



e-SMART OPERATIONAL ROADMAP

An operational instrument for public and private decision makers for the implementation of e-mobility in local public transport and last mile logistics

Interreg
Alpine Space
e-SMART 
EUROPEAN REGIONAL DEVELOPMENT FUND



Contact & Disclaimer

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Find out more about the e-SMART project: www.alpine-space.eu/projects/e-smart

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Abbreviations

AF	Application Form
AS	Alpine Space
E-CS	Electric Charging Stations
ENoLL	European Network of Living Labs
ERDF	European Regional Development Fund
EU	European Union
LML	Last-Mile Freight Logistic
LPT	Local Public Transport
JS	Joint Secretariat
OBS	Project Observer
PA	Public administration
PP	Project Partner
RLL	Regional Living Lab
SMT	Smart Monitoring Team
TLLN	Transnational Living Labs Network
WP	Work Package

1 Introduction: Why an Operational Roadmap?

1.1 Background of the e-SMART project

The development of e-Mobility in the Alpine Space presents a real challenge. In a relatively small territory, 5 countries (Italy, Slovenia, Austria, Germany, France) are involved, each of them with an extremely variegated geomorphology and delicate, protected environments. On the other hand, the area is strongly affected by significant local and long-distance fluxes of traffic: the area should be an excellent lab to implement sustainable mobility, and in particular e-Mobility. The development of fragmentary charging networks and the adoption of inconsistent strategies in diverse areas could create constraints for e-LML (electric Last Mile Logistic) and e-LPT (electric Local Public Transport) diffusion in the area.

Therefore, the e-SMART project must provide a new vision of e-LPT and e-LML planning and management in Alpine Space. There is a need to highlight the big step forward that must be taken between past and future actions, in order to reinvent, rethink, and organise operations in the different territories.

An effective governance can be achieved only by abandoning the idea of working in isolated departments and fostering the transnational cooperation, which includes both public and private actors for integrated approaches to electric vehicle charging infrastructure planning and e-Mobility services development. All these actors should share critical regional aspects and needs in order to co-create, test, and validate novel common transnational tools, methods and approaches for an integrated planning of charging networks and e-Mobility services in LPT and LML in the framework of smart territories and grid.

e-SMART aims to activate cooperation among Public Administrations (PAs) and e-Mobility and energy operators through Smart Living Labs, creating an Operational Roadmap for regional and local, and in the Slovenian case also national decision makers to achieve a common approach in the development of e-Mobility services in LPT and in LML and in planning of an adequate charging network for the entire Alpine Space.

One of the key challenges for the project's success is ensuring adequate distribution of key communications from Project Partners (PPs) to the impacted target audience and final beneficiaries. Therefore, it is crucial to ensure effective representation of relevant stakeholders, including those with high levels of interest in e-SMART who may possess low levels of influence, along with strategic stakeholders with power, motivation and means to implement research outcomes.

1.2 The Operational Roadmap

The Operational Roadmap represents the link between the Tactical Roadmap (an operational ready-to-use guide, common for all the Alpine Space Area, that aims to support public and private decision makers to improve e-Mobility services, identifying and evaluating all the possible measures that could be taken) and the respective territories. The Operational Roadmap strongly reflects the Tactical Roadmap's structure, with customised regional and local needs, objectives, business models, incentive and financial sources. It represents an operational instrument to be adopted by regional and local PAs and utilised by both public and private deci-

sion makers for the implementation of e-Mobility services and a charging network for e-LPT and e-LML in relation to smart grid.

Its contents are in line with the Tactical Roadmap, but they are defined in the light of the specific needs of the countries, considering all the elements that emerged during discussions between project partners and stakeholders.

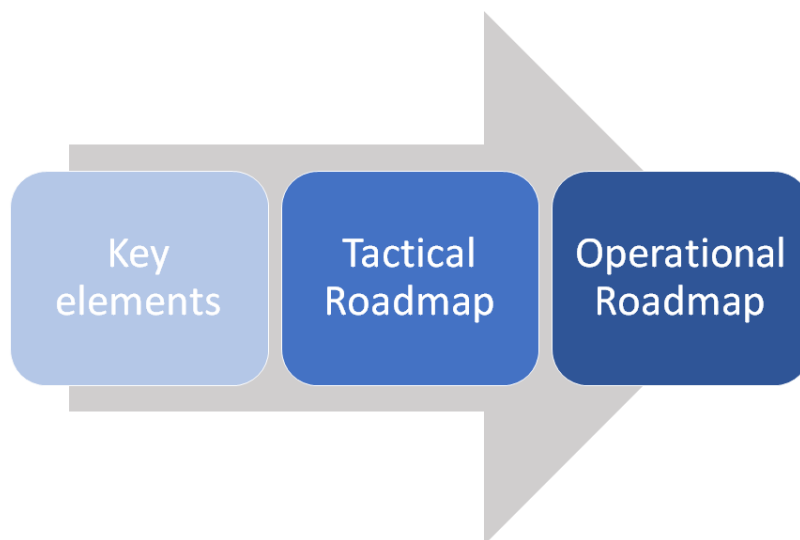


Figure 1-1 – From the key elements to the Operational Roadmap
(KE: Key Element; TRM: Tactical Roadmap; ORM: Operative Roadmaps)

1.3 Main objectives

The following can be identified as the main objectives of e-SMART Operational Roadmap:

1. To support national and regional energy and mobility planning at the local level;
2. To support local decision makers, planning bodies and stakeholders in the field of e-Mobility charging infrastructure planning for public transport and last mile logistics;
3. To facilitate the emergence of local projects/initiatives aimed at increasing e-Mobility deployment in public transport and last mile logistics sectors.

1.4 Methodology

Operational Road Maps are adapted on local areas, but the definition of each country's Operational Road Map was carried out according to a common methodology that allowed, in accordance with a homogeneous process, the identification of what a territory needs (territorial needs) and what it lacks (territorial gaps) to achieve integrated planning of ECSs and e-Mobility services in LPT and LML, in the framework of smart territories and grids.

The common methodology can be summarised in the next five steps:

1. Identify all the potential actors that could play a significant role in achieving an integrated charging network planning in relation to smart grid and e-Mobility services diffusion in LPT and LML, to highlight any critical or relevant situations that may represent risks or opportunities. Compare and analyse local findings with spider diagrams of actors/roles, that represent the e-SMART's original elaboration on different countries about the actors' role at state of the art (Annex 1 – Actors' roles);

2. Get information about level of interest/influence of each local actor;
3. Use the Living Labs as a tool to consider stakeholders' point of view; the partnership also collected and analysed the findings of the Regional Living Lab and the outcomes of the surveys organised during the project lifetime;
4. Bring the needs and gaps highlighted by the stakeholders to the key elements relevant e-Mobility, as clustered by e-SMART on the three main European policies: Green Deal - Green Europe (innovation for LPT, LML, and energy), Digital Europe - Smart Europe (smart city/village elements of PA digitalisation and data sharing in a Public-Private Partnership (PPP) framework), Europe for Citizens - Smart PA (policy cycle management, policy instrument, participatory approach, new governance model);
5. Identify measures and actions to meet specific needs of the reference area.

1.5 Alpine Space Territorial needs, gaps and expectations

To identify the needs and gaps of each territory involved in the project, a questionnaire has been distributed to public and private stakeholders in Alpine Space.

Following the elaboration of the evidence gathered, a split has been made between public administration respondents and non-public administration ones.

From a PA point of view, the two most important needs for a territory to become smart under the e-SMART program are:

- collaboration between private and public stakeholders;
- know-how sharing of funding at regional, national and EU level.

Apart from these, an adequate digital infrastructure (fibre, copper lines, ADSL, ...), the willingness of stakeholders to share the data and the presence of common technical standards stand out as important needs (Figure 1-2).

With regard to assets, PA primarily indicates mobility and energy infrastructures, followed by specific mobility policies (i.e. dedicated lanes and smart traffic lights), service agreements, guidelines for interoperability among services and e-CS network for LML, e-sharing and private mobility (Figure 1-3).

If for NON-PAs the primary need is the same as for PAs (private and public stakeholder collaboration), the point of view changes considerably on subsequent positions, as they are predominantly focused on infrastructure (charging and energy network). The most frequent needs are (Figure 1-4):

- local renewable production integration;
- smart grid network;
- smart charging;
- know-how sharing of funding at regional, national and EU level.

As well as the PA, the NON-PAs indicate mobility and energy infrastructures as the main necessary assets, followed by specific mobility policies (dedicated lanes, smart traffic lights,...). In fourth place are the guidelines for interoperability among services, followed by service agreements, data capturing tools, web-based platform and planning of LML distribution hubs (Figure 1-5).

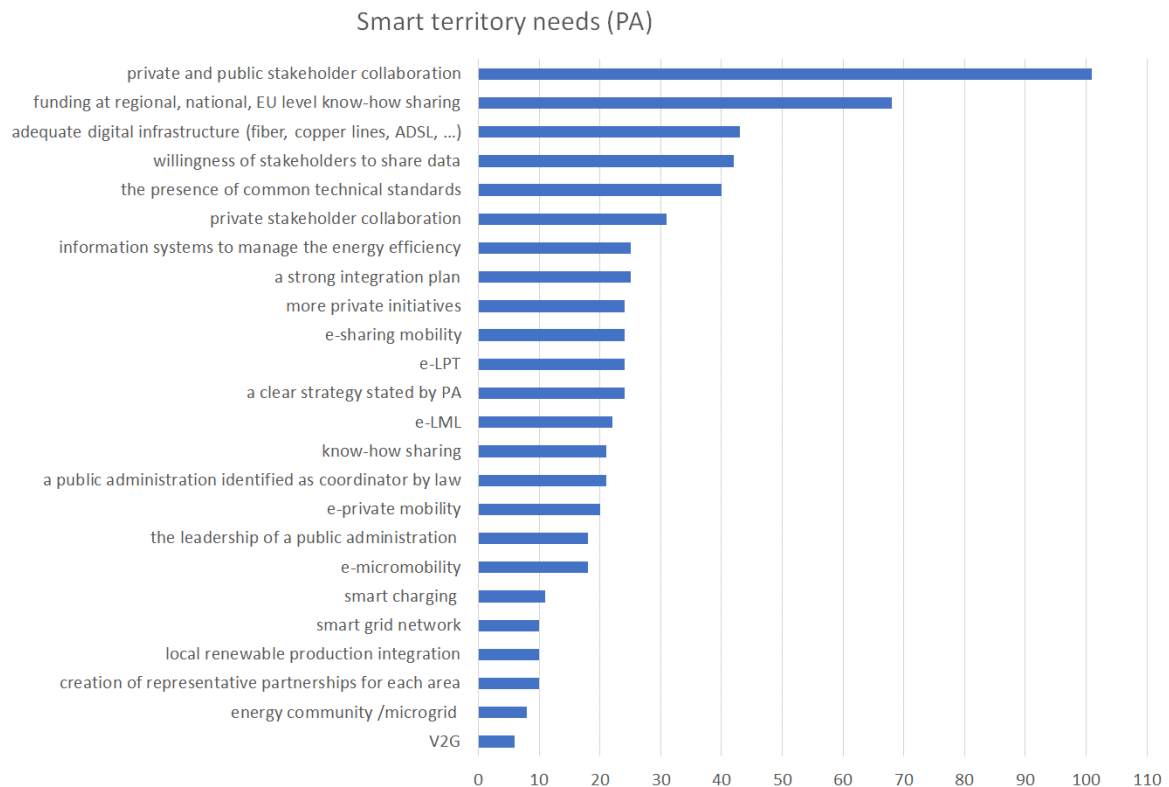


Figure 1-2 – territory needs to become a Smart Territory as relevant under the e-SMART program
(Public Administration point of view)

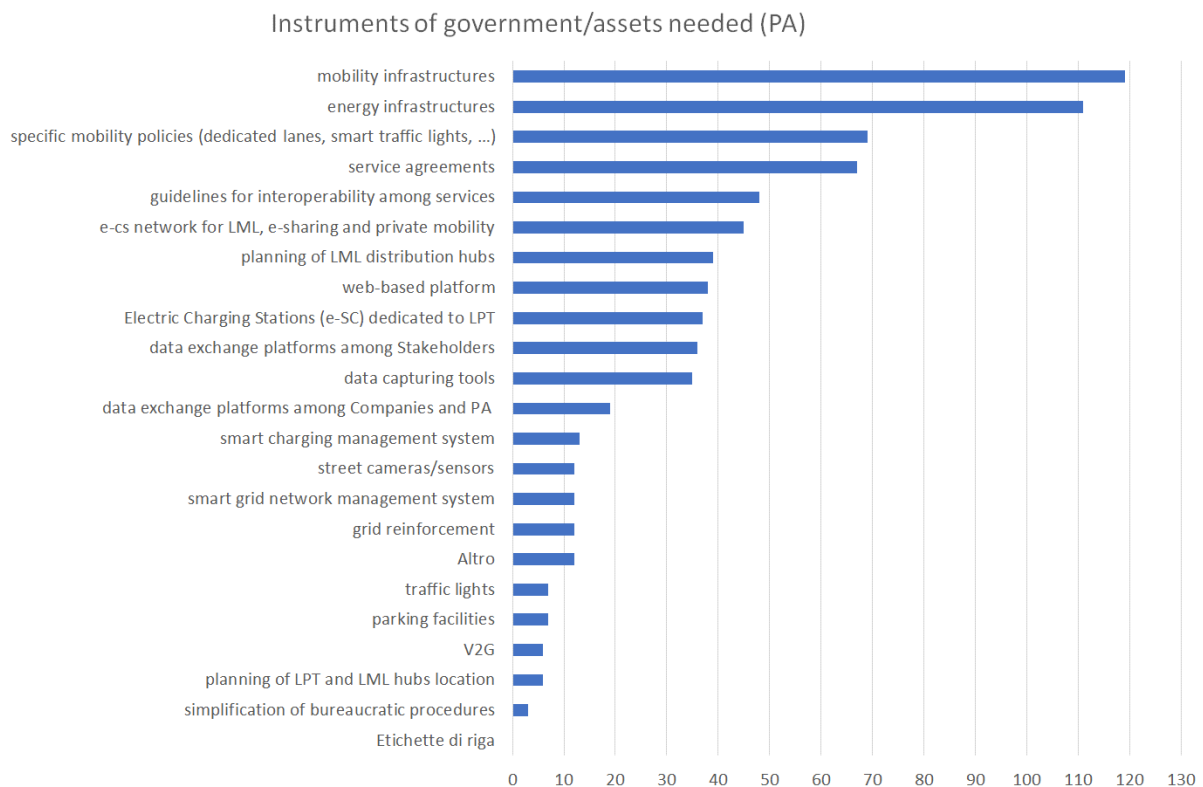


Figure 1-3 – Instruments of government/assets needed for Smart Territory
(Public Administration point of view)

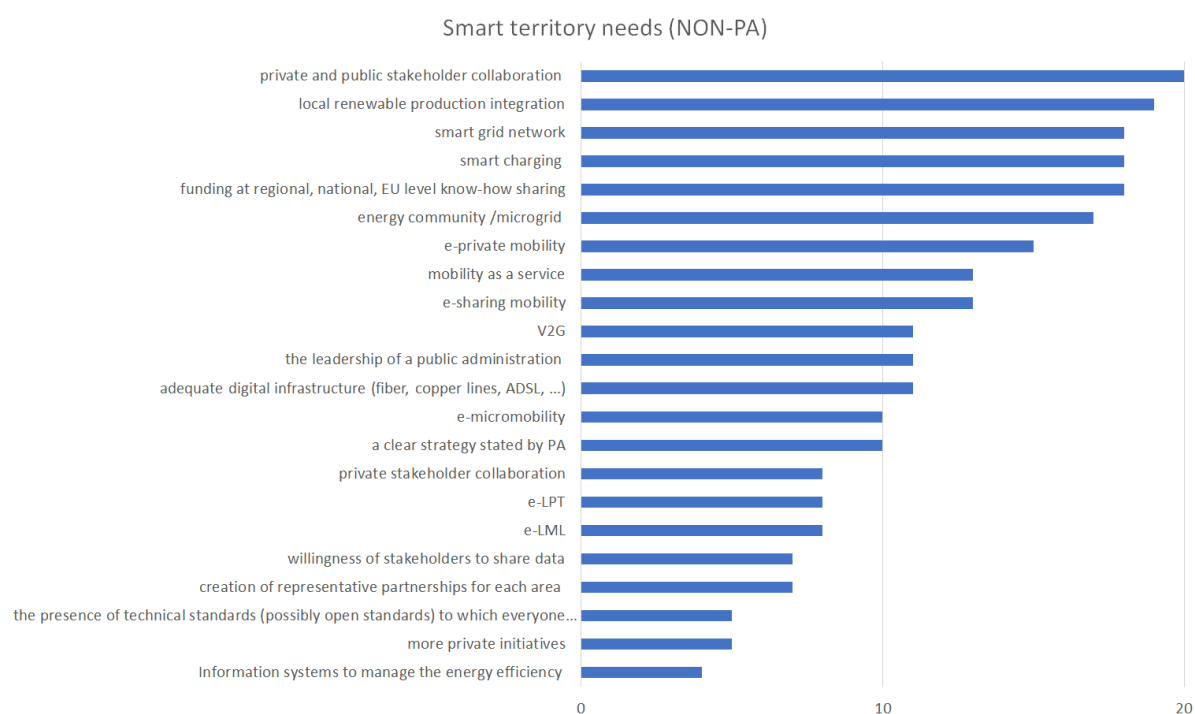


Figure 1-4 – territory needs to become a Smart Territory as relevant under the e-SMART program (NON-Public Administration point of view)

