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e-MOPOLI aims at contributing to an efficient diffusion of electric and other alternative fuel mobility by promoting mobility patterns, transport systems infrastructure and sustainable low CO2 emission services

Regional Action Plan of Region of Attica

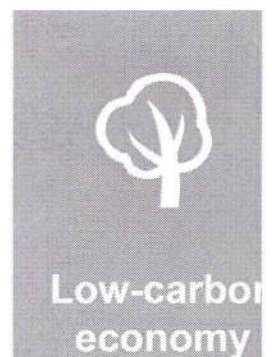


Responsible partner PP4 Region of Attica

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1. Introduction

The energy consumption and emissions production are exponentially increasing worldwide. Based on European Union (europa.eu), the transportation sector has the highest share in energy consumption (33,1% in 2016) and constitutes the second contributing factor in CO₂ emissions (28,5% in 2016). Specifically, the road transportation field is responsible for most CO₂ emissions (72,9% in 2016). In a national level, statistic data for Greece show the same trend as the share of the transportation sector in CO₂ emissions is 29,5% (the second highest after energy industries sector) and the road transportation contributes most in air pollution with by 57,3% (EU, Statistical pocketbook 2018). Concerning the Region of Attica, and more specifically the city of Athens, capital of the Region, the share of CO₂ emissions per sector is: 30,8% food, 29,1% transport, 13,7% goods, 11,3% gross fixed capital formation, 7,1% housing, 4,6% government and 3,4% services (Baabou et al., 2017). The above presented high shares in European, national and regional level, reveal the need for the design and implementation of interventions and actions towards a more sustainable mobility. Within this framework, electromobility and alternative fuels are considered to be key - solutions towards a more environmentally friendly transportation system, having a direct effect on energy saving and emissions reduction.

Based on the above, the e-MOPOLI (Electro MObility as driver to support POLicy Instruments for sustainable mobility) project, a European research project financed by the European Regional Development Fund, aims at the diffusion of electromobility and the implementation of innovative strategies for reducing the carbon footprint of economic activities in urban and extra-urban areas.

1.1 The e-MOPOLI Project

The e-MOPOLI project (Electro MObility as driver to support POLicy Instruments for sustainable mobility) is a European Interreg project aiming at promoting the electromobility and alternative fuels concepts towards more sustainable, safer and environmentally friendly transportation systems as well as increasing awareness of Regional and Local Public Administrations through policy instrument development and through action plan implementation. This will be achieved through the improvement of 9 regional policy instruments, 6 of which directly linked to Structural Funds, in 9 European Regions of 8 European countries: Italy, Slovenia, Greece, Belgium, Finland, Norway, Romania and Latvia. More specifically, the project partner regions are:

- Province of Brescia (Italy) – Lead partner
- Calabria Region (Italy)
- Regional Development Agency of Gorenjska (Slovenia)
- Region of Attica (Greece)
- Flemish government Department Environment (Belgium)
- Regional Council of Kainuu (Finland)
- Rogaland County Council (Norway)
- Bucharest-Ilfov Regional Development Agency (Romania)
- Zemgale Planning Region (Latvia).

Charging and tolling policies in favour of e-vehicles, development of charging infrastructure powered by alternative sources, integration of charging infrastructure and charging hubs in spatial planning, deployment and purchase of alternative fuel vehicles in public transport, enhancement of the capability of public authorities in developing effective policies for reducing the carbon footprint of transport activities, addressing general and specific challenges of environmental protection included in Operational Programmes and promotion of e-mobility in niche market fleets are the main working areas of the project. The policy instruments will be improved through various project activities such as interregional learning process, partner meetings, study field visits and staff exchange where the project partners will have the opportunity to exchange ideas, knowledge and practices not only among each other but also with experts actively involved in the field of electromobility and alternative fuels. Additionally, each project partner will formulate a regional stakeholders group, consisting of people with deep knowledge in the field of electromobility and alternative fuels working in the industry, in the infrastructure and (public) service, regional public authorities, in business association and in the academia/research.

e-MOPOLI intends to contribute to the Europe 2020 strategy, by promoting mobility patterns, transport systems, infrastructure and sustainable low CO2 emissions services. The promotion of sustainable solutions for e-vehicles deployment and smart infrastructure for charging will enhance the development of e-mobility as a tool for realising smart, sustainable and inclusive growth. The project is compliant with the INTERREG EUROPE priority axis 3 aiming at supporting the shift towards a low-carbon economy. In particular it addresses the specific objective 3.1 entitled "Improve the implementation of regional development policies and programmes, in particular programmes for Investment for Growth and Job focusing on the transition to a low-carbon economy". The project, in order to effectively reach its goal, will be soundly structured on following steps:

- e-MOPOLI methodology
- partners' local and regional territorial context analysis
- Good Practices selected for exchange of experience and transfer of lesson learnt
- 9 regional action plans
- monitoring of 9 Action Plans through e-MOPOLI webtool
- e-MOPOLI recommendations on business, governance and RIS3 level for regional and local authorities.

The project has a duration of 54 months, started in June 2018 and expected to be finalised by November 2022 while the budget is 1,792,053.00 euros.

1.2 The Action Plan

A key output of the e-MOPOLI project is the development of 9 Action Plans which will contribute in promoting electromobility and alternative fuels in the region of each project partner. In order to achieve this output the nine project partner regions from eight different European countries will exchange ideas, knowledge and policies already implemented that should be adopted, altered or avoided. The overall methodological process that will be followed is illustrated in Figure 1 and explained in the next paragraphs.

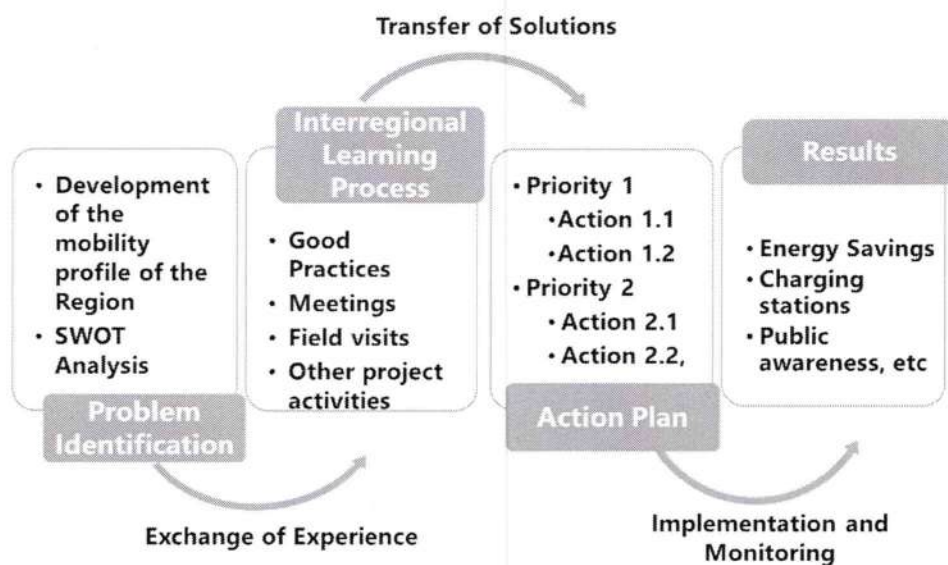


Fig. 1 Flow Diagram

The first step refers to the problem identification and each Region will analyse the current situation in terms of the progress that has been achieved in the field of electromobility and alternative fuels in the region as well as deficiencies hindering the diffusion of these sustainable technologies. Additionally, during this step each region will assess its SWOT mobility profile in terms of electromobility and alternative fuel, in order to identify main strengths, weakness, opportunities and threats in the various mobility aspects. The next step, the Interregional Learning Process, consists a core factor for the formulation of the action plan. The exchange of good practices among the project partners, the discussions and meetings, the field visits and the various project activities are the components for the development of actions suitable and targeted for each region based on the current situation and according to its needs and visions. Inspiration from the

learning process and not transfer of a good practice is the key-point for developing a successful action plan.

After the identification of good practices and experience sharing among the project partners as well as the consultation with the regional stakeholders' group, each region will formulate, in the third step, an action plan which will contain concrete, reasonable and targeted actions that should be implemented in order to promote electromobility and the use of alternative fuels in the area. It should be mentioned that all actions should be categorized in respective priority axes. Finally, the fourth step refers to the implementation and monitoring (in phase 2 of the project) of the actions that are established and presented in the action plan. Consequently, the objective of the present report is to develop and present the action plan of Region of Attica which aims to promote electromobility and use of alternative fuels in the Region through specific actions.

The present document is structured in four key parts as follows:

- The first part includes general information about the Attica Region
- In the second part, the policy instrument and its context are specified and described. Additionally, the scope of the action plan is presented as well as the way it will contribute to the improvement of this policy.
- In the third part, current situation of electromobility and alternative fuels is illustrated based on the consultation with the regional stakeholders.
- The fourth part is the core of the document and includes a detailed description of the actions formulating the present action plan.

