the project actions (obligatory)

ACTION C.1: Monitoring the project impact on the environmental problem addressed

Description and methods employed (what, how, where, when and why):

This task will focus on the on-going evaluation of the level of improvement on air quality. To that purpose, the evolution of the environmental goals set at the beginning will be monitored as the implementations of B actions go on. With regard to the monitoring protocol, it includes the revision of the actions in order to clearly define the expected results, the goals and the selected indicators. It must be underlined that, a proper monitoring period has been included in order to establish an effective monitoring system to assess the level of compliance throughout the development of the actions.

The environmental indicators related to B actions will be revised to determine the starting position (baseline) allowing to ponder the actual impact of the project's progress. Concerning indicators, 2017 LIFE Specific Project Indicators have been attached with estimated figures that will be fine-tuned when the project starts.

This action includes the following tasks:

-C1.1 Analysis of initial indicators

The revision of the implementation actions' indicators will be done at the beginning of the project in order to establish the initial situation. In this sense, it is important to determine the environmental initial scenario in order to evaluate the actual project's impact.

This action will start at the beginning of the project by defining the reference baseline. To that purpose, different measurements will be carried out over a year within the tasks of activity B1. In B1, the details of the measurement campaign (equipment, monitoring stations, frequency...) can be found.

The samples collected throughout the campaigns will be analyzed in order to extract conclusions regarding environmental indicators. First, the data should be validated by rejecting erroneous data; therefore, each environmental indicator will be analyzed individually in order to state a starting point for each of them.

The main environmental indicators that will be monitored are the following for Terrassa metropolitan area:

-PM

-NOx

-C1.2. Determination of impact through tracking of indicators

Once the background information is collected, the ambient air quality monitoring can be initiated. At this point, there is a solid knowledge of the initial situation what allows a direct comparison against the tracked indicators; thus, the progressive impact of LIFE-CAPACITy can be accurately assessed.

To that purpose, experimental campaigns will be conducted during each measure implementation in B5.2; and, the effects of each measure on emissions and air quality will be assessed during this C1.2 tasks. Furthermore, it must be underlined that, along the project's last year (once the mobility policies have been successfully deployed), the measurement campaigns performed in B1.1, B1.2 and B1.3 will be repeated; by doing so, LIFE-CAPACITy's impact on air quality will be properly evaluated. It must be also noted that, Terrassa's Air Quality Cabin measurements will be available throughout the project execution to be able to monitor indicators continuously.

Regarding loing-term impact, it is worth mentioning that indicators will be monitored until **3-years after the end of the project,** when major impact will be achieved according project characteristic.

Beneficiary responsible for implementation:

TERRASSA

All the partners

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

-575 working days of CSIC which will be in charge of the measurement campaigns along with the definition, tracking and assessment of the environmental indicators; in particular, 128 of those working days will be destined for driving the vehicle.

-23 working days of BSC which will assist CSIC in the tasks related with the evaluation of the environmental indicators.

-47 working days of UPC which will assist CSIC in the tasks related with the evaluation of the environmental indicators.

-24 working days of MCV which will assist CSIC in the tasks related with the evaluation of the environmental indicators.

-90 working days of TERR which will be in charge of the final assessment of the environmental indicators.

C1's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Report on the specific indicators, their sources of verification and assessment schedule	12/2019
Final report on the progress of indicators	06/2022
Report on the progress of indicators	06/2021

C1's PROJECT MILESTONES

Milestone name	Deadline
Initial Indicators collected, baseline established	12/2019
Intermediate indicators collected	06/2021
Final indicators collected and quantification of environmental and project impact	06/2022

C. Monitoring of the impact of the project actions (obligatory)

ACTION C.2: Assessing the socio-economic impact

Description and methods employed (what, how, where, when and why):

This action is proposed in order to assess the socioeconomic impact of the actions envisaged in the LIFE-CAPACITy project based on empirical data collected in real environment (TERRASSA); then, perform accurate socioeconomically analysis that allows the extrapolation of the project's results to other European cities and worldwide. This action will take place throughout the project period and will serve to validate the goals fulfillment.

Any previous information collected on impacts of ambient air quality can serve as baseline indicators for measuring progress (for instance, data collected for any health studies etc). In this regard, previous studies can be used to estimate the magnitude of the problem.

The actions proposed in the LIFE-CAPACITy project are expected to generate positive effects on the socioeconomic framework of urban areas. Hence, the evaluation of the socioeconomic impacts will respond to real-scale socioeconomic indicators that will be totally replicable in other regions.

According to the nature of the project, the following socioeconomic indicators have been selected:

-Total employment. This indicator reflects the number of additional jobs created and the contribution of the project to the maintenance of current posts. It is expected that the LIFE-CAPACITY methodology will be used as an alternative management approach for environmental decision making, which in turn will result in new employment positions: environmental informers, environmental technicians…

-Health and quality of life. As it has been previously stated, air quality significantly impacts on human health; particularly, the impact of long-term and peak exposure to these pollutants may cause from respiratory system impairment to premature death. Hence, the environmental benefits of LIFE-CAPACITY project will help directly to decrease the number of respiratory disease detected on the city of TERRASSA.

-Social awareness and acceptance. This is an important indicator not only for the replicability and transferability of the project results, but also for promoting social awareness at all possible levels. In this sense, the associated indicators, which are closely related to Action D and B.4, will be:

-Number of visits to the project website.

-Number of mentions in social networks.

-Number of visits to the demonstration site.

-Number of impacts in the media (press notes, radio…).

-Number of articles published in specialized magazines and press.

Related indicators has been included and quantified in LIFE Project Specific Impact Indicators that will be reviewed and updated at the beginning of the project.

Beneficiary responsible for implementation:

TERRASSA

All the partners

Assumptions related to major costs of the action:

Related to the **staff cost**, human resources estimation has the following distribution:

-218 working days of TERR which will be in charge of tracking and evaluating the indicators.

-350 working days of CSIC which will be involved in the indicators evaluation.

-23 working days of BSC which will be involved in the indicators evaluation.

-23 working days of UPC which will be involved in the indicators evaluation.

-24 working gays of MCV which will be involved in the indicators evaluation.

C2's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Report on the initial socio-economic Analysis and Strategy to increase socio-economic impact	06/2020
Report on the socio-economic assessment to be submitted with final report after project implementation	06/2022

C2's PROJECT MILESTONES

Milestone name	Deadline
Socio-economic Impact Assessment developed	06/2022

D. Public awareness and dissemination of results (obligatory)

ACTION D.1: Public awareness and dissemination of results

Description and methods employed (what, how, where, when and why):

-D1.1 – Networking with other projects

All the partners will use their own networks to interact with other project coordinators in order to improve the quality of the results obtained in LIFE-CAPACITy; the consortium firmly believe that learning from the experiences of others could save invaluable time and resources. For instance, the consortium is in close contact with ACTRIS-2 (http://actris2.nilu.no/Projects/ACTRIS2IAinH2020(20152019).aspx) project, with FAIRMODE (http://fairmode.jrc.ec.europa.eu/) forum and is collaborating in several regional clusters.

