

EnerNETMob

Mediterranean Interregional Electromobility Networks for intermodal and interurban low carbon transport systems

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Activity	3.2 – Coordinating the studying phase
Deliverable	3.2.1 – EU Policy and Regulation Framework of Electromobility
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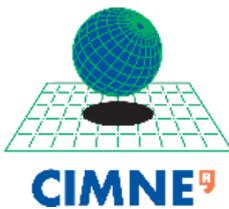
Deliverable 3.2.1

EU Policy and Regulation Framework of Electromobility

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1 Introduction

The aim of the activity 3.2 is to define the overall legal and policy framework at the European level and to share and compare the state of art of each Member State and/or regions involved in the EnerNETMob project.

This start-up phase is preparatory for the subsequent actions of the WP3 and the next WP4 and WP5.

Therefore, as reported in the application form, before starting the studying and testing activities, the project partners with the support of the WP3 *Scientific Committee Working Group* (WP3 SCWG), will define the current development of electric transport policies in the EU and in the involved Countries/Regions.

As confirmed during the 1st Steering Committee held in Tripoli on May 3rd and 4th 2018, the WP3 SCWG is coordinated by UNIPA-SAAF (Project Partner 8) and CIMNE (Project Partner 13) that, as research institutions, will support the partnership in the Studying Phase and will assess the progress implementation and effectiveness of activities.

According to the Working Plan of the Application Form, below it is reported the involvement of partnership **within Activity 3.2:**

Table 1: Partnership Activity

No. partner	Partner	Member State	Involvement in the activity
LP	Region of Peloponnese	Greece	Involved
PP1	Transport Malta	Malta	Involved
PP2	RAM logistica infrastrutture e trasporti Spa	Italy	Involved
PP3	Ministry of Transport Communication and works	Cyprus	Involved
PP4	Albanian Institute of Transport	Albania	Involved
PP5	Region of Thessaly	Greece	Involved
PP6	County of Primorje and Gorski Kotar	Croatia	Involved
PP7	Northern Primorska RDA	Slovenia	Involved
PP8	University of Palermo -Department of Agricultural Food and Forest Sciences	Italy	Involved
PP9	Energy and environment Agency of Arrábida	Portugal	Involved
PP10	Free Municipal Consortium of Ragusa	Italy	Involved
PP11	Dynamic vision	Greece	Involved
PP12	Port of Bar Holding Company	Montenegro	Involved
PP13	International Center of Numerical Methods in Engineering	Spain	Involved
PP14	Capenergies	France	Involved
PP15	Austrian mobility Research FGM - Amor	Austria	Involved

The Activity 3.2 will affect the analysis policies and Regulations/Directives adopted by EU Commission and Parliament and will define the benchmarks at EU level based on the contribution of Each partner.

Therefore, the Activity will develop 2 kinds of deliverables:

- Deliverable 3.2.1 - EU Policy and Regulation Framework of Electromobility (1 report);
- Deliverable 3.2.2 - National/Local Policy and Regulation Framework of Electromobility (16 reports).

The **Deliverable 3.2.1** is an integrated report which will define benchmark of EU policies and Regulations/Directives and their implementation at National level. Moreover, the document will summarize results of the local analysis carried out by each partner in its Country/Region.

The **Deliverable 3.2.2.** is composed by 16 national and local reports which will be drafted by each involved partner according to a common framework and common topics, as listed in the subsequent page.

The purpose is to have a comparison of the legal framework and of the policies implemented by the involved member States, in order to develop the benchmark for the next planning guidelines and technical standards to be adopted for the implementation of the *Mediterranean Interregional Electromobility Network* and connected *Small-Scale Infrastructure Networks*.

Table 2: Distribution of tasks for Deliverable 3.2.2 - National Policy and Regulation framework of Electromobility

No. partner	Partner	Member State	Title of report	Territorial level	Deadline
LP	Region of Peloponnese	Greece	Policy and regulation framework in Greece	National	August 31st
PP1	Transport Malta	Malta	Policy and regulation framework in Malta	National	August 31st
PP2	RAM logistica infrastrutture e trasporti Spa	Italy	Policy and regulation framework in Italy	National	August 31st
PP3	Ministry of Transport Communication and works	Cyprus	Policy and regulation framework in Cyprus	National	August 31st
PP4	Albanian Institute of Transport	Albania	Policy and regulation framework in Albania	National	August 31st
PP5	Region of Thessaly	Greece	Implementation of EU and National Policies and regulations in the Region of Thessaly (Greek focus)	Regional	August 31st
PP6	County of Primorje and Gorski Kotar	Croatia	Policy and regulation framework in Croatia	National	August 31st
PP7	Northern Primorska RDA	Slovenia	Policy and regulation framework in Slovenia	National	August 31st
PP8	University of Palermo -Department of Agricultural Food and Forest Sciences	Italy	Implementation of EU and National Policies and regulations in Sicilian region (Italian focus)	Regional	August 31st
PP9	Energy and environment Agency of Arrábida	Portugal	Policy and regulation framework in Portugal	National	August 31st
PP10	Free Municipal Consortium of Ragusa	Italy	Implementation of EU and National Policies and regulations in Ragusa province (Italian focus)	Local	August 31st
PP11	Dynamic vision	Greece	Implementation of EU and National Policies and regulations in the Region of Attica	Local	August 31st
PP12	Port of Bar Holding Company	Montenegro	Policy and regulation framework in Montenegro	National	August 31st
PP13	International Center of Numerical Methods in Engineering	Spain	Policy and regulation framework in Spain	National	August 31st
PP14	Capenergies	France	Policy and regulation framework in France	National	August 31st
PP15	Austrian mobility Research FGM - Amor	Austria	Policy and regulation framework in Austria	National	August 31st

The activity 3.2 will be developed according to the following flow chart:

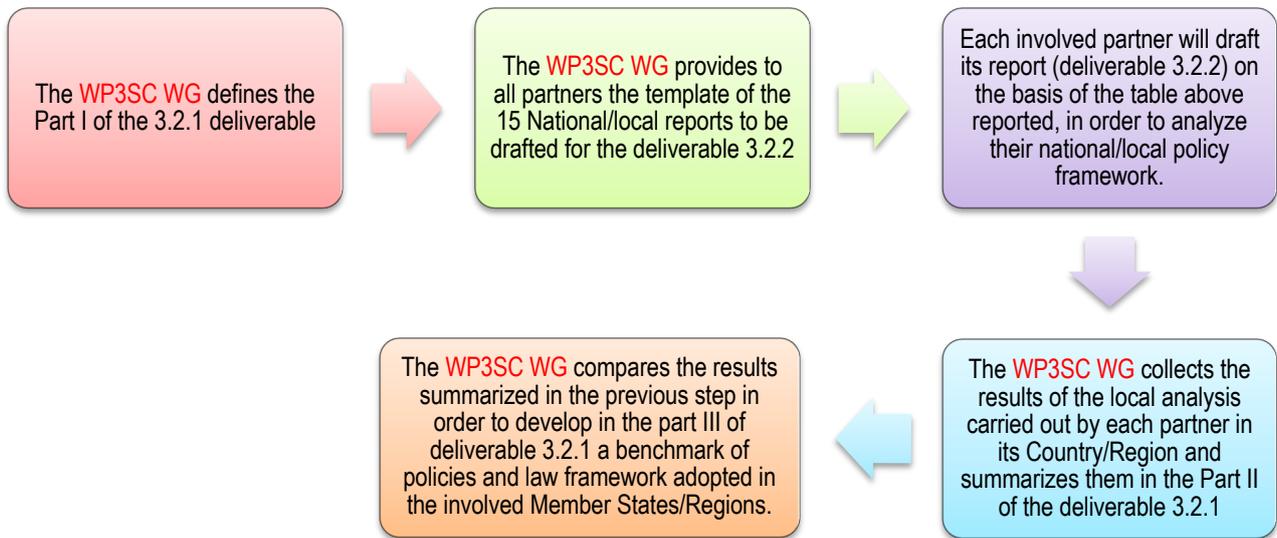


Figure 1: Flow chart of the activity 3.2

2 EU framework

2.1 Framework on Electric transport policies and regulations: Directive 2014/94/EU

Directive 2014/94/EU from the 22nd of October 2014 is the central piece of legislation at EU level dealing with the deployment of alternative fuels' infrastructure at a Member State level. As a result, the first section of the report just assesses and summarizes the most relevant aspects of the directive whenever Electromobility is involved.

2.1.1 Directive overview

Directive 2014/94/EU establishes the common framework of measures for the deployment of alternative fuels infrastructure in the European Union in order to minimise dependence on oil and to mitigate the environmental impact of transport. The Directive sets out minimum requirements for the building-up of alternative fuels infrastructure, including recharging points for electric vehicles and refuelling points for natural gas (LNG and CNG) and hydrogen, to be implemented by means of Member States' national policy frameworks, as well as common technical specifications for such recharging and refuelling points, and user information requirements.

The most relevant articles for the deployment and regulation of electro mobility are articles 3, 4, 7 and 10, although some others are of relevance for definition and concretization purposes. An overview of them ensues.

2.1.2 Major contents

The corpus of the Directive on recharging infrastructure development is laid out in Articles 3 and 7.

Article 3 establishes the provision of regulatory and policy frameworks at national level for the development of the market in alternative fuels for transport whereas article 4 develops the obligations set for the Member states regarding the development of the infrastructure for electricity supply to transport means. As a result, the directive established that the Member States had to provide a framework by 2016 covering at least the following elements:

- An assessment of the **current state and future development** of the market regarding alternative fuels to be used in the transport sector. Consider, in light of the possible simultaneous and combined use of some of the refuelling technologies any combined developments. Additionally, where relevant, **cross-border** continuity is to be studied.
- National targets and objectives by December 2020:
 - o An appropriate **number of recharging points accessible to the public** put in place in order to ensure that electric vehicles can circulate at least in urban/suburban agglomerations and other densely populated areas, and where appropriate, within networks determined by the Member States (article 4).
The number of such recharging points shall be established taking into consideration, inter alia, the **number of electric vehicles estimated to be registered** by the end of 2020, as indicated in their national policy frameworks, as well as best practices and recommendations issued by the Commission. Particular needs related to the installation of

- recharging points accessible to the public at public transport stations shall be taken into account, where appropriate (article 4)).
- Measures to encourage and facilitate the deployment of recharging points not accessible to the public (article 4).
 - Measures necessary to ensure that **national targets** and the objectives contained in the national policy framework are reached.
 - **Designation of the urban/suburban agglomerations, other densely populated areas and of networks** which, are to be equipped with recharging points accessible to the public (accordance with Article 4(1)).
 - Designation of the **requirements for recharging points deployed** or renewed from 18 November 2017 onwards (points 1.1 (normal power) and 1.2 (high power) of Annex II of the directive).
 - Other aspects covered in the articles concern the source of the energy supplied, metering, contractual relationship with energy providers and other **recharging points accessibility, purchasing and provision aspects** (articles 4(7) to 4(12)).

In addition, article 10 sets the 18th November 2019 as the deadline for the Member States to report on the level of implementation and attainment of their respective national policy frameworks and targets and objectives. After the first submission, new reports are expected, thereafter, every 3 years.

Based on the national policy frameworks, the Commission compromises to report the assessment on the coherence of the national frameworks at EU level by November 2017 and publish and regularly update information on the national targets and the objectives submitted by each Member State regarding the number of recharging points accessible to the public among other objectives. The door is left open to amendments to the Directive depending on the market evolution to ensure enough recharging points are accessible at least in the TEN-T Core network and other densely populated areas (article 4(2)).

Finally, article 7 focuses on how information should be provided to the users of alternative fuels and infrastructure (including recharging stations). Articles 7(1) to 7(6) make reference to labelling and communication of the compatibility of fuels with vehicle engines whereas article 7(7) is of special interest for EnerNETMob purposes since it dwells with data communication on recharging points geographic location, availability, and provision of real-time and historical charging information.

2.1.3 Specific requirements

Specific requirements on what needs to be periodically reported to the Commission by November 2019 and the technical considerations of the recharging points are provided by means of two separate annexes:

Annex I of Directive 2014/94/EU lists information to be provided in the periodic reports on the market evolution and deployment success of electro-mobility related infrastructure:

According to the directive, the report shall contain a description of the measures taken in a Member State in support of alternative fuels infrastructure build-up. The report shall include at least the following elements. In fact, the contents to be reported are aligned with what is assessed at country/regional level in the present deliverable:

1. Legal measures:
Information on legal measures, which may consist of legislative, regulatory or administrative measures to support the build-up of recharging infrastructure, such as buildings permits, parking

- lot permits, certification of the environmental performance of business and recharging stations concessions.
2. Policy measures supporting the implementation of the national policy framework. Information on those measures shall include the following elements:
 - Direct incentives for the purchase of electric vehicles or for building the infrastructure.
 - Availability of tax incentives to promote the use of electric vehicles and the relevant infrastructure.
 - Use of public procurement in support electro-mobility, including joint procurement.
 - Demand-side non-financial incentives, for example preferential access to restricted areas, parking policy and dedicated lanes.
 - Technical and administrative procedures and legislation with regard to authorisation of electricity supply for transportation use, in order to facilitate the authorisation process.
 3. Deployment and manufacturing support:
 - Annual public budget allocated for car electromobility.
 - Annual public budget allocated to support electricity production plants to be used for electromobility.
 - Consideration of any particular needs during the initial phase of the deployment recharging stations.
 4. Research, technological development and demonstration (RTD&D):
 - Annual public budget allocated to support electro-mobility.
 5. Targets and objectives:
 - Estimation of the number of electric vehicles expected by 2020, 2025 and 2030.
 - Level of achievement of the national objectives for the deployment of electric vehicles infrastructure.
 - Information on the methodology applied to take account of the charging efficiency of high power recharging points
 6. Infrastructure developments:
 - Changes in supply (additional infrastructure capacity) and demand (capacity actually used)

Annex II includes the technical specifications on the recharging points. Regarding technical standards, at least compatibility with Type 2 vehicle connections from standards EN 62196-2 (alternating current) and EN 62196-23 (direct current) is to be ensured.

2.1.4 Summary

As a result of the Directive a well-defined timeline with the targets to be achieved at each specific date, is put in place to ensure that a minimum common policy is ensured among the EU Member States and future candidates. The timeline resulting from the directive is:

- November 2016:
 - All State Members communicated their national policy frameworks to the Commission.
- November 2017:
 - Deployed and renewed recharging stations must comply with technical requirements
 - Report (by the EC) on the coherence of the national frameworks (summarized below)
- December 2018:

- If appropriate, the Commission adopts an Action Plan for the implementation strategy from the Communication entitled 'Clean Power for Transport: A European alternative fuels strategy'.
- November 2019 and every 3 years thereafter:
 - Reports by member States on national policy framework implementation and attainment of their respective national policy frameworks, targets and objectives.
- November 2020 and every 3 years thereafter:
 - Report by the EC on the actions and their effects at each Member State.

The directive does not provide specific targets nor proposes specific measures to facilitate the Deployment of electric vehicles nor recharging infrastructure, however enforces a series of dates for the State Members to provide targets and measures via the development of national transport policy frameworks with that specific purpose.

As a result of the directive the following should have been made available by 2016 (see Part II of this deliverable¹ for each member state):

- Number of electric vehicles (current value and expected number by 2020);
- Number of recharging stations (current value and expected number by 2020);
- Measures to stimulate the use of non-public recharging points;
- Measures to encourage the use of electric vehicles;
- Measures to facilitate that the targets (first two bullet points) are met;
- Designation of the densely populated areas, networks, and equipment thresholds that have to be met.

In addition, by the end of 2019 the first report on policy framework implementation with additional metrics and measures should be made available by the member states.

2.1.5 Addenda: Coherence on the national frameworks

As originally planned, according to Directive 2014/94/EU, on November 8th, 2017 a report assessing the coherence of the transposed directive in each state member was developed and published. The report was made available under the title: *Towards the broadest use of alternative fuels – an Action Plan on Alternative Fuels Infrastructure under Article 10 (6) of Directive 2014/94/EU, including the assessment of national policy frameworks under Article 10(2) of Directive 2014/94/EU (COM(2017) 652 final/2)*.²

To provide a view on the big picture, the report collects data from the European Alternative Fuels Observatory, at an EU level. Those were the milestones achieved so far³:

- 118.000 publically accessible recharging points for electric vehicles
- 3458 refuelling points for compressed natural gas (CNG) or liquefied natural gas (LNG)
- 82 refuelling points for hydrogen vehicles

In addition, according to the report, creating the backbone infrastructure in the TEN-T core network corridors appears less challenging since it becomes easier to provide metrics on the deployment and to set

¹ Some difficulties may appear when assessing those points at regional level or when applying to Candidate Countries

² <http://ec.europa.eu/transparency/regdoc/rep/1/2017/EN/COM-2017-652-F2-EN-MAIN-PART-1.PDF>

³ Numbers correspond to what was deployed until September 2017

target goals. It is estimated that **EUR 1.5 billion will be needed by 2025 to equip the corridors**. Gaps concern particularly the recharging points for electric vehicles, but in some areas also refuelling points for heavy-duty vehicles using liquefied natural gas (LNG), although the latter are out of the scope of the EnerNETMob project goals.

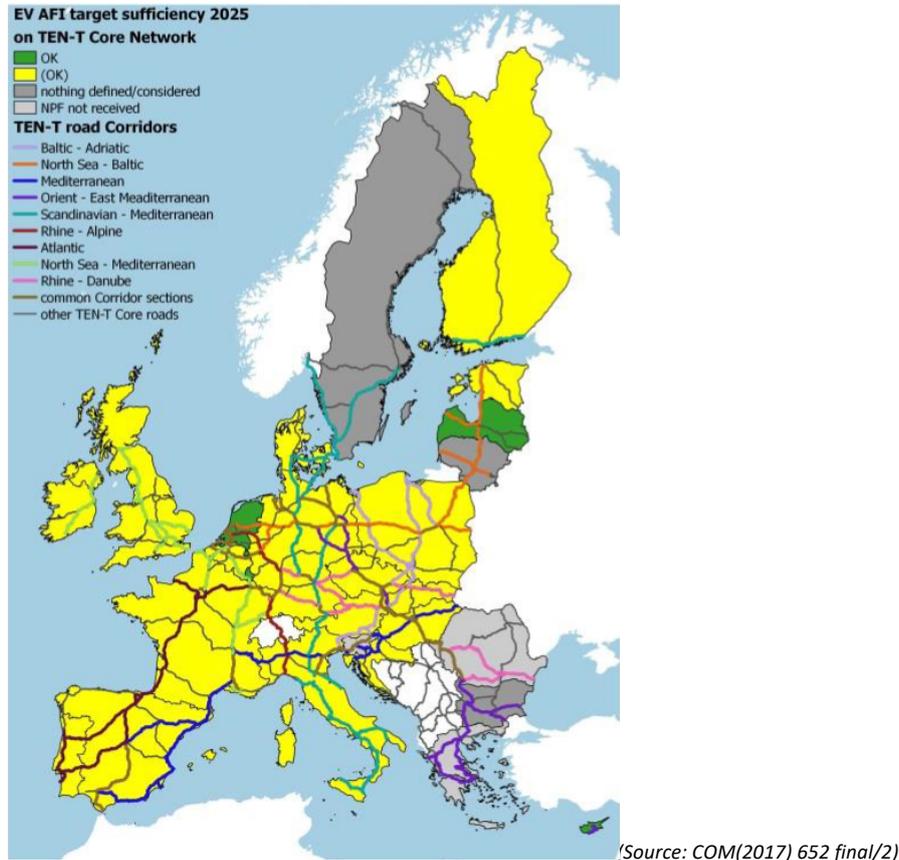


Figure 2. Overview of recharging point sufficiency to ensure appropriate coverage of the TEN-T Core Network by 2025

It is more challenging to reach a consistent number of recharging stations in the whole European area. So far, the level of ambition between different Member States varies significantly. For example, only two Member States have made the compromise to provide more than 100 recharging points for *electric vehicles* in cities with 100.000 inhabitants (the Netherlands and Latvia).

After an analysis of the NPFs (National Policy Frameworks) under Directive 2014/94/EU, the report states that the **estimates of infrastructure investment in electricity needs by Member States** are up to EUR 904 million by 2020 to develop the network to the level of implementation set in directive 2014/94/EU (the NPFs require targets for 2020 only). This numbers include the development of the TEN-T core network corridors.

As for **electricity**, these national plans fall short of the Commission's estimates of infrastructure. For electric vehicles, the Impact Assessment for Directive 2014/94/EU considered a conservative benchmark of 4 million electric vehicles on the road by 2020. This represents a strong increase compared to 2018 numbers, but when reached, the 4 million of vehicles will corresponds to just 1.5 percent of the total vehicle stock.

