EV Energy project

Barcelona Action Plan
for the development of environment-friendly mobility to reduce emissions

July 2019 - June 2021

14th June 2019

Developed by Barcelona Chamber of Commerce

Introduction

This document represents an Action Plan developed by Barcelona Chamber of Commerce for the EV Energy project "Electric Vehicles for City Renewable Energy Supply ". The project aims to analyse, initiate and implement policies **favoring renewable energy and electric mobility systems in urban areas**. Through interregional policy learning, the most appropriate policies are transferred to cities, regions and partner countries and implemented subsequently.

The project focuses on three thematic areas:

- Renewable energies
- Electric mobility
- Infrastructures (Smart grids, ICT, etc.)

The Action Plan provides details on how the lessons learnt from the cooperation will be implemented to improve the policy instrument tackled, the ERDF Operational Programme of Catalonia 2014-2020 in the case of Barcelona. The Action Plan describes the activities the partners and stakeholders will try to implement during the second phase of the project, in order not to lose what they learnt from the project. The document specifies the nature of the actions to be implemented: its link to the project, the description, their timeframe, the stakeholders involved, the costs and funding sources.

The Action Plan is a result of numerous activities between the project partners and their stakeholders. In order to develop the Action Plan in EV Energy project, a lot of emphasis was placed on the interregional cooperation and exchange of experience. Exchange of experience was conducted by numerous activities: from questionnaires between project partners' stakeholders, study visits and stakeholders meetings, good practice selection, analyses of different regions as a SWOT (Strengths, Weaknesses, Opportunities and Threats) a SIAM (Sustainability Impact Assessment Model) and intense discussions during local, regional, national and international events.

The document is split into the following parts:

- Part I – General information (contact and background information about Action Plan's developers and project scope);
- Part II – Policy context (details about the policy instrument, state of the art and progress);
- Part III – Actions in detail (detailed information about actions, their relevance to the project, planned activities, stakeholders involved, timeframe, costs and funding sources, as well as indicators and sources of verification).

Part I – General information

This part includes general information about developers of this Action Plan and their contacts. Moreover, it presents EV Energy project in detail, both of which are important to understand the context of the proposed actions.

Project: EV ENERGY

Partner organization concerned: Barcelona Chamber of Commerce

Country: Spain

NUTS2 region: Catalonia

Contact persons:

Berta Pérez
Email address: bperez@cambrabcn.org
Phone number: (+34) - 934 169 342

Leonie Hehn
Email address: lhehn@cambrabcn.org
Phone number: (+34) - 934 169 380

Project background

European context:

On 23 October 2014, the European Council agreed on the "**2030 climate and energy framework**". This framework addressed new **EU-wide targets and policy objectives** for the period between 2020 and 2030. For 2030 the EU identified following targets:

- To reduce greenhouse gases by 40% relative to 1990 levels;
- 27% improvement in energy efficiency should be improved by 27% and
- at least 27% of EU energy consumption should come from renewable energy.

But transport is the only sector in EU that has not recorded a significant decline in greenhouse gas emissions since 1990. In 2015 the road transport in Europe was responsible for 78% of EU oil consumption, which is 23% higher than in 1990. Thus, there is an urgent need to reduce oil consumption by road transport and that is formed as an aim of "EV Energy" project.

Urban context

Cities are the **main energy consumers**, but also offer the **greatest opportunities** for change. Two of the most important technologies that are gaining momentum in European cities are electric vehicles (EVs) and renewable energies. Both technologies offer great potential for climate change mitigation but do come with limitations. Solar energy production peaks at noon, when demand is low. EVs are mainly charged after

working hours, precisely at the moment of maximum demand, when the solar energy generation is much lower. This inconsistency leads to inefficient use of urban renewable energies, and a large dependence on the national energy mix, which is more CO2 intensive.

EV Energy approach

EV Energy is framed within the Interreg Europe Programme, that helps regional and local governments across Europe to develop and deliver better policy, by creating an environment and opportunities for sharing solutions and leading to integrated and sustainable policies for people and places. Specifically, the EV Energy fall into the **low-carbon economy** category, which is formed by 41 projects and 278 Policy Instruments.

The project started in January 2017 and lasts until June 2021. It is divided into two phases out of which the first one (January 2017-June 2019) is dedicated to exchanging experience in between partner regions, resulting in an action plan for each region to improve its policies (the one at hand) and a second phase, dedicated to implementing to proposed action plan (July 2019- June 2021). The project counts on an overall budget of € 1,049,797, out of which the Barcelona Chamber of Commerce manages € 185,014. 85% of the budget are con-financed by the European Union under the programme Interreg Europe.

With regards to project activities, EV Energy analyses and develops innovative policies that promote renewable energies, electric mobility and the use of ICT for their integration. Through interregional policy learning, the most appropriate policies are **transferred to cities, regions and partner countries and implemented subsequently**. Identified best practices and policies are further disseminated for the benefit of the widest possible audience. The policy measures include energy or mobility taxations, parking and charging issues, energy regulations, grid connection costs and tackles many other issues.

EV Energy project emphasises three thematic areas (pillars):

- Electric Mobility (EM);
- Renewable Energy Sources (RES);
- Infrastructure (smart grids, ICT, etc.).

The lead partner of the project is Green IT Amsterdam Region. The other partners are: Regional Association of Lazio Municipalities (ANCI Lazio) - Italy, EUR S.p.A from Rome - Italy, Kaunas University of Technology - Lithuania, Stockholm County Council - Sweden, Barcelona Official Chamber of Commerce, Industry, Services and Navigation – Spain and the Province of Flevoland – Netherlands. Based on their good practices and experiences, the interregional policy learning and exchange of experience helps to transfer successful policies to partner countries according to their policy context.

Part II – Policy context

The Action Plan aims to impact:

☒ **Investment for Growth and Jobs programme**
☐ **European Territorial Cooperation programme**
☐ **Other regional development policy instrument**

Name of the policy instrument addressed: ERDF Operational Programme of Catalonia 2014-2020 (Thematic Objective 4; IP 4.5; Specific Objective 4.5.1.)

The ERDF Operational Programme of Catalonia 2014-2020 aims to **boost economic growth in the region of Catalonia** and to help it contribute to Europe reaching its goals of smart, green growth for all. EU funding is targeted, according to the agreed **regional smart specialization strategy (RIS3CAT),** primarily to R+D+i and improved access to and quality of information and communication technologies (ICT).