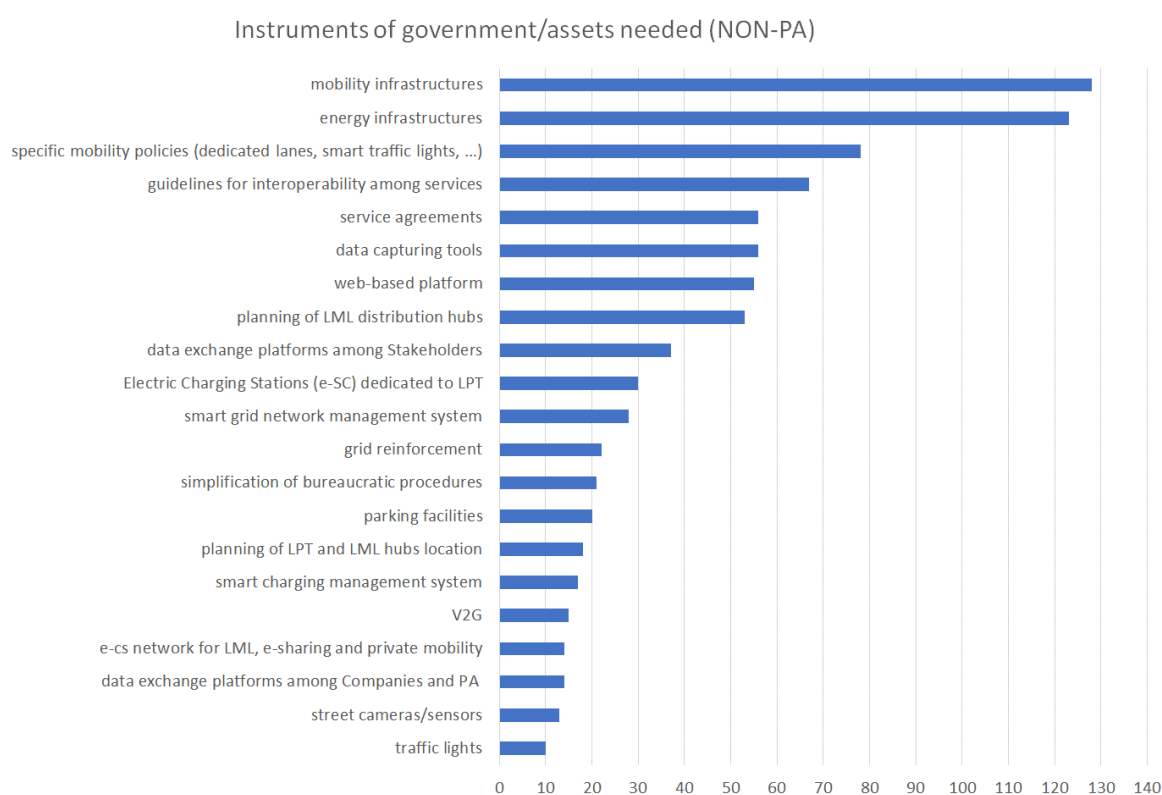


Figure 1-5 – Instruments of government/assets needed for Smart Territory (NON-Public Administration point of view)

1.6 Policies and governance models

Regarding the e-Mobility regulation, active political promotion of e-Mobility in Germany, France and Austria started in 2009, while in Slovenia and Italy it started five years ago.

In France, the state developed a plan to support the adoption of the BEV.

Germany has prepared a national plan with the aim of making Germany the leading market for electric mobility. Regarding public and semi-public infrastructure at the national level, the two countries have put in place various funding and cooperation opportunities. In Austria, the development and diffusion of electric mobility started with the development of numerous tools and strategies including the “model regions of electric mobility” programme.

Slovenia and Italy started supporting e-Mobility with regulations regarding the development of infrastructure and automotive sectors.

Up to now, policy and innovation efforts remain predominantly focused on incremental optimization of existing private motorization modes and automobile technologies rather than the use of integrated mobility and transport strategies.

As for the e-LPT and e-LML, the quality of German, Austrian, and French transport infrastructure is generally high and above the European average. But, investments in these sectors have recently increased also in Slovenia and Italy.

However, more efforts will be needed to address the backlog of infrastructure investments dating back several decades.

Following, a summary of policies and measures that e-SMART countries implemented or are implementing to support and increase e-Mobility.

Italy

With reference to the national policies, a crucial series of guidance documents related to sustainability in the transport and private sectors have been drawn. The most significant ones are the “National Plan for Electric Charging Infrastructures” (PNIRE), the “Roadmap for a Sustainable Mobility”, the “Legislative Decree 257/2016 Directive Alternative Fuels Initiative” (DAFI) and the Decree of the Minister for Economic Development of 30 January 2020.

Slovenia

Slovenia aims to become carbon neutral in the future (2050).

One of the most extensive projects is “The Slovenian Green Corridors” that will enable the development of electromobility in Slovenia within the framework of the European project Central European Green Corridors (CEGC).

The most relevant national regulations concerning the development of electric mobility obtain the following: Energy Act (2014), Decree on renewable energy sources (RES) in transport (2016), The Transport Development Strategy (2015), The Resolution on transport policy, The Action program for alternative fuels in transport (2019) and The Integrated National Energy and Climate Plan (2020).

France

The French Government is working to equip the country with the right infrastructure for the diffusion of electric mobility, with a plan for the deployment of public charging stations which provides subsidies, both for charging stations in public places and in private areas or workplaces. Moreover, France encourages private companies to cooperate in expanding electric mobility by introducing incentive mechanisms rather than new policies.

In terms of legislation, the recent national policies regarding e-Mobility, e-LML and e-LPT in France are the Law n° 2015-992 on energy transition, the Law n° 2019-1428 on mobility orientations, and the Decree 2007-23 on low emission buses and coaches.

Germany

The German Climate Protection Plan 2050 envisages a reduction in emissions in the transport sector of 40% - 42% by 2030 (compared to 1990). This requires high market penetration of electromobility. Additionally, the German Federal Government has adopted a set of laws and measures under the government's electromobility program, including a purchase grant and tax incentives for electric vehicles and the expansion of charging infrastructure. The objective is to make the transport sector more energy efficient and reduce its impact on climate change. On behalf of the German government, NOW GmbH (National Organisation Hydrogen and Fuel Cell Technology) coordinates and manages the German government's National Innovation Program for Hydrogen and Fuel Cell Technology (NIP) and the Federal Ministry of Transport's funding guidelines for electromobility and charging infrastructure (LIS).

Austria

In Austria, the promotion of investment in EVs launched in 2016 provided numerous benefits like the abolition of motor-related insurance tax, deduction of input tax, abolition of non-cash compensation, city parking privileges, low maintenance costs and many other benefits. These measures allowed private users and companies to consider the purchase of an electric car as a realistic economic alternative.

1.7 Stakeholders involved

In the process of defining the ORM, the contributions of all stakeholders involved in the project have been crucial. e-SMART has in particular mapped all the relevant stakeholders, from those with high levels of interest in e-SMART who may possess low level of influence, to strategic stakeholders who have power, motivation, and resources to implement research outcomes.

Stakeholders identified as relevant for the e-SMART project are listed in Table 1-1, along with their respective roles.

The process of participation in the project included:

- filling in ad hoc questionnaire, in order to: identify the needs, gaps, requirements of different territories; promote and support electric mobility in the LPT and LML sectors in smart territory as defined in the project; and to support the PA in adequately addressing policies and funding;
- the participation in Regional Living Labs and Transnational Living Lab in order to discuss LPT and LML, and promote diversity and sharing of experiences/issues.

Table 1-1 – List of stakeholder groups affected by e-SMART

Stakeholder categories	e-SMART stakeholder groups
Local public authority	Municipalities and county authorities involved in the spatial, mobility (i.e. SUMP) and E-CS infrastructure planning and local agencies delegated by PAs to operate on energy, transports (in particular local public), environment and digitalization.
Regional public authority	Regional Authorities, especially policy makers and technicians, involved in territorial planning of transport, public transport, e-Mobility infrastructures and services, energy efficiency, environment (Air Quality, decarbonisation) and PA digitalization.
National public authority	National Authorities, especially policy makers and technicians, in the field of transport, environment, smart territories development, e-Mobility infrastructures and services, energy efficiency, economic development and environment.
Sectorial agency	Development, energy, and environment agencies that operate for the Ministry, Region, and local authorities to support the diffusion of innovative e-Mobility services in LPT and LML sectors.
Infrastructure and (public) service provider	DSO, energy utilities & suppliers, e-Mobility service providers, energy providers, fuel stations, associations for future charging service implementation, freight and passengers' transports service providers and suppliers. Including digital infrastructure.
Interest groups including NGOs	Foundations, Associations for the Environment protection and Smart City and territories that promote more sustainable mobility solutions and transports.
Higher education and research	Universities and research centres with specific competences in smart and sustainable mobility, smart energy and grid, digital innovation, ICT.
Enterprise, excluding SME	Enterprise and multinational corporations in the field of energy, digital innovation, and sustainable transport (public transport and logistics).
Business support organisation	Chamber of commerce, business incubator or innovation centre, business and mobility clusters that promote and support enterprises on regional and local level the diffusion of e-Mobility and charging infrastructure.
General public	Citizens, students, tourists and end-users of e-Mobility services and infrastructures.

2 The e-SMART Tactical Roadmap

2.1 Why a Tactical Roadmap

A roadmap serves as a communication medium and visually represents an overview, the development of a matter over a strategically defined period. It is characterised by preparatory character and roughly introduces the steps to be taken over a longer period of time. The roadmap is used to structure long-term projects into easily manageable single steps.

The e-SMART Tactical Roadmap is intended to be a contribution to national and regional energy and mobility planning in the Alpine Space region. The document aims to support decision makers and planning bodies in the field of e-Mobility charging infrastructure planning in public transport and last mile logistics. In the roadmap, the entire Alpine Space is considered and examined as a whole, and this structure is transferred to operational roadmaps for the regions/reference areas with their specific features.

The document results from the transnational exchange and development of know-how in dealing with e-Mobility in the fields of public transport and LML beyond the national borders among the project partners, stakeholders and observers in different formats.

2.2 Regulatory framework in the project countries

The Italian national context is characterised by a complex scenario, in which the lack of infrastructure and the small number of 50 kW power stations are the main limits to the development of the e-Mobility sector. Currently in Italy there are approximately 4300 public charging stations, a relatively low number compared to leading countries in Europe. However, the number of charging stations has grown significantly since 2014 thanks to e-Mobility planning developments in the national regulatory framework, especially for e-LML and e-LPT. The Italian government has drawn a series of guidance documents related to sustainability in the transport and private sectors, which have contributed to this acceleration. The most important ones are the “National Plan for Electric Charging Infrastructures” (PNIRE), the “Roadmap for a Sustainable Mobility”, the “Legislative Decree 257/2016 Directive Alternative Fuels Initiative” (DAFI) and the Decree of the Minister for Economic Development of 30 January 2020.

Slovenia aims to become carbon neutral in the near future, and for this reason is devoting close attention to reducing the harmful effects of transport on the environment. An active promotion of e-Mobility started in 2015. One of the biggest projects is the “The Slovenian Green Corridors” which will enable the development of electromobility in Slovenia within the framework of the European project Central European Green Corridors (CEGC). The main objective is to establish a dense network of fast charging stations for electric vehicles on the motorway cross of the Republic of Slovenia. The most important national regulations concerning the development of electric mobility obtain the following: Energy Act (2014), Decree on renewable energy sources (RES) in transport (2016), The Transport Development Strategy (2015), The Resolution on transport policy, The Action program for alternative fuels in transport (2019) and The Integrated National Energy and Climate Plan (2020).

France is at the forefront of sustainable mobility transformation in Europe, thanks to the number of electric cars, investments in infrastructure and electric car sharing programs. The French

Government is working to provide the country with the right infrastructure for the diffusion of electric mobility, with a plan for the deployment of public charging stations that provides subsidies, both for charging stations in public places and in private areas or workplaces. Moreover, France encourages private companies to cooperate in expanding electric mobility by introducing incentive mechanisms rather than new policies. The most recent national policies regarding e-Mobility, e-LML and e-LPT in France are the Law n° 2015-992 on energy transition, the Law n° 2019-1428 on mobility orientations, and the Decree 2007-23 on low emission buses and coaches.

The development of electric mobility is a major forward-looking issue for Germany. The Federal Government has adopted a set of measures to promote it, including a purchase grant for electric vehicles, the expansion of charging infrastructure and a public procurement programme for the purchase of electric vehicles by public authorities. The objective is to make the transport sector more energy efficient, reduce its climate change impact and make it more environmentally sustainable.

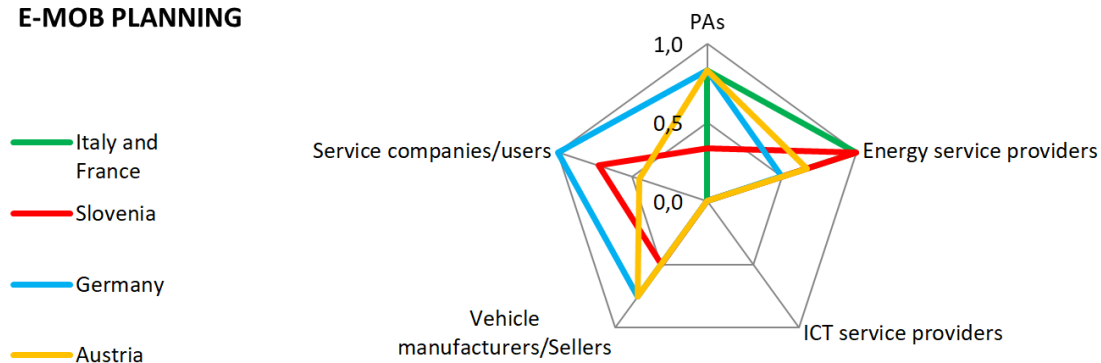
The shift to electric mobility is gaining momentum, and Austria is at the forefront of developments in this field. The promotion of investment in EVs launched in 2016 provided numerous benefits like the abolition of motor-related insurance tax, deduction of input tax, abolition of non-cash compensation, city parking privileges, low maintenance costs and many other benefits. These measures allowed private users and companies to consider the purchase of an electric car as a realistic economic alternative.

2.3 Actors and stakeholders' roles

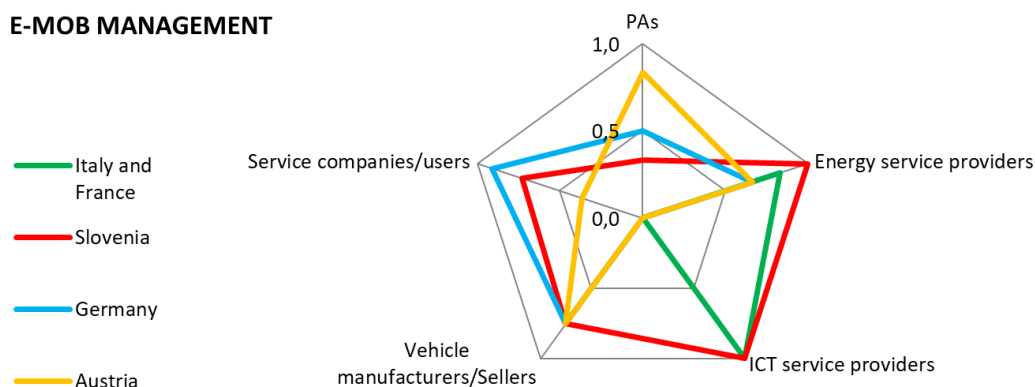
To get an overview of some specific stakeholder groups, as well as their influence and interest in the field of e-Mobility, a survey was carried out in 2020. The results are presented in the following spider diagrams, where stakeholders have been divided into 4 groups:

- PA: Public Authorities, local and regional public authorities in the Alpine Space regions of the e-SMART partners;
- Energy service providers: local, regional and international energy providers;
- ICT service providers: these stakeholders are the software developers, the telecommunication operators;
- Vehicle manufacturers/Sellers: OEM as well as vehicle modifiers.