2. General Information

2.1 Region of Attica

Region of Attica is one of the 13 regions of Greece, consisting of the Prefecture of Attica, based in Athens and divided into the next eight regional sections:

- Regional Unit of Central Athens
- Regional Unit of South Athens
- Regional Unit of North Athens
- Regional Unit of West Athens
- Regional Unit of Piraeus
- Regional Unit of Islands
- Regional Unit of West Attica
- Regional Unit of East Attica

Region of Attica is located in the central part of the country and includes the entire metropolitan area of Athens which is the country's capital and its largest city. Geographically, the Attica Region is one of the smallest regions as it covers 3,808 km² (1,470 sq mi) which is the 2,9% of the total area of the country. Concerning its population, it is the most densely populated region of Greece, since it has 3,761,810. (Hellenic Statistical Authority, 2011 census) residents, around 36% (1/3) of the total population of the country. More than 95% of the regions inhabitants lives in the capital, the city of Athens. Similarly, to the other Greek regions, Region of Attica belongs to the second level of local government organization, after the Kallikratis reform, it has its own elected governors and regional councils as well as its own administrative and economic independence. In total, 66 municipality consists the region.

Region of Attica has actively participated in various projects within the frame of E.U. Programs and initiatives, mostly dealt with innovation, development, tourism, protection of the environment, social policy and urban development. Some indicative projects are:

- MARIE - MAinstreaming Responsible Innovation in European S3 (INTERREG EUROPE)
- SCENT - Smart Toolbox for Engaging Citizens into a People-Centric Observation Web (HORIZON 2020)
- KNOWING - Knowledge Intelligence and Innovation for a Sustainable Growth (MED)
- ORIENTGATE (European Territorial Cooperation – SouthEast Europe)
- SusTEn Mechanism - Sustainable Tourism Entrepreneurship Mechanism (MED)

2.2 Contact Details

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3. Policy Context

(further details on the policy context and the way the action plan should contribute to improve the policy instrument are necessary)

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: *Attica ROP 2014-2020, Priority Axis 6: Improving Quality of Life in Urban Environment*

The Regional Operational Programme (ROP) of Attiki 2014-2020 gives a detailed overview of the Research, Technological, Development and Innovation (RTDI) policy framework for the region. More specifically, ROP aims to (ec.europa.eu):

- *“help reverse the decline of the region's productive base and gradually restructure it by enhancing high added value and low environmental impact sectors, aiming at creating jobs, enhancing extroversion, innovation and the smart use of ICT through promoting and integrating innovation, utilising ICT, creating business supporting structures and mechanisms;*
- *improve the attractiveness of the region as a place to live and attracting investments through the protection and the sustainable management of the environment and promoting climate change adaptation and the harmonization with the European environmental acquis; and*
- *ensure social cohesion through interventions. The goal is to create a framework of protection and support for vulnerable groups and to mitigate factors exacerbated by the crisis that lead to poverty and social exclusion parts of the region's population. Interventions focus on the integration / reintegration in the labor market of targeted groups with the biggest problems, improving access to welfare and health services and promoting equal opportunities also through the creation of educational and health infrastructure.”*

Major challenges that exist in Attica are related to the improvement of the physical, anthropogenic, and residential environment and the tackling of environmental degradation brought about by uncontrolled expansion of urban areas, concentration of population etc. One of the main national priorities the Regional Operational Program of Attica 2014-2020 is the Priority Axis 6 concerning the Quality of Life in Urban Environment Improvement. This priority is related to the harmonization with the European environmental acquis in waste water management, recycling actions concerning solid waste management and installations in small islands, pilot actions for bio waste, water supply networks, protection of cultural and natural heritage, Integrated Territorial Investments for sustainable urban development.

Additionally, this priority seeks to solve major problems related to the integration of environmental infrastructure and the improvement of urban environment in order to improve the quality of life of the residents. Measures to achieve this is urban revitalization and promotion of environmentally friendly mobility. Priorities of this axis are:

- waste prevention (volume reduction, recovery - material recycling and recovery of waste as productive and financial resources)
- combination of strengthening tourism development and urban rejuvenation
- management and distribution of drinking water
- protection and conservation of cultural heritage and development of cultural infrastructure
- sustainable mobility

Main aspects of this priority axis within the e-MOPOLI project are the following:

- Assessment of alternative fuel vehicles (AFV) in public transport and infrastructure in relation to quality of life
- Integration of e-mobility and AF infrastructure in spatial planning to facilitate penetration of private e-vehicles and smart mobility solutions based on alternative fuels.
- E-mobility and AFV solutions for tourism to address the minimization of local noise and air pollution due to the highly periodic demand in touristic areas.

- Integration of AFV solutions to existing infrastructure
- Promoting multimodality with AFV technologies to enhance public health and quality of life

The promotion of environmentally friendly mobility in the Region of Attica will be achieved through the formulation and implementation of this Action Plan within the eMOPOLI project. The analysis of the current situation showed that the transportation sector contributes mostly in the CO₂ emissions and the air quality deteriorates gradually, having a negative influence on the residents' health. The shift towards more sustainable modes of transportation is urgent and electromobility as well as alternative fuels are considered important players towards this direction. Unfortunately, in the Region of Attica the concept of the electromobility and alternative fuels is in preliminary stages. Few steps have already been achieved and some basic actions have been implemented. The goal of this Action Plan is the formulation of specific actions and measures in order to promote the concept of electromobility and alternative fuels in the Region of Attica and encourage potential users to shift towards eco-friendly vehicles and policy makers to formulate appropriate legislation frameworks and set incentives for the private and public sector. Therefore, this Action Plan will be the initiative for a more sustainable mobility in the Region of Attica, lower energy consumption and less emissions creating a better, cleaner and healthier environment for its residents and thus enhancing and improving their quality of life.

Apart from the description of the Policy Instrument addressed within the framework of the eMOPOLI project, is it important to set a self-defined performance indicator. For each policy instrument addressed by the project, at least one result indicator has to be defined to be used to monitor the performance of that instrument and therefore to assess throughout phase 2 whether performance has been improved thanks to interregional cooperation. Essentially, this indicator is specific to each policy instrument. It measures the percentage of beneficiaries that are better off thanks to this instrument. Like any other indicator, this indicator must be both meaningful and measurable. This indicator in the case of Region of Attica is the number of e-mobility actions incorporated in PPP initiatives.

4. Background

4.1 Current Situation

Despite the environmental benefits, electromobility is at an early stage of development in Greece and the number of electric vehicles (EV) in use is still very limited. High installation and maintenance costs for the charging infrastructure, extended recharging time, lack of adequate number of charging stations and supporting infrastructure (high-rise buildings without provision of parking places, narrow streets preventing the installation of roadside charging stations, etc), the lack of financial and non-financial incentives, the deficiency of proper legislation framework, low public awareness as well as fuel and purchase prices are some of the various factors bringing about the poor penetration rate of electric vehicles.

The commercial availability of EV models in Greece is limited in comparison to the biggest EV markets in the EU. After 2018, there is a significant increase in the number of electric and hybrid plug in vehicles in Greece, with the highest increase to be observed in 2020 (eafu.eu). The total number of electric vehicles in Greece last year (2020) was 716 while 1163 were the hybrid plug in vehicles. Despite this increase during the last year (as depicted in Figure 2) the penetration rate is still very low (0.01% electric and 0.02% hybrid plug in) (eafu.eu). Additionally, importers are reluctant to bring to market electric models due to the economic crisis (lack of Banking support, need to invest additional capital in personnel training, diagnostic equipment and spare parts stock under the existing condition of extra heavy taxation etc.), while lack of incentives to offset a higher price of an electric car in comparison to a conventional one leads also to reduced electric vehicles share.

The governmental part plays an important role in the diffusion of electric vehicles and the shift towards a more sustainable mobility. Unfortunately, both in national and regional level, there is an urgent need for further simplification, rationalization and avoidance of multi overlaps of responsibilities throughout the legislative framework which regulates the issues of proliferation of electric vehicles and the creation of supporting infrastructure. Furthermore, immediate reconsideration of urban building regulations aimed at e-mobility friendliness of all new constructions and improvement of the existing buildings so that the electric vehicles to be recharged easily when parked and when traveling is necessary. Finally, the fragmentation of public authorities and services as well as the lack of coordination between the different Ministries and other involved public bodies deteriorates the deployment of electromobility.