The programme focuses on three main funding priorities (% of funding):

- Knowledge and innovation (40.9%)
- Enhancing SME's competitiveness (37.9 %) and
- **Green economy (21.2%)**

Concerning this third priority, the programme will result in **more renewable energy production** (in particular biomass), **better energy efficiency** (in the private and public sector) and **green public transport in cities**. It includes a specific objective in order to foster carbon reduction strategies, especially in urban zones, focused on **sustainable multimodal urban mobility** and mitigation measures. Also aligned with RIS3CAT strategy, this objective aims to promote **clean urban transport, public transport, electric mobility and the development of clean energy supply systems**.

In this context, the EV project aims to affect and influence the OE.4.5.1 *"Promotion of sustainable urban mobility: clean urban transport, collective transport, urban-rural connection, road network improvements, cycling, pedestrian transport, electric mobility and development of clean energy supply systems",* which belongs to the OP priority axis 4, promoting energy efficiency and production and use of renewable energy.

The **Barcelona Chamber of Commerce**, as a partner of the EV Energy, promotes the general interest of economy and the enhancement of territorial competitiveness of regional business. During the project, it played an active role with different stakeholders of Catalonia like the Ministry of Territory and Sustainability, the Ministry of Business and Knowledge and the Ministry of Vice-presidency and Economy and Finance and RIS3CAT community as a regional level. Also, the Barcelona City Council, Barcelona Metropolitan Area (AMB), Public Transport Authority (ATM) and Barcelona Metropolitan Transports

(TMB) at local level. Finally, others like LIVE public-private platform (Logistics for the Implementation of the Electric Vehicle) and CEEC (Catalan Energy Efficiency Cluster).

Each one of the stakeholders plays a role in relation to the policy instrument to influence. In a brief way, the Government leads the application of the targeted OP at political and economic level. Barcelona City Council is promoting a sustainable mobility model through the new 2019-2024 Urban Mobility Plan, and also has its own 2018-2024 Electric Mobility Strategy. Barcelona Metropolitan Area is currently drafting its Urban Mobility Plan (PMMU) which includes a specific action program regarding electric vehicle and the Metropolitan Transport Authority is working in its Mobility Director Plan (PDM) Also, RIS3CAT Communities, which included the **ECO MOBILITY Community** envisioning low-emission mobility, and the Energy Community with the aim to transform the energy sector by innovation, receive financing under the FEDER Catalunya 2014-2020 OP.

During the project, Barcelona Chamber of Commerce set up **periodic meetings with the stakeholder group with the objective to enrich the regional policy learning process**. It had created a group of players to cluster policies and instruments and spotting linkages and opportunities for collaboration. In other words, it had created a space for knowledge transfer and exchange of practices, creating an environment to better support sustainable urban mobility at metropolitan level.

EV Energy project, through the identification of good practices and the lessons learnt from the study visits and interregional events, helped to shape Catalan policies. Also, the project added value and competitiveness to the regional economy since it had identified new opportunities and collaboration lines between the stakeholders, especially for LIVE platform and CEEC that had facilitated public-private collaboration.

Additionally, the FEDER OP for Catalonia 2014-2020 presents an opportunity to use European Funds to support improvements in the transport sector, as well as energy efficiency and renewable energy sources. Some of the regional stakeholders of the project receive FEDER financing, wherefore the EV Energy inputs and knowledge shared via the stakeholder group meetings and invitations of stakeholders to project events and activities pretend to influence the policy instrument. A share of FEDER funds in Catalonia goes to the so-called RIS3CAT Communities, as mentioned above, of which both leaders of the concerned communities (MOBILITAT ECO, ENERGIA) formed part of the stakeholder group.

Specific Role of Barcelona Chamber of Commerce in the ERDF Operational Programme of Catalonia 2014-2020

For the preparation and execution phase of the Operational Program of Catalonia, a consultation process takes place with the participation of different regional partners. Several meetings are organised with the objective to collect the concerns and proposals presented by these regional partners. One of these partners is the General Council of Chambers of Commerce of Catalonia, which is the body that represents all the Chambers of Commerce in Catalonia at political level, active as a consultative body

for the Government of Catalonia. The Barcelona Chamber of Commerce, being the biggest Chamber of Commerce in Catalonia, is a very active member participating in the drafting initiatives and proposals to favour the competitiveness and growth of Catalan SMEs.

It means that Barcelona Chamber of Commerce plays an important role as one of the stakeholders involved in both drafting and implementing the Catalan ERDF 2014-2020 Operational Programme.

Indicators

By the end of the phase 2 of the project it is important to assess what was the action plan impact to the aimed policy – how the project succeeded to affect policy. The impact will be assessed following the indicators defined in the OP FEDER Catalonia objective:

- Emission of greenhouse gases in Catalonia (KtCO2eq)
- Number of electric vehicles charging points

It means that the actions described in the Barcelona Action Plan proposed by Barcelona Chamber of Commerce within EV Energy project will work to decrease the greenhouse gases in Catalonia.

Furthermore, the impact will be assesses by the increase of more electric vehicle charging stations installed in Catalonia by the end of the project.

Obviously, it is hard to measure or trace back the effect on GHG emission reductions caused by the project, wherefore this indicator will be considered on a general level. The same counts for the number of new charging stations installed, since the government is constantly increasing the number of charging stations anyways. Nevertheless the action plan marks clear targets with regards to a certain type of charger (for motorbikes) and in certain areas (Metropolitan area of Barcelona), which makes an assessment of this indicator with relation to the action plan more traceable on a causal level.

The following chapters of the document explain, on one hand, the state of art of EVs and e-mobility in Catalonia specifying also the actual values of these indicators, and on the other hand, the actions in detail providing the objective and result value of these indicators.

Part III – Electric Vehicles and e-mobility: State of the Art in Catalonia

Transport in Spain represents 41,8% of the total final energy consumption and is also the main emitting sector. In Catalonia, transport also represents more than 40% of the final energy consumption that is covered almost entirely with oil. The transport sector represents 25% of the total emissions of greenhouse gases in Spain and almost 40% of emissions from the diffuse sectors. By modes of transport, the road represents almost 95% of emissions.