E-MOB PLANNING



E-MOB MANAGEMENT



E-MOB USAGE

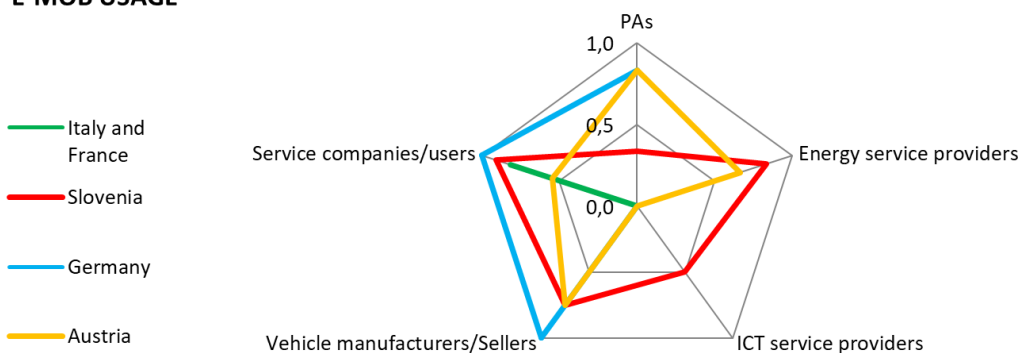
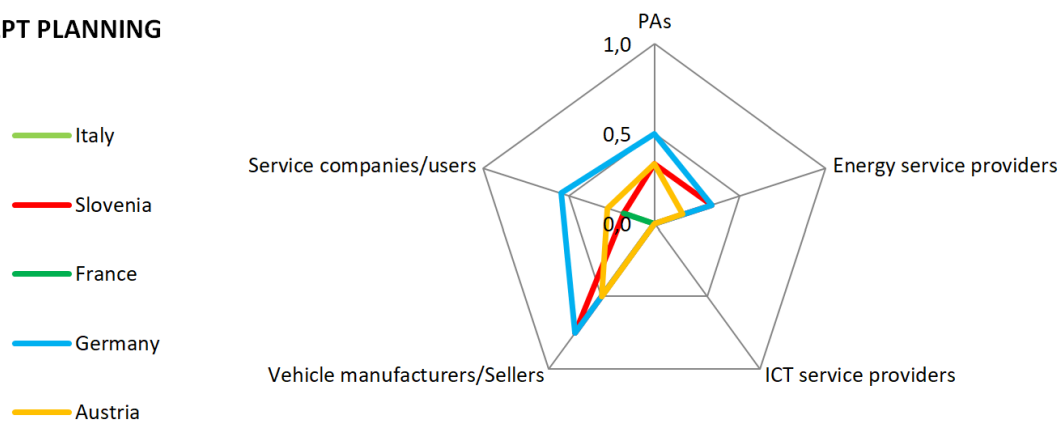
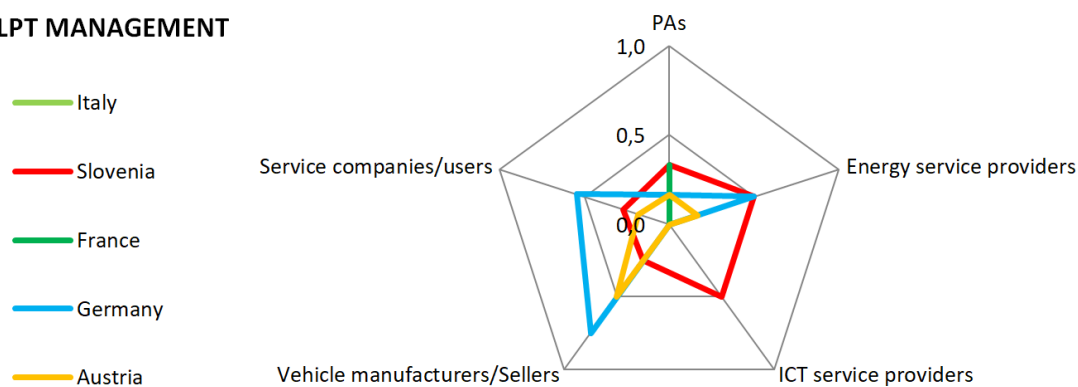
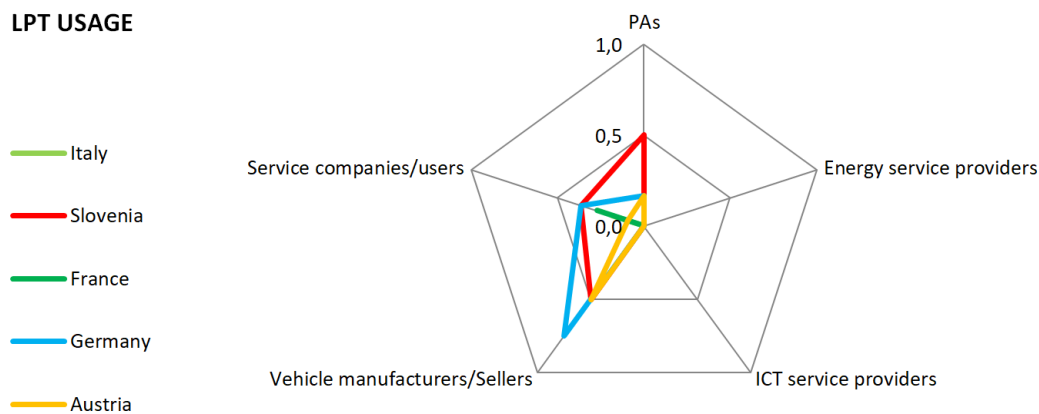


Figure 2-1 – Spider diagram for the e-Mobility data for each PP country

LPT PLANNING**LPT MANAGEMENT****LPT USAGE****Figure 2-2** – Spider diagram for the LPT data for each project's country

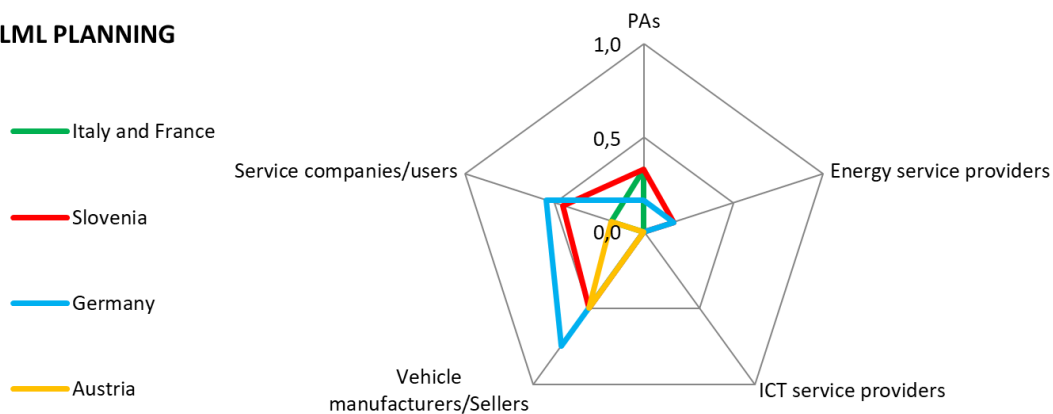
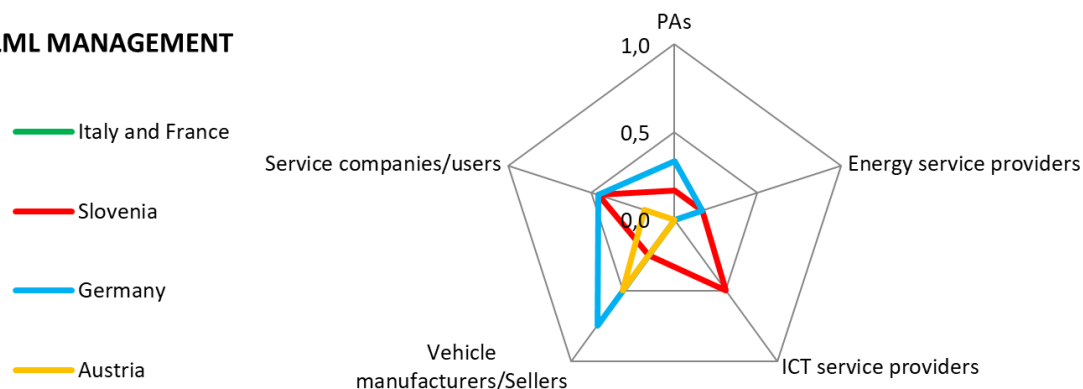
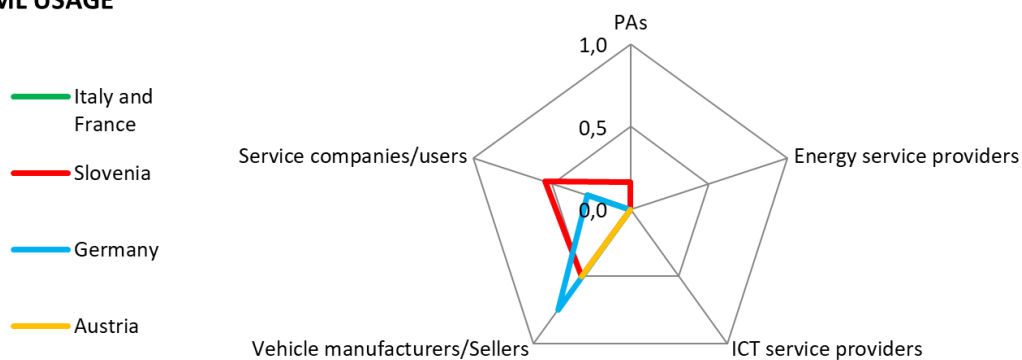
LML PLANNING**LML MANAGEMENT****LML USAGE**

Figure 2-3 – Spider diagram for the LML data for each project's country

The survey highlighted the following:

- **e-Mobility planning.** Much of the e-Mobility planning is carried out by service companies in collaboration with the public administrations and the manufacturers. In this case, the ICT service providers are considered as service companies, which include digital tools and analytics in their offers. Energy service providers are often included in the collaboration, but it's necessary to pay more attention while planning accordingly to the results of the survey.
- **e-Mobility management.** The energy service providers play a vital role in the actual e-Mobility management alongside the service companies. This may be due to the responsibility transferred for power supply and load management. Here, too, there are few or no independent ICT providers; instead, the digital tools that ensure smart energy management are, for example, integrated into the energy service providers or service companies.
- **e-MOB Usage.** The service companies/users are having a big role in the field of e-Mobility usage. Furthermore, the vehicle manufacturers/sellers are also very important. The focus in the Alpine Space countries varies. Slovenia and Austria are focusing on the energy service providers, while Germany, Italy, France and Slovenia have a high intensity on service companies/users. All the participating countries find vehicle manufactures/sellers important. Public authorities are important, and the ICT service providers are not so high-scoring in e-Mobility usage.
- **LPT Planning.** Local Public transport planning is usually the work of public administrations and transport operators in consultation with the local energy service provider. However, manufacturers are also directly involved in the planning phase, not least because the corresponding charging infrastructure must be built to match the vehicles. Germany is the country with all the actors more active on the subject of LPT planning.
- **LPT Management.** Public authorities are only indirectly involved. Most of the management of e-LPT, especially in terms of the charging infrastructure, is carried out by the suppliers in cooperation with the manufacturers and the energy service providers. Slovenia and Germany are the most active. Slovenia is extremely involved with the ICT service providers and energy service providers; Germany is mainly focused on the vehicle manufacturers and service companies.
- **LPT Usage.** For LPT usage, the highest values are reached by the vehicle manufactures in all the countries. In Slovenia, a high number is reached by the PA. ICT service providers and energy suppliers are, in general, irrelevant.
- **LML Planning.** e-Mobility in the Last Mile Logistic and in Logistics in general is a very young economy that is only just emerging. Manufacturers play a decisive role in LML planning. As for the LPT planning, the importance of vehicle manufacturers/ sellers is evident for all the countries involved. In general, ICT service providers and energy suppliers are directly uninvolved in LML planning.
- **LML Management.** Similar to the results of the LPT Management and Planning, the great influence of manufacturers/sellers in the field of e-LML management is evident. Once more, this might be due to the dependence on the implementation of the corresponding charging infrastructure, which is far from being some sort of standard solution and often has to be tailored to the needs of vehicles and operators.
- **LML Usage.** In this case, manufacturers and service companies/users also play a major role in the use.

2.4 Key elements

To develop the right strategies and provide crucial information for the future elaboration of the Tactical Roadmap, a selection of e-Mobility topics on which PAs should increase knowledge was carried out. This was done by carrying out an internal survey and an internal living lab, as well as an external survey among the stakeholders.

The main elements are related to energy production, renewable energy sources rate, distribution, services for flexible electric grid operation, local peaks management, power grid stability, energy grid integration with e-CS, e-LPT, e-LML, and e-Mobility services.

A consolidated list of all the identified elements can be found in Table 2-1. It is organised with respect to the 3 key European policies: Green Deal, Digital Europe and Europe for Citizens.

Table 2-1 – The key elements for the Tactical Roadmap

Green Deal – Green Europe	Digital Europe – Smart Europe	Europe for Citizens – Smart PA
Energy production and RES rate	Data sharing	Policy cycle management
V2V & V2G	Big Data	Circular economy
Urban Mobility Planning	(Open-source) data platform	Sharing economy
Zero emission vehicles	Data lakes	Governance model
Alternative fuels	PPP - Project Financing	Participatory approach
Mobility As A Service (MaaS)	Procurements	Fair, safe, resilient mobility
Services for flexible electric grid operation	Cloud computing	Communication and sensitization
Local peaks management	Cooperative Intelligent Transport Systems (C-ITS)	Autonomous buses
Power grid stability	Cooperative, connected, and automated mobility (CCAM)	Charging infrastructure
Energy distribution service	New business models for mobility	Centralised distribution sites
Battery development	Data of goods fluxes	Global thinking approach
Standardised charging infrastructure	Sharing charging infrastructure	Creative use of policies
e-LPT and e-LML financing	Guidelines for interoperability among services	New scheme of interconnection among PA and private SH

Green Deal – Green Europe	Digital Europe – Smart Europe	Europe for Citizens – Smart PA
Environmental assessment and cost/benefit analysis	LML data capturing tools	Cooperative scheme for small municipalities
Development of infrastructure (mobility, energy, parking, financial issue)	LML and LPT service agreements	Simplification of bureaucratic procedures
Charging concept for LPT and LML	LML instruments (street cameras/sensors/traffic lights)	Sensitising municipalities and companies on sustainable logistic solutions
Improved knowledge of one's territory stakeholders' LML flows	Data exchange platforms among Companies and PAs	
Development of unified services for LPT		
Smart charging management system		
Smart grid network management system		
Grid enforcement		
LPT specific mobility policies (dedicated lanes, smart traffic lights, ...)		
Planning of LPT and LML hubs location		

2.5 Main Transnational actions and measures

There are a large number of documents outlining transition strategies towards more sustainable transport, both on European and national level. The reduction of transport-related emissions is a necessary element to achieve the goals included in the 2015 Paris Agreement (keeping the rise of global temperatures below 1,5 °C and achieving a net-zero emissions in the second half of the 21st century) and the European Green Deal (making Europe climate neutral by 2050). Specific actions for the transport sector have been further detailed in multiple European regulations and directives.

One of them is the setting of emission standards for new vehicles, which creates strong incentives for car manufacturers to invest in green technologies. The reduction of emissions is also addressed by the European strategy on alternative fuels which promotes the use of all the available alternative options, including LPG, natural gas (LNG, CNG, biomethane, GTL), electricity, liquid biofuels and hydrogen.

A related action is the promotion of electricity generation from renewable energy sources, which is crucial for the successful transition to electromobility. In addition, the EU has also developed common rules for the internal electricity market with the aim of organising electricity markets in a more flexible manner. Lastly, a number of initiatives on energy efficiency of vehicles and promotion of collective public transport were also proposed.

The above actions are also reflected in national and regional policies, which are further based on European policies and propose some more detailed steps. Actions necessary for the development and governance of transport infrastructure are often further elaborated according to particular local circumstances.

One of the main elements is the deployment of EV charging infrastructure, facilitated by the development of the necessary regulations (e.g. regarding certificates, authorizations for the infrastructure construction), reduction of bureaucratic procedures, setting up the minimum accessibility standards for charging stations (e.g. minimum number of charging stations in new buildings), promoting research in the field (e.g. on smart grid and V2G) and pilot initiatives.

Regional mobility strategies address planning of services and networks offered by the regions, regulating the distribution of subsidies and outlining major infrastructural investments. At a more local level, typical actions include detailed plans regarding the fleet renewal and the introduction of electric buses, creation of PT lanes, distribution of charging infrastructure, development of payment systems for EV charging, management of parking spaces and limited traffic zones. Both regional and local plans foresee further integration of various modes to achieve more intermodal transport services.

3 The e-SMART Operational Roadmap ITALY

3.1 Basic elements

3.1.1 Territory of reference

The territory of reference for e-SMART project (indicated in the document as *Italy-in-eSMART*) is composed of the following regions: Piedmont, Lombardy, Liguria, Valle d'Aosta, Friuli Venezia Giulia, Veneto, Trentino-Alto Adige. These regions are situated in northern Italy, prevalently in alpine area at the borders of Italy with France, Switzerland, Austria and Slovenia. Two of the regions are located further south from the Alps: the majority of Veneto covers the flat Po valley, and Liguria spreads to the Mediterranean Sea.

Total size of the area equals 97478 km² and covers approximately 30% of the country territory. Population density varies significantly among the regions, and ranges from 39 people per km² in Aosta Valley to 422 people per km² in Lombardy, which is also the most populated of the considered regions. The total population of these regions exceeds 23 million people, which constitutes almost 40% of the Italian population. The level of urbanisation is diverse. Lombardy and Piedmont are the most urbanised regions and consist of 1509 and 1182 municipalities, respectively. As far as the Veneto Region is concerned, although less extensive than the regions of Piedmont and Lombardy, it is also less fragmented territorially. It is divided into 563 local administrations.

Other regions have more rural character and the majority of them incorporate less than 300 municipalities.

Despite constituting a relatively small part of the total country territory, the seven regions contribute to approximately half of Italian GDP, with Lombardy alone generating 22% of it, followed by Veneto and Piedmont with 9% and 8%, respectively. The structure of the economy differs significantly among the regions. Lombardy is the richest and most productive region in the country, relying mostly on its services sector, in particular financial. Piedmont is the industrial centre of Italy, with highly developed automotive and high-tech sectors. Liguria plays an important role in the global logistics system, with the Port of Genova being the biggest port in Italy and one of the most important ones in Europe. As for the north-eastern area (Veneto and Friuli Venezia Giulia), it is important to note that these two regions experienced strong growth in the small and medium industry sector from the 1970s to the 1990s. This has led to a considerable territorial dispersion of activities and residences.

The concept of Sprawl, perfectly describes this type of low-density expansion and strong land consumption. The countryside is increasingly urbanised, industrial areas are indifferently distributed in the territory, the public transport lines do not cover the costs of transport so they offer a low frequency of travel and a large number of people travel from their home to work or school by private means.

In all this, the average, in km travelled, is around 40 km.

The seaports of Venice and Trieste represent the other gateway to Europe for shipping from the south to central and eastern Europe.

Art cities, food, agriculture and tourism are important branches of the economy in all the regions.

3.1.2 Policies and governance models

At national level, the Ministry of Transport has promulgated a series of decrees and regulations that, since 2012, have been aimed at promoting electric mobility, both in terms of vehicles and the construction of charging infrastructure. Many of the regulations are not exclusively dedicated to electric mobility, but more generally to alternative fuels. Similarly, the topics of LML and LPT are never dealt with specifically, but treated in the context of electric mobility in general.