-D1.2 – Dissemination planning and development of the dissemination pack

The main aim of the dissemination campaign is to spread the project's results in the European framework. In that sense, two lines must be differentiated: TERR will be responsible on ensuring the dissemination strategy among the citizenship and public institutions; and CSIC, BSC and UPC will undertake the task of sharing the most relevant technical results in the appropriate forums.

Moreover, and In order to ensure that the project's results reach the targeted audiences, a Communication Plan will be elaborated during the first 3 months of the project.

Dissemination activities are next explained:

-Image: LIFE-CAPACITy logo will appear in all the material used.

-Project website: The project's website will be the main communication tool; in this regard, all information and dissemination materials (brochures, videos, photos, infographics, etc.) will be published in a timely manner. A prompt and continuous flow and exchange of information between the consortium and key actors and target groups is one of the most important aspects for the proper functioning of the network. To that purpose, intends to be an interactive environment giving access to all the aspects related to the technology development, current status, results, etc. In addition, project deliverables and publications will be available on the website and the final project seminar and activities will be promoted.

-On-site panels: The goal pursued in this case is to report the project's development in the nearest sites where LIFE-CAPACITy demonstrative execution will be carried out. Posters to promote the action involved will be installed in the city of Terrassa in order to inform the citizenship.

-Layman's report: The Layman's report, oriented to the general public, will have the purpose of providing a brief overview of the results and benefits of LIFE-CAPACITy project. The report will be 5-10 pages long, including graphic material (photos and infographics), and it will be presented in English, Spanish and Catalán. It will be produced electronically, accessible by the website or email. Nonetheless, a small number of hard copies will be printed to reach the audience without access to computers.

-Events: A kick off workshop will be organized at the beginning of the project. In addition, itinerant exhibitions will be performed. Eventually, a thematic **technical final workshop** will be held at the end of the project focused on the presentation of the results.

-Participation in conferences: All the partners will present the main results of the demonstration project in different forums and conferences.

-Technical publications: Several technical journals will be prepared for submission in scientific/technical journals. For instance, it is already planned a submission to Atmospheric Environment of Science of the Total Environment and to Proceedings of the Winter Simulation Conference.

-Audiovisual elements: Video DVD format, also available in MPEG format, photos and infographics.

-Communication media: The use of regional, local and national communication media to promote the activities of the project (press, radio, etc.) will be a key aspect to reach the maximum number of stakeholders possible. To that end, specific actions will be performed to ensure the proper use of this important communication channel:

-To create a database of communication media and journalist specialized environment at European, National and Regional level.

-To hold press conferences: one at project's launch and other for presenting the project's results.

-To publishing press releases as the project milestones are accomplished.

-To organize a visit with the specialized press in LIFE-CAPACITy demonstration plant.

-To exploit the benefits of social networks.

Beneficiary responsible for implementation:

TERRASSA

All the partners

Assumptions related to major costs of the action:

An estimated **950 person-days** will be dedicated to develop a solid dissemination strategy to approach stakeholders, target audience and general media. In this line, each partner will require the following working days:

-TERR:230 working days

-CSIC: 418 working days.

-BSC: 240 working days.

-UPC: 40 working days.

-MCV: 22 working days.

The outsourcing for **website implementation** is included in the budget of B.4 action within the subcontracting for the digital platform.

Also the main project **dissemination material (11.000 €)** will be produced by an **external company: leaflets, posters, layman report…**

All partners estimate a total of 4295 **€ for paying European conferences fees (BSC, CSIC and TERRASSA have estimated attendance at two congress, UPC at one congress).** Some of the events targeted will be:

-International Technical Meeting on Air Pollution Modelling and its Application.

-International conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes.

Travel cost has been estimated according the general internal rules of each participant.

Finally, BSC has estimated a total cost of 2.500€ for technical publications.

D1's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Database with the information of projects /initiatives/experts groups/local administrators related to LIFE-CAPACITy.	06/2020
Communication plan	10/2018
Notice Board	12/2018
Layman’s report	06/2022
Report on the communication activities and impact achieved to be submitted with the Mid-Term Report	06/2020
Project Website	12/2018

D1's PROJECT MILESTONES

Milestone name	Deadline
Number of related projects visited or contacted: minimum of 5	06/2020
Number of local administrators and decision makers visited or contacted: minimum 20	06/2020
Project's website available	12/2018
Layman’s report developed	06/2022

E. Project management (obligatory)

ACTION E.1: Project Management

Description and methods employed (what, how, where, when and why):

-E1.1 –PROJECT MANAGEMENT

The objective is to ensure the achievement of the project results through technical and administrative coordination as well as to provide timely and efficient organizational and financial coordination meeting contractual commitments. This action will deal with:

-Communication flow and reporting to the EC (cost statements, audits and periodic activity reports).

-Project progress monitoring and planning.

-Decision making procedures.

-Networking and interaction with third parties (other projects, stakeholders, institutions…)

-Preparation of the annual and periodic meetings.

The management structure has been accordingly designed to the number of partners in the project and it will be composed by a **Project Coordinator (PC) and** a **Project Technical Committee (PTC)**.

The PC will be Pau Sales Costa, environmental Technician on the air quality in the City Council of Terrassa and member of the "Table of Air Quality" of the Generalitat of Catalonia. It must be raised that the PC will be assisted by a Technical Coordinator TC (Dr. Oriol Jorba, BSC).

The main tasks of the PC are next described:

1. Day to day communication with the EC.

2. Formal revision and submission to the EC of progress reports, costs statements, and any other documents of relevance related to the project.

3. Calling on participants to attend coordination meetings, as well as setting up and circulating the meeting agendas. In this regard, at least 5 consortium meetings will be held during the project in order to exchange information between the PTC and the technical staff involved in the project actions

a. M2, kick off meeting. To review the project chronogram, deliverables and tasks to be performed by each party. Reviewing process will take into account the terms, the costs or time scales, and the termination date of the European Commission contract.

b. M12,24,36 progress meetings. These meetings will be split into the following parts:

i. Monitoring the fulfilment of the work programme, the achieved work progress and the quality of the results obtained by the project participants. The assessment will be based on progress indicators, milestones and expected results.

ii.Discussing the results obtained and preparing the consecutive reports.

iii. Planning in detail the work to be implemented in the following months before the next meeting.

c. M48, final meeting. Monitoring the fulfilment of the whole work programme and the quality of the results obtained during the project. Preparing and elaborating the final reports and deliverables foreseen in the work programme.