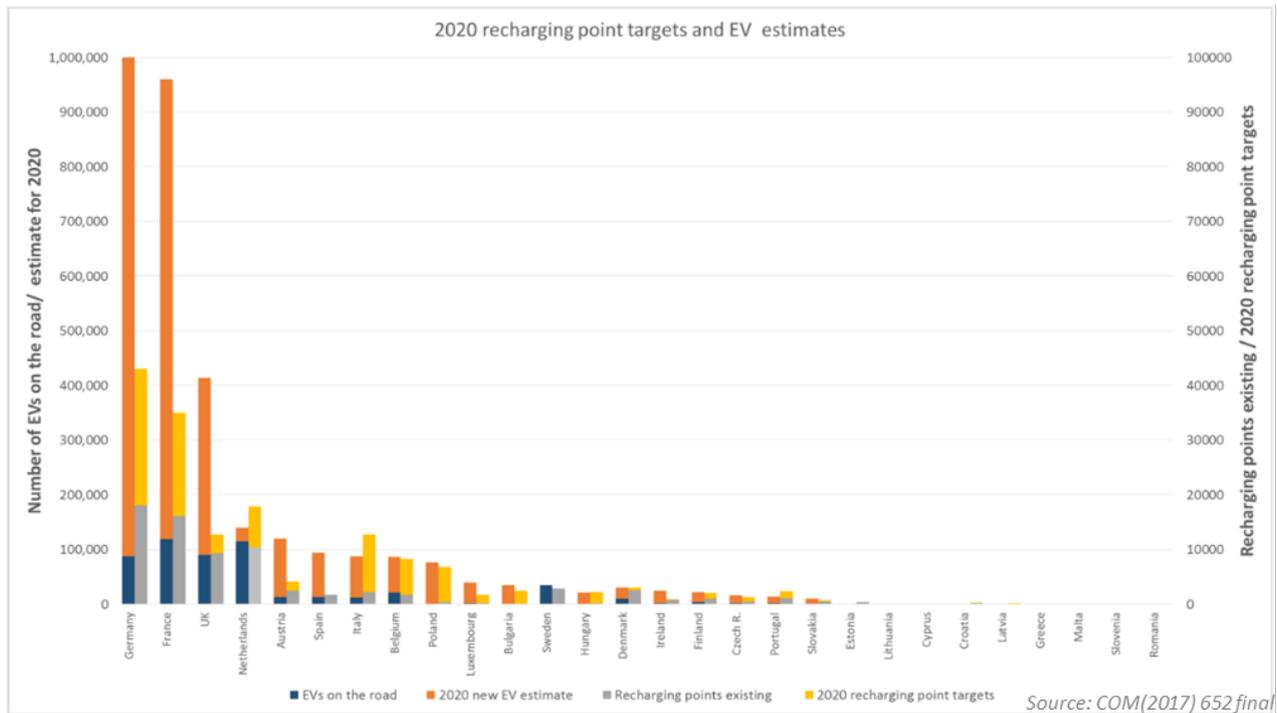


Figure 3. NPFs' 2020 recharging points targets and EV estimates, level of attainment (September 2017)

In fact, considering the goals set in Directive 2014/94/EU, at least one publicly accessible recharging point per each 10 electric vehicles should have been deployed by 2020. The current attainment level for the 2020 targets of publicly accessible recharging points, calculated as the ratio between current and targeted recharging points ranges from 1% to 88% depending on the country. But it has to be considered that the deployed fleet of EV (around half million by 2016 considering all EU countries) falls short of the expected over 4 million by 2020, therefore, the current number of electric stations deployed should increase dramatically if the targets in number of EV and number of EV/stations deployed are to be reached.

As shown in Figure 3, the level of achievement on the deployed fleet of electric vehicles compromised by 2020 varies much depending on the country.

A more rapid increase of electric vehicles, leading to a share of 7 percent in 2025, as assumed by the Impact Assessment for the proposal for CO₂ emission performance standards for cars and vans post 2020, would lead to even higher investment needs (SWD (2017) 650):

- By 2020, 440.000 public accessible recharging points would be needed - a significant increase compared to today (on September 2017 only 118.000 public accessible recharging points had been deployed). This could require investment into publicly accessible recharging points of up to EUR 3.9 billion.
- By 2025, around five times more or some 2 million publicly accessible recharging points would be needed. If the share of fast-charging infrastructure increases from 5 to 15% of the overall charging infrastructure, investments in the order of in between EUR 2.7 to 3.8 billion could be required per year, as of 2021. The majority of these investment needs would be required in *urban areas*.

Table 3: Total vehicle fleet by member state (numbers of 2016) and what supposedly will be a 1.5% of the total

	Vehicle fleet by member (2016)	1,5% of total fleet	Goal (%) set by 2020	Goal (#) set by 2020 (current fleet)	% achieved (2016) of 2020 goal
Austria	5.288.596	79.328	1,25 - 3,42	66.107 - 180.869	7,6 - 20,8
Belgium	6.538.095	98.071	1,30	84.995	24,4
Croatia ¹	1.724.267	25.864	n.a.	n.a.	n.a.
Czech Republic	6.119.478	91.792	0,35	21.418	8,2
Denmark	2.936.247	44.043	0,94	27.600	33,4
Estonia ¹	816.206	12.243			
Finland	3.048.059	45.720	0,63	19.202	15,6
France	38.651.953	579.779	2,19	846.477	12,4
Germany	49.285.424	739.281	2,14	1.054.708	8,8
Greece ¹	6.235.761	93.536	n.a.	n.a.	n.a.
Hungary	3.821.432	57.321	0,56	21.400	3,7
Ireland	2.409.983	36.149	1,00	24.099	8,7
Italy	42.862.046	642.930	0,11 - 0,32	47.148 - 137.158	9 - 25,9
Latvia	753.373	11.300	0,10	753	40,6
Lithuania	1.295.630	19.434	0,07	906	12,9
Luxembourg	422.291	6.334	9,22	38.935	3,8
Netherlands	9.528.197	142.922	1,47	140.064	82,5
Poland	25.329.863	379.947	0,32	81.055	1,3
Portugal	5.824.700	87.370	0,23	13.396	16,1
Romania ¹	6.408.904	96.133	n.a.	n.a.	n.a.
Slovakia	2.461.598	36.923	0,49	12.061	5,9
Slovenia ¹	1.284.382	19.265	n.a.	n.a.	n.a.
Spain	28.026.696	420.400	0,14 - 0,54	39.237 - 151.344	8,6 - 33,9
Sweden ¹	5.398.128	80.971	n.a.	n.a.	n.a.
United Kingdom	39.240.439	588.606	1,02 - 1,11	400.252 - 435.568	20,9 - 22,7
EUROPEAN UNION	295.711.748	4.435.676	1,24 - 1,39	3.666.826 - 4.110.393	17,07 - 20,08

¹ Targets not available for Croatia, Estonia, Greece, Romania, Slovenia and Sweden. Missing overall numbers for Malta, Cyprus and Bulgaria

Source: European Automobile Manufacturers Association (ACEA)

Overall, the report stated that the transposed directive at the different state members is rather conservative and they fail to ensure the targets preliminary set. Therefore, action from the different governments is expected to address the situation.

Those few NPFs that set ambitious targets and objectives, coupled with a comprehensive mix of policy support measures, provide an adequate response; others should follow suit, as these examples show the largest socio-economic and environmental benefits.

To help with the process, the Commission has set up the **Sustainable Transport Forum (STF)**⁴ to bring together representatives of Member States, the transport sector and civil society. Work in the STF on the implementation of Directive 2014/94/EU seeks to ensure the effective implementation of NPFs. The outcome of its work is to be revised annually at the European conference on clean transport and alternative fuels infrastructure, starting with a first one in late autumn 2018.

Support measures are an important enabler to ensure the achievement of NPF targets and objectives are reached. The maps in Figure 4 provide an overview of support measures that aim at ensuring that the national targets and the objectives contained in the NPF are reached (left map: measures targeting the deployment of recharging points accessible to the public; right map: measures to encourage and facilitate the deployment of recharging points not accessible to the public).

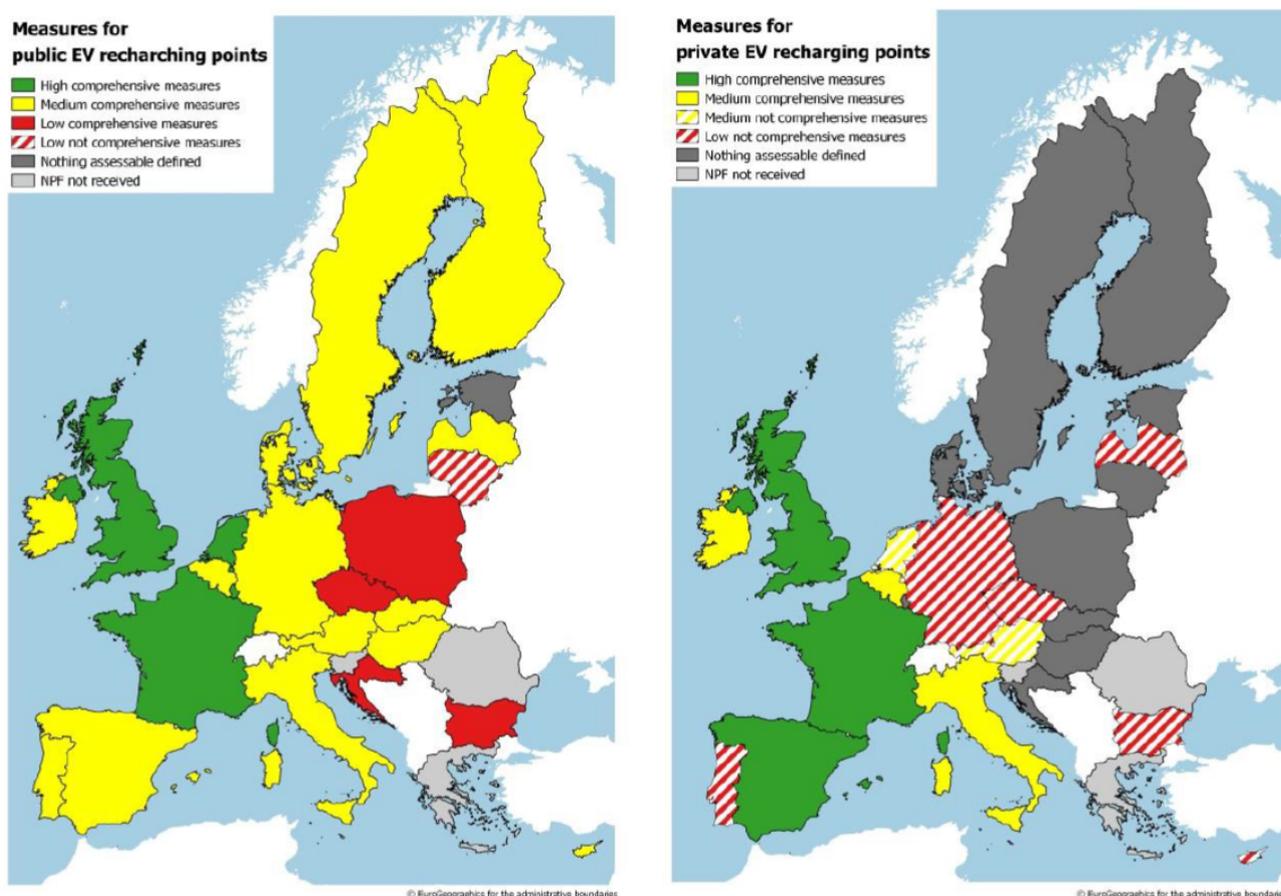


Figure 4. Support measures for recharging points (left map: measures targeting the deployment of recharging points accessible to the public; right map: measures to encourage and facilitate the deployment of recharging points not accessible to the public)

Most of the NPFs contain the definition of measures that can promote the deployment of alternative fuels infrastructure in public transport services. Depending on the Member States, they target different fuels, for example covering electricity, natural gas, hydrogen, and biofuels. They also target different modes, for example, rail, buses, taxis, and car sharing. Figure 5 shows the results of the assessment for the support measures that can promote the deployment of alternative fuels infrastructure in public transport services.

⁴ https://ec.europa.eu/transport/themes/urban/cpt/stf_en

Therefore, NPFs and these figures and Communication 652 (2017) from the commission, are a good source of information to produce the assessment at national level.

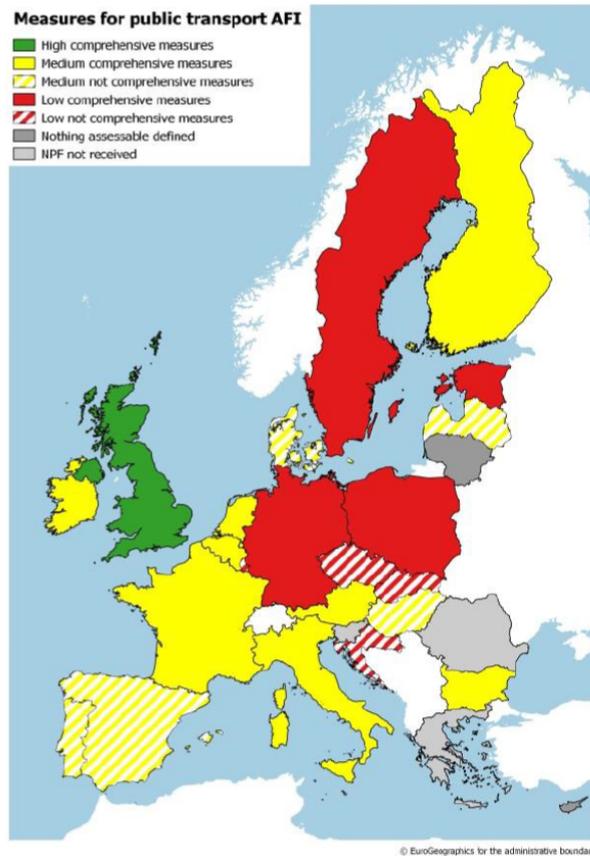


Figure 5. Support measures that can promote the deployment of alternative fuels infrastructure in public transport services.

Overall, it is observed that as a result of the low development level compared with what was planned in 2014, the contribution to the reduction of CO₂ emissions from transport is smaller than expected. Given the overall low level of ambition for the alternative fuels infrastructure AFI targets and corresponding AFV estimates contained in the NPFs. Several NPFs did not provide AFV estimates beyond 2020. It is estimated that, as a consequence of the NPFs, CO₂ emissions from transport could be reduced by 0.4% by 2020 and 1.4% by 2030 compared to a scenario without NPFs. Action is needed to put the contribution of alternative fuels back on track for a meaningful impact on GHG emissions reductions from transport and minimizing the EU's dependence on oil.

The deployment of the electric recharging stations did have rather small impacts in terms of air quality. Reduction of NO_x emissions from transport is assumed to be of 0.37% by 2020 and 1.5% by 2030 compared to a scenario without NPFs. PM_{2.5} is estimated to be reduced to 0.44% by 2020 and 1.9% by 2030. For 2030, this improvement can reach up to a 5.8% reduction in NO₂ concentrations and a 2.1% reduction in PM_{2.5} concentrations in Member States. For the most ambitious Member States the reduction can lead to up to a 7-10% decrease in NO₂ concentrations and a 8-12% reduction in PM_{2.5} concentrations by 2030 in certain areas, relative to a scenario without NPF. It can be positively noted that urban and suburban agglomerations, currently at the highest risk to violate EU air quality targets, benefit over proportionally from air quality improvements as a result of the NPFs.

2.2 Framework on Sustainable Energy policies and regulations

This section, reviews two pieces of documentation relevant to electromobility development plans:

- Directive 2009/28/EC, on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, where measures for the promotion sustainable energy are introduced.
- The definition of the concept of Sustainable Energy and Climate Action Plan (SECAP), a framework developed under the umbrella of The covenant of Mayors.

2.2.1 Directive 2009/28/EC on the promotion of the use of energy from renewable sources

2.2.1.1 Directive overview

This Directive establishes a common framework for the promotion of energy from renewable sources. It sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport. It lays down rules relating to statistical transfers between Member States, joint projects between Member States and with third countries, guarantees of origin, administrative procedures, information and training, and access to the electricity grid for energy from renewable sources. Additionally, and out of the scope of the project, it establishes criteria for biofuels and bioliquids.

2.2.1.2 Targets and requirements to states

The Directive sets mandatory national overall targets and measures for the use of energy from renewable sources. The relevant targets established by the following articles are:

- 3(1) A target of at least a 20% by 2020 share of energy from renewable sources in the Community's gross final consumption. Each Member State shall promote and encourage energy efficiency and energy saving.
- 3(4) Each Member State shall ensure that the share of energy from renewable sources in all forms of transport in 2020 is at least 10% of the final consumption of energy for that Member State

In addition to those, the directive sets the following requirements to the member states:

- **National renewable energy actions plans** (article 4 from the directive). Each Member State shall adopt a national renewable energy action plan. The national renewable energy action plans shall set out Member States' national targets for the share of energy from renewable sources consumed in transport among other sectors, by 2020, and adequate measures to be taken to achieve those national overall targets.

The minimum requirements for the national renewable energy actions plans of relevance for the EnerNETMob project are:

- o National sectoral 2020 targets and estimated shares of energy from renewable sources, including:
 - Target share of renewal energy in electricity for 2020
 - Estimated trajectory for the share of energy from renewable sources in electricity;
- o Estimated trajectory for the share of energy form renewable sources in transport; Inclusion of measures to reach the targets including:

- An overview of all policies and measures promoting the use of energy from renewable sources;
- Identification of support schemes for the promotion of the use of energy from renewable sources in transport applied by the Member States or a group of Member States;
- Assessments on the expected effect of measures to meet the targets set. Of relevance:
 - Expected contribution (to the energy consumption) from any energy saving measures.
 - Expected share of the contribution of each renewable energy technology and their expected trajectory, differentiating per sector (electricity, heating and cooling and transport).
 - Total contribution expected from the energy efficiency and energy saving measures to meet the mandatory 2020 targets and the indicative trajectory for the shares of energy from renewable sources in electricity, heating and cooling and transport.
- **Reporting by the Member States** (article 22 from the directive). Each Member State shall submit a report to the Commission, on their progress in the promotion and use of energy from renewable sources by 31 December 2011, and every two years thereafter. Of relevance to this project goals, the reports shall detail:
 - The sectoral (incl. transport) and overall shares of energy from renewable sources in the preceding two calendar year and the measures taken or planned at national level to promote the growth of energy from renewable source in that sector.
 - The introduction and functioning of support schemes and other measures to promote energy from renewable sources.
 - The estimated excess production of energy from renewable sources compared to the indicative trajectory which could be transferred to their Member States, as well as the estimated potential for joint projects, until 2020.
- **National overall targets for the share of energy from renewable sources** in gross final consumption of energy 2020 (see Table 4). Note that sectorial targets are not set in the Directive but are to be set in its transposition to the member states through their respective renewable energy action plans.

Table 4: National overall targets by 2020

	Share of energy from renewable sources in gross final consumption of energy, 2005 (\$2005)	Target for share of energy from renewable sources in gross final consumption of energy, 2020 (\$2020)
Belgium	2,2%	13%
Bulgaria	9,4%	16%
Czech Republic	6,1%	13%
Denmark	17,0%	30%
Germany	5,8%	18%
Estonia	18,0%	25%
Ireland	3,1%	16%
Greece	6,9%	18%
Spain	8,7%	20%
France	10,3%	23%
Italy	5,2%	17%
Cyprus	2,9%	13%

Latvia	32,6%	40%
Lithuania	15,0%	23%
Luxembourg	0,9%	11%
Hungary	4,3%	13%
Malta	0,0%	10%
Netherlands	2,4%	14%
Austria	23,3%	34%
Poland	7,2%	15%
Portugal	20,5%	31%
Romania	17,8%	24%
Slovenia	16,0%	25%
Slovak Republic	6,7%	14%
Finland	28,5%	38%
Sweden	39,8%	49%
United Kingdom	1,3%	15%

As implied with the description of the directive, its influence in the deployment of electricity supply infrastructures dedicated to transportation is small. No specific targets are specified, beyond the share of renewable energies being used in the transport sector at country level. Therefore, focus is concentrated on the source of the energy and not how vehicles are being fuelled, that is in electromobility it would be of relevance where the electricity comes from, rather than the amount of supply stations or electric vehicles being used.

Due to the date of this directive (2009), EVs are not specifically addressed since they were not on the agenda, thus limiting the possibility to include targets or measures addressed to them.