In particular, with the National Plan for Charging Infrastructures (last updated June 2016) the Ministry defined the minimum requirements and technologies for an effective public charging infrastructure network, estimated the need for charging points by 2030, and defined the Strategic Guidelines for the development of the national electric charging network.

Recently (Decree 30 January 2020), the Ministry of Economic Development has established the criteria and modalities to favour the diffusion of the integration technology between the electric vehicles and the electric network (V2G - vehicle to grid), in coherence with the reform of the electric services market.

The regions define the development strategies for electric mobility as well as the reference guidelines. In particular, they work with inter-directional roundtables to consider the multidisciplinary nature of e-Mobility, outline the strategic objectives and priority areas of intervention, identify the actions to be launched, define the governance of the processes and identify tools and forms of financing to support the planned support and incentive methods.

Many regions in northern Italy have also allocated contributions (including non-repayable grants) for the purchase of electric vehicles, often focusing on commercial vehicles (e.g. Piedmont Region for N1 and N2 segments).

Lastly, municipalities are the real key players in electric mobility, as they are responsible for setting up recharging infrastructures in their territory by issuing calls for tenders for the private market operators, often aimed at building and managing the ECS networks.

3.1.3 Territorial stakeholders' analysis

Figure 3-1 represents the level of interest/influence of each local actor in Italy.

The analysis highlighted the important role of PA (at various territorial levels) and privates.

In the boxes characterised by great interest, it is possible to find above all private actors and the PA. The different position of PAs in the various interest/influence boxes highlights how e-SMART issues are real, but not for all of them are addressable at the current time.

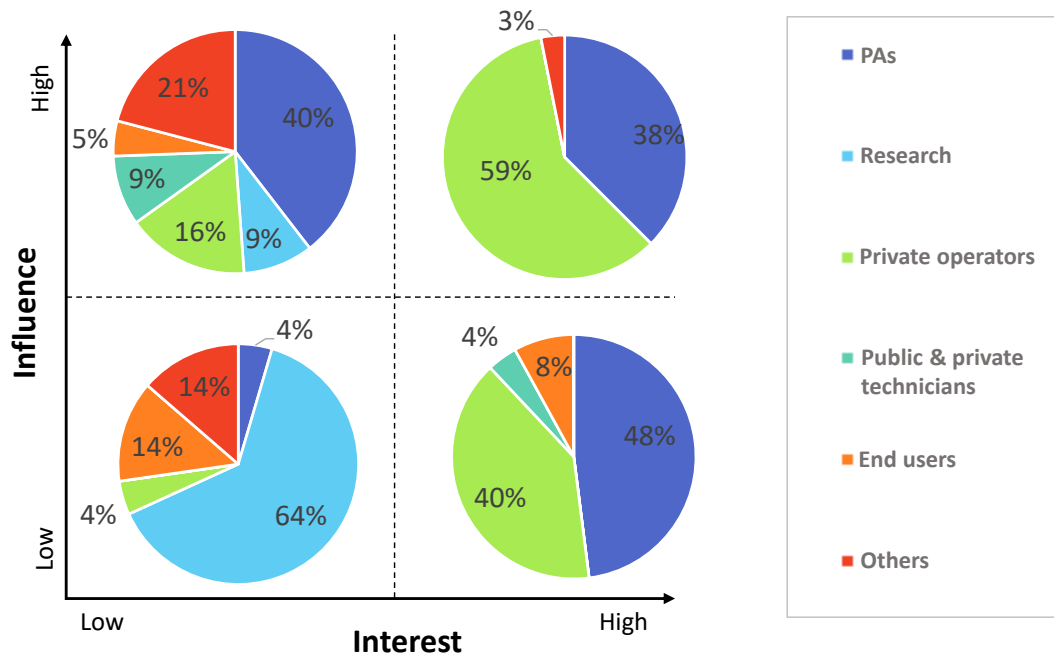


Figure 3-1 – Level of interest and influence for each type of actors (Italy)

In general, in numerous discussions with stakeholders, for both LPT and LML, a strong need emerged for a PA with a clear strategy, able to support the transition to electric mobility (guidelines, legislative support, development opportunities, ...)

With regard to recharging infrastructures, stakeholders highlighted the importance of having an in-depth knowledge of the technologies available for ECSs and the importance of designing and building an adequate network of ECSs, according to technical standards defined by the PA.

A request was also made for the simplification of bureaucratic practises and for the realisation of a digital platform to share the information necessary for construction and operation of charging infrastructures (energy distribution network, underground service network, open worksites, Wi-Fi network, ...).

A greater cooperation among LPT companies could exploit economies of scale and greater knowledge of the available technologies for EVs, with special reference to LML vehicles, could increase the diffusion of the electric fleet of vehicles.

3.1.4 Existing instruments

Here is a short description of tools, ICTs, ITSs, administrative documents or actions, funding, existing and currently used for e-LPT and e-LML. The ones that are not already usable but can be adapted to LML and LPT aim are described as best practises in the measure description sheets.

Database for LPT in Piedmont region

Regional database for the unified management of information on LPT buses in Piedmont. The service is accessible to authorised users of Piedmont's public transport companies (TPL), the Regional Agency for the Mobility (AMP) and the Piedmont Region. The functions are profiled on the basis of the users who access the system. The activity of updating the data is an exclusive competence and responsibility of the company. AMP and Piedmont Region can consult the data validated by all the LPT companies.

Regional decree D.G.R. of 19 October 2018, n. 42-7743 (Piedmont Region)

Establishment and launching of a financing programme for contributions for the development of sustainable mobility in the sector of micro, small and medium-sized enterprises through the renewal of N1 and N2 commercial vehicles - definition of criteria and management procedures. The decree indicates: beneficiaries, requirements, eligible interventions, type and amount, eligible expenditures, procedures for submitting applications.

DGR 5-2912 del 26 February 2021. Approval of the Regional Programme, 2019-2023, of investments in LPT by road. General criteria and modalities of implementation and contribution

The purpose of the decree is to regulate the purchase of M2 or M3 category vehicles, electric, powered by natural gas (including biomethane), diesel or hybrids, for replacing old vehicles. It indicates: eligible costs, beneficiaries of subsidies, actions subject to funding, equipment and preparation of new buses, procedures and deadlines for the presentation and implementation of renewal plans.

3.1.5 Territorial needs and gaps

The analysis of the actors/roles spider diagrams (Annex 1 – Actors' roles) shows that in Italy the energy service providers and the Public Administrations are the actors who play a significant role in the e-Mobility planning, in general. The management of e-Mobility is in the hands of ICT and energy service providers, while its usage is mainly managed by services companies.

Regarding the LPT planning, management and usage, there is a clear lack of the PA leadership, but there are no noteworthy roles among the other actors either.

A similar result can be seen for LML, even if in this case the PA seems to play a slightly more important role mainly in the planning perspective.

The needs and the gaps to be bridged to achieve integrated planning of E-CS and e-Mobility services for TPL and LML vary from infrastructure and engineering obstacles to political and societal challenges.

The main gaps were outlined in the three key European policies: Green Deal, Digital Europe and Europe for Citizens.

Development of ECSs is a major infrastructure gap highlighted by all three documents. It poses a challenge from the engineering point of view, e.g. design of charging stations and their optimal location, but also from the harmonisation perspective. The latter requires political co-operation and developing common technical standards on the European level. Obviously, development of better vehicle technologies is the other part of the same technological challenge.

In addition to gaps related to vehicles and charging infrastructure, there is also the problem of adjusting the power grid to new requirements. It includes upgrading of the existing grid and development of smart grids, in particular technologies like V2G and smart charging. All these technology-oriented challenges are strongly interconnected with the existing political and legal environment; therefore, it is necessary to adjust the policies to facilitate the technological transition.

Comprehensive strategies of transition to e-Mobility should be developed, with special focus on cooperation among all the relevant parties. Simplifying and harmonising existing laws and administrative procedures is the important first step, which should be followed by development of funding schemes and new business models for LPT and LML. Data collection and sharing will play a vital role in harmonisation of all the above activities. Digital Europe policy pays at-

tention to this particular gap, pointing at the necessity of developing large-scale data collection and sharing platforms. (Figure 3-2, Figure 3-3, Figure 3-4).

All the elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project are listed in detail in Annex 2 – Needs and gaps.

Green Deal – Green Europe

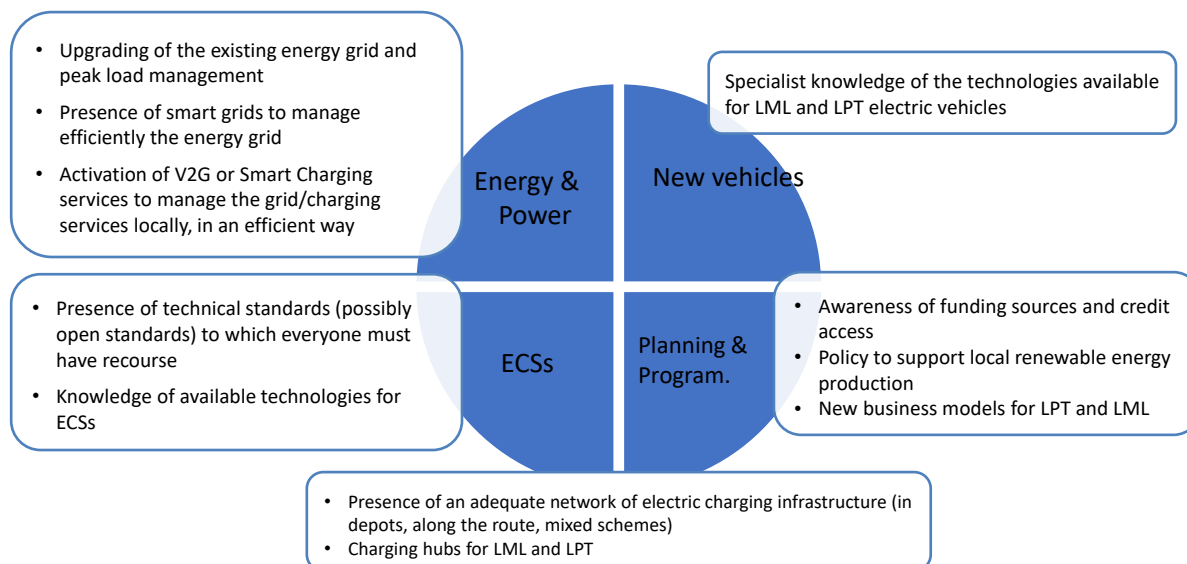


Figure 3-2 – needs and gaps for Italy-in-eSMART territory, in Green Deal policy

Digital Europe – Smart Europe

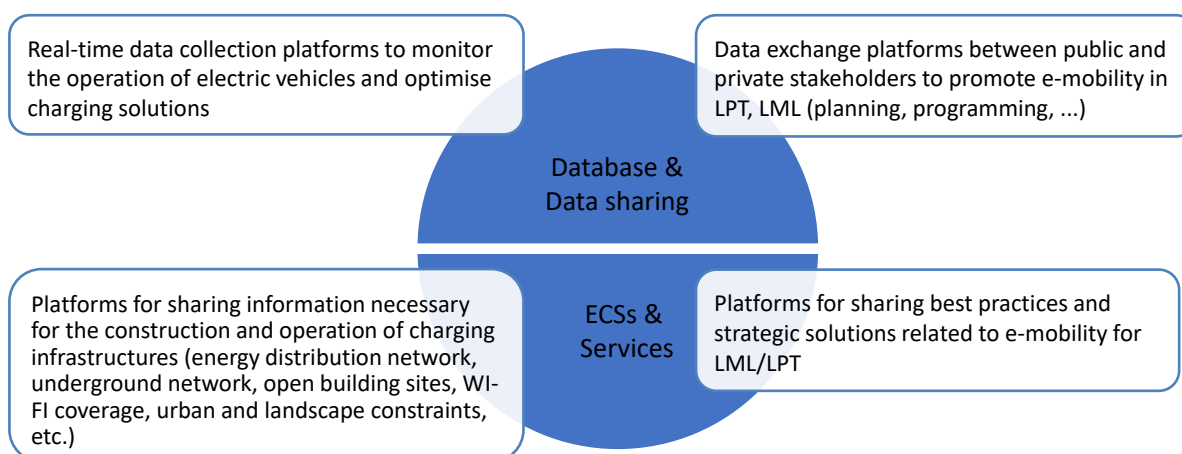


Figure 3-3 – needs and gaps for Italy-in-eSMART territory, in Digital Europe policy

Europe for Citizens – Smart PA

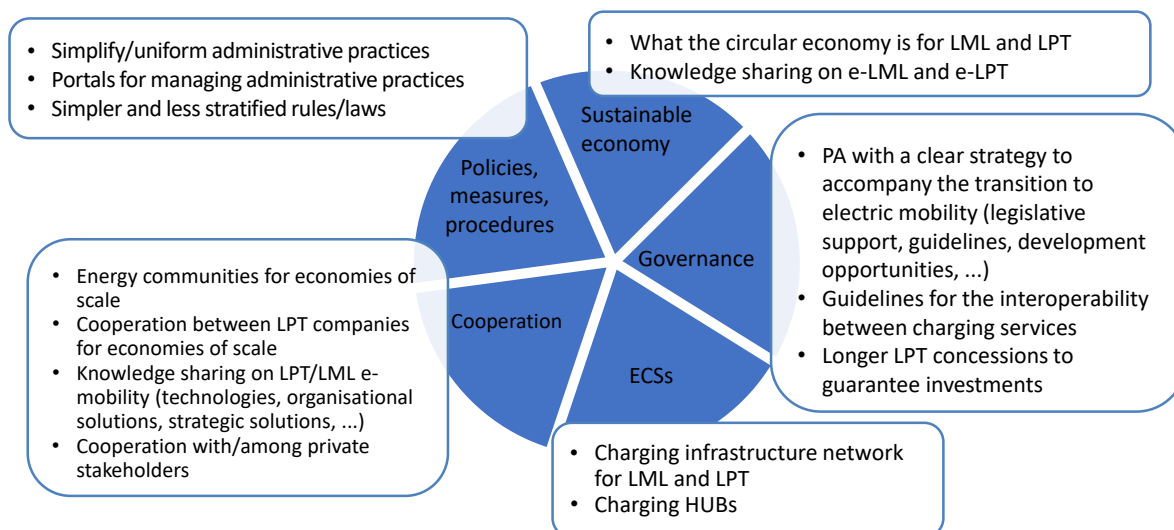


Figure 3-4 – needs and gaps for Italy-in-eSMART territory, in Europe for Citizens policy

3.2 Objectives, operational measures and indicators

The operational measures identified for Operational Road Map of Italy are listed in Table 3-1. Each measure is related with Country Objectives and with the Transnational Key Elements defined for the Tactical Road Map.

The last three columns show the qualitative evaluations of three main criteria: Impact on e-LML/LPT diffusion, Time and Estimated Cost.

More details and a complete description of each operational measure can be found in Annex 3 – Operational Measures.

Table 3-1 – Operational measures for Italy-in-eSMART Roadmap

EU Key elements	National PNRR (Missions) ¹	ORM Objectives	Operational measures	Impact on e-SMART pillars ²	Impact on carbon footprint ³	Time ⁴	Cost ⁵
Green Deal - Green Europe (zero emission vehicles, alternative fuel, charging concept for LML/LPT, new business model for e-Mobility, environmental assessment and cost/benefit analysis)	M5C1: employment policies	Increase the level of knowledge on the subject of electric mobility with regard to LML and LPT, with particular reference to the types of vehicles available on the market, the different recharging technologies available, the maintenance of e-vehicles, business models, funds, best practises	Vocational training	3	2	1	1
	M4C1: strengthening the supply of education services: from kindergartens to universities		University/post-university education	3-4	2	1	2
	M1C2: digitization, innovation and competitiveness in the manufacturing system production system		Web portal to share knowledge	1-2-3-4	2	1	1
	M1C1: digitization, innovation and security in PA		Database to collect information on LPT vehicle and services	2	2	1-2	1
	n.a.		Training on funding	1-2-3-4	2	1	1
Green Deal - Green Europe (development of infrastructures, LPT specific mobility policies, procurements) + Europe for Citizens – Smart PA (charging infrastructures)	M2C2: renewable energy, hydrogen, grid and sustainable mobility	Increase investment in e-LML and e-LPT	Creation of a charging infrastructure network for LPT	2	1	2	3
			Setting up of electric re-charge HUBs	1-2-3-4	1	-2	2-3
			Renewal of the LPT fleet	2	1	2	3
			Renewal of the LML vehicles	1	1	2	3
Digital Europe – Smart Europe (data sharing, data lakes, data exchange platform among Companies and Pas)	M1C2: digitization, innovation and competitiveness in the manufacturing system production system	Simplify the processes leading to the realisation of charging infrastructures enabling easy sharing of all necessary spatial information (energy distribution network, underground network, open building sites, WI-FI coverage, urban and landscape constraints, etc.).	Web platform to share data	1-2-3-4	2	1	2

EU Key elements	National PNRR (Missions) ¹	ORM Objectives	Operational measures	Impact on e-SMART pillars ²	Impact on carbon footprint ³	Time ⁴	Cost ⁵
Europe for Citizens – Smart PA (new scheme of interconnection among PA and private SH, participatory approach, cooperative scheme for small municipalities)	n.a.	Increase cooperation among stakeholders	Multi-disciplinary working tables among PAs	1-2-3-4	2	1	1
	n.a.		Working tables with PAs and private entities	1-2-3-4	2	1	1

Index:

1 PNRR: Plan for National Recovery and Resilience

2 Impact on e-SMART pillars: 1=LML, 2=LPT, 3=e-Mobility, 4=energy grid

3 Impact on carbon footprint: 1=direct on emission, 2=indirect (i.e. on awareness or behaviour), 3=none

4 Time: 1=short (2025), 2=medium (2030), 3=long (2050)

5 Estimated costs: 1=low, 2= medium, 3=high

The proposed monitoring instrument is based on the description of the progress of the achievement of the action goals (see table “action description”). The percentage of achievement during action time life will be the measure of the action progress.