4. Supervising and informing all participants about the project progress (i.e. sending interim reports, meetings minutes, etc.).

5. Day to day assistance to the overall Project Management (including both technical and administrative issues).

The PTC will have representatives from all the partners and it will:

1. Provide an environment for discussion, interaction and collaboration between action leaders on the progress and results of each action and their effects and interaction with other actions.

2. Advise and support the decisions of the PC on project operational issues.

3. Decide on particular managerial issues related to the work plan and tasks.

4. Report on the technical progress of the project.

5. Decide on the update of the implementation plan if necessary.

-E1.2 –After-LIFE Plan

The After-LIFE Plan will ensure exploitation and dissemination of LIFE-CAPACITy results once the project is finished. In this line, an evaluation and revision of all the project's actions will be performed during the final meeting to be held on M36 with the aim to collect the necessary information to elaborate the After-LIFE Plan, which will take into consideration the following aspects:

-Promoting the project and its results in specific sector fairs and congresses and using communication strategies to disseminate project's results (printed press, radio and television).

-Distribute promotional material among trade associations, companies, environmental bodies, schools, universities, cultural centres, the media, etc. As it has been previously stated, the promotional material will include the LIFE logo.

-Web site: updating the information after the project has concluded, feeding it with the newest data about the project.

-Demonstration visits and seminars to guarantee the spread of the project's benefits.

The plan will contain a set of detailed measures and multi-annual budget allocation to continue its implementation and securing the planned objectives. The document will clearly specify which actions will be carried out, when, by whom and with which funds. The importance of the after LIFE action plan lies in the necessity of ensuring the durability of the investments that have been done during the project implementation.

Beneficiary responsible for implementation:

TERRASSA

All the partners

Assumptions related to major costs of the action:

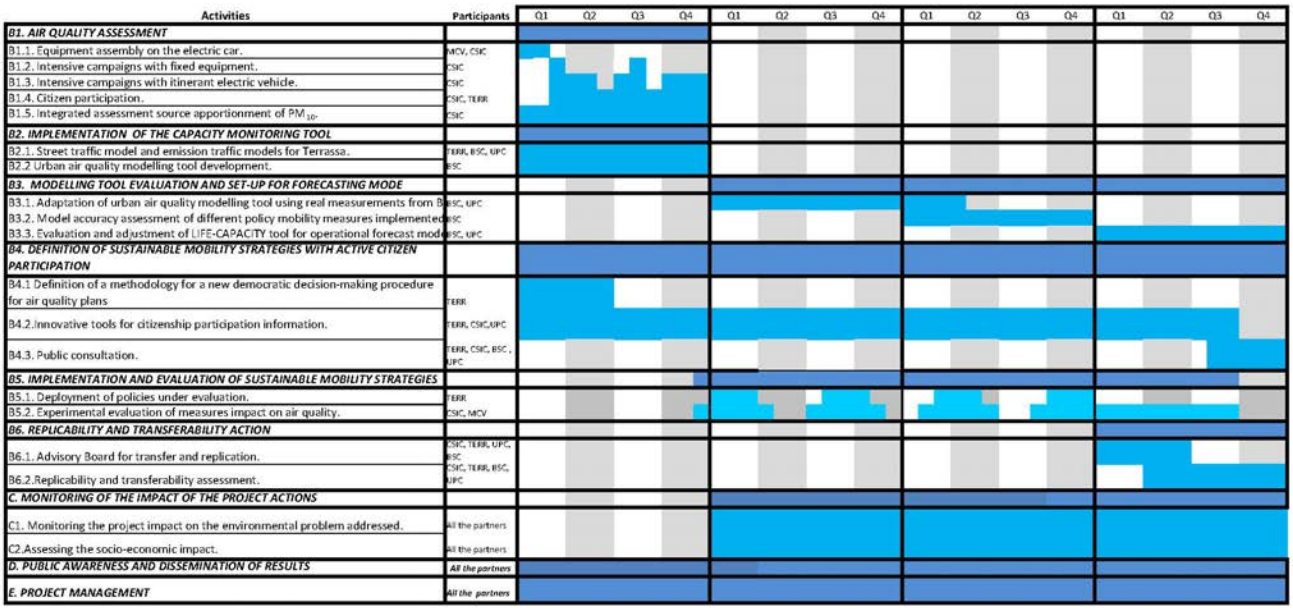
TERRASSA has envisaged to have a **full-time project manager** accounting **860 person-days**. The management of any project funded with public funds must be based on the transparency, and efficacy.

To meet the reporting requirements of the EC, the **external audit will be outsourced by TERRASSA**, **BSC and CSIC** who will hand in the auditor the financial statement corresponding to the final project report and all supporting documents required by the auditor, in order to fulfil the national legislation, accounting rules and LIFE+ common provisions. Cost estimation for the **audit is 3.500€ for each partner.**