2.2.2 Covenant of Mayors

2.2.2.1 Overview

The Covenant of Mayors initiative was launched by the European Commission in 2008, with the objective of engaging and supporting municipalities to commit with reaching the EU climate and energy targets and provide strategy guidelines and identify good practices to achieve that.

On October 2015, the Covenant of Mayors and Mayors Adapt (launched on 2014 by the European Commission based on the same principles as the CoM) initiatives officially merged on the occasion of a ceremony held on 15 October 2015 in the European Parliament. The resulting Covenant of Mayors for Climate & Energy is both ambitious and broad-ranging. Signatory cities now pledge to actively support the implementation of the EU 40% GHG-reduction target by 2030 and agree to adopt an integrated approach to climate change mitigation and adaption and to ensure access to secure, sustainable and affordable energy for all.

In June 2016, the Covenant of Mayors for Climate & Energy joined forces with another city initiative, the Compact of Mayors. The resultant “Global Covenant of Mayors for Climate and Energy” is the largest movement of local governments committed to go beyond their own national climate and energy objectives. It tackles three issues: climate change mitigation, adaption to the adverse effects of climate change and universal access to secure, clean and affordable energy.

Overall, the **Global Covenant of Mayors** serves cities and local governments by mobilizing and supporting ambitious, measurable, planned climate and energy actions in their communities by working with city/regional networks, national governments and other partners.

At the end of 2018, according to the database of the Covenant, 7,755 cities across 57 countries had signed the agreement, roughly representing 253 millions of inhabitants. The covenant's web page can be consulted of the number up to date, the list of the signing municipalities as well as the plans they compromise to follow spawning from the membership to the Covenant of Mayors (like the Sustainable Energy Action Plans commented below)⁵.

2.2.2.2 SEAP. Sustainable Energy Action Plans - Overview

Sustainable Energy Action Plans (SEAP) are documents used to showcase the commitment of the municipalities joining the Covenant to have a tangible effect on the energy management and reduction the of cities' carbon footprint as soon as 2020.

SEAPs use the results of the Baseline Emission Inventory (amount of CO₂ emitted as a result of energy consumption in the municipality during the baseline year) to identify the best fields of action and opportunities for reaching the local authority's CO₂ reduction target. SEAPs define concrete reduction measures, together with time frames and assigned responsibilities, which translate the long-term strategy into action. Signatories commit themselves to submitting their SEAPs within the year following adhesion.

SEAPs are intended to be flexible to adapt to the change of circumstances and since the ongoing actions provide results and experience, it may be useful/ necessary to revise the plan on a regular basis.

SEAPs have a predefined clear process (Figure 6) to facilitate the adaptation of the local administration to the initiative and help identify the more meaningful measures and how to plan ahead to implement them to reach the targets on CO₂ reduction.

⁵ <https://www.covenantofmayors.eu/plans-and-actions/action-plans.html>

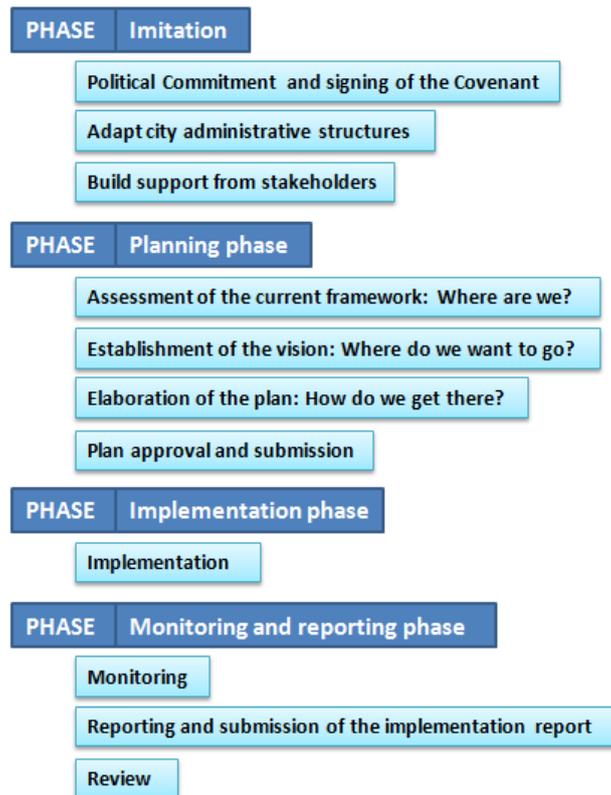


Figure 6. SEAP initiation, planning, implementation and follow up phases

2.2.2.3 SEAP. Tools and recommendations spawning from the SEAPs

As part of the SEAP development and implementation process, several recommendations are provided by the Covenant that might help when assessing current regulations and measures aimed at the creation of the network of recharging stations at regional level and deployment of electric vehicles. That is, SEAPs can be very useful to provide context and identify best practices aligned with the objectives of the EnerNETMob project.

Specifically, the following recommendations to be included in a SEAP are of relevance:

- CO₂ baseline emission inventory (BEI). The SEAP should be elaborated based on a sound knowledge of the local situation in terms of energy and greenhouse gas emissions. The BEI has to be included in the SEAP. Therefore, data on the evolution of emissions should be available.
- Comprehensive measures that cover the key sectors of activity. Key to find a repository of the intended measures on the promotion of electro mobility. The SEAP has to contain a coherent set of measures covering the key sectors of activity.
- Strategies and actions until 2020. The long-term strategy and goals until 2020, including firm commitments in areas like land-use planning and transport and mobility.
- Detailed measures for the next 3-5 years which translate the long-term strategy and goals into actions. Relevant for the EnerNETMob project goals.
- Financing; the plan should identify the key financing resources that will be used to finance the actions.

- Monitoring and reporting. The SEAP should contain a brief outline on how the local authority intends to ensure the follow-up of the actions and monitor the results. Useful to identify sources of information on implementation and measures.

SEAPs are to be found in the Covenant of Mayor's website. All SEAP developers are encouraged to submit their SEAPs in either national language or English to the Covenant of Mayors and provide a template in English summarizing its contents. This allows a quick access to the assessment of which cities in the country/region have implemented SEAPs, good practices implemented or intended, targets and current status of development, etc.

However, it is important to keep in mind the fact that many of SEAPs might be old, due to the high number of municipalities that registered years ago. Therefore, the information provided might need to be updated, in order to take into consideration the deployment of Electric Mobility facilities.

2.2.3 Summary and conclusions on Energy Policies and regulations

Directive 2009/28/EC forces that by 2020, 10% of energy used in transportation must come from a renewable origin. The increase in electricity consumption derived from the promotion of the EM is expected to have an effect on the infrastructure necessary for energy transport. Therefore, it becomes paramount that sustainable (local) sources of energy have an increasing share of the electrical market along with the increase of capacity of supply.

Although no explicit reference to electromobility is made in Directive 2009/28/EC, it should be studied if specific measures targeting electromobility can be identified from its transposition to each national context and/or what are the targets set regarding the use of renewable energies for transportation.

In addition to Directive 2009/28/EC, Sustainable Energy Action Plans (SEAP) are compulsory documents for any municipality joining the Global Covenant of Mayors (with 7,755 cities across 57 countries, roughly representing 253 millions of inhabitants). SEAPs help municipalities to measure current CO₂ levels and identify best areas of action and opportunities for reaching the local authority's CO₂ reduction target. Measures oriented to the deployment of EV and its charging infrastructure are likely to have been already considered in the redaction of the SEAP since such measures have the potential to help reaching the targets set.

Overall, neither Directive 2009/29/EC nor SEAPs forcibly include or identify targets and/or measures fostering the development of CO₂ but considering their scope it is very likely for electromobility deployment to be considered as a mean to reach the targets set. Consequently, both the transposition of the Directive and the SEAPs on the signatory municipalities within the country, especially the latter, should provide a good source to identify actions in motion to promote and foster the deployment of the electromobility.

2.3 Framework on Sustainable Mobility policies and regulations

This section assesses the importance of policies regarding the development of Sustainable Mobility Plans on the deployment and promotion of electricity charging stations.

2.3.1 COM(2013) 913 C - Concept for sustainable urban mobility plans

Under the communication 913-C from the Commission, the concept of Sustainable Urban Mobility Plans was set and guidelines on their definition were provided, emerging from a broad exchange between stakeholders and planning experts across the Union, which were supported by Commission initiatives like the ELTIS Plus project⁶.

The SUMP concept reflects a broad consensus on the main features that a modern and sustainable urban mobility and transport plan should have. The resulting output is not a one-size-fits-all approach to urban transport planning. Instead the concept can and should be adapted to the particular circumstances of each Member State and, more importantly, every urban area.

2.3.1.1 Goals and objectives

A Sustainable Urban Mobility Plan has as its central goal improving accessibility of urban areas and providing high quality and sustainable mobility and transport to, through and within the urban area. It regards the needs of the 'functioning city' and its hinterland rather than a municipal administrative region.

Summarizing the goals defined in COM(2013) 913C (Figure 7) it could be said that SUMP's aim at improving urban mobility by making it environmentally and economically sustainable, efficient, fair regardless of the needs of the user, interoperable between modes, safer and more secure, and overall improving the quality of life of citizens.

A Sustainable Urban Mobility Plan:

- a. Is accessible and meets the basic mobility needs of all users;
- b. Balances and responds to the diverse demands for mobility and transport services by citizens, businesses and industry;
- c. Guides a balanced development and better integration of the different transport modes;
- d. Meets the requirements of sustainability, balancing the need for economic viability, social equity, health and environmental quality
- e. Optimizes efficiency and cost effectiveness;
- f. Makes better use of urban space and of existing transport infrastructure and services;
- g. Enhances the attractiveness of the urban environment, quality of life, and public health;
- h. Improves traffic safety and security;
- i. Reduces air and noise pollution, greenhouse gas emissions, and energy consumption;
- j. Contributes to a better overall performance of the trans-European transport network and the Europe's transport system as a whole.

Figure 7. Final goals of a Sustainable Urban Mobility Plan according to COM(2013) 913C

⁶ http://www.eltis.org/sites/default/files/guidelines-developing-and-implementing-a-sump_final_web_jan2014b.pdf

2.3.1.2 SUMP Expected contents

To achieve their goals, SUMP shall set what are the strategies at metropolitan level on the long run, identify the major milestones to reach and what will be the sources needed to attain those milestones. Specifically, the major aspect requirements that must be included if the COM(2013) 913C is to be followed, are:

Long-term vision and implementation plan

A SUMP needs a timetable and budget plan for a period of 3-10 years with clear allocation of the responsibilities and resources. Therefore, time, cost and responsible bodies of the implementation are to be set.

Assessment of current and future performance

A SUMP needs to define an assessment of the present and future performance of the urban transport system, providing a comprehensive review of the present situation and the establishment of a baseline against which progress can be measured.

SUMPs should also set specific performance objectives, measurable targets and specific indicators to quantify them.

Balanced and integrated development of all modes

A Sustainable Urban Mobility Plan fosters a balanced development of all relevant transport modes, while encouraging a shift towards more sustainable modes. The plan puts forward an integrated set of technical, infrastructure, policy-based, and soft measures to improve performance and cost-effectiveness with regard to the declared goal and specific objectives.

A SUMP should provide a strategy for public transport (quality, security, integration and accessibility) and non-motorised transport (walking and cycling with dedicated infrastructure), facilitating interoperability between modes.

Considering urban road transport, risk areas must be identified and measures to increase their safety to be put in place. It should also establish measures for optimising private vehicle transportation.

On a different topic, measures are to be introduced to improve the efficiency of urban logistics, mobility management and to establish frameworks for the development of Intelligent Transport Systems.

Horizontal and vertical integration

The development and implementation of a Sustainable Urban Mobility plan shall follow an integrated approach with a high level of cooperation, coordination and consultation between the different levels of government and relevant authorities. The Local Planning Authority should put in place appropriate structures and procedures for it.

Participatory approach

A SUMP focuses on people and meeting their basic mobility needs, following a transparent participatory approach, which brings citizens and other stakeholders on board from the outset and throughout the plan development and implementation process

Monitoring, review, reporting

Level of progress towards the goal and of target achievement should be assessed regularly on the basis of the selected indicators framework. The review could suggest revisions of targets and, where necessary, corrective actions. Monitoring reports about the progress in developing and implementing the SUMP should be provided and transparently shared and communicated with citizens and stakeholders.

Quality assurance

Local Planning Authorities should have mechanisms to ensure the quality and validate compliance of the SUMP with the requirements of the SUMP concept.

PLANNING CYCLE FOR A SUSTAINABLE URBAN MOBILITY PLAN



Figure 8. Planning cycle for the construction of a SUMP (Rupprecht Consult, 2013)

2.3.2 Summary and conclusions

Although not specifically addressed to the deployment of the electromobility at metropolitan/urban level, Sustainable Urban Mobility Plans are a good source of information regarding the approach contemplated in each urban agglomeration on the deployment of Electric Mobility. The topics of relevance would be: i) compromised targets, ii) time plans for the implementation, iii) budget expenditure expected and iv) specific measures envisaged to foster electromobility.

On the other hand, the major handicap from SUMP are that they are not specifically targeting the deployment of electromobility, both at infrastructure and EV fleet levels, and that the novelty of the context implies that electromobility was usually not considered when setting up the plans.

The advantages compared with the information sources previously cited is that SUMP include clear targets and measures, being a good source for the identification of best practices to foster the transition towards electric mobility and as such, a good source of information for the purposes of the EnerNETMob project.

A compendium on existing Sustainable Urban Mobility Plans can be found at the ELTIS webpage, platform supported by the European Commission to coordinate the development of the concept and provide a unique source to tools for their development.

However, on 12th of June 2019, the second edition of the SUMP guidelines was published which takes into consideration new technological developments such as electric cars and Mobility as a Service.

2.4 Framework on Air Quality policies and regulations

This section compiles and digests the directives addressing air quality standards and measures and their major implications regarding the deployment of electric vehicle charging stations and electric vehicle fleets as well.

Two directives are assessed:

- 2008/50/EC of 21 May 2008 and 2015/1480 of 28 August 2015 on ambient air quality and cleaner air for Europe.
- 2016/2284 of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants.

Please note that in this case, the directives do not directly address electromobility deployment, but might be relevant on the implementation of the measure. The electrification of private transportation, however, should permit that targets set in either directive are met at a metropolitan area level.

2.4.1 Directives 2008/50/EC and 2015/1480 on ambient air quality and cleaner air for Europe

2.4.1.1 Directive overview

The purpose of Directive 2008/50/EC is to describe how air pollution should be monitored. The focus of the directive is then, to describe pollutants to be monitored, how should they be measured (methods, frequency of measurement, sampling used, accuracy, where they should be measured, availability and dissemination of results) and to put limits for the protection of human health. Directive 2015/1480 provides updates on the methodologies used, sampling and validation of data.

2.4.1.2 Agglomerations

Considering the technical approach of the directive (not very relevant to EnerNETMob project) two specific articles may be of interest, on the definition of the areas that should be monitored with the inclusion of technical definition of agglomeration. Specifically:

- *Article 4 says that: "Member States shall establish zones and agglomerations throughout their territory. Air quality assessment and air quality management shall be carried out in all zones and agglomerations".*
- *Article 3 (definitions) defines agglomeration as: "a zone that is a conurbation with a population in excess of 250 000 inhabitants or, where the population is 250 000 inhabitants or less, with a given population density per km² to be established by the Member States"*

2.4.1.3 Other contents. Summary

Overall, the goals of directive 2008/50/EC can be shortlisted as:

1. Defining and establishing objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole
2. Assessing the ambient air quality in Member States on the basis of common methods and criteria
3. Obtaining information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures
4. Ensuring that such information on ambient air quality is made available to the public

5. Maintaining air quality where it is good and improving it in other cases
6. Promoting increased cooperation between the Member States in reducing air pollution

In addition, Member States have to designate competent authorities and bodies for the assessment, measurement and approval of values for the monitoring of the air pollution at regional and country level. In the zones and agglomerations that have been identified by the member states, there are limit values that can't be exceeded.

Table 5: Limit values for the protection of human health. Annex XI

Averaging Period	Limit value	Margin of tolerance	Date by which limit value is to be met
Sulphur dioxide			
One hour	350 µg/m ³ , not to be exceeded more than 24 times a calendar year	150 µg/m ³ (43%)	- ⁽¹⁾
One day	125 µg/m ³ , not to be exceeded more than 3 times a calendar year	None	- ⁽¹⁾
Nitrogen dioxide			
One hour	200 µg/m ³ , not to be exceeded more than 18 times a calendar year	50% on July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal annual percentages to reach 0% by January 2010	1 January 2010
One day	40 µg/m ³	50% on July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal annual percentages to reach 0% by January 2010	1 January 2010
Benzene			
Calendar year	5 µg/m ³	5 µg/m ³ (100%) on 13 December 2000, decreasing on 1 January 2006 and every 12 months thereafter by 1 µg/m ³ to reach 0% by 1 January 2010	1 January 2010
Carbon monoxide			
Maximum daily eight hour mean ⁽²⁾	10 mg/m ³	60%	- ⁽¹⁾
Lead			
Calendar year	0,5 µg/m ³ ⁽³⁾	100%	- ⁽³⁾
PM₁₀			
One day	50 µg/m ³ , not to be exceeded more than 35 times a calendar year	50%	- ⁽¹⁾
Calendar year	40 µg/m ³	20%	- ⁽¹⁾
⁽¹⁾	Already in force since 1 January 2005		
⁽²⁾	The maximum daily eight hour mean concentration will be selected by examining eight hour running averages, calculated from hourly data and updated each hour. Each eight hour average so calculated will be assigned to the day on which it ends i.e. the first calculation period for any one day will be the period from 17:00 on the previous day to 01:00 on that day; the last calculation period for any one day will be the period from 16:00 to 24:00 on that day.		
⁽³⁾	Already in force since 1 January 2005. Limit value to be met only by 1 January 2010 in the immediate vicinity of the specific industrial sources situated on sites contaminated by decades of industrial activities. In such cases, the limit value until 1 January 2010 will be 1,0 µg/m ³ . The area in which higher limit values apply must not extend further than 1 000 m from such specific sources.		

Besides those, no other points of interest are found that would have a direct relationship with the deployment of electromobility.

2.4.2 Directive 2016/2284 on the reduction of national emissions of certain atmospheric pollutants.

2.4.2.1 Directive overview

Directive 2016/2284 is of more relevance than 2008/50/EC for the purposes of the EnerNETMob project because it provides specific targets on several air pollutants at country level. The purpose of the directive is to work towards levels of air quality that would avoid significant negative impacts on human health and the environment.

The air pollutants derived from anthropogenic activity that are to be monitored and where targets are set are:

- Sulphur dioxide (SO₂);
- Nitrogen oxides (NO_x);
- Non-methane volatile organic compounds (NMVOC);
- Ammonia (NH₃) and;
- Fine particulate matter (PM_{2,5})

In order to monitor and report the emissions of the pollutants (listed in Annex I of the directive), member states are obligated to design and implement national air pollution control programmes that would include systems to register air pollution impacts and monitor and report the air quality. The programmes could then, include measures to foster the use of alternative fuels for transportation.

2.4.2.2 National emission reduction commitments

The directive sets targets of emissions at Member State level, starting with year 2020 onwards. Targets are defined as a percentage of the emissions being registered in 2005. For road transport, emissions are calculated based on the basis of fuels sold. The directive explicitly recommends that to calculate yearly targets, the emission levels should be set considering a linear reduction trajectory between their emission reduction commitments for 2020 and the emission the reduction commitments for 2030. To be noted that the reductions make reference to the year 2005.

Resulting from the targets, Member States are to define their specific measures aiming at the reduction of their anthropogenic emissions of sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and fine particular matter. As a result, it is likely that the programmes spawning from the transposition of the directive include some chapters or sets of measures directly related with EV deployment or electricity supply stations.