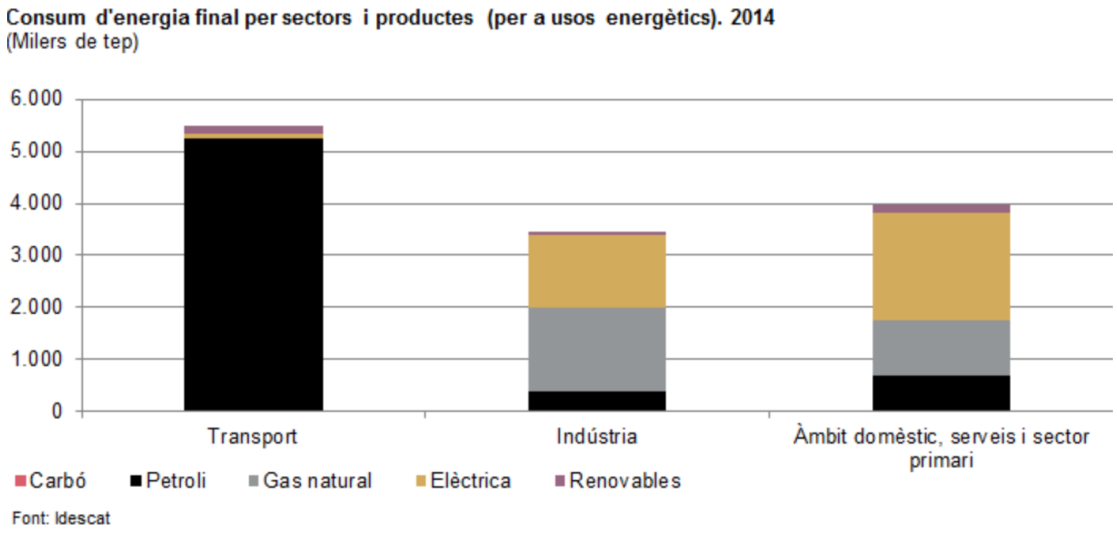

Figure 1 Final energy consumption by sectors. Source: IDESCAT

The deployment of electric mobility must allow reducing emissions and increasing the percentage of renewable end-use. In parallel, the greater efficiency of the electric vehicle can also help to reduce the final energy consumption. The latest data show that the participation of renewable energies in final consumption in Catalonia does not reach 10% while in Spain it accounts to almost 17%. The effort to promote electric mobility in Catalonia will be of vital importance to improve these indicators and to approach the objectives set.

The current share of electric vehicles on the total of vehicles in Barcelona province is about 0,31% and the new sales are about 2%. According to the Commission of Experts on Energy Transition Scenarios, and based on the cost, the technological evolution of the batteries, the use of the shared vehicle and the change in the preferences of the citizens, the deployment of the electric vehicle in Catalonia will reach between 1M and 2.4M of units by 2030.

In this context, the increase of the efficiency of combustion engines and the growth of electric mobility could help to obtain a reduction in the final consumption of transport energy by 2030.

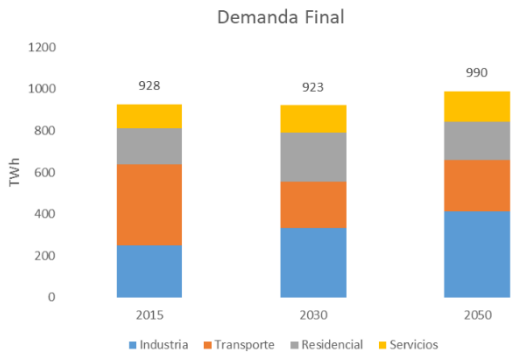

Figure 2 Final energy demand by sector. Source: Commission of Experts on Energy Transition

In the area of Catalonia, The **National Agreement for Energy Transition** was created, where the objectives about electric mobility are outlined. The objective of this instrument is to agree on a new **renewable, clean, decentralised, democratic and sustainable Catalan energy model** in line with the European Union's energy objectives. The perspective of electric mobility within the pact is addressed in relation to renewable electricity generation for self-consumption, and from the approach of storage. In this sense, the basic idea is very aligned with the objectives of the EV Energy project. The strategy of the pact for mobility is to promote the incursion of the electric vehicle through the development of the recharge network.

Also, the same idea is supported by the **Law 16/2017 on Climate Change** that consolidates the bases of electrical mobility in transport and advances in parallel to the National Agreement for the energy transition of Catalonia approved by the Government, and the **Strategic Plan for the 'Impulse of recharge infrastructure for electric vehicles in Catalonia (PIRVEC).** The model that wants to promote the Climate Change Law is a model of public, collective and intermodal transport that is not based only on the possession of a private vehicle but rather promotes the widespread use of public transport and sharing transport combined with other forms of sustainable transport without emissions of polluting gases. In this sense, on the one hand, there is the objective to ensure that the demand generated by the growth of the electric vehicle can be met. On the other hand, to guarantee that **100% of the public fleet is electric in 2030 and that 30% of the renewal of the car park is electric in 2025.**

In addition, the Strategic Plan for the deployment of recharge infrastructure 2016-2019 (PIRVEC) encompasses short-term actions being developed by the Government of Catalonia to promote electric mobility. The Plan is geared towards the development of recharging points infrastructure in the road network (100 recharge points quickly in 2019), in municipalities (400 semi-rapid recharge points in 2019) and at a particular level (25,000 recharging points for regular parking to 2019).

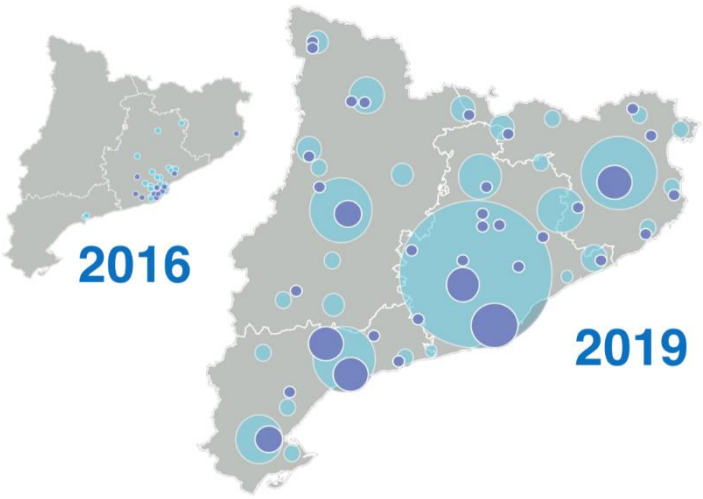

Figure 3 Objetives of recharge infrastructure development in Catalonia 2019 (PIRVEC)

The strategic plan defines a **pyramidal recharge network model** to make it more efficient. The base of the pyramid consists of recharging in locations where the vehicle usually park, mainly at home, with low charge powers that will not require, in most cases, increasing the power contracted. At the centre of the pyramid, the semi-rapid charge is placed, with medium powers. Finally, the fast strategic network, a high cost network for the need to guarantee very high powers and allow the simultaneity of recharging of several vehicles at a time.