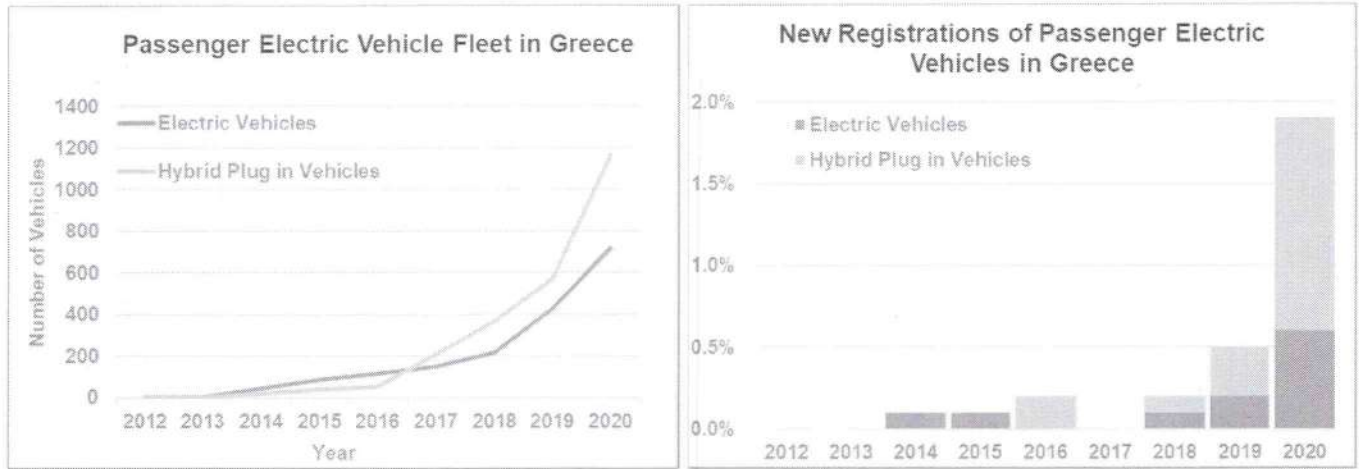


Fig. 2: Yearly evolution of the (a) passenger vehicle fleet and (b) new registrations of passenger electric vehicles in Greece (source: EAFO)

Finally, there is inadequate information of the public regarding the urgent need to reduce atmospheric pollutants and carbon dioxide, in urban environment and also for the relevant (but hidden) high costs of public health. According to the most recent statistic data about CO₂ emissions in the Region of Attica, the transportation sector is the second contributing factor while road transportation is responsible for the highest share of CO₂ emissions, deteriorating the air quality for the citizens.

Apart from the abovementioned issues provoking the further establishment of the concept of electromobility in Greece and in the Region of Attica particularly, some significant steps and efforts have already been achieved. First, Greece implemented for the first time a package for the support of EVs' penetration in the market in 2010, according to which, electric vehicles and low engine capacity hybrid and fuel cell cars registered before November 2010 were exempt from the annual circulation tax. Following November of 2010, the vehicle circulation tax was reformed to support green mobility and thus became CO₂ emissions based. Accordingly, vehicles are now taxed based on CO₂ g/km which ranks all EVs in the lowest category of 90 g/km which are exempt of circulation taxes. All-Electric Vehicles are also exempt from luxury and luxury commodity tax charge since 2013, while hybrids received a 50% discount respectively. Additionally in June 2020, the Greek "Green deal" for promoting electromobility in Greece was signed between the ministries of Infrastructure and Transport and Environment and Climate Change and 18 Greek institutions, which enables the strong cooperation between various stakeholders operating in this field.

A breakthrough step towards the increase of the number of electric vehicles was achieved through the first Greek law for electromobility established by the Greek government in July 2020, consisting of 6 parts and 65 articles in total. The main aims of this law are summarized in the following points:

1. Controlled parking spaces can be used by electric vehicle (of zero emissions of emissions up to 50gr CO₂/km) free of charge for the time period from 01/01/2021 to 31/12/2021.
2. Environmental tax enforcement in the industry for the imported old, second hand vehicles with high emission levels.
3. Tax incentives for promoting electromobility (e.g. for businesses producing electric vehicles or products related to electric vehicles)
4. Spatial planning regulations for the development of publicly accessible charging stations
5. Urban planning regulations and other requirements for the installation of charging stations
6. Grants for the purchase or leasing of electric vehicles

Moreover, concerning public transportation in the Region of Attica, Athens' main operator of buses and trolleys has a network of 300 bus and trolley lines and a fleet of some 2.022 buses (average age 13,9 years) and 354 trolley electric buses (average age 15,3 years). 610 of buses run on compressed natural gas (CNG) being one of Europe's largest fleets of CNG-powered buses. Diesel buses (1412) continue to represent the largest part of the bus fleet. Athens Urban Transport Organization (OASA) supports its fleet renewal in order to achieve green mobility, environmentally friendly vehicles and lower transport GHG emissions. Therefore, the organization is planning to use 30 million euros in funds from the Attica Regional

Authority for the purchase of 92 state-of-the-art buses, of which 80 will meet EURO VI emission standards and 12 will be electric ones.

Concerning the capital of Attica Region, the municipality of Athens within the framework of its new policy for upgrading public spaces and relieve the center from heavy traffic and congested phenomena, has developed the Athens Great Walk aiming to upgrade and regenerate the road and pavement infrastructure. The Athens Great Walk includes various interventions such as increase of sidewalks in central axes, to make specific streets and areas free of private vehicles as well as to promote public transport and cycling. Among the vehicle categories that are not falling into the restrictions are the electric vehicles, which will be allowed to enter the zone of the Athens Great Walk. Apart from this, the major of the municipality of Athens plans to allow electric vehicles to park free of charge while he also stated that within the next months 30 charging stations for electric and plug-in hybrid vehicles will be installed. Additionally, one of the traffic management strategies in the city of Athens is the establishment of the Inner Daktylios (ring). On odd dates, only vehicles with an odd plate number are allowed to enter this zone while on even dates, only cars with even plate numbers are allowed. Since April 2021, electric and hybrid vehicles with CO2 emissions lower than 140g/km as well as conventional vehicles with emissions lower than 175g/km are excluded from this traffic restrictions and are allowed to enter the Inner Ring any day.

4.2 SWOT Analysis

The SWOT Analysis conducted revealed advantages, capabilities, skills etc. of the region in relation to electromobility (Strengths), its disadvantages, gaps and deficiencies (Weaknesses), the opportunities emerged by the diffusion of electromobility (overall impacts on mobility and the environment, quality of life, innovation and technology, human resources potential, urban and regional development and mobility policies etc.) as well as threats lurking due to this promotion (financial instruments, cost of development, cost of deployment and maintenance, legislation, complexity of communication between stakeholders, political impacts etc.).

One of the major concerns about electric vehicles is their charging needs as it is necessary to install charging stations in strategic points and ensure that the driver will find a charging station nearby in order to reduce the range anxiety. An important advantage of the region of Attica is the fact that the average per day trip for work is less than 50kms, reducing demanding need for frequent charging. As far as the governance sector is concerned, Attica Region is one of the most engaged Greek regions regarding sustainable mobility enhancement policies, having already participated in European funded programs about the development of EV charging stations and pilot actions for sustainable mobility and smart city. Additionally, more than 10 municipalities in the region conduct their own Sustainable Urban Mobility Plan while the recent cooperation of several municipalities in Attica for Sustainable Mobility integration under the program of PEDDA and the fact that the Municipality of Athens has already a strategy on electromobility promotion and a well-documented EV charging station network proposal, enforces the efforts towards sustainable transportation sector. Furthermore, the region is in proximity to central government and decision-making centres, making any new measurements and policies easier for development and management. Finally, in the area of RIS3 potential great research force exists either from the open market sector or from universities and research centres that have already been established in its territory.

The low average distance per day trip, may reduce the demand for frequent charging, but still the lack of charging infrastructure even for serving the low number of electric vehicles in the Greek market is a major issue. The high prices of batteries and purchase of an electric vehicle as well as the low consumer awareness and the lack of financial resources for investments in development and manufacturing are considered basic obstacles. Concerning the governance thematic area, the unclear, or non-existing in some cases, legal background and the lack of standards in reference to electromobility and alternative fuels development and market operation are major issues need to be overcome to enhance sustainable mobility growth. Furthermore, lack of legislation regarding EV charging stations development and ownership (private or public), market entities' role in the development and management of such infrastructure is a major drawback. Hopefully, the new Greek law for electromobility established in 2020 may solve some of these issue but its implementation is still in its infancy. Finally, RIS3 Smart Specialization Strategy in Attica Region does not include electromobility in its key sectors for development. In the economic sector, Greece is still a country enduring the impacts of a major economic crisis, making it harder to attract new investors, domestic or foreign, while lack of Banking support for new businesses

and the uncertainty which prevent any small or medium scale investment and significant low EU fund-use deteriorates the situation.

The diffusion of electromobility in the region of Attica will create many opportunities in different sectors. First of all, the development and growing demand for green technologies will result in the creation of new jobs. The advent of electric vehicles will improve the air quality, reduce levels of noise and enhance life quality for the citizens of the region but simultaneously will increase public awareness about environment protection and raise their consciousness. Concerning business sector, it will be a great opportunity for a strong cooperation with IBM in the smart city concept while in the governmental sector the governmental aim schemes for EVs and infrastructure will be improved and new local strategies of several municipalities on urban resilience will be developed. Finally, in the RIS thematic area, within the concept of Smart City evolution within Attica, strategic planning for developing a complete strategy to promote the deployment of a broad charging stations network for alternative fuels and EVs can be proven to be a great opportunity in order to increase Renewable Energy Resources (RES) penetration -as indicated in RIS3 Smart Specialization Strategy- and storage system facilities (e.g. batteries, supercapacitors).

Last but not least, the promotion and increasing use of electric vehicles in the region of Attica lurks threats that should be taken into consideration. Different types of chargers in the stations, i.e lack of interoperability, is a major issue for the EV users and the lack of cooperation between EV stakeholders increases this threat. Additionally, the coexistence of public and private charging infrastructure is not a viable approach for a healthy and competitive market as seen in several EU countries and regions where e-mobility thrives, yet according to legislation it remains a possible outcome with doubtful results. The battery durability and the unknown timeline of the declined technology price are still an issue. No subsidies are granted for EV purchase, charging station deployment and energy prices, and therefore costs are raising and it is a risk for people owning an EV or developing-managing EV charging infrastructure. Finally, legally, not all involved entities are specifically defined, both their roles and means of intercommunication are still to be determined, leading to a great deal of confusion to any party wanting to participate in this particular market and increasing the risk of misunderstanding. The results of the SWOT Analysis are summarized in the following table (Table 1).