Table 6: Air pollution targets set by Directive 2016/2284 for 2020-2029 and 2030 onwards

Member State	SO ₂ ¹		NO _x ¹		NMOV ¹		NH ₃ ¹		PM _{2,5} ¹	
	2020 to 2029	From 2030	2020 to 2029	From 2030	2020 to 2029	From 2030	2020 to 2029	From 2030	2020 to 2029	From 2030
Belgium	43%	66%	41%	59%	21%	35%	2%	13%	20%	39%
Bulgaria	78%	88%	41%	58%	21%	42%	3%	12%	20%	41%
Czech Republic	45%	66%	35%	64%	18%	50%	7%	22%	17%	60%
Denmark	35%	59%	56%	68%	35%	37%	24%	24%	33%	55%
Germany	21%	58%	39%	65%	13%	28%	5%	29%	26%	43%

Estonia	32%	68%	18%	30%	10%	28%	1%	1%	15%	41%
Greece	74%	88%	31%	55%	54%	62%	7%	10%	35%	50%
Spain	67%	88%	41%	62%	22%	39%	3%	16%	15%	50%
France	55%	77%	50%	69%	43%	52%	4%	13%	27%	57%
Croatia	55%	83%	31%	57%	34%	48%	1%	25%	18%	55%
Ireland	65%	85%	49%	69%	25%	32%	1%	5%	18%	41%
Italy	35%	71%	40%	65%	35%	46%	5%	16%	10%	40%
Cyprus	83%	93%	44%	55%	45%	50%	10%	20%	46%	70%
Latvia	8%	46%	32%	34%	27%	38%	1%	1%	16%	43%
Lithuania	55%	60%	48%	51%	32%	47%	10%	10%	20%	36%
Luxembourg	34%	50%	43%	83%	29%	42%	1%	22%	15%	40%
Hungary	46%	73%	34%	66%	30%	58%	10%	32%	13%	55%
Malta	77%	95%	42%	79%	23%	27%	4%	24%	25%	50%
Netherlands	28%	53%	45%	61%	8%	15%	13%	21%	37%	45%
Austria	26%	41%	37%	69%	21%	36%	1%	12%	20%	46%
Poland	59%	70%	30%	39%	25%	26%	1%	17%	16%	58%
Portugal	63%	83%	36%	63%	18%	38%	7%	15%	15%	53%
Romania	77%	88%	45%	60%	25%	45%	13%	25%	28%	58%
Slovenia	63%	92%	39%	65%	23%	53%	1%	15%	25%	60%
Slovakia	57%	82%	36%	50%	18%	32%	15%	30%	36%	49%
Finland	30%	34%	35%	47%	35%	48%	20%	20%	30%	34%
Sweden	22%	22%	36%	66%	25%	36%	15%	17%	19%	19%
United Kingdom	59%	88%	55%	73%	32%	39%	8%	16%	30%	46%
EU 28	59%	79%	42%	63%	28%	40%	6%	19%	22%	49%

¹ Reduction levels compared to 2005 values

2.4.3 Summary and discussion

Directives on air quality do not directly address or define rules with direct implications on EV technology or policies on fostering their deployment nor regarding the placement of electric charging stations or their specific technical and placement requirements or the sources to generate electricity.

However, those directives provide additional background to support the setup of measures on electromobility. The most relevant points of each directive are:

- Directive 2008/50/EC): Definition of agglomerations where certain pollution levels are to be met (and whose coding could be replicated when transposing directive 2009/28/EC, which addresses directly the electromobility supply stations).
- Directive 2016/2284: Sets targets on air pollution reduction at country level and, its transposition to the framework of each member state could include explicit measures fostering electromobility as means to reach the targets set.

Overall, there are no clear direct implications of this set of legislation to the EnerNETMob project, but EV mobility can be a means to reach the targets set in terms of air pollution set in them, and therefore are a factor to consider identifying, setting up and implementing policies.

3 Focus on National frameworks of involved Member States

3.1 Policy and regulation framework in Albania

Albania reached an important milestone, when, in 2014, the European Council granted Albania candidate status. Membership of the European Union is the overarching goal pursued by Albania that has been and will continue to be the main driver of change, including transport, mobility, energy, and environmental domain. Furthermore, the Government has progressed with aligning its national agenda, as set out in the National Strategy for Development and Integration for the period 2015–2020.

Upon becoming an EU candidate country, aligning Albania's transport policy with the European Transport Policy and coordinating its transport infrastructure with its neighbouring countries, shall be present in any transport-related agenda.

The National Plan of European Integration serves as a planning tool for measures to meet the obligations arising from the Stabilization and Association Agreement. It includes medium- and long-term measures, extending to 2020, in order to reach full legal approximation of the national legislation with the EU acquis and align all its sectors with standards set by the acquis chapters

It can be resulted that the recent legal framework adopted by the Albanian Government has been shaped in approximation to the EU Directives and reflects most of the provisions of the European legal framework, this including mostly Sustainable Energy and Air Quality matters.

3.1.1 Electric Transport

Regarding Electromobility, Electric Vehicles and Alternative Fuel vehicles, no provision of laws, decrees, strategies and actions plans are set by the Government. There is need to:

1. Adopt a law in compliance with Directive 2014/94 EU affecting electric transport. The law should also be accompanied with respective national action plans where concrete measures and targets should be set out, regarding the number of electric vehicles and recharging points in compliance with Directive 2014/94 EU.
2. Take concrete incentives for purchasing electric vehicles by the Government.
3. Take non-financial incentives, for example preferential access to restricted areas, parking policy and dedicated lanes.
4. Organize public awareness campaigns (which actually are missing).
5. Spread the use of electric vehicles all over Albania, because actually mostly can be found in Tirana capital, and mostly there are electric taxis, not so many for private use.
6. Implement the use of electric buses in public transport.
7. Monitor the process.

3.1.2 Sustainable Energy

The Albanian Government has adopted several laws, strategies and national action plans with main focus on sustainable energy. But some laws have to be amended to include all the requirements of Directive COM/2012/27 and COM/2014/015.

It has to be complimented that the Government has set Strategic Objectives (with focus on Sustainable and Renewable Energy) which are enthusiastic and in compliance with EU targets.

1. To reach a level of energy savings versus total consumption by 15% in 2030;
2. Increase of the share of Renewable Energy Resources in 2020 by 38% and in 2030 by 42%;
3. Reduction of GHG emissions by 11.5% in 2030.

While, as regarding SEAP development, only the capital, Tirana, has adopted one, and Tirana SEAP has been drafted in compliance with energy and transport policies promoted by Directive 2014/94/EU. The Albanian Government has not yet drafted any Law or issued a Decree which imposes the municipalities to draft energy plans, but imposes the municipalities to adopt General Local Plans.

3.1.3 Sustainable Mobility

The Albanian Government has not yet included in its legislation the matter of Sustainable Urban Mobility Plans, nor adopted any specific national guidelines to draft and implement the Sustainable Urban Mobility Plans.

Considering, that from 61 municipalities only one SUMP is developed (Shkodra SUMP), though not approved yet, one is in progress (Durrës SUMP) and one is planned to be drafted (Tirana SUMP), it can be said that the process of drafting and implementing SUMP's in Albanian cities needs a strong incentive. Municipalities need to draft, approve and implement SUMP's in their territories and connect them with respective SEAPs.

However, the process of drafting and approval of General Local Plans of the municipalities is in good tracks; 43 out of 61 municipalities have a General Local Plan which in their content also treat issues of transport, infrastructure and mobility.

There is an immediate need for the Government to include in its strategic documents the adoption of SUMP's from Albanian municipalities, in transposition of Directive 2014/94/EU. Moreover, the matter of sustainable mobility should be included in central and local governmental plans.

3.1.4 Air Quality

With reference to air quality issues, the Albanian Government has adopted a lot of legal and policy framework in compliance with Ambient Air Quality Directive 2008/50/EU and Energy Policy COM/2014/015, though partly approximated.

The objectives set by the Government in its strategies in short and long term regarding air pollutants and GHG emissions are enthusiast and in compliance with European Union targets set in its air quality and energy directives.

Challenges for the future, with aim the improvement of the quality of urban air, would consist in:

1. Approval and full implementation of European urban air quality standards emissions into the air;
2. Approval and implementation of air quality action plans at national and local level;
3. Consolidation of the National Monitoring System according to European standards;
4. Strengthening the implementation of legislation especially on the control of vehicles emissions, industrial discharges, fuel quality;
5. Co-operation with local government on the approval and implementation of air quality action plans;
6. Strengthening cooperation with line institutions to integrate air quality policies into their sectoral policies;

7. Strengthen vehicle tax incentives to have a vehicle fleet eco-friendly with the environment;
8. Better planning, better management, and best ways to use technological progress in transport;
9. Investing in public education and awareness so as to influence individual behavior in the use of alternative transport;

However, it is worth mentioning that air protection policy is very well integrated into other relevant sector policy documents, such as transport, energy efficiency and climate change.

3.2 Policy and regulation framework in Austria

The Austrian transport tasks and competences are distributed among different national institutions and local authorities. On the federal level, the Federal Ministry for Transport, Innovation and Technology (BMVIT) is responsible for the general orientation and strategic planning of Austrian transport policy, the regulatory and administrative tasks for aviation and inland navigation, and the promotion of research, technology and coordination of agencies involved in the field; the Federal Ministry of Finance manages all tax aspects of the transport sector, such as the mineral oil tax, the commuter allowance or the standard consumption levy; the Federal Ministry of the Interior takes control of the technical roadside inspections via the Federal Police for almost all traffic and speed controls.

In regard to spatial planning, which is decisive for transport policy developments, it is within the competence of Regions and Municipalities. In addition, municipalities also operate regional railway lines and, among other things, fulfill an important function in local and regional transport by way of public transport associations.

3.2.1 National/regional framework on electric transport policies regulations

The current national Transport Strategy of Austria aims to provide the necessary mobility by environmental-friendly means of transportation. The conceptual goals take into consideration both national economic, social as well as environmental targets and EU legislation, such as the EU Transportation White Paper.

As such, based on the national implementation requirement of EU Directive 2014/94/EU, the National Strategic Framework "Clean Energy in Transport" was published in 2016, in which measures that contribute to the development of alternative fuels and the necessary infrastructure are defined. The framework also creates a uniform administrative practice as possible, so that the actors involved can find the broadest possible legal security through Austria-wide clear framework conditions on electromobility.

During the same year, the e-mobility package was the first to introduce an Austria-wide comprehensive support program that includes electromobility subsidies for the commercial, public and private sectors. For example, the comprehensive tax reform allowed companies to claim input tax deduction for company-owned electric cars to support the market upswing in electro-mobility, the exemption from motor-related insurance tax and the exemption from motor vehicle tax were also introduced in the tax reform.

Moreover, the increasing number of e-cars requires the expansion of charging infrastructure in residential buildings, renewable energies and network capacities. Whilst Austria is currently experiencing a progressively rapid expansion of the fast-charging network across the country, continuous funding, studies and the constant adaptation of the legal framework will be expected from the federal and state governments.

3.2.2 National/regional framework on sustainable energy policies regulations

Austria ratified the Paris Climate Change Agreement in 2016. In 2018 and following the Agreement and its ambitious goals, the new Austrian climate and energy strategy #mission2030 was prepared by the Ministry of sustainability and tourism (BMNT) and with civil participation. The mission focusses on 10 main thematic fields to lubricate the implementation of a "consistent decarbonisation pathway by 2050". The overarching goal of these strategies is committed to a complete exit from fossil energy, in the other words, the total electricity consumption is to be covered with 100% renewable energies by 2040.

3.2.3 National/regional framework on sustainable mobility policies regulations

Austria is moving towards an approach to sustainable mobility planning. Issued by the BMVIT, National guidance on transport planning includes a strong focus on Sustainable Urban Mobility Plan (SUMP) elements as defined in the 2013 Urban Mobility Package issued by the European Commission. The fulfillment of the SUMP requirements can be divided into six subareas:

- Long-term vision and clear implementation plan
- Participatory Approach
- Balanced consideration of all transport modes
- Sectoral, vertical and spatial integration
- Leadership evaluation and cost-benefit analysis
- Monitoring, plan revision and reporting

Nevertheless, the implementation of SUMP is voluntarily and dependent on Austrian cities' policies. Whilst some cities like Vienna have been actively engaged in compiling mobility plans following the SUMP approach, other cities only devised transport plans which include certain elements and/or variations of the SUMP approach. As such, a consistent approach is yet to be seen nationwide in Austria due to the great variation of transport competencies.

3.2.4 National/regional framework on air quality policies regulations

Austria's regulations on air quality are all based on provisions adopted by the EU. The main law on the protection of the air in Austria, the Air Pollution Control Act, was adopted in 1997. The Provincial Governor is responsible for establishing a program of measures accordingly to their respective air pollution threshold, which can include measures in the fields of plants, transport as well as measures regarding substances and products. Besides, an Austria-wide measuring network for air pollutants with a uniform measuring concept is operated and limits or target values are exceeded.

Most recently the EU has adopted a Directive with goals for the years 2020 and 2030 which will also be incorporated in the Emissions Ceiling Act -Air. Emission threshold values for industrial plants and energy generators are laid down in the Industrial Code and in the Emission Control Act for Boilers.

As a matter of principle, the Governor has to draw up a program to determine measures in a defined "redevelopment area" after exceeding the limit or target values after a status survey. These measures are intended to reduce emissions that have led to the exceeding of an emission limit value in order to comply with the IG-L or EU limit values. If necessary, the measures are to be ordered by decree of the governor, which has already happened in all countries, mostly several times.

3.2.5 Conclusions

The Austrian transport strategy evolved over the last 40 years from a sectorial, demand-fulfillment-driven transport strategy towards an integrated multi-modal, demand-management-driven transport strategy including environmental issues. Despite the federal commitment and their regulatory effort in promoting sustainability, the district headquarters teams (Bezirkshauptmannschaften) are of significant importance as they are responsible for the realization of strategy, for instance tasks of constructing, maintaining and improving the local traffic infrastructure or local traffic information. Proper coordination and collaboration with local authorities is therefore essential to zero-emission mobility and carbon-free traffic. In order to achieve the goals, strategies and key areas need to be very well coordinated and agreed between the Federal Government and the regional, urban and local authorities.

3.3 Policy and regulation framework in Croatia

The Government of the Republic of Croatia has adopted the National Framework of Policies at its session held on the 6th of April 2017 for the establishment of infrastructure and development of alternative fuel markets in accordance with Directive 2014/94/EU.

The aim of establishing a minimum infrastructure for the supply of electricity to the territory of the Republic of Croatia is to create more sustainable urban and road traffic and to enable electric vehicles to travel in major city centers and main roads in the Republic of Croatia as well as enabling the supply of electricity from land to vessels on inland waterways and sea ships in ports of TEN-T basic network.

To achieve this goal, by 2020, bottlenecks must be available every 50 km of freeways, in all agglomerations with more than 20,000 inhabitants, in all sea, air and inland ports as well as at railway stations.

The table below shows an estimation of vehicles and charging stations from the current year to 2030.

Table 7: Vehicles and charging stations in Croatia up to 2030

	current	2020	2025	2030
Estimation of the number of alternative fuel vehicles expected	-	-	-	-
Estimation of the number of electrical vehicle	856	-	-	-
Number of electric recharging points accessible to public	126 charging stations	164 charging stations with 296 sockets	348 charging stations with 602 sockets	479 charging stations with 806 sockets
Ratio of electrical vehicle respect recharging points	-	-	-	-

3.3.1 National/regional framework on electric transport policies regulations

Energy efficiency measures are implemented in the Republic of Croatia at state level and at local/regional level.

At state level, in 2014 and 2015, the project "Leaving Economically" was implemented by the Ministry of Environmental Protection and Energy, which in cooperation with the Fund implemented an incentive measure for the purchase of environmentally friendly vehicles. The aim of this measure is to encourage cleaner traffic in Croatia and reduce air pollution, which is in line with the European goals of increasing energy efficiency and reducing greenhouse gas emissions, and this measure was in line with the national targets set out in the Third National Energy Action Plan of the Republic of Croatia.

Furthermore, through the project "Let's Drive Economically", it was possible to realize 40% of the refunds for the purchase of electric and hybrid cars and electric scooters, motorcycles and quadricycles for citizens, businesses and craftsmen. Citizens could get the incentive for one vehicle, with the obligation to retain ownership for at least a year, and businesses and craftsmen could get up to 700,000.00 kunas, with a holding obligation of at least 3 years. The co-financing of the purchase of new vehicles, which could be purchased in any EU country, should however be registered in the Republic of Croatia.

The height of the incentive depends on the type of vehicle:

- up to HRK 70,000.00 (m1 and n1): electric vehicles
- up to HRK 50,000.00 (m1 and n1): hybrid plug-in vehicles and electric vehicles with integrated extender system with CO₂ emissions up to 50 g CO₂ / km
- up to HRK 30,000 (m1 and n1): hybrid vehicles with emissions up to 90 g CO₂ / km CO₂
- up to HRK 7.500,00 (I1): 2-wheel electric motor, engine capacity ≤ 50 cm³, or with rated maximum rated power ≤ 4 kw and speed ≤ 50 km / h - includes scooters, segway
- up to HRK 10,000.00 (I3): electric motorcycles with a construction speed over 50 km / h
- up to HRK 15,000.00 (I6): electric light quadricycles less than 4 kw
- up to HRK 30,000.00 (I7): electric heavy quadricycles up to 15 watts

In addition to this measure, the Fund continuously conducts public calls and tenders through which it co-finances energy efficiency projects with 40 to 80% of grants, at all levels, from municipalities, cities and counties, across the business sector to citizens.

The incentive measures that are implemented at national level are:

- Co-financing of the purchase of alternative means of transportation of fuel and support for vehicle filling infrastructure for alternative operation
- Tax incentives for motor vehicles which allows for a proportional reduction in the taxation of vehicles to natural and legal persons who are owners of vehicles with zero or reduced emissions
- Special environmental charge on motor vehicles is payable at the registration of the vehicle, and for its calculation, CO₂ emissions are taken into account.
- Provision of financial support to projects that assist in the development of clean traffic technology

Measures at local and regional level: Along with national measures, a number of measures at local and regional level are recommended:

- Optional parking for vehicles with zero emissions or limiting access to the parking area for vehicles with internal combustion engines.
- Measures related to the use of planning policies or legislation on the construction of new facilities, the lease of existing facilities and the expansion of the vehicle filling network by installing bulkheads in public places, with the provision of privileged access to vehicles capable of charging on built-in bulkheads at those locations.
- Encouraging greater use of vehicle emissions among car dealers and rent-a-car companies.
- Encouraging the use of zero emission vehicles in the clubs of common vehicle users.
- Measures encouraging the use of vehicles of zero or reduced emissions in tourism and / or as a means of promoting opportunities for economic development.

- Measures to encourage the involvement of medium and small businesses in this segment of the market and increase employment
- Measures encouraging the work of scientific research institutions, and cooperation with small and medium-sized enterprises.
- Measures to encourage education of the population to encourage the use of vehicles on alternative fuels.

3.3.2 National/regional framework on Sustainable Energy policies and regulations

The City of Rijeka is one of the first Croatian cities to have signed the Covenant of Mayors, an ambitious European Commission initiative launched in January 2008 with the objective of bringing together European cities in a permanent network to exchange experiences on improving the energy efficiency of urban areas and reducing CO₂ emissions by more than 20%, as set out by the Draft Energy Policy for Europe (2007).

The respective quantities emitted and the shares of the individual sectors in the City's total emissions are as follows:

- Buildings – 200.358 t CO₂ or 53%;
- Transport – 175.224 tCO₂ or 46%;
- Public lighting – 2.688 tCO₂ or 1%.

Priority measures for the City of Rijeka transport sector are:

- Promotion, information and education;
- A group of measures to improve the quality of the bus service in the City;
- A group of measures to foster motorcycle transport, including setting up a rent-a-scooter network of scooters with IT antitheft security devices.

3.3.3 National/regional framework on Sustainable Mobility policies and regulations

In 2018, the City of Rijeka was included in another project from the CIVITAS family: CIVITAS SUMPS-UP, in the Innovation Pilot Pool / Innovation Implementation Group - the SUMP Learning Program SLP1, the first in a cycle of three planned SLP groups. The CIVITAS SUMPS-Up project is funded by the European Union from Horizon 2020, which brings together European cities, researchers, universities, environmental organizations, climate institutes, transport consultants and mobility professionals in a unique initiative to assist cities in introducing cleaner and more viable mobile solutions.

The City of Rijeka joined the project in September 2017. The project is a multi-year project, and in the first part - called Sump Learning Program 1 (SLP 1) - three webinars, three e-courses and three workshops were held in Thessaloniki (Greece), Brussels (Belgium) Tampere (Finland). Participants in the program are in various stages of preparation, preparation or adoption of POUM, where interesting information is gained through mutual exchange of experiences.

SUMPS-Up helps mobility planning bodies, especially in countries where there are several SUMPs, to overcome barriers that stop them or make it difficult to implement plans. It provides cities with training opportunities, tools, and guidance to help them develop quality SUMPs and work with national governments to raise awareness of the concept and create favourable conditions that will facilitate the development of SUMP to local authorities.

3.3.4 National/regional framework on Air Quality policies and regulations

Implementing regulations adopted under the Air Protection Act regulates the main areas of air protection: monitoring, assessment and reporting of air quality, prevention and reduction of air pollution, emission limit values of pollutants from immovable sources, monitoring of pollutant emissions, technical equipment requirements and fuel, the elimination of the consumption of substances that damage the ozone layer, and mitigation and adaptation to climate change.