The system of indicators identified for monitoring the Roadmap progress is presented in Table 3-2. It includes more than 30 indicators which aim to verify the progress of measures and results.

Table 3-2 – Operational measures for Italy-in-eSMART Roadmap - indicators

Operational measures	Indicator	Description
Vocational training	Progress indicator	<ul style="list-style-type: none"> number of training courses/seminars organised per year setting up a digital platform to share knowledges and info about e-LML and e-LPT (yes/no)
	Result indicator	<ul style="list-style-type: none"> number of people enrolled in courses number of accesses per year on the platform
University/post-university education	Progress indicator	<ul style="list-style-type: none"> setting up of at least one specific course
	Result indicator	<ul style="list-style-type: none"> number of people enrolled in courses
Web portal to share knowledge	Progress indicator	<ul style="list-style-type: none"> setting up the specific web portal
	Result indicator	<ul style="list-style-type: none"> number SH (private/public) registered number of accesses per year average number of access per user, per year

Operational measures	Indicator	Description
Database to collect information on LPT vehicle and services	Progress indicator	<ul style="list-style-type: none"> • creation of the database
	Result indicator	<ul style="list-style-type: none"> • percentage of LPT companies reporting their fleet data
Training on funding	Progress indicator	<ul style="list-style-type: none"> • number of courses organised
	Result indicator	<ul style="list-style-type: none"> • number of people enrolled in courses • number of projects financed at regional/local level per year • number of projects financed/co-financed with public funds, at regional/local level, per year
Creation of a charging infrastructure network for LPT	Progress indicator	<ul style="list-style-type: none"> • definition of guidelines (yes/no)
	Result indicator	<ul style="list-style-type: none"> • number of LPT charging stations LPT, per years • total kWh of energy supplied by new HUBs, per year
Setting up of electric recharge HUBs	Progress indicator	<ul style="list-style-type: none"> • definition of guidelines (yes/no)
	Result indicator	<ul style="list-style-type: none"> • number of new HUBs, per year • total kWh of energy supplied by new HUBs, per year
Renewal of the LPT fleet	Progress indicator	<ul style="list-style-type: none"> • number of e-vehicles for LPT
	Result indicator	<ul style="list-style-type: none"> • ratio between the number of LPT electric vehicles and the total number of LPT vehicles • ratio between the number of LPT electric vehicles-kms and the total number of LPT vehicles-kms • ratio between the number LPT passengers-kms on electric vehicles and the total number of LPT passengers-kms

Operational measures	Indicator	Description
Renewal of the LML vehicles	Progress indicator	<ul style="list-style-type: none"> • number of e-vehicles for LML
	Result indicator	<ul style="list-style-type: none"> • number of LML e-vehicles over the total number of LML vehicles, per year • ratio between the number of LML electric vehicles and the total number of LML vehicles • ratio between the number of LML electric vehicles-kms and the total number of LML vehicles-kms • ratio between the number LPT tons-kms on electric vehicles and the total number of LPT tons-kms
Web platform to share data	Progress indicator	<ul style="list-style-type: none"> • setting up a digital platform to share data (yes/no)
	Result indicator	<ul style="list-style-type: none"> • number of entities participating in data sharing
Multi-disciplinary working tables among PAs	Progress indicator	<ul style="list-style-type: none"> • number of working tables organised per year
	Result indicator	<ul style="list-style-type: none"> • number of actions of planning and governance resulting, per year
Working tables with PAs and private entities	Progress indicator	<ul style="list-style-type: none"> • number of working tables organised per year
	Result indicator	<ul style="list-style-type: none"> • number of actions of planning and governance resulting, per year

4 The e-SMART Operational Roadmap SLOVENIA

4.1 Basic elements

4.1.1 Territory of reference

Slovenia is divided in 2 cohesion and 12 statistical regions:

- Eastern Slovenia (*Vzhodna Slovenija* – SI01), which groups the Mura, Drava, Carinthia, Savinja, Central Sava, Lower Sava, Southeast Slovenia, and Littoral–Inner Carniola regions.
- Western Slovenia (*Zahodna Slovenija* – SI02), which groups the Central Slovenia, Upper Carniola, Gorizia, and Coastal–Karst regions.

In regard to e-SMART project 2 statistical regions are most relevant, Central Slovenia (Osrednjeslovenska) and Upper Carniola (Gorenjska) which together represent about 38% of Slovenian population (the territory of reference for e-SMART, indicated in the document as ***Slovenia-in e-SMART***).

- | | |
|--|--|
| • Total population approx.: | 2,1 million (2021) |
| • Population density: | 103,9 residents per km ² (2021) |
| • Number of municipalities: | 212 |
| • Number mountain municipalities: | 35 (17%) |
| • Degree of urbanisation: | 50 % |
| • GDP per capita: | 22.312 EUR (2020) |
| • Car ownership: | 555 cars per 1000 resident (2020) |
| • Average car age: | 10,1 years (2018) |
| • % of income spent for mobility: | 6% (2015) which was highest in EU |
| • Passenger kilometres in road public regular transport: | 21.7 million (2020) |
| • Passengers carried in road public regular transport: | 13.35 million (2020) |
| • Goods transported by road: | 90.869 (1.000 t) (2020) |

(Source: SURS, SiStat)

4.1.2 Transportation in Slovenia

The location at the junction of the Mediterranean, the Alps, the Dinarides and the Pannonian Plain and the area being traversed by major rivers have been the reasons for the intersection of the main transport routes in Slovenia. Slovenia is ranked in the scale of the countries with the highest motorway density networks at the 5th place. Eurostat, 2008, explains that “In general, the density of the motorway network is closely correlated with population density and, thus, with the degree of urbanisation. The densest motorway networks can therefore be found in the Netherlands, Belgium, the western regions of Germany and the United Kingdom. At the country level, the Netherlands has the highest motorway infrastructure density with 77

km/1 000 km², followed by Belgium (58 km/1 000 km²) and Luxembourg (57 km/1 000 km²). Slovenia comes in at 5th place, after Germany. Slovenia has a specific distribution of population, even though it can be said that cities are relatively densely populated, Slovenia has a lot of dispersed settlements that need connection to the main urban areas. Bus traffic is the main means of public passenger transport in Slovenia, particularly in towns. The main bus stations are in Ljubljana, Maribor, Celje, and Kranj. Railway system in Slovenia is operated by Slovenian Railways and consists of 1,229 km of standard gauge tracks, 331 km as double track, and reaches all regions of the country. Slovenia is well connected by rail to all surrounding countries, reflecting the fact that it used to be part of the Austro-Hungarian Empire and later part of Yugoslavia. Planned construction of a double track section between Ljubljana and the port of Koper will alleviate transitory cargo transport to and from the port of Koper, which is the largest north Adriatic port in terms of container transport. Its main advantage is its location, which is about 2,000 nautical miles (3,700 km; 2,300 mi) closer to destinations east of the Suez than the ports of Northern Europe, and the land transport from Koper by road and by railway to the main industrial centres in Central Europe is approximately 500 kilometres (310 mi) shorter than from Northern European ports.

4.1.3 Policies and governance models

PA policies in Slovenia are divided between supranational (EU), national and local policies, without regional level. National PAs are in charge of implementation of EU policies in national framework, creating national policy framework and allocation of budget to local PA. National PAs also operate public agencies and funds which provide incentives for electrification of LPT and LML.

The main public actor in E-CS planning, on the national level, is the Ministry of Infrastructure (MI). MESP is responsible for managing the Fund for Climate Change and preparation of its funding Program in accordance with the legislation and strategies prepared by MI. According to the financial resources in the Fund for Climate Change and the prepared Program, calls for subsidies are issued through “Eco Fund”, which is an organisation responsible for administrative procedures of awarding previously mentioned incentives. The other two important national entities are the Government Office for Development and European Cohesion Policy and the Ministry of Economic Development and Technology. All ministries cooperate in planning of grant policies, and financial mechanisms which through different calls and by regional support organisations (for example: Regional Development Agencies, Association of City Municipalities Slovenia) enable implementation of the projects on the municipal level. This, however, does not assure that the municipalities will apply for the funds with projects implementing electrification of LPT. It has to be noted that also projects funded from ERDF (e.g., INTERREG Programme) support implementation of electrification of LPT and LML, mostly by co-financing preparation of strategies and action plans and pilot actions. are funded by the Fund for climate change and national funds.

MI is preparing legislation, strategies and action plans (Integrated transport planning act) regarding alternative fuels, charging stations and other legislation regarding vehicles, such as national LPT planning and overview of rules for LPT concessionaires and awarding concessions for interregional lines. Beside this, they are responsible for funding, with use of financial instruments connected to Connecting European Facility and together with Government Office for Development and European Cohesion Policy for financing Instrument Agreement for regional development. On a more operational level they are responsible for national (between municipalities) bus transport, while municipalities are responsible for municipal (local) public transport.

On a local level policies for mobility planning, including adoption of electric mobility in the segment of LPT and LML are created on municipal level. Municipalities are creating their own spatial plans, frameworks related to LPT on all levels (buses, taxis, bike sharing...) and decrees

regarding traffic regulation (dedicated LPT lanes, parking regulation, concessions...). They are also responsible for LML regulations in terms of giving permits to enter specific parts of the cities (usually closed areas for one or all of the M, N, O, T, SA vehicle categories). Therefore, municipalities have a direct power to influence the transition to e-mobility in the segment of LML as well as in the LPT.

Among the e-SMART activities, a plan to ensure stakeholders engagement has been developed. To this aim, all the relevant stakeholders were mapped: from those with high levels of interest in e-SMART who may have low levels of influence up to strategic stakeholders with power, motivation, and means to implement research outcomes.

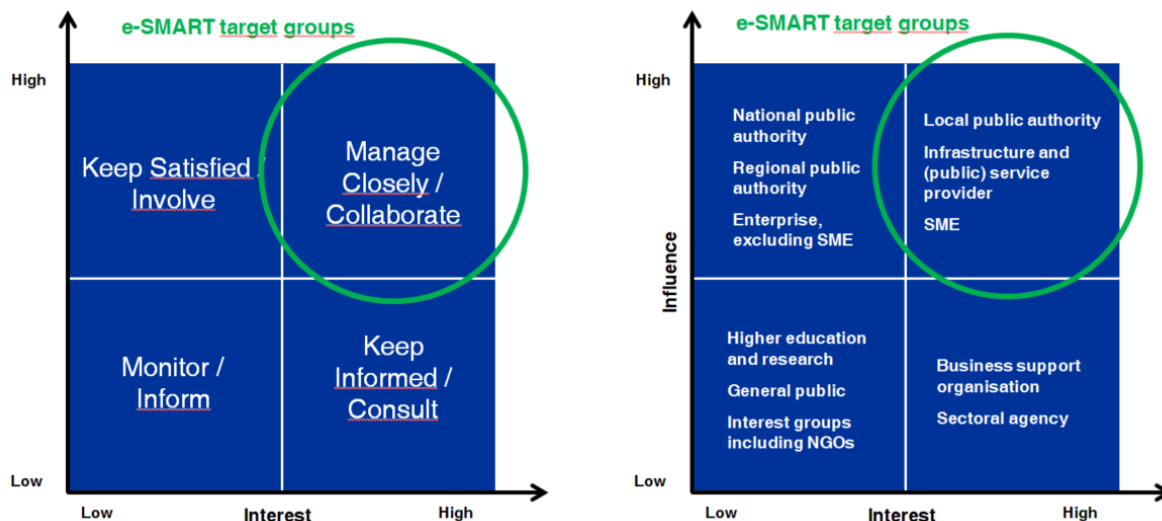


Figure 4-1 – Influence/interest grid for stakeholder prioritisation. Left: stakeholders are assigned to a category according to their likely contribution and interest in the project. Right: mapping of the stakeholder groups stakeholders that have been identified in the e-SMART AF.

The stakeholders were clustered into 6 categories: PAs, research, private operators, public and private technicians, end users, and others. Their percentage distribution in the influence/interest grid for Slovenia is shown in Figure 4-2. Having collected all the PPs' contribution, many actors, mainly PAs and private operators, are presented in all the quadrants, suggesting that they have different roles, power, and interest according to the different territory, in line with what indicated by the actors and roles analysis.

4.1.4 Territorial stakeholders' analysis

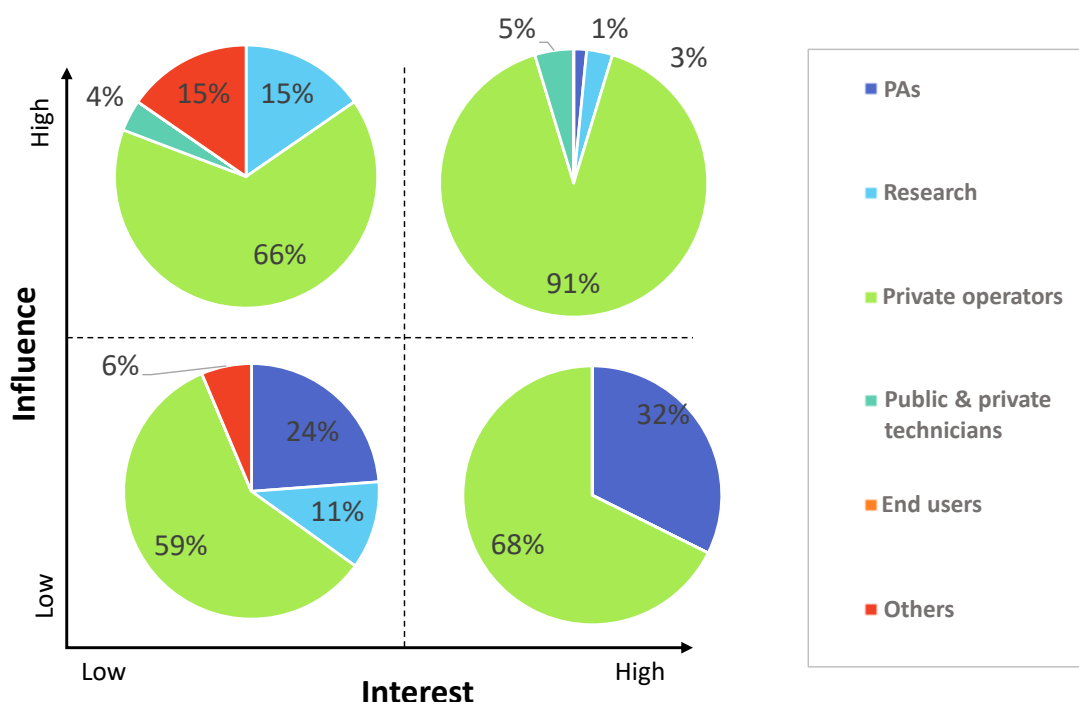


Figure 4-2 – Level of interest and influence for each type of actors (Slovenia)

Public Transport

Electrification of road public transport is still in its infancy in Slovenia. European legislation, specifically the Clean Vehicle Directive (Directive (EU) 2019/116) had an adverse effect on the development of local public transport in rural regions. The lack of financial support for vehicles and high costs of electric buses are preventing smaller municipalities from creating their own electric public transport network. General consensus between stakeholders is that even ICE based public transport has environmental and societal benefits in comparison to residents using their own private transport options.

Public transport operators (PTO) are slowly starting to adopt pilot projects in electric public transport. Significant setback happened in 2017, when two electric buses and chargers were destroyed in fire in Ljubljana, which prevented the largest PTO to continue with electric vehicle trials. The second setback was from 2020 until the end of 2021, when no call for grants for purchasing electric buses was issued by the MESP. Still, city municipalities like Maribor and Kranj have started the projects of bus lines electrification. It is expected that the users of public transport will be able to travel with normal size electric buses in Maribor by the end of 2022 and in Kranj, predictably, in the beginning of 2023. There are several projects for electrified public transport which use smaller vehicles for on demand mobility in city centres, particularly aimed at elderly and disabled. Those services utilise either electric passenger cars or electric light four-wheelers.

Government and public authorities should become the leaders in electric transformation of road public transport with better initiatives for purchasing, maintenance and operation of zero emission vehicles and charging infrastructure. Both local public authorities that are the owners of PTOs in larger cities and those who organise their public transport with private companies, should direct their city planning to incentivize green public transport with city planning ordinances, investments in charging infrastructure and fleets. On the national level suitable legislative and financial support for those investments should be made available according to the

municipal financial capacities and impact prioritisation, supporting public-private partnerships when appropriate.

Purchasing practises and tender conditions should be set to promote the best zero emission transport options for particular environments, instead of lowest cost option. With the current public procurement act, publicly owned PTOs are forced to acquire lowest cost technology options instead of the options that would contribute to zero emission LPT.

Most promising technologies in the field of local public road transport are hydrogen and battery powered buses. Both have significant issues with lack of charging infrastructure, and in case of high voltage charging for electric buses, there are problems with accessing required electrical currents in current locations of bus depots.

Operating cost of public transport lines will be high, until prices of electric buses become comparable with conventional buses. However, these are not the only costs for the service providers or municipalities. With the costs of maintenance, charging infrastructure and unpredictable costs of electrical energy, operating costs increase even more. But even with higher operating costs it is imperative, to keep the public bus transport cost available for everybody, including the most economically vulnerable end users and promote use of LPT.

Last-Mile-Logistic

Last mile logistics should be differentiated between parcel services which use vehicles under 3,5t and forwarding services which use vehicles over 7.5t. While parcel services companies are starting to use and test different zero emission solutions, logistics services are not yet electrifying their fleets and as of 2021 there aren't any registered heavy duty electric trucks in Slovenia. The main reason for lack of interest in electric heavy vehicles are availability of appropriate charging infrastructure and high prices and short ranges of heavy-duty trucks. Battery trucks also suffer from reduced cargo volume and payload.