Table 1: SWOT Analysis for Region of Attica concerning electromobility

Strengths
S1. Air pollution from vehicles is well acknowledged
S2. Average per day trip for work is less than 50kms
S3. Existing experience from the electromechanical industry of the past
S4. Attica Region is one of the most engaged Regions in Greece regarding sustainable mobility enhancement policies, having already participated in European funded programs concerning the development of EV charging stations and pilot actions for sustainable mobility and smart city.
S5. More than 10 municipalities in the region conduct their own Sustainable Urban Mobility Plan.
S6. The recent cooperation of several municipalities in Attica for Sustainable Mobility integration under the program of PEDAs.
S7. Attica Region is in proximity to central government and decision-making centers, making any new measurements and policies easier for development and management.
S8. Attica Region can benefit from a great research force either from the open market sector or from universities and research centers that have already been established in its territory.
S9. The Municipality of Athens has already a strategy on electromobility promotion and a well-documented EV charging station network proposal.
Weaknesses
W1. Higher production cost (compared to conventional cars)

- W2.** Lack of standards
- W3.** Low sales lead to low revenue and profits
- W4.** Low penetration in Greek market
- W5.** Low consumer awareness
- W6.** High price of batteries
- W7.** Administrative issues and government overrides. The unclear, or non-existing in some cases, legal background in reference to electromobility and alternative fuels development and market operation, is the main obstacle Greece needs to overcome to enhance sustainable mobility growth.
- W8.** Lack of charging infrastructure.
- W9.** High prices for purchasing EV
- W10.** RIS3 Smart Specialization Strategy in Attica Region has not included electromobility in its key sectors for development.
- W11.** Lack cooperation between EV stakeholders

Opportunities

- O1.** Technology development
- O2.** Improve the governmental aim schemes for EVs and strengthen infrastructure
- O3.** Growing public awareness about environmental protection
- O4.** Growing demand of green technologies
- O5.** Further uncontrolled increase in the price of fossil fuels
- O6.** Improve of air quality
- O7.** Unemployment – new jobs will be created
- O8.** IBM cooperation in the smart city sector.
- O9.** The local strategies of several municipalities on Urban Resilience.
- O10.** The Municipality of Athens has already a strategy on electromobility promotion and a well-documented EV charging station network proposal.
- O11.** Within the concept of Smart City evolution within Attica, strategic planning for developing a complete strategy to promote the deployment of a broad charging stations network for alternative fuels and EVs can be proven to be a great opportunity in order to increase Renewable Energy Resources (RES) penetration -as indicated in RIS3 Smart Specialization Strategy- and storage system facilities (e.g. batteries, supercapacitors).

Threats

- T1.** Different types of chargers
- T2.** Battery durability
- T3.** Unknown timeline of the decline in price of technology
- T4.** Lack of financial resources for investments in development & manufacturing
- T5.** EU automotive e-mobility industry underdevelopment influencing EU economy, import of Asian vehicles.
- T6.** The greatest drawback in Greece is the lack of legislation regarding EV charging stations development and ownership (private or public), market entities' role in the development and management of such infrastructure.
- T7.** As far as incentives are concerned, there are no subsidies granted for EV purchase, charging station deployment and energy prices, thus raising the cost for both owning an EV and developing-managing EV charging infrastructure.

- T8. Legally, not all involved entities are specifically defined, both their roles and means of intercommunication are still to be determined, leading to a great deal of confusion to any party wanting to participate in this particular market.
- T9. Greece is still a country enduring the impacts of a major economic crisis, making it harder to attract new investors, domestic or foreign.
- T10. The coexistence of public and private charging infrastructure is not a viable approach for a healthy and competitive market as seen in several EU countries and regions where e-mobility thrives, yet according to legislation it remains a possible outcome with doubtful results.
- T11. Lack of Banking support for new businesses and the uncertainty which prevent any small or medium scale investment
- T12. Significant low in EU fund-use
- T13. Large number of different stakeholders, at least for the main road network

4.3 Regional Analysis

Within the framework of the eMOPOLI project, a Regional Context Analysis was conducted formulating each partner region's profile based on various indicators (Broos and Vanhaverbeke, 2019). Table 1 shows the most important and e-mobility relevant indicators concerning Region of Attica. Data confirms the information collected from European Union, that the transportation sector is responsible for a major share of CO₂ emissions. Also in the case of Region of Attica, transportation is the second highest contributor in emissions with a share of 29,1%, almost equal with the share of the major contributor (food sector with share up to 30,8%). Additional, the electromobility indicators illustrate the current situation in the region as the number of electric vehicles is very low and there is a lack of available charging infrastructure. The indicators formulating the regional profile and their values are summarized in the following table (Table 2).

Table 2: Regional Indicators for Attica Region

Natural, physical and geographical characteristics		Year	Source
Region Size (km ²)	3.817	2016	Eurostat
CO ₂ emission per source	30,8% food, 7,1% housing, 29,1% transport, 13,7% goods, 3,4% services, 4,6% government, 11,3% gross fixed capital formation	2015	Babbou et al. 2017
CO ₂ emission per transport mode	66.15% passenger cars, 8,10% light commercial vehicles, 16,5% heavy vehicles, 5,37% buses, 3,88% motorcycles	2010	Fameli and Assimakopoulos, 2015
Demographic Data		Year	Source
Population (inhabitants)	3.773.559	2017	Eurostat
Environmental awareness	60,3%	2016	Eurostat
Energy Indicators		Year	Source
Electricity mix	59,09;2,66;0,14;0;37,21;0,89	2016	Eurostat
Renewable energy mix	19,05;17,68;8,00;13,50;31,74;4,06;5,52;0,40	2016	Eurostat

Electricity price (€ per kWh)	0,1936	2017	Eurostat
Fuel price (€ per litre diesel)	1,341	2019	MINDEV
Mobility indicators		Year	Source
Transportation mix	0,412 car; 0,435 PT; 0,072 motorcycle; 0,005 taxi; 0,071 walk; 0,015 bike	2018	OASA
Number of Electric Vehicles	3135 (BEV and PHEV in Greece)	2020	eafo.eu
Available Charging Infrastructure	334 (charging points in Greece), 78 (Region of Attica)	2020	HELIEV
Low emission zone (Yes)			

4.4 Recommendations

Before the design and plan of the action described in the next section, several recommendations were formulated, covering all possible aspects that could be improved and contribute in promoting electromobility in the region. The main recommendations are presented in Table 3 and are classified in three main thematic areas: Business, Governance and Research for Research and Innovation Strategies for Smart Specialization (RIS3). More and detailed recommendations can be found in the Project Output entitled "eMOPOLI Recommendations (Orfanou et al., 2019).

Table 3: Recommendations for Attica Region

Project Thematic Areas	Recommendations
Business Market take-up of sustainable mobility from alternative fuels	<p>B1. Very few independent improvements are possible. The successful implementation of the whole project may improve the existing situation</p> <p>B2. Extensive efforts needed for the cooperation of agents from many fields as Legislation, Taxation, Commerce etc. in order to reach feasible and efficient applications</p> <p>B3. Long term issue. A complete register of the problems should be the first step and then the recognition of the various responsible authorities. Step by step procedure for as many as possible obstacles removal.</p> <p>B4. Media will play the main role. Events, Social entities and school programs must support the total informative policy.</p> <p>B5. Investment in development of required infrastructure in the fields of electric power generation and distribution, charging positions etc.</p> <p>B6. Development and evolution of the available technology from the car manufacturers: new attractive models offering convenience and security, in reduced production and operational cost.</p> <p>B7. Private sector can give incentives to employees to use EVs and alternative fuels vehicles (i.e. cheaper charging prices, free parking, company cars, free parking in the workplace etc.)</p> <p>B8. Promotion of carpooling and car-sharing concepts to introduce these commuting attributes and technologies to everyday life</p>