Forecast number of recharging stations with power exceeding 50 kW

Year	2018	2020	2022
Fast recharge stations	60	125	250

At December 2018, the network of recharging stations has 88 public facilities, considering the 22 new facilities financed through the subsidy line. Looking to 2019, the goal is that no point in the country remains at more than 30 kilometres from a fast charging point.

The **PIRVEC also mentions the main objective of the EV Energy project**, which is the integration of renewable and electric mobility. The Plan promotes that the electric vehicle contributes to the distributed generation and favours self-consumption. As can be seen in the following graph, the electric vehicle becomes an element of a system that encompasses all the energy consumption of a user. At the same time, the electric vehicle

and the recharging point, apart from its main function, can provide others with energy storage and the provision of services to the electrical system.

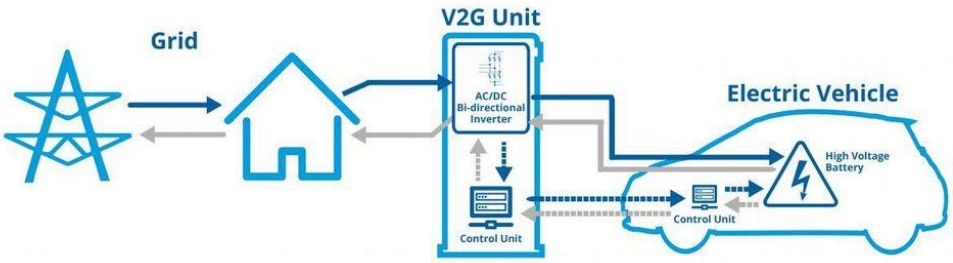

Figure 4 Scheme integrated energy system of a consumer

The current regulations in Catalonia do not allow the provision of services to the system by electric vehicles through recharging points. But the next approval of the Aggregator's figure and the participation of demand in the adjustment and balance markets will have to create the necessary legal framework to take advantage of this technology and facilitate the deployment of the electric vehicle from 'Get a quicker repayment of your investment.

Through these formulas the electric vehicle becomes a catalyst for the electric mobility strategy of Catalonia for a real paradigm shift based on distributed generation and the "democratisation" of energy. The Plan also contemplates that the electric vehicle facilitates the integration of renewable energies into the transport sector. The recharge linked to the usual car parkings and carried out at variable times allows us to take advantage of and value the electric energy produced from renewable energy sources (for example at night, taking advantage of the strength of the wind).

In Catalonia, some experiences are identified in demonstration projects on the connection of electric vehicle to buildings (V2B), such as the **SAVIES project** (Self-management AdVanced Integral Energy System). The project has been to develop an intelligent electrical micro-network and integrated in the building of Local Development of the City Council of *Santa Perpètua* incorporating systems of self-production of renewable energies and with the presence of electric vehicles connected to the building. They have a V2G station that allows to extract the energy of an electric vehicle to inject it into the consumption of the network of the building. Another driver developed in Catalonia for a connected vehicle was carried out within the framework of the **Grow Smarter project** financed by the European Commission

Apart from these research projects in Catalonia, there are no practical cases in which the V2H or V2B technology is being developed, nor the V2G because of the legal limitations and the lack of initiative on the part of public and private agents that could be involved. It is precisely at this point that the **EV Energy project can have a greater impact**, through the exchange of experiences with other European cities and regions. In the case of Catalonia, represented by the Chamber of Commerce of Barcelona, the experience of Amsterdam has been chosen in order to define a plan that allows these projects to be replicated or upscaled.

Part IV – Actions in details

Exchange of experience

Barcelona Chamber of Commerce actively participated in sharing, learning and exchanging experiences between all project partners and their stakeholders. During the first project phase, the Chamber organised four **Regional Stakeholder Events** (RSE) involving the following stakeholders:

- Government of Catalonia - Departament de la Vicepresidència i d'Economia i Hisenda (Department of the Vicepresidency and of Economy and Treasury)
- Institut Català d'Energia (ICAEN) – Government of Catalonia
- Clúster d'Eficiència Energètica de Catalunya (Catalan Energy Efficiency Cluster)
- Ficosa International, S.A. - Leaders of the ECO Mobility Community under RIS3CAT
- Catalonia Institute for Energy Research (IREC) – Leaders of the Energy Community under RIS3CAT
- Plataforma LIVE private-public platform
- Ajuntament de Barcelona (Barcelona City Council)
- Transports Metropolitans de Barcelona (Barcelona Metropolitan Transports)
- Autoritat del Transport Metropolità (Metropolitan Transport Authority)
- Area Metropolitana de Barcelona (Barcelona Metropolitan Area)
- Smartgrid.cat – private network concerned with the energy transition

The objective of these local stakeholders' meetings was to share the knowledge learned of the EV Energy project and to inspire the regional stakeholders with the documentation and good practices collected.

Each one of the stakeholders above play a role in the improvement of mobility policies at a metropolitan and local level, so the regional meetings helped to influence national and local policies, providing the knowledge and knowhow to these policymaking bodies.

Thus, the involvement of the representatives of the different levels of the Catalan administration into process of exchange of experience from the very beginning of the project implementation was very important. Also, the representatives participated in number of **international workshops and study visits** in Rome (18-19 October 2017), Stockholm (12-13 April 2018) and Amsterdam (4-6 June 2019), and also the Barcelona 4th EV Energy Dissemination Event (3 October 2018). During these visits, representatives learned a lot from case studies, study visits and presentations:

- **Rome Event Agenda:**

- Day 1:
- Workshop for exchange of Experience among partners
- Day 2:
- Roundtable 1: Good practices and experiences from Europe – the Ev Energy experiences
- Roundtable 2: Good practices and experiences from the main Italian stakeholders
- Roundtable 3: E-mobility: Institutional point of view
- Participation at Formula E press release and visit of EUR quarter of Rome, where formula E will take place.