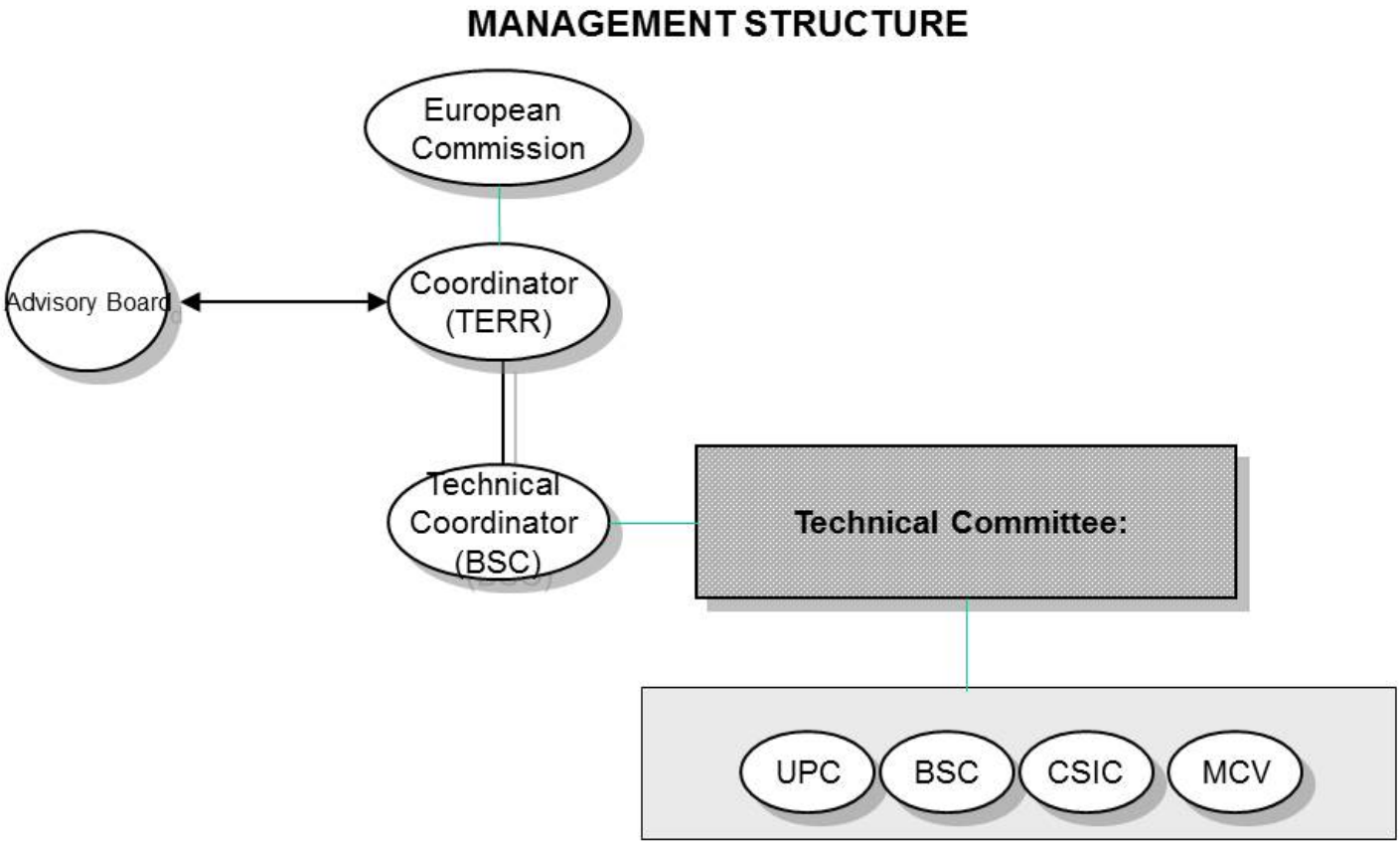
BSC, UPC, MCV and **CSIC** has also envisaged 387 working days for managerial purposes.

Travel expenses associated to the **kick-off meeting** with the Contracting Authority is estimated on **1.450 €** (1 trip, 2 persons, 1 day + 1 travelling day).

Name of the picture: Project Gantt



Name of the picture: Project management structure



E1's PROJECT DELIVERABLE PRODUCTS

Deliverable name	Deadline
Project Management Handbook	10/2018
Consolidated minutes of the meetings	10/2018
Audit report	06/2022
After-LIFE Plan	09/2022

E1's PROJECT MILESTONES

Milestone name	Deadline
Compliance of the budget estimation (Target: 0% deviation)	06/2022
An “After-LIFE Communication plan” produced as a separate chapter of the final report	09/2022

DELIVERABLE PRODUCTS OF THE PROJECT

Name of the Deliverable	Number of the associated action	Deadline
Communication plan	D 1	31/10/2018
Consolidated minutes of the meetings	E 1	31/10/2018
Project Management Handbook	E 1	31/10/2018
Notice Board	D 1	31/12/2018
Project Website	D 1	31/12/2018
Protocol for a citizens empowerment to collect air quality data	B 1	31/12/2018
Digital platform for civic participation	B 4	31/01/2019
A source apportionment of PM10 study	B 1	30/06/2019
A street traffic model and emission traffic model developed for Terrassa	B 2	30/06/2019
Communication campaign	B 4	30/06/2019
Integrated urban air quality forecasting modelling tool developed	B 2	30/06/2019
Map of spatial distribution of air quality pollutants including NOx, PM, BC and UFP	B 1	30/06/2019
Protocol for a citizens empowerment to collect air quality data	B 1	30/06/2019
Map of citizens' perception with atmospheric characterization	B 4	31/12/2019
Report on the specific indicators, their sources of verification and assessment schedule	C 1	31/12/2019
Report on the validation of the LIFE-CAPACITY model for air quality measures evaluation.	B 3	31/01/2020
Database with the information of projects /initiatives/experts groups/local administrators related to LIFE-CAPACITy.	D 1	30/06/2020
Report on the communication activities and impact achieved to be submitted with the Mid-Term Report	D 1	30/06/2020
Report on the initial socio-economic Analysis and Strategy to increase socio-economic impact	C 2	30/06/2020
Report on the progress of indicators	C 1	01/06/2021
Report on the conclutions of the Public Training Workshops	B 4	31/07/2021

Report on the impact of the mobility and air quality planning measures on the air quality levels of Terrassa.	B 5	31/03/2022
Audit report	E 1	30/06/2022
Final report on the progress of indicators	C 1	30/06/2022
Layman’s report	D 1	30/06/2022
Replicability and transferability plan	B 6	30/06/2022
Report on the performance of the LIFE-CAPACITy tool in forecasting mode.	B 3	30/06/2022
Report on the socio-economic assessment to be submitted with final report after project implementation	C 2	30/06/2022
After-LIFE Plan	E 1	30/09/2022

MILESTONES OF THE PROJECT

Name of the Milestone	Number of the associated action	Deadline
Traffic camera network installed and monitoring road transport in Terrassa	B 2	31/08/2018
4 environmental Informers hired and trained	B 4	30/09/2018
300 citizens recruited to install the passive dosimeters and to gather the results	B 1	30/11/2018
10.000 citizens contacted by door-to-door actions	B 4	31/12/2018
Project's website available	D 1	31/12/2018
Availability of the calibrated microscopic traffic simulation model	B 2	31/01/2019
Availability of the street scale traffic emission model	B 2	30/04/2019
10.000 citizens registered on the digital platform	B 4	30/06/2019
5.000 active users on the digital platform	B 4	30/06/2019
Availability of the integrated urban air quality modelling tool	B 2	30/06/2019
Emission sources defined and classified	B 1	30/06/2019
First database of reference itinerant measurements for air quality across the city	B 1	30/06/2019
High spatial and temporal resolution of air	B 1	30/06/2019

pollutants concentrations including NOx, PM, BC and UFP		
Contrast between measurement and citizens' pollution perception	B 4	31/12/2019
Initial Indicators collected, baseline established	C 1	31/12/2019
Number of local administrators and decision makers visited or contacted: minimum 20	D 1	30/06/2020
Number of related projects visited or contacted: minimum of 5	D 1	30/06/2020
Intermediate indicators collected	C 1	01/06/2021
Integrated tool adapted and calibrated	B 3	30/06/2021
AB for transfer and replication: 5 European cities, 1 European urban association	B 6	31/12/2021
2500 citizens actively participating in proposing measures	B 4	28/02/2022
20 public training workshops	B 4	31/03/2022
3 Workshops: one at the beginning of the task, middle and at the end of the tasks	B 6	30/06/2022
Availability of LIFE-CAPACITy tool in forecasting mode	B 3	30/06/2022
Availability of the operational urban air quality forecasting system	B 5	30/06/2022
Compliance of the budget estimation (Target: 0% deviation)	E 1	30/06/2022
Final indicators collected and quantification of environmental and project impact	C 1	30/06/2022
Layman's report developed	D 1	30/06/2022
Measure favored by public consultation	B 4	30/06/2022
Socio-economic Impact Assessment developed	C 2	30/06/2022
An "After-LIFE Communication plan" produced as a separate chapter of the final report	E 1	30/09/2022