	<p>B9. Incentives from energy providers' perspective regarding EV charging stations and EV owners in general (i.e. cheap pricing schemes)</p> <p>B10. Synergies between RES energy producers and EV charging stations operators to promote green energy policies</p> <p>B11. Incentives from companies active in pricing services sector and cooperation with EV car industries (i.e. free charging stations for domestic use)</p> <p>B12. Incentives from insurance companies for EV ownership (i.e. cheaper contracts, advantages against diesel and petrol vehicles etc.)</p> <p>B13. Tax reduction in buying/leasing EV</p> <p>B14. Carbon credits issuing from charging infrastructure</p>
<p>Governance</p> <p>Needs, requirements and policies to enhance sustainability from e-mobility and alternative fuels</p>	<p>G1. The latest European and National Legislation must be considered. Gaps and overlapped texts to be located and cured. Terminology applied in to Geek language to be unified and the maximum possible simplification of the procedures to be targeted.</p> <p>G2. This planning must be analysed in various time phases in order to encourage the sales as the commercial situation is progressed. Incentives for specific types of Vehicles and/or for a certain quantity of sales are useful tools</p> <p>G3. This is one of the most effective tools for the National movement in to new era of e-mobility. A preliminary study is already available by HEL.I.E.V.</p> <p>G4. The standardization and validation of the available technology, introduction of common rules for quality and adaptation. EU must accept the role of the coordinator, setting the direction for all involved parties.</p> <p>G5. Financial incentives such as purchase rebates and subsidies, subsidization of scrapping of conventional ICE vehicles and their substitution with battery electric vehicles (BEV) or plug-in hybrid electric vehicles (PHEV), purchase penalties on emission intensive vehicles and purchase tax exemptions, annual circulation tax exemptions, road toll exemptions, free parking, bus lane access.</p> <p>G6. The familiarization of users with the characteristics and specification of the new vehicles and the potential of this vehicle technology to cover consumers' needs. The Government, together with industry, should even organize educational programs to increase consumer confidence and understanding of electric vehicles. Likewise, disseminating information about the operation of electric vehicles (including battery life, recharge times, location of charging points, type and cost of repairs, etc.) can help increase consumer trust in these vehicles.</p> <p>G7. Introduction of electric vehicles in the Government's own fleet of vehicles.</p> <p>G8. Revision and upgrade of the existing institutional framework. Introduction of a package of legislative actions that are directed towards the enforcement of the emerging market for EVs.</p> <p>G9. Development of R&D programs that promote the use of materials and innovative designs that can reduce the production costs of electric vehicles.</p> <p>G10. Promotion of electrification of public transport system. -Secure funding for electric buses and infrastructure and renew the fleet gradually through public procurement - Collaborate with the public transport operator(s) to define the fleet electrification targets - Involve electricity network operators and electricity suppliers to enable smart charging and ancillary services at bus depots.</p>

	<p>G11. Creation of an expert national group for development of e-mobility initiatives in Greece.</p> <p>G12. Establishment of cooperation with all relevant organization in EU with focus to support collaboration efforts.</p> <p>G13. Completion of legislation regarding all involved market entities, market operation, data exchange strategies</p> <p>G14. Incentives for EV owners (i.e. free parking in designated areas)</p> <p>G15. Subsidies for EV purchase</p> <p>G16. Promotion campaigns to raise environmental and social awareness (i.e. carpooling and car-sharing)</p> <p>G17. Correlation between sustainable mobility actions and e-mobility (compulsory development of Low Emission Zones in city centres and suburban neighbourhoods)</p> <p>G18. Complete legal framework regarding the EV charging infrastructure</p> <p>G19. Building code to have charging infrastructure mandatory</p>
<p>RIS3</p> <p>e-mobility in relation to RIS3 Smart Specialization Strategy documents</p>	<p>R1. During the design and implementation of Smart Specialization Strategy, all the relevant stakeholders (public sector, industry, education and research institutes, technological centres, other institutions, investors) should collaborate and agree on a comprehensive scenario for the development of e-mobility.</p> <p>R2. Establishment of monitoring and evaluation procedures that will assess the outputs of the strategy and examine whether specific objectives have been met. Regarding e-mobility, indicators should be measured such as reduction of CO2 emissions, change in the share of green vehicles etc.</p> <p>R3. Define action lines within the RIS3 strategy such as: a) Promoting interregional networks of stakeholders working in e-mobility. b) Supporting regional clusters that will promote R&I investments in this field. c) Services for innovative SMEs working in e-mobility. d) Funding infrastructure for testing and certification of important components and systems of e-mobility. e) Funding of large scale deployment actions and public procurement schemes.</p> <p>R4. Promotional and educational campaigns properly studied and prepared for various group targets. Support by printed material is necessary</p> <p>R5. Close collaboration with economic and administrative authorities. Formation of available budgets case by case. Monitoring of the response</p> <p>R6. Nomination of the responsible public authority, preferably from the electric energy production and/or distribution field. Complete and financially supported plan. Tight but realistic time schedule for the creation of whole network.</p> <p>R7. updated of the local RIS strategy to set realistic goals for EV and alternative fuels vehicles penetration</p> <p>R8. Set measurable goals for EV charging stations deployment combined with RES penetration levels</p> <p>R9. Promotion of EV and alternative fuels vehicles use in the Attica Region via incentives and subsidies policies especially for public transportation fleet and logistics</p> <p>R10. Promotion of EV and alternative fuels vehicles for small freight vehicles</p> <p>R11. Creation of a monitoring system to coordinate regional planning schemes</p> <p>R12. E-mobility to be supported by research innovation programs</p>

5. Actions envisaged

5.1 General Information

The Action Plan includes concrete and targeted actions aiming to effectively promote electromobility in the region based on its needs and characteristics. The formulation of the Action Plan for the Region of Attica was inspired by various activities taken place within the framework of the eMOPOLI project such as the Interregional Learning Workshops, the Round Tables, the Field visits or the Staff exchange which enable the discussion, the ideas, knowledge and experience exchange among project partners. Additionally, one of the outputs of the project, the Sourcebook of Good Practices which includes Good Practices being or already implemented in the project partner regions and have contributed in the diffusion of electric vehicles in various sectors.

Furthermore, the Workshops of the Regional Stakeholder Group had a significant impact in the formulation of clear and targeted actions based on the experts knowledge and experience. The RSG for the Region of Attica consists of 17 members experts from the academia/research, national and regional public authority, general public, industry, business association and infrastructure and (public) service provider. During the stakeholders meetings and according to the project requirements, the current situation in Region of Attica concerning electromobility has been described and the gaps existing or progress achieved in various sectors of electromobility have been identified through the GAP Analysis. Additionally, a SWOT analysis has been conducted for specifying strengths and weaknesses of the region that could favour and hinder the establishment of electric vehicles respectively as well as the opportunities arisen from this establishment and the threats lurking from the advent of this technology. Finally, recommendation have been formulated that could assist in promoting electromobility in the region based on the outcomes of all the previous analyses. The experience of the members of the RSG was significant in developing the regional profile and identify the sectors where we should focus on.

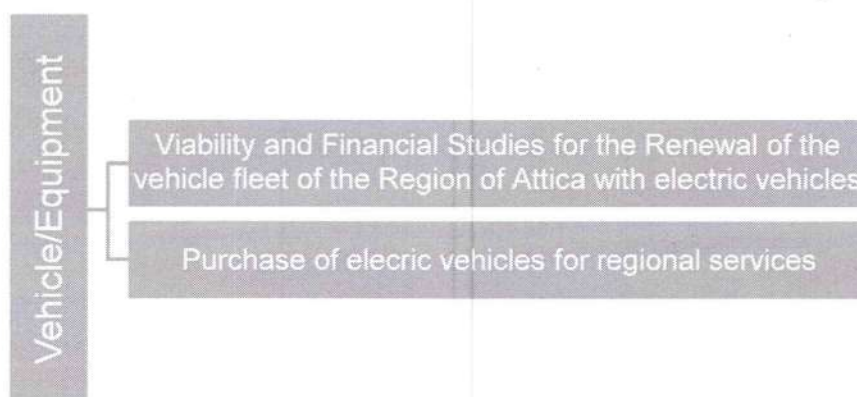
Based on the above, this Action Plan has been developed including 5 actions that are considered to encourage the diffusion of electromobility in Region of Attica and will solve critical gaps towards the transition of zero emission technology.

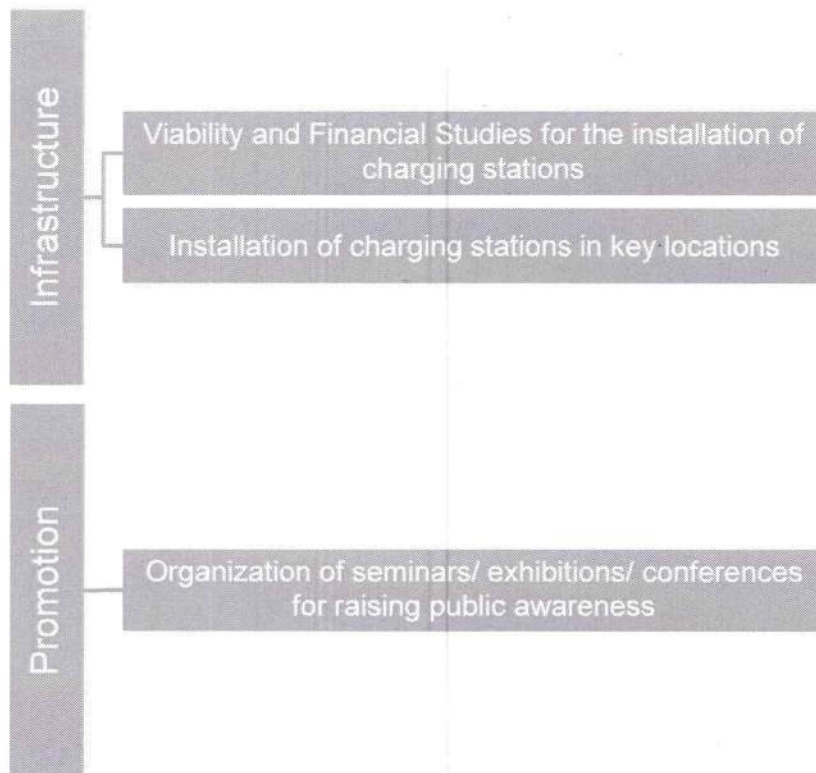
5.2 Actions for Region of Attica

The Actions that are included in the action plan of Region of Attica are divided in the following three priority axes:

- Vehicle/Equipment
- Infrastructure
- Promotion

In the next figure the priorities along with the specific actions are presented and further analysed in the following sections.