3.4 Policy and regulation framework in Cyprus

The Ministry of Transport of Cyprus was created in collaboration between the Ministry of Energy, Commerce, Industry and Tourism (MECIT) and Ministry of Agriculture, Rural Development and Environment which is responsible for climate related policies. There are three divisions in the Ministry of Transport, Communications and Works: department of road transport, department of public works, and department of electrical and mechanical services, which are responsible for road transport. Additionally, a “Public Transport Enhancement Unit” was recently created under the department of public works to conduct and manage studies for the introduction of innovations or the improvement of the existing public transport.

3.4.1 Current framework on electromobility and related agents in Cyprus

As far as energy efficiency measures are concerned, the country could achieve up to 14.5% energy savings in 2020 compared to a ‘business as usual’ scenario. This means that the EU target of 20% energy savings cannot be achieved on the grounds of cost-effectiveness.

The overall target for the penetration of renewable energy defined in the RED Directive is to reach 13% of Cyprus gross final energy consumption by 2020. Based on the country’s first National Renewable Energy Action Plan (NREAP), the target of 13% penetration rate of renewable energy will be achieved through reaching 16% of RES (Renewable Energy Sources) in the energy sector, 23.5% for heating and cooling, and 4.9 % for transport.

3.4.2 National/regional framework on Electric transport policies and regulations

The objective of EU Directive 2014/94/EU is to increase the share of alternative fuels through the development of required infrastructure. Charging infrastructure being one of it, encouraging the use of intelligent metering and ensuring an open and competitive market for recharging points are examples of supporting measures. Since Cyprus is small, low charging infrastructure investment is required to achieve a good coverage, but budget constraints limit the expense in high cost technologies, i.e. e-vehicles.

Considering the need of different transport modes and the level of cooperation from local authorities and other Member States, the national policy framework includes, but is not limited to, the assessment of current state and future development of the alternative fuels market, infrastructure requirements and measures to achieve the alternative fuel development. The implementation process should be submitted by 18 November 2019, and every three years thereafter.

Cyprus is one of the countries with highest energy import dependency; the transport sector uses mostly imported, conventional fuels. Fossil fuels make up of 92% of total energy consumption. This together with EU regulations are the main drivers to explore local gas resources and renewable energy. From 2020, natural gas will be extracted from the economic exclusive zone (EEZ), which has significant reserves, in effort to reduce its energy imports.

By the end of 2014, the total number of licensed motor vehicles was 646,636 with 78% of them being passenger cars. Specific measures, such as tax exemption and subsidy plan, were taken to encourage electrification of road vehicles and penetration of biofuels. However, they have not been successful. Despite the governmental grant system from 2006 to 2008 to encourage purchase of low carbon vehicles, petrol vehicles made up around 70% of the total fleet and only 15 passenger cars were BEVs in 2014. RES accounted for 1.5% of road transport energy consumption in 2015. Short-to mid-term measures (2020) may focus on biodiesel and electricity to increase the share of RES in the transport sector. Currently there are 16 public electric car charging stations and 34 battery electric cars. Thus, new technologies are only starting to penetrate the market in Cyprus.

According to AFI Directive, appropriate number of AC/DC recharging points will be established with focus on populated areas by 2020, and infrastructure for shore side electricity supply in ports will be developed by 2025.

3.4.3 National/regional framework on Sustainable Energy policies and regulations

24 cities of Cyprus signed the Covenant of Mayors which brings local government together to work on reduction of GHG and mitigation of climate change. They must monitor eight sectors, one of which is transport.

Nicosia Municipality has a local target of 33% reduction of CO₂ emission by 2020; it is estimated that transport sector will be responsible for 10.58% of total reduction. In 2009, transport sector was the largest consumer of energy, contributing more than 45% of the total energy consumption in Nicosia.

Nicosia has a high car ownership ratio – more than 600 cars per 1000 inhabitants – and a low use of green transport. Only 3% of the share of trips are by public transport and 2% by cycling. The considerable growth of city will result in a transportation demand of 740,000 to 800,000 daily trips in three years. The existing challenges towards sustainable mobility are insufficient public transport, paths and infrastructure for bikes and EVs, spread spatial planning and division of city in two parts, and people's preference of using private cars. The Integrated Mobility Master Plan (IMMP) of Nicosia, proposed in 2010, aims to improve traffic condition by achieving a polycentric spatial development, developing and improving public transport network and service, increasing share of cycling, and creating a pedestrian friendly environment.

In order to meet the target of emission reduction, the Sustainable Energy Action Plan (SEAP) of Nicosia includes measures for the active involvement of citizens, implementation of projects, and development of infrastructures, i.e. tram and EV charging point. In addition, with a vision of promoting a well-functioning city center, Nicosia's Area Scheme contains actions required to optimize the use of land and bring sustainable change.

Smart transport can play an important role in implementing sustainable transport solutions. For instance, they include E-mobility as well as ICT platform that encourages carpooling and ICT stops for public buses.

3.4.4 National/regional framework on Sustainable Mobility policies and regulations

As discussed in previous section, Nicosia has serious traffic issues which not only limit the mode of transport, but also causes environmental impacts (air and noise pollutions) and reduce city's attractiveness for business, shopping and living. The share of public transport must be above 10% by 2020.

To ameliorate the traffic situation, Integrated Mobility Master Plan (IMMP) was designed. The IMMP is a strategic plan to satisfy the mobility needs for a better quality of life. It contains proposals for development of bus and cycle network, introduction of a tram, and recommendations for comprehensive parking policy. A high frequency minibus service operating in and around the historic, walled city of Nicosia is suggested to facilitate short distance travels, and thereby sustaining growth in number of public transport trips. The operation of green buses is either electric or hybrid. In line with the aims of the Area Scheme, a minibus service would facilitate economic development, enhance the physical environment and encourage residents to move to the central area. It may increase competition in the market for tendered bus services and raise the standards of passenger transport service delivery.

Furthermore, IMMP recommends three potential tram lines based on a pre-feasibility assessment. Considering the economic and environmental benefits of tramway system implementation in Nicosia, more detailed investigation and full feasible study should be undertaken. Strategic Environmental Impact Assessment showed that with high number of bus lines or new tramway system, the pollutants per passenger is decrease in roads.

3.4.5 National/regional framework on Air Quality policies and regulations

The National Action Plan includes measures to improve air quality and, more specifically, reduce the concentration of particulate matter from human activities. It was updated in 2017 and is now in the process of being implemented. The atmospheric air quality monitoring network consists of ten monitoring stations. The stations receive measurements of various pollutants, such as SO₂ and O₃, and meteorological parameters with modern instruments. The promotion of a bicycle path network to connect the Universities and Integrated Plan for Mobility in Nicosia are examples of the measures to reduce gaseous pollutants in Cyprus.

In accordance with Directive 2002/49/EC, the environmental noise laws was implemented. Determination of exposure to environmental noise (noise mapping), adoption of actions plans, and ensuring that related information is publicly available are required by the laws. It covers the noise to which humans are exposed, but not the noise caused by the exposed person, domestic activities, transport or military activities.

According to the results of noise mapping in Nicosia, 5.9% of people are exposed to noise above 70dB during the day-evening-night and 60dB at night due to road traffic. Therefore, the Action Plan was developed to reduce noise from road transport. The measures were split into two areas: sources and recipients. The sources include road traffic management, introduction of electric vehicles, and encouraging financial incentives. On the other hand, recipients are the applications of soundproofing polyurethane and urban planning regulations.

3.4.6 Conclusions

Cyprus is heavily dependent on fossil fuels, representing 92% of the total energy consumption. A large part of these fuels are petroleum products, which have to be fully imported. This very high import dependency on expensive energy sources constitutes an important burden for the Cypriot economy and its political independency.

The transport sector accounts for around one third of the domestic energy demand of Cyprus and is also totally dependent on fossil fuels. Nevertheless, current sustainable energy policies, e.g. the objective of 10% renewable energy sources (RES) in transport energy consumption in all EU countries by 2020, are designed to change the current trajectory. They also represent a first step towards a long-term

decarbonisation of the transport sector. Both an increase in energy efficiency and a shift in the current energy mix towards renewable energy sources (RES) are key elements for a sustainable transport. However, as for mother EU member states, the penetration of most of the new technologies, e.g. electric or gas powered vehicles, are only starting to enter the market in Cyprus. Therefore, a solid strategy for the promotion of the different RES technologies is required.

3.5 Policy and regulation framework in France

National Transport Policy and Plans are developed by the French Government in collaboration with Metropolises (Métropoles), whose territorial jurisdiction corresponds to the perimeter of the intercommunalities and cities, in respective to mobility competence. The collaboration covers aspects of organization, operation and financing of transport services, as well as development of intermodal travel plan and information service for users.

The competence was first decentralized under the Solidarity and Urban Renewal Act of 13 December 2000, which empowered regions to be the organizing authorities for public transport of regional interest, for instance organizing and financing regional rail passenger services and road services performed in substitution of these. The competence of regions was later extended to the intermodality and complementarity between modes of transport. As such, the regional level is then also responsible for defining general rules on intermodality between public transport and mobility services within the framework of the regional development plan, sustainable development and territorial equality.

3.5.1 National/regional framework on Electric Transport policies and regulations

French government has developed clear and progressive visions in promoting the use of electric transport. Whilst there are currently 22 000 electrical vehicles and 56 000 hybrid vehicles on French road, the overall target of electrical vehicle ownership is set to reach 8,1 million in 2030, along with 7 million nationwide recharges points and 2 millions of hybrid fuel vehicles. A substantial effort is therefore seen to realise the French ambition in electric mobility.

In 2009, the Ministry of Sustainable Development presented a National Plan for the Development of Electric and Hybrid Vehicles, which comprises 14 concrete actions designed to promote the development of electric and plug-in hybrid cars. Ever since, legal frameworks and policies that cover different aspects, such as “the Automobile Plan”, were set out in 2012 with measures to foster innovation and research in the vehicle sector and to reinforce the establishment of nationwide charging operators.

Moreover, built upon the purchasing aid launched in 2008 that stimulates the investment of bonus-ecological malus devices, an additional aid was laid out in 2017 to promote the replacement of a diesel car by a new electric or plug-in hybrid vehicle, namely the newly introduced conversion premium or super bonus.

3.5.2 National/regional framework on Sustainable Energy policies and regulations

The Energy Transition Law for Green Growth (LTECV) was approved in 2015, with the aim to enable France to contribute more effectively to the fight against climate change and to strengthen its energy independence, in which several medium- and long-term objectives for national energy production and consumption were set out:

- Cut greenhouse gas emissions to contribute to the target of a 40% decrease in EU emissions by 2030 (compared with 1990 levels);
- Halve France’s final energy consumption by 2050 (compared with 2012);

- Cut consumption of fossil fuels by 30% by 2030;
- Reduce the share of nuclear energy to 50% of electricity production by 2025;
- Increase the share of renewables to 32% of final energy consumption by 2030 and to 40% of electricity production.

3.5.3 National/regional framework on Sustainable Mobility policies and regulations

For over thirty years, France has been adapting The “Plans de déplacements urbains” – PDU (Sustainable urban mobility plans) in devising its transport policies. While the content and process of the PDUs have been amended since they were first created in 1982, the latest laws were incorporated in the urban planning sector (ALUR) in 2014 and are now legally defined in the transport code.

Moreover, the aforementioned act LTECV, which was passed in 2015, also covers different key areas of energy transition including transport. It aims to develop clean transport, notably by setting a target of 7 million recharging points for electric vehicles in 2030, by requiring the renewal of public fleets by a minimum proportion of low-emission vehicles, by developing modes of alternatives such as carpooling or car-sharing or by allowing traffic restriction measures in areas affected by poor air quality. In addition, the law mandates mobility plans in companies located in areas affected by poor air quality in order to promote alternative modes of travel to the private car.

3.5.4 National/regional framework on Air Quality policies and regulations

The 2016 National Ambient Air Quality Monitoring Plan (PNSQA) defines the organizational, technical and financial guidelines for the national air quality monitoring system for the period 2016-2021. Whilst the French greenhouse gas emissions currently sits at 338 million tons, the nation aimed to restrict the emission to -40% of 1990 levels by 2030.

3.5.5 Conclusions

Being one of the leading economies in Europe, France is determinedly devoted to clean energy and electric mobility. Whilst the nation has demonstrated how to set a proactive road map to achieve its goals in sustainability, it is believed to be necessary to keep an eye on the realisation and deliverables of these progressive approaches.

3.6 Policy and regulation framework in Greece

3.6.1 National/regional framework on electric transport policies regulations

The main relevant regulation for electric transport in Greece (and, consequently, in the Region of Attica) is summarised as follows:

- Law 4439/2016: Incorporation of Directive 2014/94/EU into the Greek national legal framework
- Regulatory administrative act 77226/1: National Policy Framework for the development of alternative fuels market infrastructure in transportation and for the implementation of the relevant infrastructure
- Joint ministerial decision 42863/438: Definition of terms, conditions and technical specifications for the installation of battery chargers for electric vehicles (recharging points).

In November 2016, the Greek Parliament with the law 4439/2016 approved the incorporation of Directive 2014/94/EU into the Greek national legal framework. Based on this law, a sufficient number of recharging points should become available to the public by the end of 2020. The Article 4 of the law 4439/2016 states that there's a plan for the connection of public recharging points with intelligent electricity measurement

systems. Once the measurement systems are installed, it will be possible to record and control energy consumption not only for the manager of the recharging points but also for the operator of the electricity grid.

Estimations based the National Policy framework were made in terms of electric vehicles and recharging points in Greece for 2020, 2025 and 2030. An optimistic scenario states that the number of electric vehicles in Greece will increase drastically to 3,500 by 2020, 8,000 by 2025, and 15,000 by 2030, mainly due to the incentives provided by the government.

3.6.2 National/regional framework on Sustainable Energy policies and regulations

There are 35 cities in the Region of Attica that have already signed up the Covenant of Mayors. However, only the municipalities of Galatsi, GLYFADA, Kifissia, and Moschato – Tavros have submitted an Action Plan.

Regarding the peloponnese Region, there are 5 cities that have signed the Covenant of Mayors, but only the municipalities of Pylos-Nestor and North Kynouria have submitted an Action Plan in 2018 which was approved.

Although 8 cities from the Region of Thessaly have signed the Covenant of Mators, only the Municipality of Ellassona has submitted an Action Plan in 2018 that has been approved. Furthermore, the municipalities of Larissa and Volos have designed a Strategic Planning which covers various sectors among which energy.

3.6.3 National/regional framework on Sustainable Mobility policies and regulations

All of the Attica region municipalities are currently in the process of elaborating Sustainable Urban Mobility Plans (SUMP) due to the recent funding from the Green Fund for 49 cities (Decision 114.9/2016). The funding is based on the population of these region according to the table1

The current Implementation status of Sustainable Urban Mobility Plans in Attica is mainly in progress for the following municipalities: Athens, Alimos, Halandri, Galatsi, Elliniko-Argyroupoli, Lavrio, Vrilissia, Voula-Vari-Vouliagmeni, Zografou, Piraeus Peristeri, Pallini, Kythera.

With regards to the Peloponnese Region, cities such as Kalamata, Loutraki, Xylokastro-Evrostini have expressed their interest in developing and adopting a SUMP. However, most of these plans are still in the phase of discussions, exchange of ideas, and designing; hence, not many actions have already started being implemented. At national level, Greece has developed a National Transport Plan in the framework of a project funded by EU with a primary objective to provide the basis for sustainable transport infrastructure and service development in Greece over the medium to long term, which will contribute to the competitiveness of the transport sector of the country and it will define the transport sector development strategy for the next 20 years.

With regards to the Thessaly region, cities like Larissa, Volos, Trikala, Karditsa, Ellassona have recently adopted the SUMP. The most relevant actions of these plans are:

- Promotion of environmental-friendly mobility patterns, walking, cycling, public transport.
- Emphasis on low (or zero) emission vehicles combined with the creation of the necessary supporting infrastructure for their operation (i.e. charging stations for the electric vehicles).
- Provision of real-time updated information to the citizens with modern telematics and digital applications.

- Optimal organization of urban transport with adaptive traffic monitoring and traffic management applications, parking management.

Some actions of the SUMP's have already started with the implementation, but most of them are planned for the coming years.

3.6.4 National/regional framework on Air Quality policies and regulations

European countries are required to develop National Energy and Climate Plans (NECPs) for the period 2021 to 2030, submit a draft and be ready to submit the final plans by December 2019, report on the progress made on the implementation of their NECPs on a biennial basis.

Greece has already submitted its National Energy and Climate Plan (NECP), as a part of the central European climate change policy with specific climate targets by 2050. Key quantitative policy targets are set for the period up to the year 2030, stemming from national priorities as well as from the climate and energy objectives developed and agreed at EU level. Furthermore, increasing energy efficiency is a key horizontal priority, leading to multiple benefits such as reduction of greenhouse emissions, energy costs, improvement of comfort conditions in buildings, increased added value and employment, improvement of competitiveness of business.

The targets set for the year 2020 are as follows:

- a target of a 4 % reduction in non-ETS greenhouse gas emissions compared to 2005
- a national indicative key target set for Final Energy Consumption (FEC) of no more than 18.4 Mtoe by 2020
- target of RES penetration into gross final energy consumption for the year 2020, which at national level is set at 18 % according to the provisions of Directive 2009/28/EC.

While achieving these national, climatic and related environmental targets in the context of European policies and commitments is a priority of National Energy Planning in the development of the NECP, other national targets are developed at the same time on the basis of the policy axes already mentioned, taking into account the individual potential, the technical specificities and the qualitative characteristics of the Greek energy system in the fields of production, distribution and consumption of energy. These qualitative objectives are divided into four main categories, which are the following:

1. Targets related to the development and operation of an energy system
2. Targets of protecting and strengthening the role of consumers
3. Targets to change fuel consumption and consumption patterns in final consumption areas
4. Targets related to the competitiveness of national economy

Regarding the decarbonisation dimension, a target of reduction of the emissions by at least 16% compared to the respective emission levels of 2005 is set for non-ETS sectors. Whereas the ETS (emissions Trading Scheme) sectors are subject to the overall European GHG reduction target of 43% compared to 2005.

In addition, the NECP integrates and adopts the quantitative targets set in the context of the implementation of Directive 2016/2284/EC on the reduction of national emissions of certain air pollutants for the period 2020-2029 and for the year 2030 compared to 2005 which also requires the development, establishment and implementation of National Air Pollution Control Programmes, as well as the monitoring and reporting of the emission levels for relevant pollutants [sulphur dioxide (SO₂), nitrogen oxides (NO_x),

volatile organic compounds other than methane (NMVOC), ammonia (NH₃) and fine particulate matter (PM_{2.5}) and other pollutants (CO, heavy metals, POPs, BC).

3.6.5 Observations

As far as the electric transport is concerned, Greece has set up the basis for its promotion. The setting up of the standards for the construction and the deployment of charging infrastructures are in place. A series of incentive proposals are in place for EVs, such as policy measures and exemptions from various taxes and fees under the National Policy Framework for the development of alternative fuels, but additional investment measures are needed at regional level mainly for the construction of the relevant infrastructure.

Furthermore, the main challenges in the Energy sector of Greece arise from the various peculiarities, problems and distortions of both structural and operational nature of the individual energy subsystems, as well as from the strategic options on energy issues and the ways in which energy policies are designed and legislated.

3.6.6 Greek regions

3.6.6.1 Region of Attica

The region of Attica and specifically in the city of Athens there has been an action plan announcement aimed at the introduction of specific targeted actions to introduce zero pollutant areas and apply electromobility in different areas of the Municipality. These measures concern the introduction of electromobility in the Municipal Transport Network, the city operations, creation of charging hubs and citizens' information and awareness-raising campaigns and events to promote sustainable urban mobility and 'clean' vehicles. The main challenges both at local and regional level are the implementation of the announced measures and also the introduction of similar measures both at regional and interregional levels to accommodate longer distance urban EV trips along with the facilitation of trips between the mainland and the islands.

3.6.6.2 Region of Peloponnese

The basic challenge that Greece (and, consequently, the Region of Peloponnese) faces concerning the promotion of EVs is the fact that the sales of these vehicles remain very low in the past years. This is mainly due to the lack of adequate fiscal incentives in the market of alternative fuelled vehicles and, specifically, EVs. Furthermore, the so-called "electric range anxiety" is widely expressed, mainly due to the fact that the supporting infrastructure is still inadequate.

With regards to sustainable energy, the Region of Peloponnese has drafted a Regional Operational Program (ROP) which aims to contribute in achieving the national targets in the context of environmental protection EU Policy and Regulation Framework of Electromobility Version 1.0 and sustainable development. This Regional Program complements the corresponding Sectoral Programs with emphasis on the particular characteristics and needs of the Region of Peloponnese.