- **Stockholm Event Agenda:**
  - Day 1: Peer-to-peer talks (group discussion in between PPs and stakeholders from Stockholm and partner regions)
  - Study Visit: Hammarby Sjöstad / ElectriCity
  - Short visit and explanation of charging infrastructure
  - Day 2: Dissemination event
  - Stockholm's regional planning and good practices from Stockholm + GPs from PPs
  - Keynote speeches and panel discussion
- **Barcelona Event Agenda:**
  - The Energy and Mobility Transition: State of Play in Catalonia, with the participation of Smartgrid.cat, Catalan Advisory Council for Sustainable Development, Catalan Energy Institute and Barcelona City Council.
  - Interview with Representatives from EV Energy Partner Regions, with the participation of Flevoland, Rome, Kaunas and Stockholm stakeholders.
  - Workshop talking about Electric Vehicles and Renewables Integration, Technological Changes, Business Models, Social Perspective and Policy and Regulation.
  - Meeting between LIVE Platform and Stockholm stakeholders.
  - Visit to Public Charging Stations for Electric Vehicle and Scooters
  - Visit to eCooltra, the leader in Electric Scooter Sharing in Europe.
  - Visit to TMB and presentation and test ride with new electric buses (opportunity charging)

- **Amsterdam Event Agenda:**
    - Project visit to Johan Cruyff Arena
    - Project visit to Almere, Reality neighborhood Almere
    - Conferences from Nissan, European Commission and Greater London Authority
    - Political debate
    - Workshops talking about Policy Making and business models, energy management systems at neighborhood/city scale, energy system simulation for design, scenario development and decision making and electrification of public transport.

During these international meetings, the regional stakeholders from Catalonia actively discussed with local stakeholders not only about challenges they experience in Catalonia, but also possible solutions and other good practices (GP) in the PP's regions, their applicability and the ways how they can be transferred to our region.

Another way of learning from each other was an exchange of information related to GP. The learning process was done by active communications between project partners and their stakeholders by emails, conference calls and project meetings. Semester meetings took part in the PP's regions (The Netherlands, Italy, Spain and Sweden), where project partners and their stakeholders presented a selection of their GP. Moreover, stakeholders from the Barcelona City Council actively participated in a specific meeting (Policy review) in Amsterdam to share Amsterdam experiences with EV charging infrastructure growth with Barcelona.

Such ways of communication, active cooperation and process of exchange of experience show already a great impact in policy learning.

Objectives and actions:

The ERDF Operational Programme for Catalonia 2014-2020 focuses on three main funding priorities (% of funding):

- Knowledge and innovation (40.9%)
- Enhancing SME's competitiveness (37.9 %) and
- **Green economy (21.2%)**

Concerning this third priority, the programme includes a **thematic objective**, which promotes the transition to a low carbon economy in all sectors. This thematic objective has a investment priority related, in this case the number 4.5: **Promotion of carbon reduction strategies, especially in urban areas, including the promotion of sustainable**

multimodal urban mobility and adaptation measures with a mitigation effect. Also, this strategic objective can be specified to a number of specific objectives. One of them promotes a sustainable mobility: clean urban transport, collective transport, electrical mobility and the development of systems for the supply of clean energy. The objective wants to develop an environment-friendly transport to reduce carbon dioxide emissions. Such specific objectives can be achieved by actions, which are presented in this Action Plan. Actions together with strategic and specific objectives can be overviewed in table 2. Additionally, information regarding all the details about the Action Plan are presented below for each action separately.

Strategic objective	Specific objective	Action
A. Promoting low-carbon strategies for all types of territories, in particular urban areas, including the promotion of sustainable multimodal urban mobility and mitigation relevant adaptation measures	A.1 Promote sustainable mobility and develop environment-friendly transport to reduce carbon dioxide emissions	A.1.1 The development of the **interoperable network of recharging points for electric vehicles**, facilitating the recharge of plug-in vehicles at the optimal moments for the system.
		A.1.2 Boosting the bicycle and **electric vehicles**.

Figure 5 Strategic, specific objectives and related actions

ACTION 1: Development strategy of recharging infrastructure for electric motorcycles in Barcelona

1. Background:

- **Motivation:** The existence of a public network of electrical vehicle charging points is necessary to raise confidence in electric driving and increase the demand for electric vehicles. The Europe directive 2014/94/EU Clean Power for Transport (Alternative Fuels for Sustainable Mobility in Europe) says that recharging points must be accessible to the higher number of people possible, to facilitate the circulation of electrical vehicles in urban zones. In a future scenario, public charging facilities furthermore will offer great opportunities to achieve other sustainability targets, including (temporary) storage and use of sustainable energy.
  In 2017 the number of recharging points in Catalunya was 1.241; 28 super-fast recharging points (120kW), 110 fasts (between 22kW and 44kW), 75 semi-fast (between 11kW and 22kW) and 1028 normal (<11kW). Specifically, in Barcelona, there are 247 public charging points for motorcycles; 122 located in public parking and 125 located in public road. The number of public charging points has increased by 409% since 2011.
- **Challenges:** The Electric Mobility Strategy of the Barcelona City Council foresees to further reinforce the charging infrastructure (for electric cars and motorcycles likewise) with the objective to increase the number of electric motorcycles in the city up to 24.000 by 2024. This would correspond to a share of 8% of the total number of motorcycles currently present.
- **Good practices:** Amsterdam disposes of one of the world's most dense networks of public charging infrastructure (2.800 public charging points in 2018). The city took a pro-active approach to overcome the "chicken-egg situation" between the presence of EVs and charging infrastructure.
  Through an innovative long-term procurement process (for 1.000 new charging points in 2011) Amsterdam has achieved a very rapid expansion at low cost while ensuring interoperability and a maximum chargeable price by the supplier.
  (New) EV owners can make an online request for the installation of a charging pole, where they need one. Charging points are only installed for EV drivers who cannot park on their own premises. At the same time, no additional parking permits are issued for non-EVs.
  Due to a multiple stakeholder approach to implementation, the whole process from the request to the installation of a new charging pole takes a maximum of 2 months.

Thereby the city guarantees the availability of charging facilities for all electric drivers at affordable rates, according to the real demand and without delays.