5.2.1 Priority 1: Vehicle/Equipment

The first priority axis includes two actions: (1) viability and financial studies for the renewal of the vehicle fleet of the Region of Attica with electric vehicles and (2) renewal of the vehicle fleet of the Region of Attica with electric vehicles. The actions are further described in Tables 4 and 5, respectively.

Table 4: Description of Action 1: Viability and Financial Studies for the renewal of the vehicle fleet of the Region of Attica with electric vehicles

Action 1	Viability and Financial Studies for the renewal of the vehicle fleet of the Region of Attica with electric vehicles
Background	<p>The inspiration for developing this action is the Sourcebook of Good Practices formulated within the framework of the project, which includes Good Practices been implemented in the project partner regions. More specifically, the following Good Practices were taken into consideration:</p> <ol style="list-style-type: none"> 1. Metropolitan Chart Of Electric Mobility and EMOB event - Lombardy Region. One of the chart principles is the diffuse of e-mobility in Last mile logistics, company fleets, and Local Public Transports (i.e e-buses) 2. Implementation of electric vehicles - City municipality Kranj (CMK) shifts to the electric vehicles and RES infrastructure and optimizes the number of vehicles used for the public administration. 3. Electric cars for municipal services in Jelgava city <p>The viability and financial study are the first step for identifying the optimal number and type of vehicles that should substituted by electric ones.</p>

Objective	<i>Both studies are required to be conducted before action 2 (Renewal of the vehicle fleet of the Region of Attica with electric vehicles) so that the best scenario can be revealed, i.e. the optimal number and type of vehicles that should be substituted by electric ones.</i>
Relevance	<i>This action along with Action 2, will result in finding the optimal solution and then substituting part of the regional vehicle fleet with electric ones. The outcome will be more electric vehicles on the regional road network which have lower environmental footprint, i.e. lower emissions and energy consumption. Taking into consideration that the offices of the Region are located in and near the city center, where the air quality is highly overwhelmed due to heavy traffic and congestion phenomena especially during the peak hours, the substitution of conventional vehicles with electric ones will relieve the atmosphere in terms of emissions and noise levels. Therefore, both actions will be a preliminary but significant step in improving quality of life. These actions will also indirectly contribute in improving the policy instrument as the operation and maintenance costs of the vehicle fleet will be reduced and thus funds can be dedicated for additional actions towards this direction.</i>
Activities	<ul style="list-style-type: none"> -Data collection - Market research on electric vehicles and charging stations - Identification of economic and environmental indicators -Scenarios development -Estimation of Economic benefits -Feasibility, Economic and Technical analysis - Comparison among the different scenarios -Report preparation
Bottleneck	<i>Data gathering from all the involved stakeholders</i>
Stakeholders involved	<ul style="list-style-type: none"> - National Technical University of Athens will perform all the activities described above and will deliver the report and the analysis results in Region of Attica. - Region of Attica will provide the team of NTUA with the data required for the analysis - Industries operating in the field of electric vehicles will give data concerning the technical characteristics of the vehicles, the prices, etc.
Timeframe	<i>4 months</i>
Indicative Funding Sources	<ul style="list-style-type: none"> - Public Investments Program - Regional Business Program of Region of Attica
Indicative Costs	<i>16.000euros</i>
Expected Impact	<i>- Best solution in terms of feasibility and CBA ratio</i>
<ul style="list-style-type: none"> - economic - environmental - territorial - on e-mobility 	<i>- Indirect environmental and e- mobility impacts that will be arisen through the implementation of action 2</i>
Transferability	<i>This action can be easily transferred to any region interested in the renewal of its vehicle fleet</i>

Table 5: Description of Action 2: Renewal of the vehicle fleet of the Region of Attica with electric vehicles

Action 2	Renewal of the vehicle fleet of the Region of Attica with electric vehicles
Background	<p>The inspiration for developing this action is the Sourcebook of Good Practices formulated within the framework of the project, which includes Good Practices been implemented in the project partner regions. More specifically, the following Good Practices were taken into consideration:</p> <ol style="list-style-type: none"> 1. Metropolitan Chart Of Electric Mobility and EMOB event - Lombardy Region. One of the chart principles is the diffuse of e-mobility in Last mile logistics, company fleets, and Local Public Transports (i.e e-buses) 2. Implementation of electric vehicles - City municipality Kranj (CMK) shifts to the electric vehicles and RES infrastructure and optimizes the number of vehicles used for the public administration. 3. Electric cars for municipal services in Jelgava city <p>Additionally, during the Study Field Visit in Jelgava we had the chance to see the electric vehicles of the municipal police and discuss more about this initiative.</p>
Objective	<p>The objective of this action is threefold:</p> <ol style="list-style-type: none"> 1. Substitution of the conventional diesel vehicles with electric ones → lower emissions for regional service purposes. This action can be a good example for other regions and municipalities of the country. 2. Promote public awareness on electromobility and the different types of electric vehicles as people will see the electric vehicles driving around the regional network 3. More publicly accessible charging stations will be added to the existing network. The station will be located in a central locations as it will be further described later in this section
Relevance	<p>This action along with Action 1, will result in finding the optimal solution and then substituting part of the regional vehicle fleet with electric ones. The outcome will be more electric vehicles on the regional road network which have lower environmental footprint, i.e. lower emissions and energy consumption. Taking into consideration that the offices of the Region are located in and near the city center, where the air quality is highly overwhelmed due to heavy traffic and congestion phenomena especially during the peak hours, the substitution of conventional vehicles with electric ones will relieve the atmosphere in terms of emissions and noise levels. Therefore, both actions will be a preliminary but significant step in improving quality of life.</p> <p>These actions will also indirectly contribute in improving the policy instrument as the operation and maintenance costs of the vehicle fleet will be reduced and thus funds can be dedicated for additional actions towards this direction.</p>
Activities	<p>Indicative individual activities:</p> <ol style="list-style-type: none"> 1. Contact between the Regional Directorate for Development Planning and the responsible directorates/managing authorities for the funding - Internal process will be carried out in order to specify the funding source(s) 2. After the funding clarification, the Regional Directorate for Development Planning should prepare the relevant document with all the characteristics of the electric vehicle and the charging station 3. Region of Attica will notice an invitation for tenders both for the purchase of the electric vehicle and the installation of the charging station 4. Offers will be evaluated and the optimal one will be chosen 5. Purchase and release of the electric vehicles

Bottleneck	<i>The administrative and bureaucratic process that may delay the action implementation and finalization</i>
Stakeholders involved	<ul style="list-style-type: none"> - Region of Attica will conduct all the necessary documents and will handle all the required process till the purchase of the electric vehicles - NTUA will conduct the study including the specifications for all the categories of the electric vehicles that Region of Attica needs to obtain - Industries operating in the field of electric vehicles will give submit their offers in the tender. The tender winner will be responsible for delivering the electric vehicles
Timeframe	<p><i>Duration: 18 months</i> <i>Start date: July (August) 2021</i> <i>End date: February 2023</i></p> <p><i>Timeframe of indicative activities:</i></p> <ol style="list-style-type: none"> 1. <i>Internal process for funding agreement: 1 – 2 months</i> 2. <i>Preparation for notice of invitation to tender: 4 months (September 2021 – December 2021)</i> 3. <i>Tender duration: 8 months (January 2022 – August 2022)</i> 4. <i>Offers evaluation, selection of the best choice and purchase/release of the electric vehicles: 6 months (September 2022 – February 2023)</i>
Indicative Funding Sources	<ul style="list-style-type: none"> - <i>Regional Operational Programme, Priority Axis 6: Improving Quality of Life in Urban Environment</i> - <i>Public Investments Program</i> - <i>Regional Business Program of Region of Attica</i> <p><i>An internal process (no calls) will be carried through in order to specify the funding source(s) . As a result the final finding source(s) and its/their share will be defined after this process is finalized.</i></p>
Indicative Costs	<i>2.000.000 euros</i>
Expected Impact	<ul style="list-style-type: none"> - <i>Less operational and maintenance costs compared to the conventional diesel vehicles.</i>
- economic	
- environmental	- <i>Less emissions as the regional vehicle fleet needs to drive very often and for a long time around the region</i>
- territorial	
- on e-mobility	- <i>People will be attracted to the electric vehicles and be encouraged to buy/use one.</i>
Transferability	<i>This action can be used as an inspiration for any other region. The way it will be applied depends on the administrative processes each region has.</i>

5.2.2 Priority 2: Infrastructure

The priority axis entitled infrastructure includes two actions: (1) viability and financial studies for the installation of charging stations and (2) installation of charging stations in key locations. The actions are further described in Tables 6 and 7, respectively.