3.6.6.3 Region of Thessaly

With regards to electric transport, in the Region of Thessaly faces challenges related to the low number of sales of electric vehicles. Moreover, the municipalities need to participate in more activities that raise the public awareness on electromobility and include more measures in their Regional Business Plans on promoting electric vehicles.

With regards to sustainable energy, the municipalities of Larissa and Volos have designed a Strategic Planning (outside of the scope of the Covenant of Mayors) which covers various sectors and sustainable energy is among them. The actions which are more relevant to transport are:

- Replacement of old vehicles with new (more energy efficient) ones
- Promotion of alternative (eco-friendly) transport means

At regional/local level, a regional plan of Thessaly for adaptation to climate change has been proposed in 2017 in the framework of a diploma thesis submitted in the University of Thessaly. This plan provides general directions for the reduction of GHG emissions. The municipality of Volos, already since 2007, in the framework EU Policy and Regulation Framework of Electromobility Version 1.0 of an EU LIFE project, has developed a local action plan for climate change mitigation until 2020. Within this plan, a number of GHG emission reduction measures have been presented, along with a SWOT analysis.

3.7 Policy and regulation framework in Italy

3.7.1 National/regional framework on electric transport policies regulations

The Italian Government has defined further electromobility targets, as reported in the *Proposal of Integrated Energy and Climate National Plan (PNEC)* delivered on December 31st 2018 to the European Commission. The plan will be analyzed in chapter 4 and chapter 6, since it affects mainly the national policies for Sustainable Energy and Climate Change.

With *Decree n.83/2012* and the “*National infrastructure plan for the recharge of electric vehicles*” (PNIRE), approved in 2014, the Italian Government set targets to 2020 for the number of electric vehicles and charging points. Subsequently, with the Decree of April 18th 2016, the legislator sets the legal basis to revise the PNIRE with new policies and targets for years subsequent 2020. The revised plan should be presented in late 2019.

Even if the current plan will be soon superseded by its short-coming revised version, under the PNIRE efforts (especially within the first phase), the legislator sets the basis for the subsequent development of urban and transport infrastructure network and provided tools to expedite the future operations thanks to:

- a general simplification of the administrative procedures for the installation and construction of charging infrastructures, through the *Decree of the Ministry of Infrastructures and Transport of August 3rd 2017*;
- a new decision making process, with the involvement of Regional Authorities in the development of the national network, implementing the *Programme Agreement* pursuant to art. 17-septies of Law 134/2012 and the Prime Minister Decree of 18th April 2016, approved with *Prime Minister Decree of 1st February 2018*.

Besides the targets in PNIRE and in its upcoming revision, it is worth mentioning the commitment of the legislator to implement a *National Single Platform* to collect and make available all the information of each public charging point.

Thanks to this registry, it will be possible to:

- monitor the charging service providers and related infrastructures;
- provide to final customer with the homogenous information about the national network.

This measure should be implemented at European Level with a strong coordination between the Member States. To this end, the DG Move⁷ recently promoted the initiative of an *European Electro-mobility Observatory (HyER)*⁸ with the idea to establish a single platform for the monitoring of public charging infrastructures in order to:

- coordinate and control the economic operators involved the public recharging points network;
- inform the final user about the availability of charging points and related costs.

3.7.2 National/regional framework on Sustainable Energy policies and regulations

In Italy, the matters incorporated later within the draft of SEAPS in compliance with the guidelines of the JRC, have been anticipated for the first time with the drawing of the energy plans at regional levels and for urban areas with more than 50.000 inhabitants, according to the Law 10/1991 art. 5.

In relation to the initiative of the *Covenant of Mayors*, Italy has submitted and implemented the highest number of approved SEAPs. In addition to that, a number of *Sustainable Energy Action Plans*, approved by Municipalities since 2012, anticipated some of the electric transport policies promoted by Directive 2014/94/EU.

Concerning the limited number of SEAPs adopting sustainable mobility strategies, the actions and measures affect mainly the cycling transport, pedestrian and traffic restricted areas and initiatives related to electromobility. Although some issues have been already anticipated by few SEAPs, these are sporadic and isolated initiatives and, as a consequence, it is not possible to consider any of this action as on-going best practice.

Integration between SEAPs and SUMPs in a comprehensive planning and control tool along with the revision of national legislation on energy efficiency with the policies promoted by *Directive 2014/94/EU* on electric transport will represent a significant strategy to reach the full-fledged potential of electromobility.

3.7.3 National/regional framework on Sustainable Mobility policies and regulations

In Italy, the matters, assessed later within the draft of SUMP, were anticipated for the first time with the drawing of *Urban Mobility Plans (PUM - Piani Urbani della Mobilità)*, according to Law 340/2000 art. 22.

These Plans were established in order to:

- meet population mobility needs;
- reduce atmospheric pollution and noise;
- reduce energy consumption;
- increase traffic and transport safety;
- discourage the use of private vehicles;
- increase the transport capacity;
- promote the use of public and collective transport, with car-sharing and car-pooling solutions;
- reduce the congestion in urban areas.

The Italian legislation integrated the matter of *Sustainable Urban Mobility Plans* during the transposition of *Directive 2014/94/EU* with the Decree 257/2016 and specific national guidelines were adopted by the Italian Government for the drafting and implementation of the *Sustainable Urban Mobility Plans* following

⁷ Directorate-general, the Commission department responsible for EU policy on mobility and transport.

⁸ www.hyer.eu

provisions from the European Commission and the ELTIS observatory. Worth mentioning is the incentive system to adopt *Sustainable Urban Mobility Plans* in the main cities and metropolitan area.

In spite of the above mentioned actions, further efforts could hasten the adoption of SEAPs. More in detail, it could be helpful to:

- create direct connection between SEAPs and electromobility infrastructures such as charging points for electric vehicles.
- Strengthen the incentives system to promote SEAPs adoption.
- As highlighted in chapter 4, integrate SEAPs and SUMP in a comprehensive planning and control tool along with the revision of national legislation on energy efficiency with the policies promoted by *Directive 2014/94/EU* on electric transport: that could represent a feasible strategy to reach the full-fledged potential of electromobility.

3.7.4 National/regional framework on Air Quality policies and regulations

With reference to 2020, the projections show that Italy has significantly exceeded the expected level of GHG emissions reductions in both the ETS and ESR sectors. In particular, the latest available data for year 2016 in the national inventory 2018 ISPRA show, for the emissions of greenhouse gases in the ESR sector, a reduction of about 18% compared to 2005. The reduction, registering an over achievement, should reach approximately -21% in 2020.

Considering the 2030 target, the decline in emissions, compared to the European aggregate objective in the ETS sector, is confirmed and made possible thanks to the phase-out of coal in thermoelectric production and an increased use of renewables to produce electricity. With reference to the ESR sector, in order to stick to the emission trajectory (that will lead to a 33% reduction in 2030 compared to 2005 emissions levels), a further minimum cumulative reduction of emissions of about 142 Mt CO₂eq (compared to reductions obtainable with the policies already in place) will be achieved, mainly in the transport, civil and industrial sectors, with a mix of measures for the efficiency and use of renewables, under the PNEC efforts.

In particular, in the transport sector it is expected a reduction in emissions of about 39%⁹ in the timeframe 2005-2030 (and about 35% in the period 2008-2030 meeting the 20% reduction target recommended in the Transport White Paper) due to the increasing use of biofuels and, to a larger extent, to the massive electrification of transport, which is also in the scope of the EnerNetMob project.

Concerning Air Quality, according to the present emission projections scenario¹⁰, all the targets should be met in 2020 even though attention should be paid to NMVOC emission reduction, while for the 2030 targets additional measures will be adopted to respect PM_{2.5}, NMVOC and NH₃ goals.

The measures will be identified in the PNEC in which it is clearly stated that actions subsequent the transposition of directive 2016/2284/EU concerning the reduction of national emissions of certain atmospheric pollutants will be part of the plan itself.

⁹ https://www.mise.gov.it/images/stories/documenti/Proposta_di_Piano_Nazionale_Integrato_per_Energia_e_il_Clima_Italiano.pdf_page_222

¹⁰ Italian Emissions Inventory 1900-2016, Informative Report 2018
<http://www.isprambiente.gov.it/en/publications/reports/italian-emission-inventory-1990-2016-informative-inventory-report-2018>

3.7.5 Observations

On the basis of the analyses developed in this document, considering the current needs on national and European level, it is possible to highlight, in the following table, some concluding remarks and proposals for each area within the scope of the report.

Table 8: Main remarks and needs at National and European Level

Main remarks and needs at National and European Level	
Electric Transport	<ul style="list-style-type: none"> - need to activate a “European Single Platform”, containing the general register of public charging points and their real-time interoperability and effectiveness; - need to create a common electromobility planning tool, on the model of <i>Sustainable Urban Mobility Plans</i> and <i>Sustainable Energy Action Plans</i>, according to guidelines that are shared and adopted by all Member States; - lack of a clear projection of the energy requirements of the electric recharge infrastructures in the short and medium-long term, in consideration of the electromobility demand and of the current and planned energy distribution networks’ supply.
Sustainable Energy	<ul style="list-style-type: none"> - need to integrate at legal and regulatory level the Sustainable Energy Action Plan model with the other tools for energy planning, land use planning and transport planning which are adopted by each Member State; - need to integrate the SEAP and SUMP models, avoiding planning overlaps and identifying potentially complementary actions in transport and energy sectors.
Sustainable Mobility	<ul style="list-style-type: none"> - potential overlaps between the Sustainable Urban Mobility Plan model and other transport planning tools adopted and implemented at national and local level by Member States; - need to integrate at legal and regulatory level the Sustainable Urban Mobility Plan model with the other tools for transport planning, land use planning and energy planning which are adopted by each Member State; - need to integrate the SEAP and SUMP models, avoiding planning overlaps and identifying potentially complementary actions on transport and energy sectors.
Air Quality and GHG emissions	<ul style="list-style-type: none"> - need to create a common Air Quality planning tool to be implemented at local level, on the model of <i>Sustainable Urban Mobility Plans</i> and <i>Sustainable Energy Action Plans</i>, according to guidelines that are shared and adopted by all Member States; - need to define a clear projection of the GHG emissions related to the electromobility demand in the short and medium-long term, on the basis of the mix of Primary Energy Sources and on the basis of the substitution of vehicles powered by fossil fuels.

3.7.6 Italian regions

3.7.6.1 Region of Sicily

The Sicilian Region in the last years implemented a complete framework allowing the electromobility spread, both at regional and local levels. As a consequence of the adoption, at Government level, of the main Directive addressing electromobility and sustainability issues, the Regional assembly approved those milestones necessary to launch the beginning of a new governance in this field. In particular, the majority of Plans, Policies, Programmes and laws (including bills) are totally addressed to support a shift from traditional transport systems to electric (and/or sustainable), achieving in this way a mainstreaming of sustainable principles in the most relevant areas of interventions, that is: energy, urban mobility, transport and air quality.

3.7.6.1.1 Local framework on electric transport policies regulations

It is not easy to identify standardized measures aimed at encouraging the switch to electric transport yet. For sure, it is worth mentioning that thanks to the promotion of targeted Local Plans (such as the SUMP but also the SEAP) some Municipalities were able to move in depth towards the introduction of

important shares of electric vehicles inside their territory (both at public and private level, by renewing the municipal car fleet or by supporting private citizens in purchasing zero emissions cars).

So, starting from a general invitation from the Regional body, each Municipality is acting individually, while following standardized guidelines, for the drawing up of more particularized Plans. On the whole, the main regional laws, suggest to take into account the following measures:

- free access to restricted traffic areas (Zona a Traffico Limitato)
- possibility to travel on preferential lanes (those ones usually limited to public transport such as bus or to taxi lines)
- free parking in the areas delimited by the blue strips (usually no for free)
- access to natural areas and or specific roads forbidden for ordinary cars
- exemption from the payment of municipal taxes for cars owners

From a political and legislative point of view, the Sicilian Region put the first milestones necessary to allow a spread of electric vehicles diffusion among several stakeholders: from business partners to public bodies and citizens. The recent bills witness this important commitment and will from the Regional level.

From a practical point of view, in order to effectively achieve the expected impact it is necessary for local actors (above all Municipalities) to adopt new strategies and governance. In particular, being the regional level aware and ready for to the introduction of electric vehicles, now Municipalities should reply to this political request at first starting with the drawing up of targeted Plans (such as SUMP and SEAP) so as to regulate the matter from an urban point of view, by respecting all the other conditional Plans necessary to be adopted before a real infrastructural change can be realized. Moreover, the necessity of such type of Plans is also linked to the preliminary assessment, both economically and stakeholders-based, so as to quantify the effort needed. As showed in the next paragraphs, Municipalities that already adopted relevant Plans at this regards are still few in number and to overcome a such shortage a relevant raise awareness actions should be recommendable, so as to align all Municipalities to what set at Regional level.

3.7.6.2 Province of Ragusa

The development of electric transport in Ragusa Province is regulated exclusively by the National and Regional legal references reported in the related reports. In reference to the local implementation of national and regional policies of electric transport, it is useful to highlight the recent approval of Guidelines for Electromobility Regional Plan of Sicily.

“The guidelines for the electric mobility plan” were approved with the Decree of Regional Council n. 549/2018, after a modification which included the installation of electric columns on all newly built plants.

Pursuant to the European and national regulatory framework, the Region identifies the Guidelines to support the creation of an efficient, distributed and interoperable network of charging infrastructures for electric vehicles.

In reference to the regulations in force concerning the location of the reference points, the regional guidelines report the following provisions:

- the infrastructure of urban and metropolitan areas must provide for a reasonable relationship between residential infrastructure and those accessible to the public

- in order to minimize the impact of public work, each recharging infrastructure ensures simultaneous charging of at least two vehicles
- in the case of new construction, be prepared to be placed in a level playing field
- for all garages, private and public car parks and for large-scale retail distribution, shopping centers and cinemas, an adequate number of stalls should be set up to be set up with recharging systems.

3.7.6.2.1 Local framework on Sustainable Energy policies and regulations

Local energy planning is implemented pursuant to the National and Regional Laws on the basis of the art. 5 of Law n. 10/1991, establishing the institution of Energy Plans (Piani Energetici) to be drafted and adopted by Regional Authorities and Municipalities with more than 50.000 inhabitants. Between 2009 and 2018, the Sicilian Region developed the regional energy planning affecting also the Municipalities of the 9 regional provinces.

Moreover, starting from 2010, the municipalities of Sicilian Region implemented the “Piani di Azione per l’Energia Sostenibile” (i.e. Italian transposition of Sustainable Energy Action Plans), as well as at national level.

Regarding the initiative of the Covenant of Mayors, Sicily registers a high number of submitted and approved SEAPs compared to the Italian and European level. Several Sustainable Energy Action Plans, which were approved by Municipalities since 2012, anticipated the electric transport policies promoted by Directive 2014/94/EU. However, the majority of approved SEAPs includes few paragraphs related to transport, focusing their measures mainly on renewable sources and energy efficiency in the public and private buildings. However, where included, the mobility strategies affect mainly the slow mobility (e.g. cycling transport and pedestrian areas) promoting the sharing of means of transport (bikes or cars) and encouraging the use of electric means.

In the majority of cases, there is no direct connection or integration of SEAPs with the Sustainable Urban Mobility, due to the very recent institution of such transport planning tool. The best practices affecting the electromobility are few and not updated with the Directive 2014/94/EU. For the next years it appears necessary to improve the regional legislation on energy efficiency by integrating it with the policies promoted by Directive 2014/94/EU on electric transport.

3.7.6.2.2 Local framework on Air Quality policies and regulations

The matters concerning Air Quality and GHG emission levels as well as GHG reduction are mainly regulated by the legal references reported at National and Regional level.

3.8 Policy and regulation framework in Malta

There is currently no legal framework set up in Malta with respect to Electromobility and related agents. This work is currently in progress.

3.8.1 National/regional framework on Electric transport policies and regulations

In 2013, the Malta National Electromobility Platform (MNEP), the first government policy related to electric mobility, was set up to create its visibility and reliability. Some of the objectives are

- to expand the national car charging infrastructure,
- promote research and development in electromobility,
- setup a national e-Car sharing platform

- assist meeting the environmental targets.

Various projects such as LIFE+ funded project, DEMO EV 2013/16, and PORT-PVEV 2015/2016 projects, were conducted to test the usage of electric vehicles and as a result first few modern EVs were introduced and the National EV Charging Network was established. In 2016, the Maltese government offered an incentive scheme for private companies to invest in charging stations, but it was unsuccessful due to the existing charging facilities and small size of their EV fleet. In 2017, the amended grant scheme enabled companies to invest in enlarging EV fleet instead; as a result, 16 EVs were registered by companies. The 2018 scheme will be applicable for individuals, local councils, NGOs and commercial entities.

Considering the environmental advantages and the size of land – the distances travelled are short –, electric mobility is considered as a promising fuel for future transport systems in Malta. The proposed CO₂ emission factor for electromobility by 2020 would ensure a GHG emission reduction of about 40% WTW compared with ICE vehicles. However, as of 2017, only 0.075% of licensed passenger cars and light good vehicles were Battery Electric Vehicles (BEVs). Several factors such as limited number of models, uncertainty in vehicle longevity, and need to replace battery, which increases incremental cost, may create a barrier for consumers.

Despite the challenges, Malta remains committed to increase the share of electric vehicles. The Malta National Electromobility Action Plan is being updated to achieve a target of 5,000 electric vehicles on the road by 2020. Moreover, The Malta Transport Master Plan aims to reach 20% of national vehicle fleet to be non-conventionally fueled vehicles by 2025. Further studies and projections after 2020 will be provided based on the national household travel survey, which is planned to be carried out in 2019.

Transport Malta is also improving the National Electric Vehicle Charging Network by installing fast chargers and extending charging points to further areas and prominent public parking spaces. According to the plan, 590 charging points will be available by 2020. From an initial cost benefit analysis to action plan to carry out the implementation of charging infrastructure, a new study funded under the Horizon 2020 program is in its final stage of completion. Furthermore, a nationwide Intelligent Traffic Management System will provide real time traffic congestion updates so EV drivers can be reassured on the issue of recharging. The integration of the Intelligent Transport Systems Platform will facilitate the interface between electric vehicles and charging infrastructure.

There is a number of other ongoing projects aimed at increasing carbon free enforcement and promoting electric mobility. The Maltese Government has pledged to announce a cut-off date for the importation of all internal combustion engine (ICE) vehicles. Though subject to availability of EU funding, the deployment of eight electric buses will be introduced into the public transport fleet with installation of 10 medium-fast charging pillars for public transport buses and third party BEV owners. Another pilot project, DESTINATIONS, will use light goods EVs for delivery in the capital city of Valletta. On top of that, three measures related to cycling will take place to encourage multimodality. Bicycle racks and pedelec racks will be placed in at least 45 locations, two cycling routes will be created, and pilot E-bike sharing will address the safety concerns and intermodal limitations faced by cyclists.

A private e-Car Sharing Project on a national level and two governmental grants are planned to increase electric vehicle penetration and development of charging stations. E-car sharing will require the purchase of 150 electric vehicles and development of 225 charging pillars. It highlights the sharing economy while

allowing drivers to experience an electric vehicle without having to purchase one. First grant promotes the purchase of BEVs from Category M1 and N1, i.e. electric quadricycles, pedelecs, electric motorcycles, and electric mopeds, along with reduction in the number of ICE motor vehicles. The budget for the year of 2018 is €500.000, which translates to 71 EV's on the National Road Network. The second grant targets commercial undertakings – providing financial assistance to introduce new Plug-In Electric Vehicles, upgrade facilities of electric service garages of importers and operators, and run staff training. With the sum of €80.000 budgeted, at least three garages are expected to receive the training and thereby introducing of three new EV models on the market.

3.8.2 National/regional framework on Sustainable Energy policies and regulations

Although there is no national framework on sustainable mobility or SUMP, there are national policies and regulations for energy and climate in the Maltese Islands. 2012 National Energy Policy follows the five dimensions of the Energy Union and they remain valid until 2030. Based on the priorities, various major projects have been undertaken to reduce GHG emission, increase energy efficiency, and ensure security of energy supply, environmental protection and national competitiveness. The Renewable Energy Action Plan was set out to increase the share of renewable energy and meet its 2020 Renewable Energy target. The measures are classified under the dimension 'Decarbonisation' in the NECP framework. For example, the government will ensure that impact of investment in RES on the economy is controlled. Other plans include National Energy Efficiency Action Plan, National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gas Emissions, and National Energy and Climate Plan. Furthermore, apart from energy and climate policies, the Air Quality Plan aims to provide guidance to reduce daily average pollutant concentrations, such as PM10 and NO2.