Considering the use of light vehicles (under 3.5t) in LML, there are several pushes to hasten decarbonisation of package delivery vehicles in Slovenia. Several international delivery companies are following their global goals to lower emissions and are starting to use zero emission vehicles. The most ambitious project is electrifying the fleet of Slovenian Post with e-Vans and light electric vehicles and creation of their own network of charging stations.

Infrastructure for efficient operation of electric delivery vehicles is still not adequate or in the case of heavy delivery trucks, non-existent. In 2022 the project for setting up a public charging infrastructure for HDV in transit at the Ljubljana ring is in the implementation phase. Overnight charging at delivery depots is a planned option, while opportunity charging at depots is not practical, due to the short times trucks spend at depots. Logistics companies are sceptical of shared charging points, because they require total uninterrupted access to charging and at the same time locations at the delivery depots are not interesting locations for the general public and would not generate adequate income to justify potential interrupted access. Development of alternative charging options, such as wireless induction charging, which doesn't require vehicles to stop, should also be explored.

LML operators have interest in using public charging stations only for partial charging during deliveries. For such partial charging high voltage additional infrastructure should be planned, so vehicles could receive significant charge during relatively short stops and to prevent situations where delivery people would have to wait for their vehicle to charge.

4.1.5 Existing instruments

e-SMART addressed the following platforms for meta DSS digital instrument:

T2 Smart city

T-2 Smarty city platform is an automated data collection (from IOT devices) and communication platform, which provides municipal authorities with information about local areas and at the same time it provides local residents with information about community (either by app, website, or SMS) in real time.

IOT platform »T-2 Smart Cities« consist of building new telecommunication infrastructure, its management and creation of »data pool«. Collected data is shared to end users via a connected app; platform managers are able to access data via web control app and developers are able to access data via smart cities open platform.

Gremo na elektriko

Gremo na elektriko is Slovenia's first and biggest charging stations (CS) finder. Find a station to plug your electric vehicle or sign in your own charging station. Use of this website is free. Elektro Ljubljana operates this website (and option to export charging point data, to personal GPS device) to provide services to EV owners, drivers and charging stations owners.

GNE utilises OCEAN platform, localised for Slovenia's needs. It provides:

- Charging equipment integration
- Roaming services

4.1.6 Territorial needs and gaps

Analysis of data collected in survey and during RLL, which was collected in spider diagrams presented in this document (Annex 1 – Actors' roles) quite clearly show importance, of energy services providers for e-Mobility planning in general, mostly because of potential pressure of e-Mobility on the power grid.

e-Mobility management stays in control of ICT service providers combined with Energy service providers, because energy service providers manage some of the most important ICT tools related to electric mobility in Slovenia. Usage of e-Mobility solutions is focused mostly on the private sector and general public users, while showing that PA's lag behind in implementation speed.

LPT planning shows similar images as in other target territories addressed in e-SMART project, where the largest steps are made by vehicle manufactures and sellers. LPT management shows similar status as e-Mobility management in general, where the connection between ICT providers and energy service providers shows their proactive role in development of new solutions. e-LPT usage is still extremely limited in Slovenia.

LML data shows similar conclusions as for LPT, weak PA leadership with most activity shown in the private sector particularly with service providers and vehicle manufacturers and sellers. ICT providers are active in LML management as platform developers/providers.

Decarbonization of European mobility is a complex problem that requires a comprehensive approach that includes technological, social and policy changes as outlined in key European policies: Green Deal, Digital Europe and Europe for Citizens. Without solutions that address all three main challenges and also address the influence on the global economic competitiveness of the EU in regard to these strategies, a change is impossible.

Technologically, the main challenges are development of interconnected and harmonised charging infrastructure, construction of a smart power grid capable of supporting charging infrastructure and development of advanced attainable vehicles that suit the needs of their users. Advances in both fields require policy changes on European and national level, to provide a predictable legal and policy framework for research and development of technologies and innovative business models to support transition to e-Mobility. On the other hand, policies should push LPT and LML companies to invest in green mobility, so the market forces can put pressure on infrastructure and energy sector which will need to tackle these issues with public authorities.

To achieve before stated goals:

- all policies should be supported by strong large-scale data collection and;
- sharing infrastructure is vitally important to provide decision makers with current and precise information.

Following, a schematic representation of needs and gaps for Slovenia. All the elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project are listed in detail in Annex 2 – Needs and gaps.

Green Deal – Green Europe chart

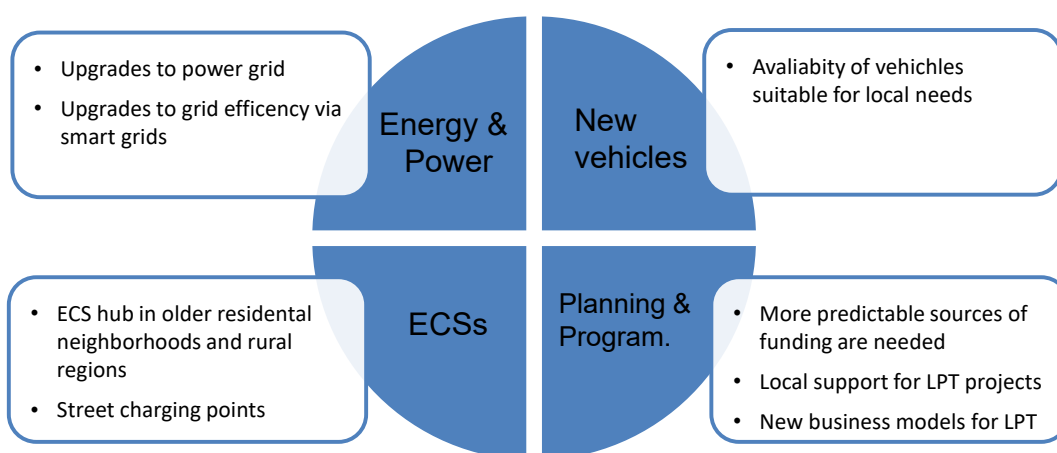


Figure 4-3 – Needs and gaps for Slovenia-in-eSMART territory, in Green Deal policy

Digital Europe – Smart Europe chart

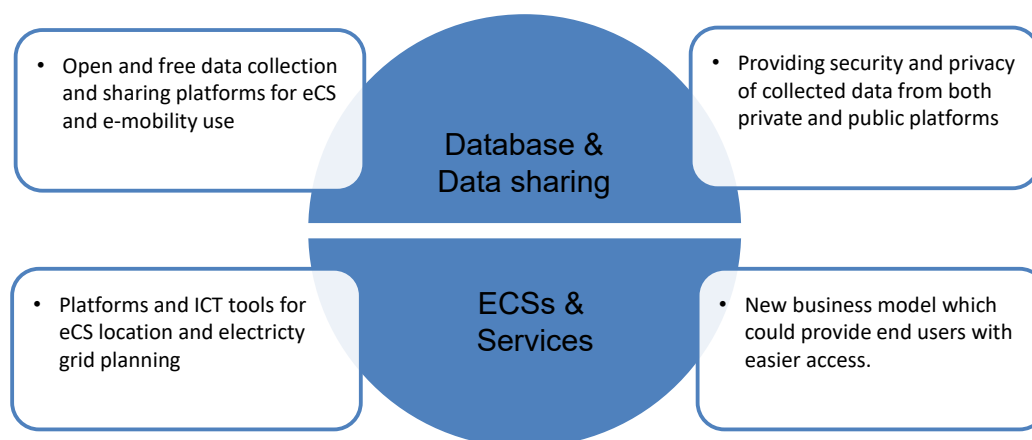


Figure 4-4 – needs and gaps for Slovenia-in-eSMART territory, in Digital Europe policy

Europe for Citizens – Smart PA chart

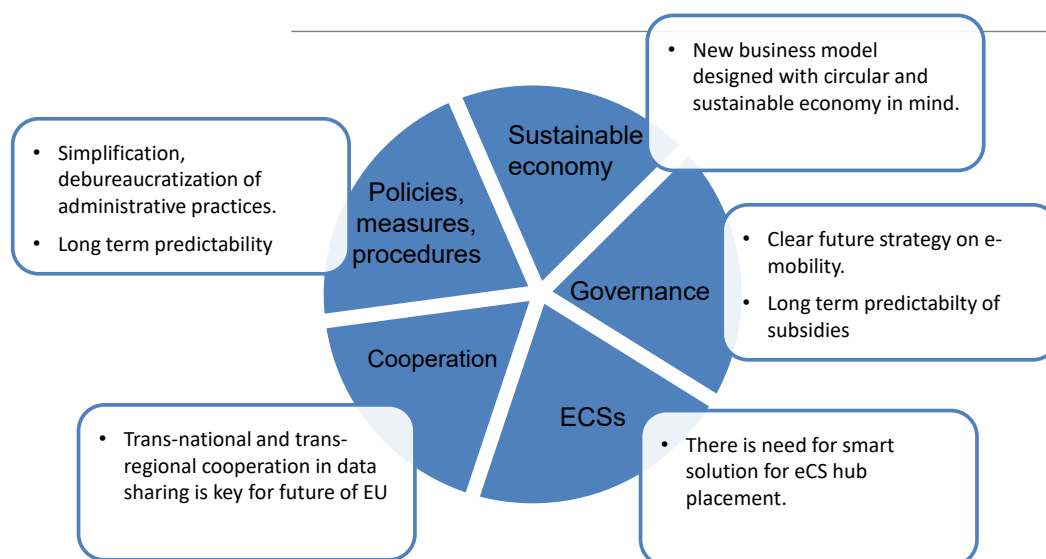


Figure 4-5 – needs and gaps for Slovenia-in-eSMART territory, in Europe for Citizens policy

4.2 Objectives, operational measures and indicators

The operational measures identified for Operational Road Map of Slovenia are listed in Table 4-1. Each measure is related with Country Objectives and with the Transnational Key Elements defined for the Tactical Road Map.

The last three columns show the qualitative evaluations of three main criteria: Impact on e-LML/LPT diffusion, Time and Estimated Cost.

More details and a complete description of each operational measure can be found in Annex 3 – Operational Measures.

Table 4-1 – Operational measures for Slovenia-in-eSMART Roadmap

EU Key elements	National PNRR (Missions) ¹	ORM Objectives	Operational measures	Impact on e-SMART pillars ²	Impact on carbon footprint ³	Time ⁴	Cost ⁵
Green Deal - Green Europe (zero emission vehicles, alternative fuel, charging for LML/LPT)	Development area 1; Green transition Component 1 Renewable energy sources and energy efficiency in economy Component 4: Sustainable mobility	Encourage the integration of zero emission criteria for vehicles in public procurement regulations, Support the extension of the electrified public transport network, fleets and management systems; Dedicate financial incentives within existing financial instruments for statistical regions solely for the implementation of the electrification of the public road transport and e-LML (example Fund for Climate change). Support provisions for increasing efficiency of public transport by implementing techniques already in use in last mile logistics services; Support energy sector in upgrading the grid in order to enable expansion of e-LPT and e-LML charging infrastructure.	LPT and LML charging infrastructure expansion	2,3,4	1	2 & 3	3
			LML fleet updates and expansion	1,3	1	2	3
			LPT fleet updates and expansion	2,3	1	2	3

EU Key elements	National PNRR (Missions) ¹	ORM Objectives	Operational measures	Impact on e-SMART pillars ²	Impact on carbon footprint ³	Time ⁴	Cost ⁵
Digital Europe – Smart Europe (data sharing, data lakes, data exchange platform among Companies and PAs) + Europe for Citizens – Smart PA (new scheme of interconnection among PA and private SH, participatory approach, cooperative scheme for small municipalities)	Development area 2; Digital transformation Component 1: Digital transformation of the economy Component : Digital transformation of the public sector and the public administration	Provide the legal grounds for data sharing from private economic entities in the energy sector, important for the PAs and relevant economic entities for the planning diffusion of the charging infrastructure in the sectors of LML and LPT.	Web platform to collate collected data from existing relevant data sources and smart city platforms	1,2, 3,4	2	1	2
		With public data sharing on charging infrastructure on the national level promote the readiness of Slovenia in terms of charging service for e-LML and e-LPT.	Legislation for data sharing.	1,2, 3,4	2	1	1
		Provide legal grounds for funding strategic integrated solutions in the sectors of Energy, e-LPT and e-LML for urban and rural areas, focused on achieving national KPIs in the mentioned sectors.	Projects for diffusion of e-mobility in the sectors of LPT and LML infrastructure with adequate national funding.	1,2, 3,4	1	1	3
		Foster public-private-partnerships (PPP) to enable private investors to access to better locations to display their respective services;	Legislation for existing financial instruments focusing on achieving the national KPIs in the sectors of Energy, e-LPT and e-LML.	1,2, 3,4	2	1	1

Index:

1 PNRR: Plan for National Recovery and Resilience

2 Impact on e-SMART pillars: 1=LML, 2=LPT, 3=e-Mobility, 4=energy grid

3 Impact on carbon footprint: 1=direct on emission, 2=indirect (i.e. on awareness or behaviour), 3=none

4 Time: 1=short (2025), 2=medium (2030), 3=long (2050)

5 Estimated costs: 1=low, 2= medium, 3=high

The proposed monitoring instrument is based on the description of the progress of the achievement of the action goals (see table “action description”). The percentage of achievement during action time life will be the measure of the action progress.

Table 4-2 presents the system of indicators identified for monitoring the Roadmap progress. It includes more than 10 indicators which aim to verify the progress of measures and results.

Table 4-2 – Operational measures for Slovenia-in-eSMART Roadmap - indicators

Operational measures	Indicator	Description
e-LPT charging infrastructure expansion	Progress indicator	• funds allocated for incentives for e-lpt charging infrastructure
	Result indicator	• number of new e-LPT charging stations
Updates of the LPT fleet to BEVs	Progress indicator	• funds allocated for incentives for e-LPT
	Result indicator	• percentage of e-LPT vehicles in comparison to ice vehicles
Renewal of the electrified LML vehicles	Progress indicator	• number of measures supporting transition of LML HDV fleets to BEVs
	Result indicator	• percentage of e-LML HD vehicles in comparison to ice vehicles
Web platform to col-late collected data from existing relevant data sources and smart city platforms	Progress indicator	• setting up a national digital data sharing platform
	Result indicator	• number of entities participating in data sharing
Legislation for data sharing	Progress indicator	• preparation of the legislation enabling compulsory data sharing of the data relevant for promoting the diffusion and use of the charging infrastructure for LPT and LML BEVs.
	Result indicator	• adopted legislation put into force
Projects for diffusion of e-mobility in the sectors of LPT and LML infrastructure with adequate national funding	Progress indicator	• number of national calls for grants supporting projects for diffusion of e-mobility in the LPT sector and public infrastructure for LML
	Result indicator	• number of successfully implemented projects achieving national KPIs in the sectors of Energy, e-LPT and e-LML.
Legislation for existing financial instruments focusing on achieving the national KPIs in the sectors of Energy, e-LPT and e-LML.	Progress indicator	• number of financial instruments supporting integrated solutions for the implementation of national KPIs in the e-SMART sectors
	Result indicator	• allocated funds specifically dedicated only for achieving KPIs in the e-SMART sectors per statistical region.

5 The e-SMART Operational Roadmap FRANCE

5.1 Basic elements

5.1.1 Territory of reference

The territory of reference for the e-SMART project (indicated in the document as ***France-in-eSMART***) encompasses 3 different regions:

The AURA region, located in the south-east part of France: It counts 7.6 million inhabitants, out of which 78% live in urban areas. There are 4100 municipalities in total, with four metropolitan areas having more than 200 000 inhabitants. 67% of the region is covered by mountains, 40% by forests and there are 9 natural regional parks. With 230 billion €, the Region represents 12% of the French GDP, mainly based on tourism and industry. With many hydro power plants and nuclear power plants the region is presently exporting energy.

The Franche-Comté part of Région Bourgogne-Franche-Comté : Since 2016 Franche-Comté is part of Région Bourgogne-Franche-Comté, which encompasses the territories of former régions Bourgogne & Franche-Comté. Franche-Comté is the only part of régions Bourgogne & Franche-Comté that officially belongs to Alpine Space. It is located in the East of France and in the North-Western area of the Alpine Space. The territory covers four French departments: Doubs, Jura, Haute-Saône and Belfort Territory, with a total surface of 16.202 km². The Franche-Comté extends to about 170 km from south-west to north-east, and to about 110 km from north-west to south east.

The Alsace part of Région Grand Est : the former French region Alsace merged with Lorraine and Champagne-Ardenne to form the new big region Grand-Est after the taking effect of the territorial reform on 1st January 2016. Alsace is located in the Northeast of France, between Germany in the East, the Vosges Mountains in the West and Switzerland in the South. Its capital is Strasbourg. The Region covers two French departments, the Upper-Rhine (Haut-Rhin) and the Lower Rhine (Bas-Rhin). At 190 km in length and 50 km wide, Alsace covers a surface area of 8,280 km².

5.1.2 Policies and governance models

French regulatory framework on mobility is based on 2 main laws:

- Law n° 2015-992 of 2015 August 17th on energy transition: the law deals with many topics related to energy transition. It gives detailed objectives as regards low-carbon mobility: 7 million charging points have to be deployed by 2030, subsidies for the purchase of electric vehicles are proposed; 50% of the new buses in the public fleets have to be with low emissions in 2020 and 100% in 2025, areas with restricted circulation are defined.
- Law n° 2019-1428 of 2019 December 24th on mobility orientations: this law is dedicated to mobility issues. For e-Mobility, the objective is to have only low emission vehicles in 2050 (for land transport), to develop 5 times more charging points by 2022, to draw a legal framework for autonomous vehicles, to develop new mobility plans integrating logistic needs, to develop low emission zones in city centres.