Table 6: Description of Action 1: Viability and Financial Studies for the installation of charging stations

Action 1	Viability and Financial Studies for the installation of charging stations
Background	<p><i>During all Interregional Learning Workshops (ILW) and the Interregional Policy Learning Round Table, the issue of charging stations was discussed and the importance of an efficient charging stations network was highlighted. For example, in Finland the different commercial chains are developing their own network of charging stations but still there is lack of charging facilities and the available infrastructure cannot support the electromobility concept and the increase of the number of electric cars. In Calabria, energy providers are invited to participate and install charging stations as the lack of infrastructure and the high prices do not favour electric car purchase.</i></p> <p><i>Furthermore, the provinces of Brescia, Bucharest-Ilfov, Calabria and Flanders have already included the development of charging station network in their Good Practices. The reasons behind the introduction of such practices were the lack of charging infrastructure and the lack of reference for evaluation of costs for charging stations installation and they mention that such a network can accelerate the transition towards greener transport and mobility as well as zero emissions. More specifically, the Good Practices were:</i></p> <ol style="list-style-type: none"> <i>1. Development of green charging infrastructure – Bucharest City Hall</i> <i>2. Development of charging infrastructure - Bucharest-Ilfov</i> <i>3. Deployment of public charging infrastructure in Flanders Region</i> <i>4. Public tender for the development of charging infrastructure networks for e-vehicles</i> <i>5. RICARICA VALLI BRESCIANE" project</i> <p><i>Additionally, it is important to mention that the driver should not stop the electric vehicle when the battery needs to be charged but wherever he stops/parks the vehicle, the appropriate and necessary infrastructure should exist. As it was mentioned during the 1st WRSG in Region Attica, a vehicle remains parked for the biggest part of the day (approximately 21-22 hours) and therefore the main idea behind the development of an extensive and efficient network of charging station is that the owner of an electric vehicle could charge it when they stop/park. The drivers can plug in their vehicle within few seconds and during the charging time they can perform their activities (sleep, work, shopping, other outdoor activities, etc). All these advantages of the existence of an efficient and appropriate charging network for electric vehicles were evaluated as important for the promotion of electromobility and the shift towards a more sustainable mobility in the Region of Attica.</i></p> <p><i>The viability and financial study are necessary for identifying the optimal scenario in terms of the number of charging stations that should be installed. Some partners have also included the feasibility study of their whole Action Plan.</i></p>
Objective	<p><i>Both studies are required to be conducted before action 2 (Installation of charging stations in 4 key locations) so that the best scenario can be revealed, i.e. the optimal number of charging stations that should be installed.</i></p>
Relevance	<p><i>This action along with Action 2, will result in finding the optimal solution and then installing charging stations in strategic locations. This will lead to less cruising time and driving distance for finding and reach the closest gas station as the regional electric vehicles do not need fuel and since there will be charged in any of the key locations there will be no need for driving around the network for fulfilling charging issues. Taking into consideration that the offices of the Region are located in and near the city center, where the air quality is highly overwhelmed due to heavy traffic and congestion phenomena especially during the peak hours, the</i></p>

	<p>substitution of conventional vehicles with electric ones and the reduction in the distance covered and cruising time for finding a gas station will relieve the atmosphere in terms of emissions and noise levels. Therefore, both actions will be a preliminary but significant step in improving quality of life.</p> <p>These actions will also indirectly contribute in improving the policy instrument as the operation and maintenance costs of the vehicle fleet will be reduced and thus funds can be dedicated for additional actions towards this direction.</p>
Activities	<ul style="list-style-type: none"> -Data collection - Market research on electric vehicles and charging stations - Identification of economic and environmental indicators -Scenarios development -Estimation of Economic benefits -Feasibility, Economic and Technical analysis - Investigation of funding sources - Comparison among the different scenarios -Report preparation
Bottleneck	Data gathering from all the involved stakeholders
Stakeholders involved	<ul style="list-style-type: none"> - National Technical University of Athens will perform all the activities described above and will deliver the report and the analysis results in Region of Attica. - Region of Attica will provide the team of NTUA with the data required for the analysis - Industries operating in the field of charging stations purchase and installation will give data concerning the technical characteristics of the stations, the prices, etc.
Timeframe	4 months
Indicative Funding Sources	<ul style="list-style-type: none"> - Public Investments Program - Regional Business Program of Region of Attica
Indicative Costs	16.000euros
Expected Impact	- Best solution in terms of feasibility and CBA ratio
<ul style="list-style-type: none"> - economic - environmental - territorial - on e-mobility 	- Indirect environmental and e- mobility impacts that will be arisen through the implementation of action 2
Transferability	This action can be easily transferred to any region interested in increasing the number of charging stations

Table 7: Description of Action 2: Installation of charging stations in key locations

Action 2	Installation of charging stations in key locations
Background	<p>During all Interregional Learning Workshops (ILW) and the Interregional Policy Learning Round Table, the issue of charging stations was discussed and the importance of an efficient charging stations network was highlighted. For example, in Finland the different commercial chains are developing their own network of charging stations but still there is lack of charging facilities and the available infrastructure cannot support the electromobility concept and the increase of the number of electric cars. In Calabria, energy providers are invited to participate and install charging stations as the lack of infrastructure and the high prices do not favour electric car purchase.</p>

Furthermore, the provinces of Brescia, Bucharest-Illfov, Calabria and Flanders have already included the development of charging station network in their Good Practices. The reasons behind the introduction of such practices were the lack of charging infrastructure and the lack of reference for evaluation of costs for charging stations installation and they mention that such a network can accelerate the transition towards greener transport and mobility as well as zero emissions. More specifically, the Good Practices were:

1. Development of green charging infrastructure – Bucharest City Hall
 2. Development of charging infrastructure - Bucharest-Illfov
 3. Deployment of public charging infrastructure in Flanders Region
 4. Public tender for the development of charging infrastructure networks for e-vehicles
 5. RICARICA VALLI BRESCIANE" project
 6. Metropolitan Chart Of Electric Mobility and EMOB event - Lombardy Region
- Among the Chart principles is the promotion of the development of a public access charging network

Additionally, it is important to mention that the driver should not stop the electric vehicle when the battery needs to be charged but wherever he stops/parks the vehicle, the appropriate and necessary infrastructure should exist. As it was mentioned during the 1st WRS in Region Attica, a vehicle remains parked for the biggest part of the day (approximately 21-22 hours) and therefore the main idea behind the development of an extensive and efficient network of charging station is that the owner of an electric vehicle could charge it when they stop/park. The drivers can plug in their vehicle within few seconds and during the charging time they can perform their activities (sleep, work, shopping, other outdoor activities, etc). All these advantages of the existence of an efficient and appropriate charging network for electric vehicles were evaluated as important for the promotion of electromobility and the shift towards a more sustainable mobility in the Region of Attica.

Objective

The objective of this action is serving the part of the regional fleet consisting of electric vehicles. The charging stations may not be publicly accessible but they will be used apart from the regional vehicle fleet, also from the people working in the region and own a private electric vehicle. As a result, all these users will not have to use extensively the available public accessible charging infrastructure for charging the vehicle and thus occupy a free parking space for a long time. Practically, charging network will be expanded by these charging stations will serve solely the demand related to the Regional personnel.

Relevance

This action along with Action 1, will result in finding the optimal solution and then installing charging stations in key locations. This will lead to less cruising time and driving distance for finding and reach the closest gas station as the regional electric vehicles do not need fuel and since there will be charged in any of the key locations there will be no need for driving around the network for fulfilling charging issues. Taking into consideration that the offices of the Region are located in and near the city center, where the air quality is highly overwhelmed due to heavy traffic and congestion phenomena especially during the peak hours, the substitution of conventional vehicles with electric ones and the reduction in the distance covered and cruising time for finding a gas station will relieve the atmosphere in terms of emissions and noise levels. Therefore, both actions will be a preliminary but significant step in improving quality of life. These actions will also indirectly contribute in improving the policy instrument as the operation and maintenance costs of the vehicle fleet will be reduced and thus funds can be dedicated for additional actions towards this direction.

Activities	<p>Indicative individual activities:</p> <ol style="list-style-type: none"> 1. Contact between the Regional Directorate for Development Planning and the responsible directorates/managing authorities for the funding - Internal process will be carried out in order to specify the funding source(s) 2. After the funding clarification, the Regional Directorate for Development Planning should prepare the relevant document with all the characteristics of the electric vehicle and the charging station 3. Region of Attica will notice an invitation for tenders both for the purchase installation of the charging stations 4. Offers will be evaluated and the optimal one will be chosen 5. Purchase and installation of the charging stations 6. Contact the electricity supplier and distribution network operator for the proper operation and supply of the charging station.
Bottleneck	The administrative and bureaucratic process that may delay the action implementation and finalization
Stakeholders involved	<ul style="list-style-type: none"> - Region of Attica will conduct all the necessary documents and will handle all the required process till the purchase of the stations - NTUA will conduct the study including the specifications for all the categories of the charging stations that Region of Attica needs to install, along with a proposal for the most appropriate locations for the development of the latter and their dimensioning on the basis of the existing electrical infrastructure - Region of Attica will contact the electricity supplier - Industries operating in the field of charging stations will submit their offers in the tender and the best offer will be responsible for the station installation
Timeframe	<p>Duration: 18 months Start date: July (August) 2021 End date: February 2023</p> <p>Timeframe of indicative activities:</p> <ol style="list-style-type: none"> 1. Internal process for funding agreement: 1-2 months 2. Preparation for notice of invitation to tender: 4 months (September 2021 – December 2021) 3. Tender duration: 8 months (January 2022 – August 2022) 4. Offers evaluation, selection of the best choice and purchase/release of the electric vehicles: 6 months (September 2022 – February 2023)
Indicative Funding Sources	<ul style="list-style-type: none"> - Regional Operational Programme, Priority Axis 6: Improving Quality of Life in Urban Environment - Public Investments Program - Regional Business Program of Region of Attica <p>An internal process (no calls) will be carried through in order to specify the funding source(s) . As a result the final finding source(s) and its/their share will be defined after this process is finalized.</p>
Indicative Costs	60.000 euros
Expected Impact	<ul style="list-style-type: none"> - More drivers will be encouraged to buy/use an electric vehicle as the charging anxiety will be reduced when driving within the region - More EVs have positive environmental impact on noise levels and air quality
<ul style="list-style-type: none"> - economic - environmental - territorial 	- More EVs have positive environmental impact on noise levels and air quality

- on e-mobility	- Less operational and maintenance costs compared to the conventional diesel vehicles.
Transferability	This action can be used as an inspiration for any other region. The way it will be applied depends on the administrative processes each region has.