3.8.3 National/regional framework on Air Quality policies and regulations

The Air Quality plan for the Maltese Islands of Jan 2010 is the main policy document to refer to with regards to Air Quality policies even though this is a relatively old document.

The document is aimed to act as policy guidance to reduce daily average PM10 concentrations in ambient air in the Maltese agglomeration. The traffic measures proposed in this document are also aimed to bring the annual average of nitrogen dioxide within the acceptable thresholds.

With respect to the road transport sector, national data shows that this sector is the major contributor to the exceedance of PM10 concentrations in ambient air. The document therefore focuses on measures mainly aimed at reducing vehicle emissions and encouraging modal shift, amongst others.

3.8.4 Conclusions

Thus, the government of Malta is currently carrying out new studies and projects to broaden access to electric mobility, and thereby reduce the volume of ICE vehicles and traffic emission. Extending the National EV Charging Network, e-Car sharing, and new funding programs are the major examples that demonstrate their effort to reach a goal of 5.000 electric vehicles on the road by 2020.

3.9 Policy and regulation framework in Montenegro

In December 2010, Montenegro became candidate country for European Union (EU) membership with the opening of the EU accession negotiations at the end of June 2012. One of the key obstacles to the progress of the economy, in addition to economic and political ones, is the state of transport infrastructure which, due to insufficient and different regional development, has been recognized as a limiting factor, and even if in the past few years a significant work has been done to improve the situation in all modes of transport,

which is stated in the Report of the European Commission. In this accession process Montenegro needs to adopt all EU legislation and accordingly directives which tackle the electromobility.

3.9.1 National/regional framework on electric transport policies regulations

Electric vehicles are recognized in the world as cars of the future, and in Montenegro 74 have been registered so far, as stated by the Ministry of the Interior of Montenegro in 2018. Montenegro still doesn't have the infrastructure and public stations for their charging, nor is the issue regulated by law. For those who want to drive an electric car in Montenegro, the problem is the lack of public charging stations, which are not present in the territory of the country.

In the EU accession process, Montenegro needs to adopt all EU legislation and accordingly directives which tackle the electromobility. At the moment policies for transport are general (there are no dedicated electric transport policies or regulations) and a general description has been used for electric cars (energy efficient vehicles). In following period, we are expecting a new Transport development strategy as current is from 2006 as well as new regulations regarding electromobility.

Montenegro is in the process of EU integration with gradual adoption and implementation of EU legislation.

In the following text, three best practices from Montenegro are shortly presented:

1. In Tivat, there are six charging stations within the hotels in the Municipality of Tivat. Currently, only one is public available high-capacity charger for charging batteries of electric cars, and it is located in the tourist settlement of the Luštica Bay.
2. Municipality of Budva is partner within the project implementation #DynaMob 2.0 - Dynamic mobility. The Municipality of Budva will, for the first time, through the #DynaMob 2.0 project, provide the opportunity for its citizens and tourists to have an alternative for a healthier and more economical transportation in the city, through the purchase of electric bikes, the installation of a charging station for eco cars, in combination with the appropriate application.
3. Since 2011, the GFEI (Global Fuel Economy Initiative) has supported Montenegro with the development of an auto fuel economy baseline, the development of a national comprehensive policy that includes tax incentives for more fuel-efficient cars and an auto fuel economy label. The Ministry of Sustainable Development and Tourism, with support from the Regional Environmental Center (REC) Country Office Montenegro, issued the labeling Rulebook no. 40/17 on 27 June 2017n accordance with EU Directive 1999/94/EC from 13 December 1999 on the availability of consumer information on fuel economy and CO2 emissions, and it was published in the Official Gazette of Montenegro - making the fuel economy label mandatory by law for all vehicle importers bring in new cars.

3.9.2 National/regional framework on Air Quality policies and regulations

The reduction of GHG emissions in road traffic is achieved through the following measures:

- promotion of cleaner vehicles through the obligations of the auto industry to significantly reduce the GHG emissions from new cars in the process of production itself
- the obligation of the vehicle distributors in the entire sales chain to inform consumers about GHG emissions
- promotion of alternative vehicles (electric and hybrid vehicles)
- promotion of alternative fuels (biodiesel, ethanol), etc.

The 2010 inventory shows that road traffic in Montenegro causes 20% of emissions of carbon (II) -oxide and 36% of nitrogen oxide from total emissions. As for greenhouse gases, road transport accounts for 11% of the total emissions of carbon (IV) -oxide and 11% nitrogen (I) -oxide.

As Montenegro is a party in a Paris agreement, the goal is a 30% reduction in emissions by 2030 compared to 1990.

3.9.3 Conclusions

One of the key obstacles to the progress of the economy, in addition to economic and political ones, is the state of transport infrastructure which is, due to insufficient and different regional development, has been recognized as a limiting factor, even though in the past few years a significant work has been done to improve the situation in all modes of transport, as stated in the Report of the European Commission. In this accession process Montenegro needs to adopt all EU legislation and accordingly directives which tackle the electromobility.

In most of the strategies or plans, electromobility is not pointed out as one of the main priority/goals and it is a part of the general description as energy efficient vehicles. In fact, there are no plans in development phase for the public chargers for the electric cars.

As electromobility is practically a new field for the all stakeholders in Montenegro and the development plans, strategies and similar relevant documentation pointed out some of the issues related to this topic, such as:

- Lack of specific technical skills in terms of planning sustainable transport modes
- High dependence on private vehicles
- Problems of congestion and pollution on the main road network
- Difficulties in changing the behavior of participants in traffic

Port of Bar as partner in EnerNETMob project will use this project as an opportunity to encourage the development of electric mobility in Montenegro, in particular for the promotion of intermodal sea-road el electromobility connections between urban ports and for the development of electric mobility for passengers and for the activities in the terminal passenger area of the port.

3.10 Policy and regulation framework in Portugal

The Electrical mobility was a priority of the Portuguese Government expressed in the scope of the National Action Plan for Energy Efficiency implementation - Portugal Efficiency 2015- (hereinafter referred to as 'PNAEE'), approved by the Resolution of the Council of Ministers nr. 80/2008, April 17th, following the approval by the Resolution of the Council of Ministers nr. 169/2005, October 24th, of the National Strategy for Energy.

3.10.1 National/regional framework on electric transport policies regulations

Currently, in Portugal there are 1117 charging points. Sales of new electric and hybrid cars, in Portugal, reached record values in 2018, with more cars sold in the first nine months than in the whole 2017. In 2018, 8.241 cars were sold, as many as in the previous seven years since the EV commercialization began in Portugal, where the accumulated sales were 8.469. This is an absolute record, representing a growth of 95% in relation to 2017 and expecting an exponential but simultaneously sustainable growth of EV sales in Portugal (Table 9).

According to the Electric Vehicle Users' Association, from a total number of 71 Fast Charging Points planned by the actual Government and private entities, to be installed all over the country, 55 are already installed, 4 await certification and 12 will begin the installation process.

Table 9: EV (cars) sales in Portugal, between 2011 and 2018

Year	Number of EV sold	%	Comments
2018	8 241	94,50	Record in annual sales
2017	4 237	115,08	
2016	1 970	50,96	
2015	1 305	260,50	Incentives reintroduced
2014	362	61,61	
2013	224	39,13	
2012	161	-23,33	Incentives withdrawn
2011	210		
Total	16 710		

All these figures refer to passenger cars (BEV + PHEV), if we add heavy passenger and freight cars, motorcycles, mopeds and quadricycles, including tuk-tuk, the total number of electric vehicles sold in Portugal already exceeds the 40 000 units (Table 10).

Table 10: EV and alternative fuel vehicles registered in Portugal (all types of vehicles)

	Current	2020	2025	2030
Estimation of the number of alternative fuel vehicles expected	53 000	-	-	62 000
Estimation of the number of electrical vehicle	38 500	-	-	3 264 000
Number of electric recharging points accessible to public	1 117	-	-	81 000
Ratio of electrical vehicle respect recharging points	34,5	-	-	40

The Portuguese State, through the Environmental Fund, created a set of supporting measures for the development of electromobility:

- Purchase Subsidies
- Registration Tax Benefits
- Ownership Tax Benefits
- Company Tax Benefits
- Local Incentives
- VAT Benefits
- Support of the purchase of electric cars, motorcycles, bicycles
- Exemption on parking rates for EV (Beja, Funchal, Guimarães, Lisbon, Loures, Mirandela, Oeiras, Oliveira de Azeméis, Ribeira Brava, Setúbal, Setúbal)
- Discount on parking rates for EV (Funchal, Porto)

Considered as a measure for promoting the EV purchase, it is expected that more polluting cars will be hit by ISV (tax on vehicles) climb.

3.10.2 National/regional framework on Sustainable Energy policies and regulations

In the scope of the Covenant of Mayors and in order to achieve the targets underlined in the European Strategy for climate and energy (20-20-20 target), the Portuguese Municipalities have been deploying measures in the scope of Sustainable Energy Action Plans for Climate and Energy (SEAPs/SECAPs). The municipalities that submitted SEAP/SECAP cover approximately 60% of the Portuguese total population due to the fact that the main urban centres are a part of the 30% that have signed the CoM.

The most common measures refer to behaviour and energy infrastructure changes (renewable energies, energy efficiency in buildings, public lighting, etc.), waste and transport (such as optimization of transport infrastructures, vehicles and road operations). Public lighting is one of the energy measures present in all SEAPs that have been submitted, playing a very significant role in energy consumption, reaching values of up to 12%, mainly in coastal areas due to the higher population density and urban residential areas.

However, in spite of the implementation efforts, there is still a long way to go in terms of energy efficient consumption at local level.

For the SEAPs' implementation, local authorities have been trying to involve companies and organizations of civil society. The analysis of energy governance at regional and local levels is a relevant topic in promoting the change in the community.

3.10.3 National/regional framework on Sustainable Mobility policies and regulations

In general, the Portuguese Municipalities consider that urban planning and land use, associated with the planning of sustainable urban mobility, play a determining role for a healthier, carbon neutral and more resilient cities.

A glance to urban areas shows the unequivocal relationship between the shape of the urban areas, their expansion and the search for the daily journeys' transport modes. Thus, it is understood the direct relationship between the land use typologies and the transport needs, so that in the decarbonisation design of urban areas, it is fundamental the relationship between the territorial management instruments such as Spatial Planning Municipal Plans (PMOT) and the Sustainable Urban Mobility Plans (SUMP), named, in Portugal, Mobility and Transport Plan (PMT).

3.10.3.1 Barriers to SUMP development

The most relevant challenges to the SUMPs' implementation are the following:

- Feeble institutional cooperation, awareness, political will, funding, knowledge and data;
- Strong traditional transport planning approaches focused on infrastructure and motorized traffic;
- Dependence on EU projects regarding funding, capacity building, SUMP development and other SUMP-related activities;
- Confusing SUMP approaches from different initiatives;
- Transport models as a condition for SUMP development;

3.10.4 National/regional framework on Air Quality policies and regulations

Portugal committed to limit between 2013 and 2020, the increase in GHG emissions from non-ETS sectors to 1% in relation to 2005. For this purpose annual emission allocations are established for each Member State, representing in practice annual emission limitation or reduction targets for the period 2013 to 2020 and the respective adjustments for non-ETS emissions for Portugal in that period (table below).

Table 11: Annual Emission Allocations for Portugal established by the Effort Sharing Decision (European Commission Climate Action)

YEAR	2013	2014	2015	2016	2017	2018	2019	2020
AEA (Mt CO ₂ e)	49.3	49.6	49.9	50.1	47.9	48.7	48.7	49.1

Portugal has committed itself internationally to the goal of reducing its greenhouse gas emissions so that the balance between emissions and removals from the atmosphere (e.g. by the forest) is zero in 2050. This purpose has been named "carbon neutrality".

This objective is in line with the Paris Agreement, under which Portugal has undertaken to contribute to limiting the global average increase temperature to 2°C, and to make efforts not to exceed 1.5°C. The commitment to carbon neutrality confirms Portugal's position among those who take the lead in combating climate change.

To this end, it has recently published the Roadmap for Carbon Neutrality 2050⁴ whose objective is to identify and analyze the implications associated with alternative, technically feasible, economically viable and socially accepted trajectories and to achieve the objective of carbon neutrality of the Portuguese economy in 2050. The Roadmap recognizes that deep decarbonization of the economy requires, in addition to analytical skills and appropriate tools, the broad involvement and collaboration of all stakeholders, with a view to analyzing and discussing mitigation options and strategies, and the definition of low trajectories for the national economy.

The Roadmap presents alternative trajectories up to 2050 for four sectorial components - Energy; Transportation; Waste and Agriculture; Forests and Land Use - mainly responsible for GHG emissions and carbon sequestration.

With regard to mobility and the options for transition to a competitive low carbon economy in 2050 present in the **National Low Carbon Roadmap in 2050**⁵, a profound change in the technological profile of transport after 2020 is expected, leading to a decrease of energy consumption in the sector and a reduction in the emission of gaseous pollutants, even though the demand figures for mobility of people and goods increase until 2050, denoting the growing efficiency of the sector. Particularly noteworthy is the entry of electricity into all trajectories and scenarios analyzed as early as 2020, and biofuels in trajectories with emission restrictions (in particular in the High scenarios in the period 2030-40 and in the Low scenarios, only between 2040- 50), to the detriment of the fossil fuels that maintain great expression in the trajectories without restrictions.

3.10.5 Conclusions

The energy transformation that Portugal is living is essential for the development and guarantee of citizens' quality of life. It is seen as an opportunity to increase investment, employment and economic growth, to change imports, an opportunity for the scientific and innovation system and for consumers, who will have lower costs in the daily life.

Efforts are being made to transform Portugal in a competitive country, with:

- Growth of medium cities and reduction of population concentration in the Metropolitan Areas
- Greater degree of decentralization and digitization of the energy system
- Greater entrepreneurship

- Greater circularity of the economy
- High penetration of new mobility forms (shared and smooth)
- Predominance of organic production and conservation regime; valuation of externalities (ecosystem services)

All the Portuguese sector are contributing to the carbon neutral development, and the generalization of electric mobility, the reinforcement of public transport and shared mobility systems are essential to achieving the 20% renewables in transport and meeting the targets by 2030.

The lines of force that contribute to the achievement of the mobility development objectives are:

- **Public policy and regulation:** Legislation should be simple, stable and fast-paced, allowing for testing in sensible time horizons.
- **I & DT:** Research in the processes of digitalization, systems' integration (ITS and others) and in the models of sharing/optimizing the transport activity.
- **Socioeconomics:** Economic growth and the prospect of new niches that can obtain access to mobility in a more general and inclusive way.
- **Market:** Acting as a catalyst, in a way that the first to find efficient models will have a privileged stage for growth within their respective markets. A market with innovation levels will be introduced very fast in technologies and in the organization of processes (integration of different flows into distribution, optimization of collections and deliveries, integration models of shared services, ...).

3.11 Policy and regulation framework in Slovenia

Overall Slovenia has been fulfilling the commitments regarding energy efficiency and the reduction of energy consumption, while being relatively successful also in the overall reduction of greenhouse gas emissions. However, the transport sector still represents a problem that could prevent the country from achieving the objectives of reduction of energy consumption and greenhouse gas emissions until 2020. In this case the achievement of the commitments set out for 2025 and 2030 would be even more challenging.

Furthermore, there is a need for more attention to the transport sector, especially to e-mobility in order to achieve the objectives set, i.e. the number electric vehicles by 2020, and the 2025 and 2030 objectives.

Table 12 : The required number of electric vehicles (BEV – battery electric vehicles, PHEV – plug-in hybrid electric vehicles) in Slovenia

	Percentage	No. of vehicles	Percentage	No. of vehicles	Percentage	No. of vehicles
Private cars BEV	0.46	5 311	3.40	26 591	10.89	129 690
Private cars PHEV	0.52	6 033	2.26	40 096	6.02	71 664
Light commercial vehicles BEV	0.49	398	3.71	3 189	12.38	11 020
Buses BEV	0.26	8	2.01	64	6.32	215
Heavy goods vehicles BEV	0.00	0.00	0.04	14	0.70	258
Heavy goods vehicles PHEV	0.00	0.00	0.05	18	0.43	160

Table 13: The number of estimated charging stations for electric vehicles in Slovenia 2020, 2025 and 2030.

2020	2025	2030
1200	7000	22 300

3.11.1 National/regional framework on Transport and Electric policies

In 2015, the Slovenian government adopted the Transport Development Strategy of the Republic of Slovenia (TDS) until 2030 in an effort to improve the mobility of the population living in remote areas and environment in urban areas by using advanced technologies for efficient traffic monitoring and management, promoting green vehicles, and constructing network of charging stations. Moreover, a network of fast AC/DC charging stations was established on the motorway for mass transport electrification.

However, there are still insufficient number of charging stations in major urban centres and infrastructure for apartment buildings. To achieve this, more active engagement of local communities is needed. Slovenia aims to achieve optima ratio between number of vehicles and charging points and to develop a system centre for smart network and smart community management to promote the use of charging points.

Slovenia's Sustainable Urban Mobility Plan (SUMP) is called Integrated Transport Strategy and it was implemented in 2016. It puts emphasis on motor traffic optimization and the intended period of development and implementation of the measures is from 2016 to 2020. From 2017 on, more than 70 municipalities developed their Integrated Transport Strategy and it is a condition for participating in public tenders, such as the construction of sidewalks, cycling infrastructure and measures to promote walking.

The Strategy for the Market Development of Adequate Alternative Fuel Infrastructure for the Transport Sector in the Republic of Slovenia was adopted in 2017. In other words, European Directive 2014/94/EU was implemented in Slovenian Law. This strategy contains targets related to greenhouse gas emission and pollutant emissions, i.e. SO₂, NO_x, NMVOC and PM_{2.5}. In the following year, Action Plan on Alternative Fuels in Transport, which consists of objectives and measures to achieve the targets of 2017 Strategy, was developed.

- by 2025, Slovenia will implement a restriction on private vehicles and light commercial vehicles that have CO₂ emission of more than 100g/km.
- by 2030, the limit will be 50g/km.

The measures in land transport are aimed to promote sustainable transport policies and thereby lower environmental burden of traffic. Time frame and financial aspect of the measures for establishment of charging infrastructure for alternative fuels and promotion of electric vehicle sales and uses by 2020 are also included in the action plan.

However, in order to meet the proposed future targets, the already defined and new measures should be implemented. Although the transport energy consumption and CO₂ emission have decreased, its share has increased. Besides, it is important to note that the prominent limitations in implementing sustainable mobility are the dispersed population and high level of motorisation which make it hard to replace private vehicles with public transport.

3.11.2 National/regional framework on Sustainable Energy policies

Apart from transport and electric mobility, energy policies are adopted as well. The Action Plan for Energy Efficiency 2020 intends for 20% improvement of energy efficiency through multi-sectoral measures: public sector, building, industry, transport, heating and cooling, energy transformation, transmission, and distribution. Such plan is crucial for achieving other complementary targets related to reducing greenhouse

gas emission and increasing share of renewable energy sources to 25%, also by 2020. Once again, the issue faced for this plan is the high volatility of end use energy consumption in transport.

Local energy concept (LEC) is an energy management program that is used by all local communities. It is in line with Energy Concept of Slovenia, action plans, and operational programs, i.e. limiting greenhouse gas emission, for energy supply and use. Additionally, Integrated National Energy and Climate Plans are being prepared for the period until 2030. It will contain objectives, policies and measures covering five dimensions:

- decarbonisation,
- energy efficiency,
- energy security,
- internal market
- research, innovation, and competitiveness.

3.11.3 Conclusions

Therefore, implementing measures related to transport to promote use of electric mobility is ideal in Slovenia. This will allow further reductions in energy consumption and greenhouse gas emission, the increase of the share of renewable energy sources, the improvement of air quality and the implementation of sustainable mobility measures.

Consequently, properly enforced sustainable energy measures reduce energy consumption and this can be indicated with an environmental parameter, reduction in emission.

3.12 Policy and regulation framework in Spain

In Spain, 1,520 municipalities have signed the covenant of Mayors. In general, most SEAPs were written years ago, which causes a lack of contextualization when referencing the electric vehicle. In addition, despite the commitment to make a review every two years in order to update the indicators or review goals, most cities have not done so.

However, many regions have developed/created plans which focus on air quality, greenhouse gas emissions and some of them contain strategies for the development of electromobility as well.

3.12.1 National/regional framework on Electric transport policies

The 2014/94/EU directive has been transposed into the Spanish framework. A series of measures have been set out from which the main are summarized as:

- Charging infrastructure financial aids: since 2015, it has been aiding the public recharging network with fast and semi-fast charging points.
- Subsidies to purchase vehicles according to range and type of vehicle. These can be either direct (processed by the car dealer) or ordered, by the owner, once the vehicle has been purchased.
- Identification of ecological and non-ecological vehicles through stickers to be able to be identified when circulating in high pollution episodes.
- Traffic tax exemption, which is a significant saving in the indirect cost in the vehicle lifetime.
- The reserved use of roads for high occupation vehicles.