ACTIVITY REPORTS FORESEEN

Please indicate the deadlines for the following reports:

• Progress Reports n°1, n°2 etc. (if any; to ensure that the delay between consecutive reports does not exceed 18 months)

• Mid term report payment request (for project longer than 24 months or with Eu contibution of more than EUR300,000)

• Final Report with payment request (to be delivered within 3 months after the end of the project)

Type of report	Deadline
Progress report	01/07/2019
Midterm report	01/07/2020
Progress report	01/07/2021
Final report	30/09/2022

TIMETABLE

Action		2018				2019				2020				2021				2022				2023			
Action numbe	Name of the action	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A. Preparatory actions (if needed)																									
B. Implementation actions (obligatory)																									
B.1	Air quality assessment			■	■	■	■																		
B.2	Implementation of the capacity monitoring tool			■	■	■	■																		
B.3	Modelling tool evaluation and set-up for forecasting mode							■	■	■	■	■	■	■	■	■	■	■	■						
B.4	Definition of sustainable mobility strategies with active citizen participation			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
B.5	Implementation and evaluation of sustainable mobility strategies						■	■	■	■	■	■	■	■	■	■	■	■							
B.6	Replicability and transferability action															■	■	■	■						
C. Monitoring of the impact of the project actions (obligatory)																									
C.1	Monitoring the project impact on the environmental problem addressed							■	■	■	■	■	■	■	■	■	■	■	■						
C.2	Assessing the socio-economic impact							■	■	■	■	■	■	■	■	■	■	■	■						
D. Public awareness and dissemination of results (obligatory)																									
D.1	Public awareness and dissemination of results			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
E. Project management (obligatory)																									
E.1	Project Management			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						

LIFE17 ENV/ES/000268

FINANCIAL APPLICATION FORMS

Part F – financial information

Budget breakdown cost categories	Total cost in €	Eligible Cost in €	% of total eligible costs
1. Personnel	3,114,808	3,114,808	83.36%
2. Travel and subsistence	20,176	20,176	0.54%
3. External assistance	89,540	89,540	2.40%
4. Durable goods			
Infrastructure	0	0	0.00%
Equipment	29,697	14,848	0.40%
Prototype	100,849	100,849	2.70%
5. Land	Not applicable		
6. Consumables	136,320	136,320	3.65%
7. Other costs	16,030	16,030	0.43%
8. Overheads	244,131	244,131	6.53%
Total	3,751,551	3,736,702	100.00%

Contribution breakdown	In €	% of total	% of total eligible costs
EU contribution requested	2,242,020	59.76%	60.00%
Coordinating Beneficiary's contribution	590,440	15.74%	
Associated Beneficiaries' contribution	919,091	24.50%	
Co-financers contribution	0	0.00%	
Total	3,751,551	100.00%	

Cost category in Euro									
Project action	Personnel (Days)	Travel	External assistance	Infrastructure	Equipment	Prototype	Consumables	Other	Total
B1 Air quality assessment	183,367 (1,051)	0	0	0	29,697	100,849	54,220	0	368,133
B2 Implementation of the capacity monitoring tool	233,367 (1,021)	1,500	0	0	0	0	68,725	545	304,137
B3 Modelling tool evaluation and set-up for forecasting mode	642,438 (3,171)	1,500	0	0	0	0	1,575	550	646,063
B4 Definition of sustainable mobility strategies with active citizen participation	642,578 (3,928)	0	89,540	0	0	0	0	2,500	734,618
B5 Implementation and evaluation of sustainable mobility strategies	410,173 (2,232)	0	0	0	0	0	0	0	410,173
B6 Replicability and transferability action	253,646 (1,064)	0	0	0	0	0	0	0	253,646
C1 Monitoring the project impact on the environmental problem addressed	156,719 (779)	0	0	0	0	0	0	0	156,719
C2 Assessing the socio-economic impact	129,328 (638)	0	0	0	0	0	0	0	129,328
D1 Public awareness and dissemination of results	226,192 (950)	15,726	0	0	0	0	11,800	3,200	256,918
E1 Project Management	237,000 (1,247)	1,450	0	0	0	0	0	9,235	247,685
Overheads									244,131
Total	3,114,808 (16,081)	20,176	89,540	0	29,697	100,849	136,320	16,030	3,751,551

Costs per Beneficiary

Short name	Personnel (Days)	Travel	External assistance	Infrastructure	Equipment	Prototype	Consumables	Other	Overheads	EU contrib.	Total eligible costs	% of total eligible costs
TERRASSA	1,183,536 (6,657)	8,700	89,540	0	0	18,150	75,000	4,735	96,438	885,659	1,476,099	39.50%
BSC	630,896 (3,193)	3,000	0	0	0	0	6,300	5,595	45,141	414,559	690,932	18.49%
CSIC	822,521 (4,232)	6,500	0	0	14,848	0	55,020	4,500	63,147	579,922	966,536	25.87%
MCV	104,325 (436)	0	0	0	0	82,699	0	0	13,073	120,058	200,097	5.35%
UPC	373,530 (1,563)	1,976	0	0	0	0	0	1,200	26,332	241,822	403,038	10.79%
Total	3,114,808 (16,081)	20,176	89,540	0	14,848	100,849	136,320	16,030	244,131	2,242,020	3,736,702	100.00%
Share of total eligible costs	83.36%	0.54%	2.40%	0.00%	0.40%	2.70%	3.65%	0.43%	6.53%	60.00%	100.00%	

Coordinating Beneficiary's contribution				
Country code	**Beneficiary short name**	**Total costs of the actions in € (including overheads)**	**Beneficiary's own contribution in €**	**Amount of EU contribution requested in €**
ES	TERRASSA	1,476,099	590,440	885,659