- **Exchange of experience:** In 2018 during the third Regional Stakeholder Event (RSE) the Barcelona Chamber of Commerce presented this successful approach to its stakeholder group. Barcelona City Council, forming part of the group got interested in this successful demand-driven approach and expresses a possibility to apply it to Barcelona for the development of the motorcycle charging infrastructure in the city with the aim to reach a more sustainable urban mobility model. BCC upon the manifested interest from the side of the Barcelona city council engaged with the partners from Amsterdam to receive more information on the GP, which was exchanged through mail, and explained in a specific skype call. The issue was furthermore discussed in a specific meeting in between the Barcelona Chamber of Commerce and the Barcelona city council to elaborate on details and specifics of the practice. It soon became obvious that the practice in the context of the Barcelona strategy for charging infrastructure development is better applicable to the development of motorcycle charging infrastructure than car charging infrastructure. This is due to the following reasons: In Amsterdam the largest part of private cars park on the streets, because people do not have private garages, whereas in Barcelona the city council wants to avoid cars parking in the street (and charge there), but wants to have them park in car parks. In a long-term perspective parking cars should be totally avoided on the street and cars in general replaced by lighter vehicles (e.g. motorcycles). Motorcycles are furthermore a very much used means of transport in Barcelona among other reasons due to the climate. In line with this strategy and the local context, the GP from Amsterdam can find its application in the development of motorcycle charging infrastructure.

  The further facilitate the exchange of information in between the representatives of the Barcelona City Council and Amsterdam stakeholders and dedicated meeting (so-called policy review) in between the two parties was set up back to back with the Dissemination event in Amsterdam and Flevoland on the 4-5 June enabling wider dialog between both sides. The objective was to share Amsterdam experiences with EV charging infrastructure growth with Barcelona.

Present from the Amsterdam side were:

- Phillip Renard, Municipality of Amsterdam, Programme-manager Charging Infrastructure.
- Jaap Burger, Municipality of Amsterdam, Strategy Advisor EV Charging.
- Robert van den Hoed, Amsterdam University of Applied Sciences, Lector Energy and Innovation;
- Julie Chenadec, Green IT Amsterdam project manager EV ENERGY

- Hugo Niesing and Marc Cañigueral, Resourcefully, Supporting partner in the EV ENERGY project

Participants from Amsterdam made the following interventions:

- Energy EV charging policies Amsterdam: Amsterdam incentive and contracts for EV charging infrastructure 2009 – 2019 Jaap Burger
- Data gathering and analysis: HvA, Robert van den Hoed
- EV charging & energy steering: The Flexpower project Philipp Renard

From Barcelona the following representatives took place in the meeting:

- Àngel López, Electro Mobility Program Director, Barcelona City Council
- Joan Catala, Head of the Operations Support Center, Barcelona de Serveis Municipals, S.A. (B:SM), Barcelona City Council
  B:SM is a public company 100% owned by the city of Barcelona, operating all public charging facilities in the city (among other things, such as public parkings etc.)
- Berta Pérez and Leonie Hehn from the Barcelona Chamber of Commerce, Partner in the EV ENERGY project
- Berta Fauró, Consultant - Innovation, Transport and Logistics, Institut Cerdà

2. Actions

- **Use the user demand-driven system seen in Amsterdam. Satisfy the demand of the electric motorcycles users to have a near recharging point:**

  Despite the previous numbers, the intention is to increase the number of recharging points for electric motorcycles using the user demand-driven system seen in Amsterdam. Barcelona City Council and BSM will study how to implement an easy and optimal process to implement a new charging point for motorcycles in Barcelona.

  The process will take into account the following steps:

  1. The (new) electric driver makes a request online for expansion of the public charging network.
  2. The electricity and grid operator check that the request meets the requirements and whether a new charge point is needed in the area concerned. Their considerations include:
     - the walking distance to the nearest existing or planned available charge location

- the occupancy rate of the nearest charge locations (based on data available)
- previous requests which have been turned down

3. Barcelona city council will ultimately decide whether a new location will be installed.
4. If a new charge point is going to be installed, the electricity and grid operator will draw up an installation plan in consultation with the grid operator.
5. Barcelona (road authority) will formally give permission for the installation plan and publish its decision in the official journal.
6. The location and the plan are published online on a map.
7. BSM will request connection to the network from the grid operator.
8. Barcelona council instructs the installation of the charge point and the design of the location.
9. Following a soil survey, the grid operator will allocate the connection to the electricity and grid operator and release the location for installation.
10. BSM (or installer) will install the charge point, set up the location(s) and connect it/them to the electricity network.

3. Players involved

The following players are involved in the development and the implementation of the action plan: the Barcelona City Council, specifically the Mobility Department, and Barcelona Municipal Services (BSM), a company of the Barcelona City Council with the aim of providing services and managing Barcelona's infrastructures related to mobility and leisure.

Additional players: Grid operator, motorcycle owners, LIVE platform, Scooter sharing services (e.g. eCooltra, Muving)

4. Timeframe

Starting year is 2019 (autumn). The first motorcycle charging pole is planned to be installed by the end of 2020. If successful, the practice is foreseen to be continued after the ending of EV Energy project phase II in June 2021.

5. Costs and funding sources

This action is related with the specific action A.1.1 The development of the interoperable network of recharging points for electric vehicles, facilitating the recharge of plug-in

vehicles at the optimal moments for the system, of the ERDF Operational Programme for Catalonia 2014-2020 Catalonia. However, the funding source for its implementation will be assumed by the BSM and Barcelona City Council budgets.

ACTION 2: Political framework: METROPOLITAN PLAN OF URBAN MOBILITY (PMMU)

1. Background

- **Motivation**: Barcelona Metropolitan Area (AMB) is currently drafting its Urban Mobility Plan, which includes a specific action programme regarding electric vehicles. AMB will promote the use of low emission vehicles to the citizenship, public centres and companies through communication and sensitisation campaigns. In the private sector, the low emission vehicles will be promoted in the fleets of companies, especially in renting, transporting and distributing companies.

  About the public sector, the objective is sensitising the administrations, cities councils and publics companies about the importance of incorporate low emission vehicles in their fleets. The AMB will lead this change and will promote the communication about the importance in the transition with low emission vehicles.

  Finally, the AMB will foment between citizens the progressive substitution of vehicles with conventional motors, with low emission vehicles, through sensitisation and communication campaigns, expositions, diffusion of financial assistance and grants on recharging costs. They will design campaigns considering the different activities and target groups like adults and elderly people.

  The consciousness of citizenship about environmental benefits using that kind of vehicles must match with a sensitisation of the fight to improve the road safety and the traffic congestion, because the transition to low emission vehicles does not solve these problems.

  Following this, it is important to raise awareness about road security specially to protect the pedestrians and cyclists. The low emission vehicles are more silent than conventional motors and can run over easily for this fact. European Union has approved that from mid-2019, new electrical and hybrid vehicles will have to make noise when their speed is less than 30 km/h.