Then the legal framework is completed by specific decrees:

- Decree 2007-23 of 2017 January 23rd on low emissions buses and coaches: Several criteria are given according to the types of vehicles and the place and time where and when they can circulate. For instance, in a city exceeding 250 000 inhabitants, within a perimeter that has to be defined by local authorities, low emission buses are only: electric, hydrogen, natural gas using a certain amount of biogas and hybrid-ZEV vehicles.
- Decree of 2018 August 3rd on depots for bus charging: Many rules have to be respected when there are more than 10 buses charging in a depot with a load exceeding 600 kVA: distance between charging points and building walls or ceilings, necessity to have a monitoring station, fire security equipment, etc.

5.1.3 Territorial stakeholders' analysis

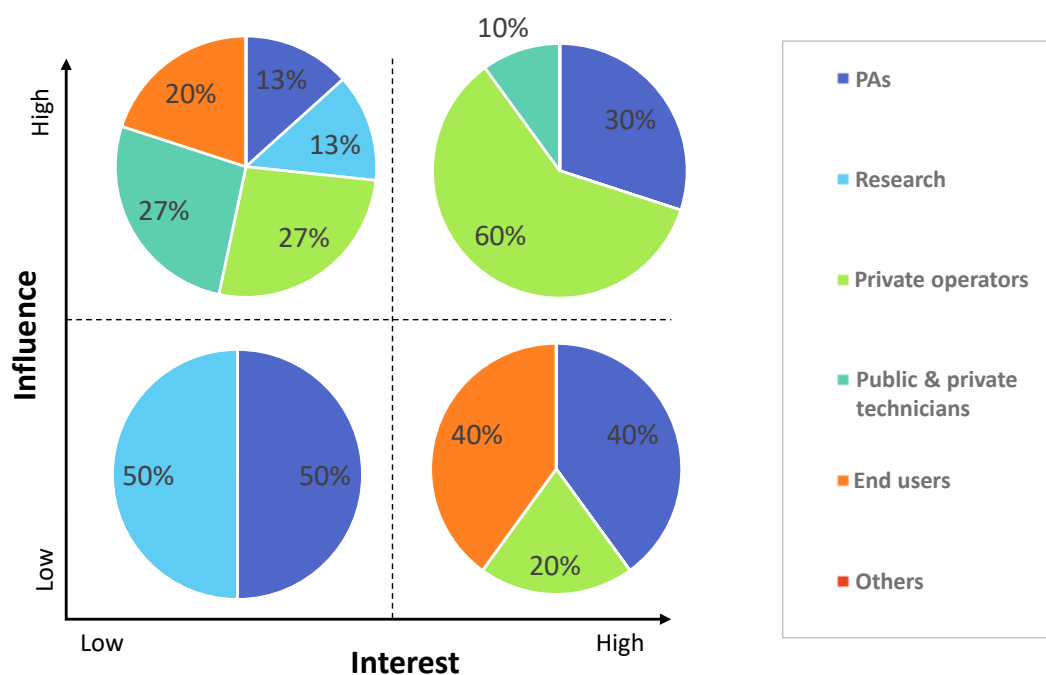


Figure 5-1 – Level of interest and influence for each type of actors (France)

In France, private operators are key players in the governance model of electric mobility. They are the ones who have the most interest in it, but also have the most impact on the political decisions taken. What is striking in studying these graphs is that end-users, in this case citizens, remain very little interested in the development of public policies on electric mobility, despite the impact they could have on the decisions taken. In view of these results, it seems important in France to develop cooperation between the various stakeholders, mainly private actors, and public authorities, to accelerate the process of electrification and greening of public transport and last mile delivery.

5.1.4 Existing instruments

In AURA, the SRADDET (regional planning tool for land planning, sustainable development and territories) has been approved in 2019 and describes the overall strategy of the Region. Among the various measures, we can mention the accompanying measure n°27.1 “Encourage alternative usage of parking lots” and n°27.2 “Plan deployment of E-CS”. There is also a regional scheme for economic development, innovation and internationalisation. The section on mobility plans to prepare the future intermodality and to foster innovative clean mobility.

In AURA the TERRISTORY tool (<https://auvergnerhonealpes.territory.fr/>) gives access to municipalities and many other SH to a wide range of indicators on their territory. These indicators concern energy consumption and production, mobility, air pollutants emissions, employment, etc. The tool also enables a municipality to design a long-term trajectory on its energy policy. TERRISTORY aims at integrating more indicators on e-Mobility through the e-SMART project.

The SRADDET of Burgundy Franche-Comté (Schéma Régional d'Aménagement, de Développement Durable et d'Égalité des Territoires) is the new regional planning instrument of the region, approved on September 16th, 2020. The aim is to accompany the territories in their planification and to sensitise and train them for tomorrow's objectives.

The SRADDET Great East is based on the same principle as the SRADDET Burgundy-Franche-Comté and represents a performant planning instrument for the region, and thus for Alsace.

Both of these schemes will participate in the sensibilisation of citizens and public administrations to the stakes of sustainable development, and thus to the implementation of smart mobility.

5.1.5 Territorial needs and gaps

In France, e-Mobility planning is of high-interest and highly influenced and managed by the Public Administrations and of very-high interest and mainly managed by the energy service providers. We will see in the different spider-diagrams (Annex 1 – Actors' roles) that this couple public administration – service providers is the one at the head of e-Mobility management whether for e-LML or for e-LPT in France, and in particular in the Alsace, Franche-Comté, Rhône-Alpes and PACA regions.

As mentioned right above, the service providers are the ones who are managing e-Mobility on the French territory. In this case, they are divided in two: the ICT service providers who are the most involved in the management of e-Mobility and the energy service providers who also participate actively.

Concerning the e-Mobility usages, they are oriented and managed in France by the service companies together with the end-users (service companies are most of the time the end-users).

The LPT planning does not raise much interest in France, and only among service companies, meaning those who are operating public transports. They are following the political lines of the municipalities in order to organise their planning.

The management of local public transport in France is mainly managed by public administrations, since they are the ones who prepare the global political guidelines in terms of transportation in the city, as it will be explained later with the other diagrams.

Concerning the LPT usages, just as for the LML, the service companies are the ones influencing the usages. Local public transport in France is managed by service companies and made and planned at a political level by public administrations. Cities and public administrations give service operators the broad political and public health guidelines, the city's carbon neutrality objectives, etc., and the latter organise the uses according to these broad guidelines.

The organisation and management of LML in France is rather the responsibility of the public administrations, followed by the service companies, logistics operators. This can be easily explained by the fact that the organisation of cities in France is exclusively governed by municipalities, and last mile logistics falls within their remit, in collaboration of course with the service operators who plan deliveries. This is part of urban planning and urban reorganisation for a healthier and more sustainable city.

Regarding public transport, the main obstacles to the development of e-Mobility concern the costs, the autonomy, the regulation on depots (above 10 buses and 600 kVA of charge, regulatory requirements become really demanding for fire protection), the strategy of municipalities which are not ambitious enough, the environmental impacts of the batteries. Thus, the needs and expectations of the stakeholders would be to:

- Try to develop more buses with pantograph charging which lead to smaller batteries in the vehicles, fewer costs and better autonomy
- Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs
- Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements
- Lower the costs, give financial support

As regards public car sharing, difficulties are met regarding the use of the vehicles and the business models. The needs and expectations of the stakeholders would be to:

- Help people change their behaviour and understand better how to use an electric car
- Improve interoperability between charging points and allow payment with a unique card
- Improve the business model by making subscription costs less expensive when the vehicles are more used

Regarding LML, the main obstacles to the development of e-Mobility are due to: regulatory requirements concerning vehicle size in city centres, costs of the investment and operation, lack of time to charge during the daily round sounds, vehicle autonomy. Thus, the needs and expectations of LML SHs would be to:

- Reorganise delivery schemes
 - » More concertation between public and private sectors to identify the local constraints on logistics, the various stakeholders to involve, the various delivery solutions operated on the territory
 - » Try to draw a map of the LML flows at the territorial level to better optimise them
 - » Make some experimentation and then assess their efficiency on the environmental and economical point of view
 - » Rely on LML stakeholders who already know the more efficient solutions (for instance: several small vehicles versus one bigger truck) and do not try to multiply electric small vehicles for B2C flows, which will create traffic congestion. Accept to keep having heavy trucks in city centres when it optimises the transport of a big volume (example: supermarket)
 - » Adapt the urban environment: platforms, hubs, LML parking areas, etc.
- Reduce operation costs and bring financial support
 - » Work first on flow organisation and schemes before investing in electric vehicles
 - » Electric solutions are not yet relevant for heavy trucks. At the moment, only light commercial vehicles should be supported
 - » Help companies transform their fleet and choose the right solution, give them more information and advice
 - » Try to have an energy mix in a fleet and do not head towards one single technology

- Improve autonomy
 - » Try to develop more private charging during night-time
 - » Avoid big batteries which have a shorter lifetime
 - » Develop more charging points dedicated to LML
 - » Bring more knowledge on vehicle market solutions
 - » Develop charging solutions that are connected to renewable energies

Following a schematic representation of need and gaps for France. All the elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project are listed in detail in Annex 2 – Needs and gaps.

Green Deal – Green Europe chart

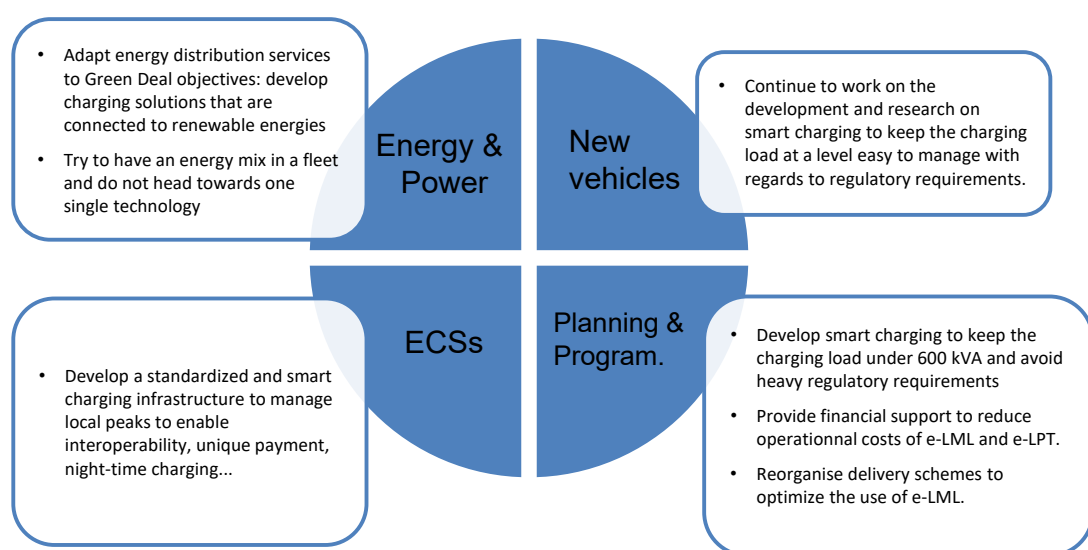


Figure 5-2 – needs and gaps for France-in-eSMART territory, in Green Deal policy

Digital Europe – Smart Europe chart

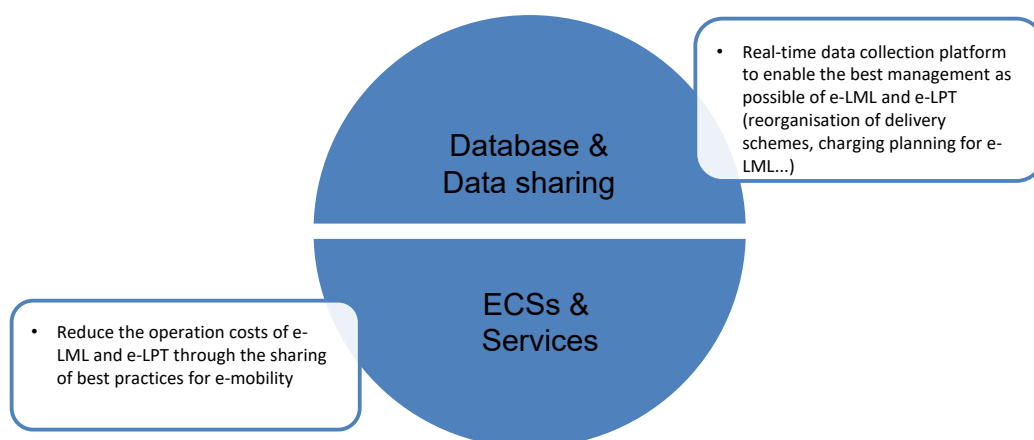


Figure 5-3 – needs and gaps for France -in-eSMART territory, in Digital Europe policy

Europe for Citizens – Smart PA chart

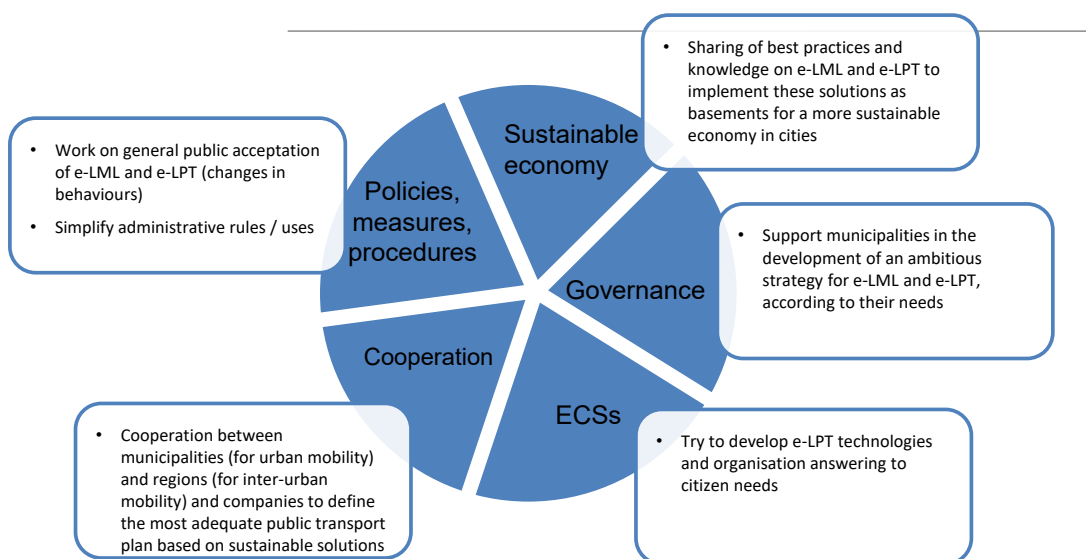


Figure 5-4 – needs and gaps for France-in-eSMART territory, in Europe for Citizens policy

5.2 Objectives, operational measures and indicators

The operational measures identified for Operational Road Map of France are listed in Table 5-1. Each measure is related with Country Objectives and with the Transnational Key Elements defined for the Tactical Road Map.

The last three columns show the qualitative evaluations of three main criteria: Impact on e-LML/LPT diffusion, Time and Estimated Cost.

More details and a complete description of each operational measure can be found in Annex 3 – Operational Measures.

Table 5-1 – Operational measures for France-in-eSMART Roadmap

EU Key elements	ORM Objectives	Operational measures	Impact on e-SMART pillars ¹	Impact on carbon footprint ²	Time ³	Cost ⁴
Smart PA (global thinking approach, governance model, participatory approach) Green Deal (urban mobility planning)	Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs / Help people change their behaviour and understand better how to use an electric car / New scheme of interconnection among PA and private SH Reorganise delivery schemes	Develop a regional coordination of the stakeholders	1-3	2	1	1
Green Deal (standardised charging infrastructure / e-LPT and e-LML financing) Smart PA (global think approach)	Lower the costs, give financial support / Improve interoperability between charging points / Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs / Help people change their behaviour and understand better how to use an electric car	Promote the use of e-Mobility	1-3	2	1	2
Green Deal (/ e-LPT and e-LML financing)	Reorganise delivery schemes	Develop dedicated fundings and support measures	1-3	2	2	2
Green Deal (energy production, V2V/V2G, services for flexible electric grid operation, local peaks management, battery development) Smart PA (Charging infrastructure)	Develop charging solutions that are connected to renewable energies / Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements / Develop more private charging during night-time / Try to develop more buses with pantograph charging which lead to smaller batteries in the vehicles, fewer costs, and better autonomy	Encourage experimentations	3-4	1	2	3

EU Key elements	ORM Objectives	Operational measures	Impact on e-SMART pillars ¹	Impact on carbon footprint ²	Time ³	Cost ⁴
Green Deal (energy production, zero-emission vehicles, power-grid stability, energy distribution services, development of infrastructure) Smart PA (communication and sensitization)	Improve interoperability between charging points and allow payment with a unique card/ Develop charging solutions that are connected to renewable energies / Try to have an energy mix in a fleet and do not head towards one single technology / help people change their behaviour	Promote the use of renewable electricity to charge the vehicles	4	1	2	2
Green Deal (development of infrastructure, standardised charging infrastructure)	Improve interoperability between charging points / Try to have an energy mix in a fleet and do not head towards one single technology	Develop and make more reliable the charging infrastructures	4	2	1	2
Green Deal (Charging concept for LPT, Urban mobility planning)	Develop more charging points	Develop electric public transport	2	1	1	3
Smart Europe (open source, data sharing, data lakes)	Reorganise delivery schemes	Develop data platforms	1	3	1	1
Index: ¹ Impact on e-SMART pillars: 1=LML, 2=LPT, 3=e-Mobility, 4=energy grid ² Impact on carbon footprint: 1=direct on emission, 2=indirect (i.e. on awareness or behaviour), 3=none ³ Time: 1=short (2025), 2=medium (2030), 3=long (2050) ⁴ Estimated costs: 1=low, 2= medium, 3=high						

The proposed monitoring instrument is based on the description of the progress of the achievement of the action goals (see table “action description”). The percentage of achievement during action time life will be the measure of the action progress.