Associated Beneficiaries' contribution				
Country code	**Beneficiary short name**	**Total costs of the actions in € (including overheads)**	**Associated beneficiary's own contribution in €**	**Amount of EU contribution requested in €**
ES	BSC	690,932	276,373	414,559
ES	CSIC	981,385	401,463	579,922
ES	MCV	200,097	80,039	120,058
ES	UPC	403,038	161,216	241,822
TOTAL Associated Beneficiaries		**2,275,452**	**919,091**	**1,356,361**

TOTAL All Beneficiaries	**3,751,551**	**1,509,531**	**2,242,020**

Co-financers contribution	
Co-financer's name	**Amount of co-financing in €**
TOTAL	**0**

Direct Personnel costs

			Calculation =>	A	B	A x B
Beneficiary short name	Action number	Type of contract	Category/Role in the project	Daily rate (rounded to the nearest	Number of person-days	Direct personnel costs (€)
TERRASSA	B 1	Additional staff	Environmental Informer II	131	50	6,550
TERRASSA	B 1	Additional staff	Environmental Informer III	131	50	6,550
TERRASSA	B 1	Additional staff	Environmental Informer	131	50	6,550
TERRASSA	B 1	Additional staff	Environmental Informer IV	131	50	6,550
TERRASSA	B 1	Additional staff	Environmental technician	208	10	2,080
TERRASSA	B 2	Additional staff	Environmental technician	208	50	10,400
TERRASSA	B 2	Permanent staff or civil servant	Technician for the implantation of mobility measures	217	20	4,340
TERRASSA	B 4	Additional staff	Environmental Informer II	131	595	77,945
TERRASSA	B 4	Permanent staff or civil servant	Gender policy maker	193	180	34,740
TERRASSA	B 4	Additional staff	Environmental Informer III	131	595	77,945
TERRASSA	B 4	Permanent staff or civil servant	Chief of mobility department	322	80	25,760
TERRASSA	B 4	Permanent staff or civil servant	Democratic quality technician	193	180	34,740
TERRASSA	B 4	Permanent staff or civil servant	Technician for the implantation of mobility measures	217	110	23,870
TERRASSA	B 4	Additional staff	Environmental Informer IV	131	595	77,945
TERRASSA	B 4	Permanent staff or civil servant	Planning technician for mobility measures	217	230	49,910
TERRASSA	B 4	Permanent staff or civil servant	Manager of the environmental informers team	193	284	54,812
TERRASSA	B 4	Additional staff	Environmental technician	208	280	58,240
TERRASSA	B 4	Additional staff	Environmental Informer	131	595	77,945
TERRASSA	B 4	Permanent staff or civil servant	Chief of environmental department	293	80	23,440
TERRASSA	B 5	Additional staff	Environmental technician	208	240	49,920
TERRASSA	B 5	Permanent staff or civil servant	Technician for the implantation of mobility measures	217	515	111,755

Direct Personnel costs

Calculation =>				A	B	A x B
Beneficiary short name	Action number	Type of contract	Category/Role in the project	Daily rate (rounded to the nearest	Number of person-days	Direct personnel costs (€)
TERRASSA	B 5	Permanent staff or civil servant	Planning technician for mobility measures	217	200	43,400
TERRASSA	B 6	Permanent staff or civil servant	Chief of environmental department	293	40	11,720
TERRASSA	B 6	Permanent staff or civil servant	Chief of mobility department	322	40	12,880
TERRASSA	B 6	Additional staff	Environmental technician	208	80	16,640
TERRASSA	B 6	Permanent staff or civil servant	Democratic quality technicia	193	20	3,860
TERRASSA	B 6	Permanent staff or civil servant	Gender policy maker	193	20	3,860
TERRASSA	C 1	Permanent staff or civil servant	Chief of mobility department	322	20	6,440
TERRASSA	C 1	Additional staff	Environmental technician	208	70	14,560
TERRASSA	C 1	Permanent staff or civil servant	Chief of environmental department	293	20	5,860
TERRASSA	C 2	Permanent staff or civil servant	Chief of mobility department	322	10	3,220
TERRASSA	C 2	Permanent staff or civil servant	Gender policy maker	193	84	16,212
TERRASSA	C 2	Permanent staff or civil servant	Chief of environmental department	293	10	2,930
TERRASSA	C 2	Additional staff	Environmental technician	208	30	6,240
TERRASSA	C 2	Permanent staff or civil servant	Democratic quality technicia	193	84	16,212
TERRASSA	D 1	Permanent staff or civil servant	Chief of environmental department	293	65	19,045
TERRASSA	D 1	Permanent staff or civil servant	Chief of mobility department	322	65	20,930
TERRASSA	D 1	Additional staff	Environmental technician	208	100	20,800
TERRASSA	E 1	Additional staff	Project manager	159	860	136,740
CSIC	B 1	Permanent staff or civil servant	Researcher	329	2	658

Direct Personnel costs

Calculation =>				A	B	A x B
Beneficiary short name	Action number	Type of contract	Category/Role in the project	Daily rate (rounded to the nearest	Number of person-days	Direct personnel costs (€)
CSIC	B 1	Permanent staff or civil servant	Research Professor	352	4	1,408
CSIC	B 1	Additional staff	Researcher	154	229	35,266
CSIC	B 1	Permanent staff or civil servant	Technician	171	80	13,680
CSIC	B 1	Additional staff	Researcher	154	230	35,420
CSIC	B 1	Permanent staff or civil servant	Researcher	241	15	3,615
CSIC	B 4	Additional staff	Researcher	154	30	4,620
CSIC	B 4	Additional staff	Researcher	154	30	4,620
CSIC	B 4	Permanent staff or civil servant	Researcher	241	2	482
CSIC	B 4	Permanent staff or civil servant	Research Professor	352	4	1,408
CSIC	B 4	Permanent staff or civil servant	Researcher	329	2	658
CSIC	B 5	Permanent staff or civil servant	Researcher	329	4	1,316
CSIC	B 5	Additional staff	Researcher	154	516	79,464
CSIC	B 5	Permanent staff or civil servant	Research Professor	352	8	2,816
CSIC	B 5	Permanent staff or civil servant	Technician	171	163	27,873
CSIC	B 5	Permanent staff or civil servant	Researcher	241	30	7,230
CSIC	B 5	Additional staff	Researcher	154	516	79,464
CSIC	B 6	Additional staff	Researcher	154	459	70,686
CSIC	B 6	Permanent staff or civil servant	Research Professor	352	345	121,440
CSIC	C 1	Additional staff	Researcher	154	350	53,900
CSIC	C 1	Permanent staff or civil servant	Researcher	241	225	54,225