- **Challenges**: The exchange of good practices between administrations and cities can improve innovation, news management formulas and the transition process. The campaigns are specially addressed to public administrations and to his technical personal, but in some cases it's recommendable to open these campaigns to all interested in the low emission vehicles introduction, like platforms, associations, companies and individual persons.
- **Good practices:** This action is made up of two points or specific actions, where each one of them is related to different good practices:
    - The **action 2.1**., related to the promotion of low emissions vehicles, takes into account two EV Energy GPs, the Clean Vehicles in Stockholm and the Promoting websites for EVs from Stockholm likewise.
      Both are GPs that foster the promotion towards EVs.
      The first one is a large scale programme run by the City of Stockholm to facilitate market introduction of clean vehicles and sustainable fuels including electric charging. Its worked in three phases: (1) remove barriers and pave the way for users of clean vehicles; (2) broadening the market varieties/ motivating manufacturers to bring out new clean vehicle models requires a bigger market; (3) increasing the market for clean vehicles (including EVs) in and outside Stockholm/Sweden.
      Relevant experience for Barcelona and Catalonia refers to the 3rd and currently running phase.
      The latter GP (Promoting websites for EVs) tackles the necessity of neutral information on electric vehicles for citizens to support their purchase decision. This includes information on different EV models with technical specifications, use cases, accessibility etc. The websites furthermore include information of the charging stations network and availability.

    - The **action 2.2**., related to the expansion of the metropolitan network of recharging points for EVs considered the Amsterdam demand driven charging infrastructure development (see above) and the Power Parking good practice from Lelystad Airport and business park. In this good practice large carparks become renewable energy plants, connected with a smart grid to EV chargers and the adjacent buildings.
      In this innovative ERDF financed pilot project large parkings are transformed to decentralised sustainable energy plants. It provides a solution to the increasing imbalances on the grid and the need for a more flexible energy system.

- **Exchange of experience:** Related to the **action 2.1.**, the need for a fast transition to clean cars and improve the access to renewable fuels including electricity was

already discovered during the kick-off meeting of EV Energy project in Amsterdam. After Stockholm has published their GPs Clean vehicles program from Stockholm and EV Promoting websites and BCC presented them to the stakeholder group of Barcelona, they were understood as a model when it comes to EV promotion. The GPs were taken into consideration in the drafting of the Urban Mobility Metropolitan Plan from AMB.
Websites promoting e-mobility were generally identified as an important information channels for enterprises and private users to make the step towards using electric vehicles. The LIVE platform, I private public platform for the promotion of electric vehicles, and an important means of disseminating EV related issues (as identified in the PMMU), got inspired by the Stockholm websites example and the comprehensive information provided.
A representative from the LIVE platform assisted as stakeholder from Barcelona to the meeting in Stockholm, where he took part in the peer-to-peer meetings and further activities and got in direct contact with stakeholders from Stockholm.
During the meeting in Barcelona (3 October 2018) a specific meeting was arranged in between the partners and stakeholders from Stockholm and the LIVE platform (several members of it) to exchange information in between the two parties, interested in each others practices. In an additional meeting that was set up on the 29 Jan 2019 in Amsterdam in between project partners to discuss the action plans, exchange in between Barcelona partners and Stockholm partners in a one on one discussion took place.

On the other hand, and related to **action 2.2**., the Power parking good practice from Lelystad (NL) was one of the project's first good practices presented and raised partners and stakeholders interest from the start. It was mentioned in the kick-off meeting in Amsterdam and then officially presented by the manager in charge of the project during the Stockholm Conference (12-13 April 2018) as a flagship project for renewable energy integration in the Netherlands. This practice in especially relevant for the installation of charging infrastructure in the municipalities of AMB, where the installation of solar panels on top of the parking slots is envisaged.
For the exchange of experience process for the Amsterdam demand driven charging infrastructure development see action 1. Note that the Barcelona city council forms part of AMB.

2. Actions

- **Action 2.1.: Promote the use of low emissions vehicles, related to the action number 101 of the PMMU**

The first point consists in the promotion of **communication and sensitisation campaigns**: financial assistance and grants on recharging costs. The participation of the Barcelona Chamber of Commerce in the organisation events addressed to companies will be crucial.

The second point, the promotion as a Chamber of Commerce of **sensitisation campaigns addressed to companies**, doing intern audits to optimise their vehicle fleets with low emission vehicles.

Finally, the action will take into account an exchange of good practices to introduce low emission cars in the cities, in other words, **sharing experiences with top sustainable cities**. In this point, the EV Energy GPs related will play an important role.

Specifically, AMB and Barcelona Chamber of Commerce will work through the following phases:

a. **Organisation of communication events**
   Focus the events to citizenship, business and responsible of public fleets purchases to inform about incentives, fiscal exceptions, grants, available recharging nets and price.
b. **Create and keep up a space about low emission vehicles inside AMB's web**
   Include information and activities related to low emission vehicles and sustainable mobility and spread good practices for the green logistic promotion, giving special visibility to logistic companies with environmental dimension.
c. **Create an argumentation to be added to communication campaigns or other media:**
   With the finality to assure road safety (especially pedestrians and bicycles), for example, the low emission vehicles are more silent than conventional motors.
d. **Increase participation in platforms and associations of public-private collaboration** like LIVE platform. LIVE Platform is a public-private platform opened to all entities related with sustainable mobility, especially electrical and natural gas vehicles, and with the common objective of developing projects, strategy policies, new business models, and creating a knowledge network.
   The objectives of this platform are:
   - Increase the strategic positioning of Barcelona, its metropolitan area and Catalunya to an excellent international centre in sustainable mobility sector.
   - Nexus between the different public initiatives (Barcelona, Metropolitan Area, Catalunya), as well as share experiences and necessities between public and private sector.
   - Give support to private sector to favour the implantation of local and international strategy projects, give promotion tools and respond to the necessities and interests of the sector.
e. **Create an online platform**

Where urban online operators (interested in low emission vehicles fleet optimisation) sign a statement of intents, giving visibility to these companies increasing also networking.

f. **Give low emission vehicles to metropolitan city councils temporally**
Give low emission vehicles to metropolitan city councils for a trial period, these vehicles can be electric vehicles but also natural gas propelled vehicles.

g. **Write and spread a technical instruction to all city councils to facilitate the election and redaction of criteria in the conditions document for the low emission vehicles services hiring.**

h. **Make a sensitisation campaign addressed to companies, promoting internal audits to optimise their vehicles fleets with low emission vehicles.**

i. **Exchange good actions to introduce low emission vehicles in the cities.**

On the other hand, AMB jointly with Barcelona Chamber of Commerce will work on the action 2.2.:

- **Action 2.2.: Expand the metropolitan network of recharging points for VBE, related to the action number 36 of PMMU.**

The action pretends to expand the network of AMB's recharge infrastructure with the installation of 48 points.