5.2.3 Priority 3: Promotion

Promotion of the concept of electromobility includes 1 action entitled "Organization of seminars/ exhibitions/ conferences for raising public awareness" and is described in detail in Table 8.

Table 8: Description of Action 1: Organization of seminars/ exhibitions/ conferences for raising public awareness

Action 1	Organization of seminars/ exhibitions/ conferences for raising public awareness
Background	<p>During the project meetings in the project partner regions as well as the WRSG in Region of Attica, the issue of lack of knowledge and information on electric vehicles was discussed. There are regions where people are more aware of the advantages and characteristics of electromobility and are in favour of purchasing or use an electric car. On the other hand, there are regions where public awareness should be increased and further actions should be taken towards this direction. For example in Flanders the Good Practice entitled "Website about environment friendly vehicles" aims to provide adequate and complete information about all kinds of zero emission cars.</p> <p>Additionally, the lack of coordination and communication between all relevant stakeholders has also been tackled by the following Good Practice:</p> <ol style="list-style-type: none"> 1. Working group for electric mobility in Lombardy (MEL)
Objective	<p>The objectives of this action is summarized below:</p> <ol style="list-style-type: none"> 1. Introduction of electric transport modes to the public and the authorities 2. Raise public awareness about the new technology and thus promote the idea of electromobility 3. Participants will get familiar with these new type of vehicles 4. Long term objective: Increase public acceptance 5. Bring together all relevant stakeholders
Relevance	<p>This action will indirectly contribute to improving the policy instrument addressed. The event(s) will achieve in getting people familiar with electric vehicles, raising awareness concerning this technology and its advantages over conventional vehicles as well as their capabilities. This will result in minimizing or even alleviate any concerns or prejudices that drivers or users may have and they will be encourage to abandon diesel vehicles and shift to electric ones. Therefore, these will lead to increase in the penetration rate of electric vehicles, bringing about less emissions and noise levels and thus improving life quality in the region.</p>
Activities	<p>Indicative individual activities:</p> <ol style="list-style-type: none"> 1. Region of Attica will contact National Technical University of Athens for the joint organization of the campaign 2. NTUA will contact the relevant stakeholders in the field of renting, purchasing and sharing electric vehicles as well as stakeholders being involved in the

	<p>electromobility field (e.g. installation of charging stations, etc) to participate in the campaign with some vehicles.</p> <p>3. Region of Attica and NTUA will set the place and date of the event</p> <p>4. Region of Attica and NTUA will disseminate the event in social media, websites etc.</p>
Bottleneck	<p>Get together all the relevant stakeholders</p> <p>In case of an exhibition of electric vehicles, ensure the existence of different types that the participants can test.</p>
Stakeholders involved	<ul style="list-style-type: none"> - Region of Attica and National Technical University of Athens will be responsible for the organization of the seminar/campaign/conference as well as the efficient promotion of the event for attracting more visitors - NTUA will contact all relevant stakeholders for participating in the event - Industry operating in the field of electromobility that will participate in the event should prepare presentations and other relevant material to be displayed.
Timeframe	2 month (preparation/organization/realization of the event)
Indicative Funding Sources	<ul style="list-style-type: none"> - Regional Operational Programme, Priority Axis 6: Improving Quality of Life in Urban Environment - Public Investments Program - Regional Business Program of Region of Attica
Indicative Costs	3.000euros
Expected Impact	- Long term environmental impact as this action may encourage people to buy/use/share electric vehicles
- economic	
- environmental	- This encouragement will to a higher number of electric vehicles in the territory.
- territorial	
- on e-mobility	- Participants and attendees will have the chance to get familiar with electric vehicles and learn more about electromobility and its advantages.
Transferability	This action can be easily transferred to any region

6. Monitoring

The timeplan of the above described actions is illustrated in the following Gantt diagram (Figure 3)

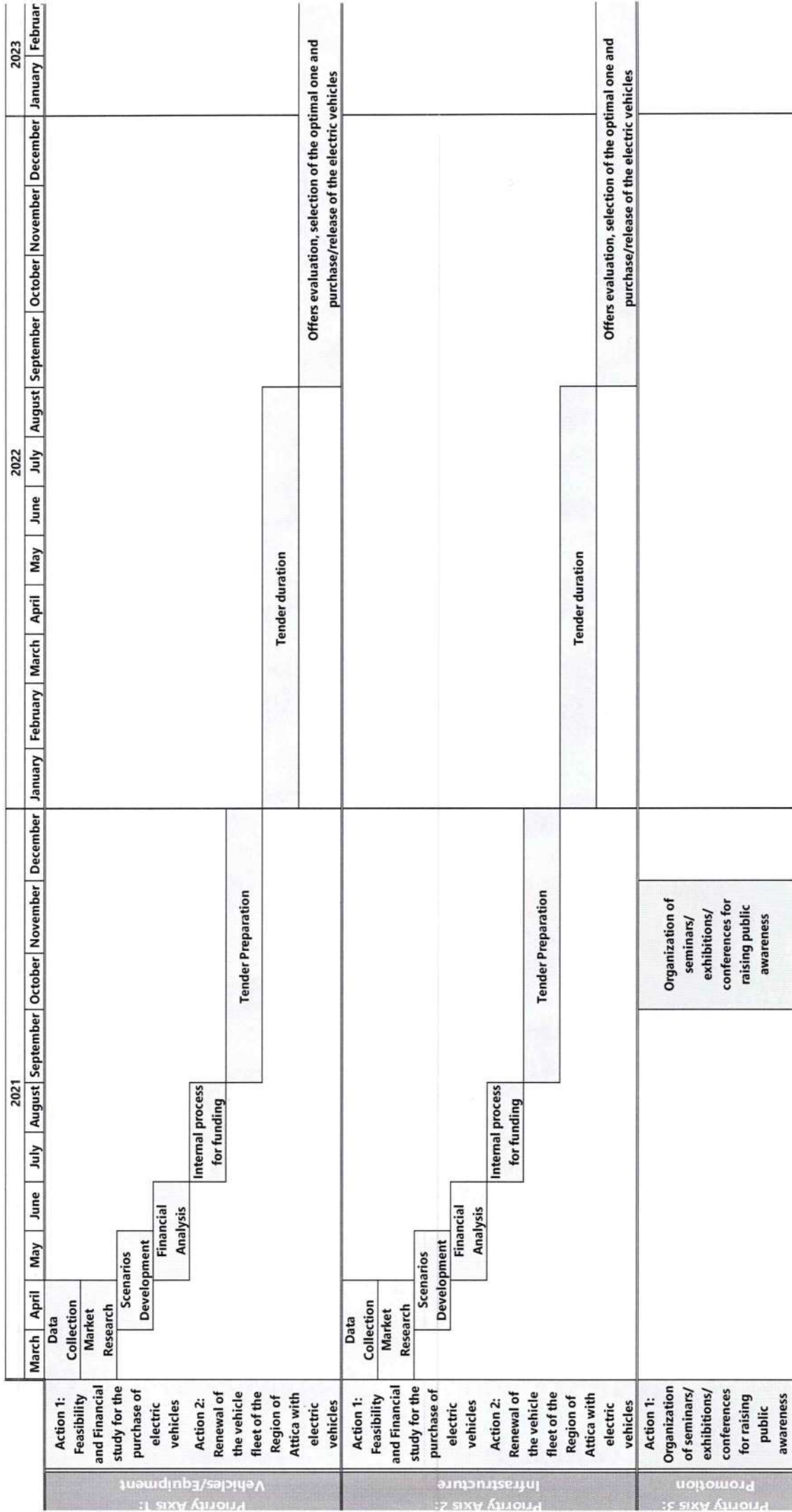


Fig. 3: Gantt Diagram



e-MOPOLI: Electro MOBility as driver to support POLicy Instruments for sustainable mobility



€1,792,053.00



from 1 Jun 2018
to 30 Nov 2022



Low carbon
economy



9 partners
IT - SI - EL - BE - FI
NO - RO - LV

Project coordinator and lead partner

Province of Brescia
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8. Declaration

The Regional Governor of Region of Attica agrees to support and promote the implementation (and where appropriate implement) the plan detailed above.

George Patoulis

Regional Governor of Region of Attica

Signature _____

Athens, 30/07/2021

Stamp of the Organisation