Direct Personnel costs

Calculation =>				A	B	A x B
Beneficiary short name	Action number	Type of contract	Category/Role in the project	Daily rate (rounded to the nearest	Number of person-days	Direct personnel costs (€)
CSIC	C 2	Additional staff	Researcher	154	190	29,260
CSIC	C 2	Permanent staff or civil servant	Researcher	241	160	38,560
CSIC	D 1	Permanent staff or civil servant	Researcher	329	208	68,432
CSIC	D 1	Additional staff	Researcher	154	210	32,340
CSIC	E 1	Additional staff	Researcher	154	120	18,480
CSIC	E 1	Permanent staff or civil servant	Research Professor	352	100	35,200
UPC	B 2	Additional staff	Technician	203	200	40,600
UPC	B 2	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	125	46,875
UPC	B 2	Permanent staff or civil servant	Senior Technician	280	60	16,800
UPC	B 3	Additional staff	Traffic Simulation Scientist	210	80	16,800
UPC	B 3	Permanent staff or civil servant	Senior Technician	280	290	81,200
UPC	B 3	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	2	750
UPC	B 3	Additional staff	Technician	203	600	121,800
UPC	B 4	Additional staff	Traffic Simulation Scientist	210	40	8,400
UPC	B 4	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	10	3,750
UPC	B 6	Additional staff	Traffic Simulation Scientist	210	24	5,040
UPC	C 1	Additional staff	Traffic Simulation Scientist	210	45	9,450
UPC	C 1	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	2	750
UPC	C 2	Additional staff	Traffic Simulation Scientist	210	21	4,410
UPC	C 2	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	2	750

Direct Personnel costs

Calculation =>				A	B	A x B
Beneficiary short name	Action number	Type of contract	Category/Role in the project	Daily rate (rounded to the nearest	Number of person-days	Direct personnel costs (€)
UPC	D 1	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	5	1,875
UPC	D 1	Additional staff	Traffic Simulation Scientist	210	35	7,350
UPC	E 1	Additional staff	Traffic Simulation Scientist	210	8	1,680
UPC	E 1	Permanent staff or civil servant	Traffic Simulation Senior Professor	375	14	5,250
MCV	B 1	Permanent staff or civil servant	SENIOR ENGINEER/EQUIPMENT INTEGRATION	199	45	8,955
MCV	B 1	Permanent staff or civil servant	TECHNICIAN/EQUIPMENT MAINTENANCE	143	19	2,717
MCV	B 1	Permanent staff or civil servant	SENIOR ENGINEER/PROJECT MANAGER	310	50	15,500
MCV	B 1	Permanent staff or civil servant	PROJECT MANAGER	128	25	3,200
MCV	B 1	Permanent staff or civil servant	SENIOR ENGINEER/EQUIPMENT INTEGRATION	143	45	6,435
MCV	B 1	Permanent staff or civil servant	SENIOR ENGINEER/EQUIPMENT INTEGRATION	375	50	18,750
MCV	B 1	Permanent staff or civil servant	SENIOR ENGINEER	344	12	4,128
MCV	B 1	Permanent staff or civil servant	TECHNICIAN/MECHANIC BUILDER AND INTEGRATOR	153	35	5,355
MCV	B 5	Permanent staff or civil servant	SENIOR ENGINEER	176	25	4,400
MCV	B 5	Permanent staff or civil servant	PROJECT MANAGER	169	15	2,535
MCV	C 1	Permanent staff or civil servant	SENIOR ENGINEER	344	6	2,064
MCV	C 1	Permanent staff or civil servant	SENIOR ENGINEER/PROJECT MANAGER	310	12	3,720
MCV	C 1	Permanent staff or civil servant	SENIOR ENGINEER	176	6	1,056
MCV	C 2	Permanent staff or civil servant	SENIOR ENGINEER	176	6	1,056
MCV	C 2	Permanent staff or civil servant	SENIOR ENGINEER/PROJECT MANAGER	310	12	3,720

Direct Personnel costs

Calculation =>				A	B	A x B
Beneficiary short name	Action number	Type of contract	Category/Role in the project	Daily rate (rounded to the nearest	Number of person-days	Direct personnel costs (€)
MCV	C 2	Permanent staff or civil servant	SENIOR ENGINEER	344	6	2,064
MCV	D 1	Permanent staff or civil servant	SENIOR ENGINEER	176	6	1,056
MCV	D 1	Permanent staff or civil servant	SENIOR ENGINEER/PROJECT MANAGER	310	10	3,100
MCV	D 1	Permanent staff or civil servant	SENIOR ENGINEER	344	6	2,064
MCV	E 1	Permanent staff or civil servant	SENIOR ENGINEER	176	15	2,640
MCV	E 1	Permanent staff or civil servant	SENIOR ENGINEER	344	15	5,160
MCV	E 1	Permanent staff or civil servant	SENIOR ENGINEER/PROJECT MANAGER	310	15	4,650
BSC	B 2	Additional staff	IT engineer 2	178	240	42,720
BSC	B 2	Permanent staff or civil servant	Senior scientist	272	86	23,392
BSC	B 2	Additional staff	Junior scientist 2	201	240	48,240
BSC	B 3	Additional staff	IT engineer 2	178	720	128,160
BSC	B 3	Permanent staff or civil servant	Senior scientist	272	99	26,928
BSC	B 3	Additional staff	Junior scientist 2	201	580	116,580
BSC	B 3	Additional staff	IT engineer 1	178	460	81,880
BSC	B 3	Additional staff	Junior scientist 1	201	340	68,340
BSC	B 4	Permanent staff or civil servant	Senior scientist	272	2	544
BSC	B 4	Additional staff	Junior scientist 1	201	2	402
BSC	B 4	Additional staff	Junior scientist 2	201	2	402
BSC	B 6	Additional staff	Junior scientist 2	201	16	3,216
BSC	B 6	Additional staff	Junior scientist 1	201	16	3,216

Direct Personnel costs

Calculation =>				A	B	A x B
Beneficiary short name	**Action number**	**Type of contract**	**Category/Role in the project**	**Daily rate (rounded to the nearest**	**Number of person-days**	**Direct personnel costs (€)**
BSC	B 6	Permanent staff or civil servant	Senior scientist	272	4	1,088
BSC	C 1	Permanent staff or civil servant	Senior scientist	272	1	272
BSC	C 1	Additional staff	Junior scientist 1	201	11	2,211
BSC	C 1	Additional staff	Junior scientist 2	201	11	2,211
BSC	C 2	Additional staff	Junior scientist 1	201	11	2,211
BSC	C 2	Permanent staff or civil servant	Senior scientist	272	1	272
BSC	C 2	Additional staff	Junior scientist 2	201	11	2,211
BSC	D 1	Additional staff	Junior scientist 2	201	100	20,100
BSC	D 1	Additional staff	IT engineer 1	178	20	3,560
BSC	D 1	Permanent staff or civil servant	Senior scientist	272	20	5,440
BSC	D 1	Additional staff	Junior scientist 1	201	100	20,100
BSC	E 1	Permanent staff or civil servant	Senior scientist	272	100	27,200
				TOTAL =>	16,081	3,114,808