In this action, it is proposed to **expand the number of recharging points** of the AMB in the territory to have at least **one recharge point in each municipality in the metropolitan area**. Plans will be studied to guarantee the criteria mentioned and influence the importance of promoting shared low emissions vehicles services at modal exchange points, such as taxis, railroads, buses, as well as locations suitable for the urban distribution of goods and services.

On the other hand, it is **important to ensure the interoperability of the electric recharging services** in the metropolitan municipalities (and particularly with Barcelona) to facilitate the use among low emission vehicle users. The sharing of the database must be ensured in addition to enabling the activation, operation and payment of points by part of the users, through a means that gives access to the entire recharging service on the public road network. Allowing interoperability will accelerate the adoption of EVs and improve the driver's experience.

In addition, and related to EV Energy goals, it is **intended to promote that electricity comes from renewable sources**, and to the extent possible to ensure that production is local. It is planned to be able to inform users of this origin and of the long-term commitment and where possible to install solar plants next to charging infrastructure. This is where the GP PowerParking from Lelystad comes into consideration.

3. Players involved

Different stakeholders are involved in this action. First of all, the AMB (Metropolitan Area of Barcelona) with the collaboration of the Metropolitan city councils. Also, public-private collaboration platforms as LIVE platform or AEDIVE.

The need for technical staff or administrations out of AMB, nationals or internationals (European) will be very important to acquire the maximum experience and knowledge from abroad.

Finally, some regional administration like Diputació de Barcelona, Generalitat de Catalunya and the Catalan Institute of Energy (ICAEN) would play an important role in this action number 2.

4. Timeframe

The action will start this year 2019 and will last until 2023, so it will take place during the first five years of the Urban Mobility Metropolitan Plan (2019-2024). The monitorisation of action by EV Energy project will end in June 2021 with the end of the project phase 2.

5. Costs and Funding sources:

Metropolitan Area of Barcelona has studied that the approximate cost to perform and develop this action is approximately 1,8M€. It will assume the entire cost of the action.

Indicators and sources of verification:

In order to achieve the indicated aims, the Action Plan has to be monitored, controlled and evaluated. Therefore, measures or indicators have to be addressed. For this action, we address self-defined, compulsory, indicators. Self-defined indicators are mandatory and defined in the application form. A series of further indicators have been added to directly refer to the actions outlined in the action plan. They are dedicated to increase the quality of the monitoring and general assessment.

Self-defined indicators (Application form) in relation to the OP:

- Emission of greenhouse gases in Catalonia (KtCO2eq)
- Number of electric vehicles charging points

Indicator	Reference source of information for monitoring	Baseline value	Target value
ACTION 1: Development strategy of recharging infrastructure for electric motorcycles in Barcelona.			
Emission of greenhouse gases in Catalonia (KtCO2eq)	Generalitat de Catalunya	42.832,77 KtCO2eq (2012)	41.432,10 KtCO2eq (2023)
Number of electric vehicles charging points	Generalitat de Catalunya	xxx	6990 (Catalonia) year 2023

Additional indicators:

Indicator	Reference source of information for monitoring	Baseline value	Target value
ACTION 1: Development strategy of recharging infrastructure for electric motorcycles in Barcelona.			

Number of motorcycles charging stations in Barcelona	Barcelona City Council and Barcelona Municipality Services	247 public charging points for motorcycles; 122 located in public parking and 125 located in public road	tbc
Consume and number of recharges in Barcelona stations	Barcelona City Council and Barcelona Municipality Services	40.568,03 kwh monthly and 3.812 monthly recharges (all vehicles)	tbc
ACTION 2: Political framework: METROPOLITAN PLAN OF URBAN MOBILITY (PMMU)			
Recharge cards issued	Metropolitan Area of Barcelona and Barcelona Municipality Services	214 cards	tbc
Registered EV users	Barcelona Municipality Services	3.887 EV users	24.000 EV users
Number of charging stations in AMB	Metropolitan Area of Barcelona	10 rapid charging points and 10 normal charging points	48 charging points

AMB Àrea Metropolitana de Barcelona

To whom it may concern:

The *Àrea Metropolitana de Barcelona – AMB (Barcelona Metropolitan Area)* hereby confirms that it has been involved in the stakeholder group and the preparation of the "Catalonia Action Plan for the development of environment-friendly mobility to reduce emissions" of the Interreg Europe project EV Energy, implemented by the Barcelona Chamber of Commerce as project partner in Catalonia.

The actions outlined in the above-mentioned Action Plan are in line with the administration's policy and corresponding to its future strategy for charging infrastructure development and the promotion of electric vehicles in the territory. AMB furthermore commits itself to implementing the proposed actions during Phase 2 of EV Energy project (July 2019 - June 2021) within its available possibilities and means.

Yours sincerely,

Mr. Joan M. Bigas
Director of Mobility and Transport
AREA METROPOLITANA DE BARCELONA

C/ 62, núm. 16-18 Zona Franca 08040 Barcelona Tel. (+34) 93 223 51 51 Fax (+34) 93 223 47 90 www.amb.cat

Generalitat de Catalunya
Departament de la Vicepresidència
i d'Economia i Hisenda
Direcció General de Promoció Econòmica,
Competència i Regulació
Sub-direcció General de Programació Econòmica

Interreg Europe
European Union | European Regional Development Fund

Regional Action Plan letter of support

Project Information

Project acronym	EV Energy
Project title	Electric Vehicles for City Renewable Energy Supply
Name of project partner	Barcelona Chamber of Commerce

We hereby state:

- that we were informed about the preparation of the Regional Action Plan as part of the above-mentioned project,
- that the topic tackled by this Regional Action Plan is in line with the Catalonia ERDF Operational Programme,
- that we acknowledge the participation of the above-mentioned partner(s) in the Regional Action Plan,
- that we will engage with the stakeholder group and welcome opportunities for exchanging experiences with other institutions in Europe,
- that we will consider possibilities for implementation of the action plan through our policy instrument.

Name of signatory	Teresa MEDINA PLANS
Position of signatory	Deputy General Director of Economic Programming
Date	26th July 2019
Signature and institution stamp	Generalitat de Catalunya Departament d'Economia i Finances Direcció General de Promoció Econòmica