Although Spain has already a relatively developed charging stations network in important cities, the network still needs to be implemented in small to medium sized towns and, above all, there is a need for a uniform network of fast charging points throughout the whole road network to guarantee long journeys.

Grants for green or zero-emission cars should also be applied with an open budget, so that the buyer does not depend on whether there are active grants at that time.

In order to help financing incentives, there is need for the creation of a CO2 emission tax linked to the emitted GHG by a vehicle at purchase time. This tax should be gradually implemented, year-by-year.

Finally, the Moves Plan (Real Decreto 72/2019) that entered into force March 8, 2019, has a budget of 45 M€ to be equally split among autonomous communities. This plan has two main lines of action: the first gives grants the purchase of electric vehicles (ranging from passenger cars to LDV and buses), should the beneficiary scrap an old vehicle; the second, subsidizes the installation of recharging points either public or private.

3.12.2 National/regional framework on Sustainable Energy/Mobility policies and regulations

In this section, we have analysed the Barcelona SEAP in the form of PECQ and the strategies carried out by the autonomous communities of Catalonia and the Balearic Islands.

As for the PECQ, it was found that it mainly refers to energy efficiency and reduction of pollutants, greenhouse gases and noise, but there is no concrete strategy for the electric vehicle. However, the strategy document for the electric vehicle in Barcelona is based in the PECQ and in other documents as it ends up being a measure to reduce local pollution.

The Balearic and Catalan Plans are quite similar. They both opt for a network in which you can move comfortably along the regions roads with a sufficiently close recharge station. There is also the obligation to place recharging points in car parks, at least one for every 40 parking spots. The main differences are:

Balearic Islands:

- Taking advantage of the archipelago and its tourism, it will force rental companies to reach a 10% share of EVs by 2035.
- As of 2025, diesel vehicles not registered in Balearic Islands will not be allowed and by 2035, only electrical vehicles will be able to enter the islands.

Catalonia:

- Has a clear incentive for domestic recharging points, where by 2020, reaching more than 25.000 points is expected.
- Is looking for 1.2 recharging points for every electric vehicle (including private and public)

3.12.3 National/regional framework on Air Quality policies and regulations

In this section, the legislation that affects Spain in terms of Air Quality has been presented. In reference to the most important practices regarding the transport and implementation of the electric vehicle, the following measures are highlighted:

- Labelling of vehicles according to their pollutant degree. This measure is important in order to identify vehicles that are allowed to enter, or not, in the low-emitting areas in certain agglomerations. This has a direct effect on the urban buyer decision.
- Introduction of labelling in two or three-wheeled vehicles, which until now were exempt. For example, in Barcelona it would mean more than 200,000 vehicles.
- Record of the acoustic pollution level of the different vehicles that make up the Spanish fleet.

These measures are much related to other views in previous sections show that in order to improve the air quality in urban areas, the electric vehicle implementation is an important pillar for the cities' decarbonisation. At the same time, it should be achieved that the energy with which electricity is generated is also free of polluting emissions.

4 Benchmark of policies and regulations/directives adopted in the involved Member States

4.1 Benchmark on Electric transport policies and regulations

4.1.1 Grants to purchase EV

Local, regional and national authorities offer various incentives to encourage the purchase and use of EVs. Some of these incentives are not limited to passenger cars but also include other road vehicles such as vans, buses, bicycles and motorcycles.

Some governments also offer purchase grants. The amounts under these grants, the method of calculating them and the types of eligible vehicles vary greatly from one government to another. For instance, France offers bonuses up to 6.300 € reserved for vehicles that emit less than 20g of CO₂/Km. Moreover, Austria awards funding in the form of a lump sum for vehicles up to 20.000 € for light electric vehicles and electric minibuses.

The Government of Portugal maintains incentives for the purchase of low emission vehicles, granting a benefit of up to 2 500 euros in the purchase.

Many countries also offer purchase grants or discounts to buyers of two-wheelers. For instance, Malta, as in many other states, has provided grants for electric vehicles to foster their penetration and trigger the development of the charging infrastructure. However, it is worth mentioning that the incentives are also being extended to include electric motorbikes, electric motor scooters and pedal electric bicycles and are valid for both new and used vehicles.

4.1.2 Funding to install charging points

A number of governments support the installation of EV charging infrastructure. For instance, in Portugal some of the cities offer not only free parking for the electric vehicles, but also free slow charging in the national network until at least, the end of 2019. This is a step that has also been taken by the city of Barcelona, where currently electric cars can be charged for free in the recharging points of the city.

In 2016, Malta introduced grants for private companies to invest in charging points: a €2,000 grant (up to a maximum of €10,000) per charging pillar for commercial companies interested in changing their current vehicle fleet to an electric one.

There are other kinds of support for EVs as well. Several governments have, for instance, ensured that EVs are part of their public procurement contracts, or have given them access to bus lanes or to free parking.

4.1.3 Tax relief

All countries are using incentives to promote the low/zero emission vehicles. Electric vehicle owners are often either fully exempted from paying the vehicle registration tax or pay a discounted rate in many of the countries involved in the EnerNETMob project. Other tax reductions are also offered. For instance, the NoVA exemption in Austria, the exemption from motor-related insurance and motor-vehicle tax. In Cyprus, taxes of new cars and annual circulation taxes are partly calculated on the basis of the car's CO₂ emissions. Therefore, electric cars have lower registration prices and zero circulation taxes.

Moreover, in France there is an exemption from the annual tax for electric company vehicles. In the case of Catalonia, it is worth mentioning the LIVE platform which aims to create a network for knowledge sharing and the dissemination of information. Live aspires to encourage the population to make the move to low-emission vehicles by providing the newest information available in relation to grants and incentives that the public and private bodies are taking to try and increase the number of electric vehicles.

The Government of Portugal has also created, through Environmental Fund, a set of supporting measures for the development of electromobility which consist in purchase subsidies, registrations tax benefits, ownership tax benefits, company tax benefits, local incentives and VAT benefits.

In some cases, such as the case of Greece, the vehicle circulation tax was reformed to support green mobility and thus became CO₂ emissions based. Accordingly, since 2010, vehicles are taxed based on CO₂ g/km which ranks all EVs in the lowest category (90 g/km) which are exempt of circulation taxes. Moreover, all-electric vehicles are also exempt from luxury and luxury commodity tax charge since 2013, while hybrids receive a 50% discount.

4.1.4 Indirect measures

European-level legislation is used to encourage the development of low-CO technologies in transport, such as electric vehicles and advanced biofuels. Whether member states or not, all countries are following the European directives and are trying to achieve the objectives set.

A combination of supporting incentives and coordinated policy is key in accelerating electric vehicle market development.¹¹ Two EU regulations set mandatory targets for average CO₂ emissions for new passenger vehicles and vans. These regulations establish effective CO₂ emission targets for each manufacturer, depending on vehicle weights and types. The targets for new passenger vehicles and vans were both met several years before the deadlines (2015 and 2017 respectively). However, there is a growing discrepancy between the official test measurements and real-world emission measurements. This means that in recent years actual on-road vehicles have reduced their emissions more slowly.

Other examples of EU legislation include the Fuel Quality Directive and the Renewable Energy Directive, which require respectively a reduction of the GHG intensity of fuels used in vehicles and a 10 % share of renewables in the transport sector by 2020. Both directives focus on the deployment of biofuels, but they can support electric vehicles indirectly, as Member States can credit energy use by electric vehicles toward their targets.

Table 14: Countries that offer grants, funding or tax relief to incentivize electromobility

Country	Grants to purchase EV	Funding to install charging points	Tax relief
Albania			
Austria	✓	✓	✓
Croatia	✓	✓	✓
Cyprus			

¹¹ Electric Vehicles in Europe, European Environment Agency 2016

France	✓		✓
Italy	✓		
Malta	✓	✓	
Montenegro			
Portugal	✓	✓	✓
Slovenia	✓		
Spain	✓	✓	✓

4.2 Benchmark on Sustainable Energy policies and regulations

The EU Covenant of Mayors for Climate & Energy brings together thousands of local governments voluntarily committed to implementing EU climate and energy objectives. The Covenant of Mayors was launched in 2008 in Europe with the ambition to gather local governments voluntarily committed to achieving and exceeding the EU climate and energy targets. Not only did the initiative introduce a first-of-its-kind bottom-up approach to energy and climate action, but its success quickly went beyond expectations. The initiative now gathers more than 7,000 local and regional authorities across 57 countries drawing on the strengths of a worldwide multi-stakeholder movement and the technical and methodological support offered by dedicated offices. The Global Covenant of Mayors is capitalizing on the experience gained over the past eight years in Europe and beyond, and is building upon the key success factors of the initiative: its bottom-up governance, its multi-level cooperation model and its context-driven framework for action.

4.2.1 SEAPs

The involvement of all countries is very important to ensure the viability of the European objectives towards low carbon. Increasing awareness amongst the country representatives is also a key step towards the development of climate-air-energy documentation and concrete results.

Every European country is setting measure in order to achieve the targets set. For instance, Albania is working on a set of measures related to parking policies, fuel quality and economy standards, energy labelling of new cars, promotional activities, public transport. 24 cities have signed the Covenant of Mayors and the SEAP of Nicosia is already completed with the contribution of the Cyprus Energy Agency and the Energy Team of the Municipality of Nicosia.

Moreover, the information available on the Covenant of Mayors website shows that 80 French cities have launched their SEAP deployment and the steps used for their deployment are already set. Montenegro signed the Covenant of Mayors in 2009, and prepared the first SEAP in 2011 for the city of Podgorica. Later on SEAP were prepared for Žabljak and Kolašin.

Italy and Spain are also great examples in terms of Sustainable Energy, having respectively 4.012 and 1.520 cities that have signed the Covenant of mayors, with Italy having submitted and implemented the highest number of approved SEAPs (3.184).

Plans that are worth mentioning in Italy are those of Naples, Bologna, Cagliari whereas in Spain, plans of Barcelona, Catalonia and the Balearic Islands. However, in the case of Spain it is worth mentioning that these plans were more concerned with energy efficiency, reduction of pollutants, greenhouse gases and noise but they have no concrete strategy for the electric vehicles.

Portugal is also a great example, with currently 140 signatory Municipalities of the Covenants of mayors and the submission of 113 SEAPs. However, it is important denoting that the implementation rate of the planned actions is low.

4.2.2 Indirect measures

In relation to measures, each country tries to follow up with the objectives set by the European Commission, and at the same time the objectives set up nationally. However, the decisions depend also on the local administrations and on the context of each local region. Therefore, the measures set need to be in line with the realities faced in the cities. For instance, Austria is applying measures and setting targets related to green electricity, promotional and educational programmes, energy efficiency, energy savings, renewable energy.

Moreover, the Italian cities rely on national regulations that are mutually connected with EU policies, and at the same time affect the Sustainable Energy and the Energy Efficiency matters.

Table 15: Countries that apply infrastructure targets and indirect measures

Country	Aggressive Infrastructure targets	Indirect measures
Albania		✓
Austria		✓
Croatia	✓	✓
Cyprus	✓	✓
France	✓	✓
Italy		✓
Malta		✓
Montenegro		✓
Portugal	✓	✓
Slovenia		✓
Spain	✓	✓

4.3 Benchmark on Sustainable Mobility policies and regulations

Availability of mobility options or the lack of it has direct implications on the economic efficiency of the cities and their overall well-being. The increased rate of urbanisation and sprawling in cities places great pressures on the existing transport systems in terms of meeting the mobility needs of people as well as goods. However, the public transport systems are sometimes inadequate and have difficulties keeping the

pace with the increasing demand to travel. The current transport systems are largely dependent on fossil fuels, have been accompanied by serious environmental, social and economic costs. With growing concerns towards sustainable development and mitigating climate change, it is realised that there is a need to shift from the current unsustainable approach to a more sustainable approach that allows movement and transport activity in a way that helps in mitigating the above issues and strengthen the process of urbanisation in the long run.

Many European cities are working on policy interventions or measures to guide the development of the transport sector on the lines of sustainable development, some of them just recently and some have already implemented sustainable urban mobility plans.

4.3.1 SUMPs

A Sustainable Urban Mobility Plan¹² is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles. In recent years, the approach to transport planning has changed considerably in academia and in planning practice.

With many European cities approaching critically low air quality, the reduced air pollution that results from more sustainable mobility may be the most obvious plus. The necessity of reducing emissions to mitigate climate change is universally acknowledged, and road transport is the second biggest source of the EU's CO₂ emissions. These reductions are easiest to achieve with the buy in of different government departments, and different levels of government – something that planning together makes possible. Nine of ten cities in the EU with the lowest levels of air pollution, have a Sustainable Urban Mobility Plan in place.

Regarding the countries involved in the project:

- Albania has SUMPs in Tirana and currently working on SUMPs of Durres and Shkodra.
- Austria is moving towards an approach to sustainable mobility planning. Cities like Vienna but also smaller ones take part in SUMP projects (e.g. PUMAS, ADVANCE) and are aware of the SUMP concept. However, although these cities follow the SUMP guidelines in some fields, it is difficult to adapt all the existing sustainable transport planning (e.g. "Masterplan Traffic" in Vienna) to SUMP standards.
- Croatia is currently involved in different project related to SUMPs and the overcoming of barriers that makes their implementation difficult.
- Cyprus is currently working on different strategic plans related to mobility, development of SUMPs and National Strategic Transport Plan.
- France is a great example of implementation of SUMPs; sustainable urban Mobility Plans have been in existence in France for thirty years. Several laws, both at national and European level have helped improve the contents and processes of the SUMPs in France. Some of the best examples of SUMPs are: Plan 2013-2023 of Marseille-Provence Metropolis, PDU Pays d'Aix en Provence, PDU Toulon Provence Méditerranée Métropole.
- Montenegro, currently there is one plan financed by the United Nations Development Programme (UNDIP), the Polycentric Sustainable Urban Mobility Plan for Boka Bay and the Old Royal Capital

¹² Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan (Second Edition), 2019

Cetinje 2016-2020 which aims to improve transport infrastructure within the framework of developing sustainable tourism in Montenegro.

- Slovenia has developed SUMP (Integrate Transport Strategies) in accordance with guidelines developed within projects financed by the European Commission.
- Portugal is a good example, although there is no formal legal obligation for local authorities to implement a Sustainable Urban Mobility Plan / Mobility and Transport Plan the rate of engaged municipalities has increased since 2011. The energy transformation that Portugal is living is essential for the development and improvement of the quality of life. It is seen as an opportunity to increase investment, employment and economic growth, to change imports, an opportunity for the scientific and innovation system and for consumers, who will have lower costs in the daily life.
- Italy is one of the pioneer countries in terms of developing Sustainable Urban Mobility Plans. In Italy, the matters, assessed later within the draft of SUMP, were anticipated for the first time with the drawing of Urban Mobility Plans (PUM - Piani Urbani della Mobilità), which were established in order to achieve reduction of atmospheric pollution and noise, reduction of energy consumption, increased traffic and transport safety, promote the use of public and collective transport, reduce the congestion in urban areas.
- Greece, at national level, has developed a National Transport Plan in the framework of a project funded by EU.

4.3.2 Indirect measures

All in all, every country has developed measures, both direct and indirect, for the achievement of the objectives set by their national/regional plans in order to improve the sustainability of their transport systems. Almost all countries inside and outside of the EU have some funding, some directly connected to SUMP and others indirectly for wider objectives, which sustainable mobility can help achieve.

Being as there is no requirement by law, to develop a Sustainable Urban Mobility Plan, each country has various departments/bodies that try to implement policies and collaborate, by also influencing indirectly, offering support, general guidance.

Table 16: SUMP and indirect measures with the project countries

Country	SUMPs	Indirect measures
Albania	✓	✓
Austria	✓	✓
Croatia	✓	✓
Cyprus	✓	✓
France	✓	✓
Italy	✓	✓
Malta	✓	✓
Montenegro	✓	✓
Portugal	✓	✓

Slovenia	✓	✓
Spain	✓	✓

4.4 Conclusions

A strong electric vehicle benchmark can cut transport emissions and help modernise Europe’s electricity grid.

The European institutions are currently debating the introduction of a zero- and low-emission vehicles sales incentive, as part of the future CO2 targets for automakers. This offers an important opportunity to clean up vehicle emissions EU-wide. Member States favour voluntary sales “benchmark” in 2025 and 2030 that would offer CO2 credits for carmakers whose sales exceed the target. More ambitious is the European Parliament’s suggestion that, along with this bonus, a “malus” should apply that increases carmakers’ carbon reduction obligation if they fail to meet their sales goal. This would turn the voluntary benchmark into a de facto mandatory target and become the key driver for the rapid uptake of EVs.

Often absent from this discussion, however, are the far-reaching energy policy benefits that would stem from an EV sales benchmark, in particular a mandatory one. More EVs on the road by 2025 will reduce costs for consumers, modernise the power system, provide investment security across several sectors, and promote renewable energy. Simply put, the more certainty this regulation can provide regarding the expected number of EVs in use in the next decade, the better stakeholders can plan to reap their benefits. Needless to say, these benefits are much greater if the regulation favours pure electric vehicles over plug-in hybrids, and applies across all European auto markets equally.

More certainty about the timing of increasing market shares of EVs would allow the electricity industry to consider the grid potential of EVs in energy resource planning. In turn, a reliable number of EVs also provides investment security for utilities and network operators, carmakers and suppliers, as well as charge point operators and other innovative market players. This chain of effects supports the energy transition envisioned in the Clean Energy for all Europeans package. Europe now has the opportunity to accelerate the energy and the transport transitions—or to fall behind in both.

Charged smartly, more EVs help modernise the grid and lower costs for all consumers

While we repeatedly hear attempts to spread scepticism about the grid’s ability to integrate EVs, evidence suggests that more EVs does not automatically mean costly, new infrastructure. Europe’s electricity industry found that even if all of today’s vehicles were electric, the investment needed for new capacity would be very modest. EV integration can be managed through more efficient use of existing systems. Based on case studies from Germany and France, RAP research found that today’s electricity distribution networks are significantly underutilised. EVs, as flexible loads, could leverage this unused capacity. In other words, existing infrastructure can largely, if not entirely, accommodate the take-up of EVs, while benefiting all consumers by making better use of it.

A growing number of utilities support the integration of EVs and offer EV-friendly tariffs such as time-of-use pricing to meet owners’ needs and incentivize smart charging. In general, evidence suggests that consumers react to variable pricing with flexibility, such as charging their cars at off-peak hours. For example, a Minnesota utility in the U.S.—where the energy sector has developed many time-of-use pricing

schemes to support EV-uptake—finds that 90 to 95 percent of customers switch significant amounts of their consumption to off-peak hours, when the off-peak price is five times lower than the on-peak price.

Some network companies, for example in Germany, offer free grid connections and smart technology, such as meters or wall boxes, to EV owners who help optimise charging by plugging in the car when not in use and automatically charging when electricity is cheapest. Analyses from the U.S. and EU countries such as the UK and France suggest that controlled charging significantly reduces EVs' contribution to peak load, even assuming a high penetration of EVs.

While we don't know whether the next best-selling electric vehicle will even be a private passenger car (in fact, it's not likely to be), we do know how to ensure that it can be charged beneficially for the environment, the grid, and all consumers.

Policy options to support the adoption of electric vehicles

The transition to zero-emission transport and the development of clean technologies needs to be supported by a more ambitious policy agenda both at EU and national level. The Electric Vehicles technology is among the most powerful clean power-train technologies, and the aim is for Europe to lead the global EV race in order to remain at the frontier of automotive technology.

It is important for the proper framework conditions to be in place, to have more ambitious investments in Electric Vehicles. Both the European Union and the member states are increasingly discussing and putting in place policies to support the deployment of electric vehicles. There is a need for a broader policy framework, combining the demand and supply side instruments in a long-term clean transport policy.

Changes are already happening, with subsidies, taxation and public procurement favouring clean technologies. Moreover, there is public R&D support for the next generation of clean technologies. However, Europe should do more to encourage the transformation of the automotive industry through more ambitious and stimulating policy measures.

In order to ensure a smooth a transition to the decarbonised electric transport, the action needed to be taken into account are:

- Guarantee the competitiveness of electromobility
- Support the mass amount of electric and zero-emission vehicles on the road
- Encourage investments in battery technology through regulations and funding
- Facilitate the charging of vehicles in all building, ease procedures for the deployment of charging stations in parking lots
- Exploit synergies between the transport and energy sectors, by benefiting from the electric cars