Travel and subsistence costs

			Calculation =>	A	B	A X B
Beneficiary short name	Action number	Destination	Explanations of assumptions	Travel and subsistence rate	Number of travels	Total travel and subsistence costs
TERRASSA	D 1	Inside EU	Dissemination activities (3trips, 2 persons, 2 days). Meeting with stakeholders: other cities, mobility associations...	1,450	3	4,350
TERRASSA	D 1	Inside EU	2European congress (2 trip, 2 persons, 2 days + 1 travelling day)	1,450	2	2,900
TERRASSA	E 1	Inside EU	Regional kick off meeting in Brussels (1 trip, 2 persons, 1 day + 1 travelling	1,450	1	1,450
CSIC	D 1	Inside EU	European Aerosol Conference (Barcelona-EU). 2 persona y 5 días (5 noches de hotel a 140euros+ 85 euros /día+500 viaje)	3,250	2	6,500
UPC	D 1	National	Meeting in Terrassa (coordination; Barcelona, Terrassa, 3 hours; 2 persons). 70 km x 0,16€/km	11	16	176
UPC	D 1	Outside EU	Conference assistance from Barcelona to TOBE DETERMINED; 5 days; 1 person	1,800	1	1,800
BSC	B 2	Inside EU	ITM Conference assistance; from Barcelona to Europe; 5 days; 1 person	1,500	1	1,500
BSC	B 3	Inside EU	HARMO Conference assistance; from Barcelona to Europe; 4 days; 1 person	1,500	1	1,500
					Total	20,176

External assistance costs

Beneficiary short name	Action number	Procedure	Description	Costs (€)
TERRASSA	B 4	Multiple offers	Communication campaign	49,610
TERRASSA	B 4	Multiple offers	Digital platform for civic participation and app development and web project	39,930
			TOTAL =>	89,540

Durable goods: equipment costs

Beneficiary short name	Action number	Procedure	Description	Actual cost (€)	Depreciation (eligible cost)
CSIC	B 1	Direct treaty	PM sensors DYLOS (20 units)	4,689	2,344
CSIC	B 1	Direct treaty	Miniaethalometer (1 unit)	6,252	3,126
CSIC	B 1	Public tender	Condensation Particle Counter (1 unit)	18,756	9,378
			TOTAL =>	29,697	14,848

Durable goods: Prototype costs

Beneficiary short name	Action numbe	Procedure	Description	Costs (€)
TERRASSA	B 1	Multiple offers	Electric car for measurements	18,150
MCV	B 1	Direct treaty	AC	2,000
MCV	B 1	Direct treaty	NO2: API Teledyne CAPS	16,750
MCV	B 1	Direct treaty	Particulate matter: Grimm EDM180	13,494
MCV	B 1	Direct treaty	SAI and Batteries	6,500
MCV	B 1	Direct treaty	Sistema Datalogger	1,775
MCV	B 1	Direct treaty	Particulate matter: TSI EPC	21,835
MCV	B 1	Direct treaty	Particulate matter: Aethalometer Magee AE31	20,345
			TOTAL =>	100,849

Consumables

Beneficiary short name	Action numbe	Procedure	Description	Costs (€)
TERRASSA	B 2	Direct treaty	2 traffic camares	64,000
TERRASSA	D 1	Direct treaty	Dissemination material. Onsite panels leaflets, poster	5,000
TERRASSA	D 1	Direct treaty	Dissemination material.Dissemination plan After life	2,500
TERRASSA	D 1	Direct treaty	Dissemination material.Layman report	3,500
CSIC	B 1	Public tender	300 Passive tubes of NO2	54,220
CSIC	D 1	Direct treaty	Dissemination material:printing items	800
BSC	B 2	Direct treaty	Storage system 90TB	4,725
BSC	B 3	Direct treaty	Storage system 30TB	1,575
			TOTAL =>	136,320

Other costs

Beneficiary short name	Action numbe	Procedure	Description	Costs (€)
TERRASSA	D 1	Direct treaty	Congress fees	500
TERRASSA	E 1	Direct treaty	Auditor costs	4,235
CSIC	D 1	Direct treaty	Congress fees	1,500
CSIC	E 1	Direct treaty	Auditor Costs	3,000
UPC	D 1	Direct treaty	Congress fees (1 person)	1,200
BSC	B 2	Direct treaty	1 ITM congress fee	545
BSC	B 3	Direct treaty	1 HARMO congress fee	550
BSC	B 4	Direct treaty	1 scientific publication	2,500
BSC	E 1	Direct treaty	Auditor cost	2,000
			TOTAL =>	16,030

Overheads

Beneficiary short name	Total direct costs of the project in €	Overhead amount (€)
CSIC	903,389	63,147
UPC	376,706	26,332
MCV	187,024	13,073
BSC	645,791	45,141
TERRASSA	1,379,661	96,438
	3,492,571	244,131

Proposal attachments

Attachment title	Attachment type	Included? Yes	No
letter of Suport local environmental association	declaration of support (other than form A8)		
Letter of suport Terrassa Newspaper	declaration of support (other than form A8)		
Letter of support ARPA Lombardia	declaration of support (other than form A8)		
Letter of support Croatia Air quality Division	declaration of support (other than form A8)		
Letter of support Barcelona city council	declaration of support (other than form A8)		
Letter of support LEITAT	declaration of support (other than form A8)		
_Letter of support ADENC	declaration of support (other than form A8)		
letter of Suport AMB	declaration of support (other than form A8)		
letter of support barcelona Provincial Council	declaration of support (other than form A8)		
Letter of support Birmingan university	declaration of support (other than form A8)		
Letter of suport of the Government of Catalonia	declaration of support (other than form A8)		
Letter of support DEP of the Lazio Region	declaration of support (other than form A8)		
Letter of support of Balearic Island Government	declaration of support (other than form A8)		
Letter of support University of Bari (Italy)	declaration of support (other than form A8)		
Letter of support IS Global	declaration of support (other than form A8)		
Letter of support DGT	declaration of support (other than form A8)		
Letter of support of Madrid City Council	declaration of support (other than form A8)		
Letter of Suport of AIRPARIF	declaration of support (other than form A8)		
letter of Suport POLIS	declaration of support (other than form A8)		
Public body declaration	public body declaration		
Project performance indicators	project performance indicators		