The system of indicators identified for monitoring the Roadmap progress is presented in Table 5-2. It includes more than 30 indicators which aim to verify the progress of measures and the results.

Table 5-2 – Operational measures for France-in-eSMART Roadmap - indicators

Operational measures	Indicator	Description
Develop a regional coordination of the stakeholders	Progress indicator	• Number of meetings gathering private and public SH
	Result indicator	
Promote the use of e-Mobility	Progress indicator	• Number of training sessions
	Result indicator	• Development of communication campaign
Develop dedicated fundings and support measures	Progress indicator	
	Result indicator	• Amount of funding spent / year
Encourage experimentations	Progress indicator	
	Result indicator	• Number of experimental projects
Promote the use of renewable electricity to charge the vehicles	Progress indicator	
	Result indicator	• Share of electricity consumption of vehicle charging which comes from RES
Develop and make more reliable the charging infrastructures	Progress indicator	• Map of charging stations
	Result indicator	
Develop electric public transport	Progress indicator	
	Result indicator	• Number of municipalities with electric buses / shuttles
Develop data platforms	Progress indicator	• List of data shared on data platform
	Result indicator	

6 The e-SMART Operational Roadmap GERMANY

6.1 Basic elements

6.1.1 Territory of reference

The alpine territories in southern Germany in the context of the e-SMART include the District of Oberbayern (Upper Bavaria) and Schwaben, representing the Bavarian territory, as well as the districts Tübingen and Freiburg, representing the alpine region of Baden-Wurttemberg (the *Germany-in-eSMART* territory).

The demographic and economic centres in Bavaria are not located within the alps but in the alpine foothills or plains. Agriculture characterises the suburban areas, while urban regions like Munich, Augsburg and Kempten form regional centres for research, innovation and economy. Numerous forests and nature reserves, lakes and of course the alps characterise the regions as recreational and leisure areas. As of 2019, 4.68 million people live in the District of Oberbayern, 1.8 million in the District of Schwaben.

The District of Oberbayern achieved a gross domestic product (GDP) of almost 268 billion euros in 2017. In Germany, Upper Bavaria is the region with the second-highest gross domestic product per capita. In comparison with the GDP of the EU expressed in purchasing power standards, the administrative district achieved an index of 178 (EU-28=100) in 2015. It is thus one of the economically strongest regions in Europe. The state capital Munich and its surroundings form one of the most dynamic economic regions in Europe and the centre of economic activity in Bavaria. The economy in Upper Bavaria is characterised by a healthy mix of high-tech and craftsmanship. In research and development, Upper Bavaria is one of the leading regions in the European Union. As a tourism magnet, Upper Bavaria regularly ranks among the top 20 tourist regions in all 27 states of the European Union.

In terms of territory, the administrative district of Schwaben ranks third behind Upper and Lower Bavaria among the seven Bavarian administrative districts; in terms of population, Schwaben ranks second behind Upper Bavaria. The settlement center is the large city of Augsburg, followed by the independent cities of Kempten, Memmingen and Kaufbeuren. The economy in Schwaben is characterized by the manufacturing industry, especially mechanical engineering, and tourism. In recent years, Schwaben has developed into one of the most innovative regions in Europe in cooperation with neighbouring regions.

Tübingen and Freiburg represent the two southern governmental districts of the federal state of Baden-Wurttemberg. Freiburg lies in the West, bordering Switzerland and France, Tübingen in the East, bordering Bavaria.

As of 2019, the district of Freiburg counts 2.3 million inhabitants, 231.000 of them living in the biggest city Freiburg im Breisgau. In 2018, the GDP comprised 86.9 billion Euro (2.6% of the German economic output and (per employee) 97% of EU average). The city of Freiburg im Breisgau is located in the trinational metropolitan region of the Upper Rhine with approximately

six million inhabitants. Due to its environmental activities, the city has adorned and marketed itself with the title “Green City” since 2008.¹

As of 2019, the district of Tübingen counts 1,87 million inhabitants, 92.000 of them living in the biggest city Tübingen (one of the youngest cities in Germany, with an average age of around 40). In 2018, the GDP comprised 80.8 billion Euro (2.4% of the German economic output and (per employee) 108% of EU average). Given this, the district of Tübingen presents one of the wealthiest regions in Germany and Europe.²

Also, Baden-Wurttemberg as a whole is seen as one of the strongest regions in Europe in terms of economic strength, competitiveness and innovation - especially regarding industrial high technology, research and development.³

6.1.2 Policies and governance models

The transport sector is the third-largest emitter of greenhouse gases after the energy sector and industry, with around 20 % of CO₂ emissions (2019). By far the largest share (94%) of transport emissions is caused by road traffic. Gasoline and diesel cars are responsible for about 59% of this. Since 1990, CO₂ emissions from transport have not fallen. The reason: although vehicles are more energy-efficient, there are many more, heavier and more powerful passenger cars on the roads than 30 years ago. Passenger miles travelled - mostly by car - increased by about 64% by 2017. Freight traffic increased by 74%. 71% of goods were transported by road. In 2019, 47.7 million passenger cars were registered - 66% of which were gasoline-powered, 32% diesel, and two percent with alternative drives⁴.

Compared with 1990, emissions in the transport sector must be cut by almost half by 2030 if the climate targets are to be met⁵. To achieve the German climate targets (see box A for more details), significantly fewer gasoline and diesel vehicles and more vehicles with alternative drives, such as with electric or fuel cells, are needed.

On September 20, 2019, the German government presented key points for a 2030 climate protection program, the main measures, among several others, for the transport sector are as follows⁶:

- Promoting the switch to electromobility (environmental bonus, tax advantages)
- Expanding the charging infrastructure (see box C for more details) with 1 million charging points by 2030
- Tax incentives for electromobility (Annual Tax Act 2019)
- Making rail travel more attractive by lower prices and raise prices for flights
- Making local public transport more attractive
- Putting low-CO₂ trucks on the road (field of action “Commercial vehicles”)
- Expand refuelling, charging and overhead line infrastructure (field of action “Commercial vehicles”)

1 Sources: <https://www.statistik-bw.de/>, 06.10.2021; <https://ec.europa.eu/eurostat/documents/2995521/10474907/1-05032020-AP-EN.pdf/81807e19-e4c8-2e53-c98a-933f5bf30f58>, 06.10.2021

2 Sources: <https://www.statistik-bw.de/>, 06.10.2021; <https://ec.europa.eu/eurostat/documents/2995521/10474907/1-05032020-AP-EN.pdf/81807e19-e4c8-2e53-c98a-933f5bf30f58>, 06.10.2021

3 Source: http://www.statistik-bw.de/Service/Veroeff/Monatshefte/PDF/Beitrag12_12_04.pdf, 06.10.2021

4 Source: Brochure “Climate Protection in Figures,” 2020 edition

5 Source: Website www.bundesregierung.de, 08.10.2021

6 Source: Brochure “Climate Protection Program 2030 of the Federal Government for the implementation of the Climate Protection Plan 2050”, 2019 edition

- Automate, connect and enable innovative forms of mobility (field of action “digitalization”)
- Investing in the railroads
- Modernization of inland waterway transport and use of shore-side electricity in ports (Field of action “Freight transport”)

In the e-SMART context, the electrification of the commercial vehicles and the expansion of the charging infrastructure are especially relevant and highlighted in the German Roadmap. But the measures also show that the targets of the climate action plan can only be reached with a set of many different measures which intertwine with each other.

Box A: Initiatives that show the German (national) and Bavarian (regional) commitment and interest in sustainable mobility issues:

- Climate Action Plan 2050 - Germany’s long term low greenhouse gas emission development strategy (national)
- Climate Protection Plan 2030 for the implementation of the Climate Action Plan 2050
- The Bavaria 2050 climate protection program (regional)
- Amendment to the Climate Protection Act in Baden-Württemberg (regional)

Commercial Electric vehicles (EVs)

The number of registered EVs reached approximately 220.000 in 2019 and approximately 75% of all registered EV’s are still in use. The expansion of electromobility in Commercial electric vehicles depends on a number of push and pull factors. By far the best known of these are the immense funding directives in Germany.

“By 2030, about one-third of heavy-duty road transport will be electric or based on electricity-based fuels.”⁷ In 2021, the EU approved a new funding directive for commercial vehicles with alternative drive systems, by 2024, the BMVI will have made a total of around 1.6 billion euros available to promote the purchase of climate-friendly commercial vehicles and around 5 billion euros for the development of refuelling and charging infrastructure (cars and trucks)⁸.

In addition, there are a variety of research and development programs (R&D programs) in several Ministries (a.o. Ministry for Economy, Ministry of Transport and digital infrastructure) in the field of electromobility. Through the R&D program “Renewably Mobile”, the BMU (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) is funding projects for the purpose of raising the potential of electric vehicles for climate, environmental and resource protection and as a contribution to increase the quality of life and sustainable urban development.

The focus of the funding is on projects that help tap the climate and energy policy potential of electric mobility and at the same time contribute to strengthening the competitive position of the industries involved (www.bmu.de). The funding programs are coordinated by the NOW GmbH.

⁷ Source: Brochure “Overall concept for climate-friendly commercial vehicles”, Federal Ministry of Transport and digital Infrastructure (BMVI), 2020

⁸ Source: Website: www.bmvi.de, 08.10.2021

Electrifying the Local Public Transport

Around 10.4 billion passengers used local public transport (ÖPNV) in Germany in 2019. Buses and trains thus replace around 20 million car journeys on German roads every day⁹. Because of the Clean Vehicle Directive, many public utilities and transport companies are focusing on regional projects to implement bus fleets with alternative drives. Therefore, electrification of bus lines in local public transport is a strongly growing market. At present, around 1.4 % of the approx. 50,000 vehicles in the public transport bus fleet in Germany are electric buses and plug-in hybrids (absolute: 676)¹⁰. Through the e-Mobility starter-kit, the Federal Government promotes the electrification of the local public transport in municipalities. The funding guideline for the acquisition of electric buses in public transport was launched in 2018 and led to increasing numbers of e-bus fleets. To this end, the BMU is funding the purchase of more than five electric buses with up to 80% and plug-in hybrid buses with up to 40% of the additional investment costs.

Charging infrastructure

To promote the expansion of the charging infrastructure in Germany, the “Masterplan Charging Infrastructure”, which was adopted by the Federal Cabinet at the end of 2019, sets out a large number of measures for creating a user-friendly charging infrastructure across Germany for up to ten million electric cars (Box C). On behalf of the Federal Ministry of Transport and Digital Infrastructure (BMVI), the National Charging Infrastructure Control Centre coordinates and manages activities to expand the charging infrastructure in Germany under the umbrella of the federally owned NOW GmbH (Box B).

Box B: The objectives of the German National Control Centre for Charging Infrastructure (launched in October 2020) include:

- The expansion of a public fast-charging network with 1000 locations by the End of 2023, covering charging needs during extended journeys and in day-to-day situations in urban areas.
- The installation of 50,000 publicly accessible, fast and normal charging points by the end of 2021.
- Acceleration of the development of private charging infrastructure through financial support and improved legal framework conditions.
- A user-friendly public charging infrastructure with easy-to-find charging points that function reliably and invoice the charging process transparently using common payment methods.

⁹ Source: Website: www.vdv.de, 08.10.2021

¹⁰ Source: Website: www.PwC.de, 08.10.2021

Box C: Master Plan for Charging Infrastructure:

1. Measures for setting up publicly accessible charging infrastructure:

- Revision of the Charging Post Ordinance (Ladesäulenverordnung or LSV) by summer 2020
- Amendment of the Renewable Energy Sources Act (EEG)
- Proactive Grid expansion
- Operation of charging infrastructure by distribution grid operators (as part of the implementation of the EU's „Clean Energy for All Europeans“ package)
- Supply obligation at conventional gas stations
- Amendment of parking space regulations
- Fast charging stations as decarbonization measures (review of the application)
- Amendments to building and construction law/fire protection

2. Measures for the development of charging infrastructure not accessible to the public:

- **Amendment of tenancy and COA law:** The Federal Council has adopted a proposal for a draft law on the reform of the Act on the Ownership of Apartments and the Permanent Residential Right (COA). The states of Baden-Württemberg and Bavaria (BR-Drs. 347/19 of 11.10.2019) have submitted the project for the draft law adopted on 11.10.2019 to amend the Civil Code and the COA to promote electric mobility (BR-Drs. 347/19 of 11.10.2019).
- **Charging infrastructure in buildings:** The amended EU Building Directive 2018/844 is to be transposed into German law in spring 2020.
- **Changes in tax legislation:** The law on further tax incentives for electromobility and amending other tax regulations is already in the legislative process.
- **Review of the flat rates for the charging of a company car**
- **Ordinance on Section 14a Energy Industry Act (EnWG) on network load management:** In 2020, the legal framework is to be defined in order to determine the framework conditions for network loading/load management.

3. Further coordinated measures:

- Charging Infrastructure for long-distance mobility at managed free-way service areas
- Municipalities are invited to share their Customer parking lots and municipal properties with the public

(Source: Deloitte; masterplan charging infrastructure)

On a regional level, the Bavarian state government has been supporting the market launch of electromobility since 2008, for example by expanding the Bavarian research landscape accordingly, establishing model regions and supporting lighthouse projects¹¹.

Other initiatives (funding programme, legal framework etc.) that show the Bavarian commitment and interest in sustainable mobility issues can be found in Box D.

With the “State Initiative III Market Growth Electromobility BW”, Baden-Württemberg is further expanding its support in the field of electromobility (vm.baden-wuerttemberg.de).

At the municipal level, funding opportunities for the expansion of the charging infrastructure offer financial support to municipalities and cities in particular. Further funding packages are expected in the coming years.

Box D: Initiatives that show the Bavarian commitment and interest in sustainable mobility issues:

- The funding programme „charging infrastructure for electric vehicles in Bavaria“ which aims to support the development of publicly accessible charging infrastructure in Bavaria;
- The creation of an “Electromobility Competence Centre”, the central point of contact for municipalities, companies and government agencies for current challenges in electromobility;
- The launch of a webapp, Ladeatlas Bayer, which provides an almost complete overview of publicly accessible charging locations in Bavaria.

Furthermore, the Bavarian State Government is pursuing the goal of creating a suitable legal framework for electromobility:

- The Charging Station Ordinance that implements some parts of the European Directive 2014/94/EU (Directive on the Construction of Alternative Fuels Infrastructure).
- The Electromobility Act which provides the enabling basis to enable preferential rights for electric vehicles in road traffic, (such as electric car parking spaces, exemption from parking fees or exemptions from entry bans; furthermore, the law allows the introduction of a new number plate with the suffix „E“ to identify electric vehicles in road traffic)
- The Act on the Provision of Nationwide Fast Charging Infrastructure, with which the Federal Government intends to ensure the nationwide, demand-oriented development of publicly accessible infrastructure for the fast charging of pure battery electric vehicles.

¹¹ Source: Website: www.stmwi.bayern.de, 08.10.2021

6.1.3 Territorial Stakeholders analysis

A territorial analysis of the stakeholders was made in Germany. It was composed of a desk analysis considering studies and papers that were published on this topic and was completed by personal interviews with 21 representatives from the target groups. 10 of them were with private companies and 11 with public actors. According to these interviews and the analysis, the following considerations can be made.

A big role in promoting e-Mobility is played by the public administration and policymakers. In fact, economic transport can be considered as a cross-cutting issue: a joint cross-departmental approach within the administration and between the administration and the business community. Therefore, offices need to work together to foster networks and the exchange of experience; nevertheless, Public Authorities (and in particular municipalities) need to be better equipped in terms of staff, for example by adding more municipal freight commissioners. Municipalities can also support e-Mobility, whether in the form of non-material support (information events and communication with citizens) or the provision of suitable areas for charging infrastructure and through the participation in pilot projects and working groups.

Hence policymakers, whose role is crucial in this frame as was mentioned before, must provide more planning certainty, investment certainty and legal certainty. It is therefore important to have a strong political will.

In addition to this, public support is needed to start up and/or develop new e-technologies: Public administration should give financial support/funding (i.e. co-financing models for e-vehicles) and provide infrastructures/service (i.e. reduce electricity tariff, etc.).

The leadership of public administration i.e. the imposition of laws and setting quantitative goals must be avoided. The goal's setting should be left to the private sector.

More in particular, from the public administration is expected:

1. simplification of bureaucratic procedures
2. specific mobility policies (dedicated lanes, smart traffic lights, etc.)
3. increase in mobility infrastructures
4. increase in energy infrastructures
5. increase in charging infrastructure
6. development of smart-grid-nets-management system
7. planification of LPT and LML nodal point

Moreover, some problems concerning e-Mobility (in particular concerning the battery) are: difficulty both in raw material sourcing and in production of electricity and where to dispose of them; lack of places for big charging stations; need to provide a big charging capacity.

Consequently, investment cycles for the acquisition of new vehicles as well as the extension of rights for e-vehicles should be taken into consideration. Besides, need for action in road traffic regulations such as partial regulation and allocation of e.g. parking spaces via special use is required.

Some other features that emerged from the territorial analysis concerning stakeholders involved in the e-Mobility frame in Germany:

- All stakeholders are involved in local initiatives and they are therefore committed to sustainable mobility (see Agenda 2025), even if they choose different technologies: i.e.

battery, fuel cell, hydrogen or LNG fuelled engines. Also, all stakeholders have the possibility to collect and share DATA of their vehicle fleet in real time.

- Concerning Medium Sized companies, they need more financial support for Light Duty commercial vehicles. The effort required to apply for funding must be kept to a minimum, for smaller companies it is not possible without external experts.

Further considerations that can be made about the issues that have been found are: the implementation of a Best-Practice platform or Platforms for image improvement (for CEPs); Municipal platform for bundling the actors.

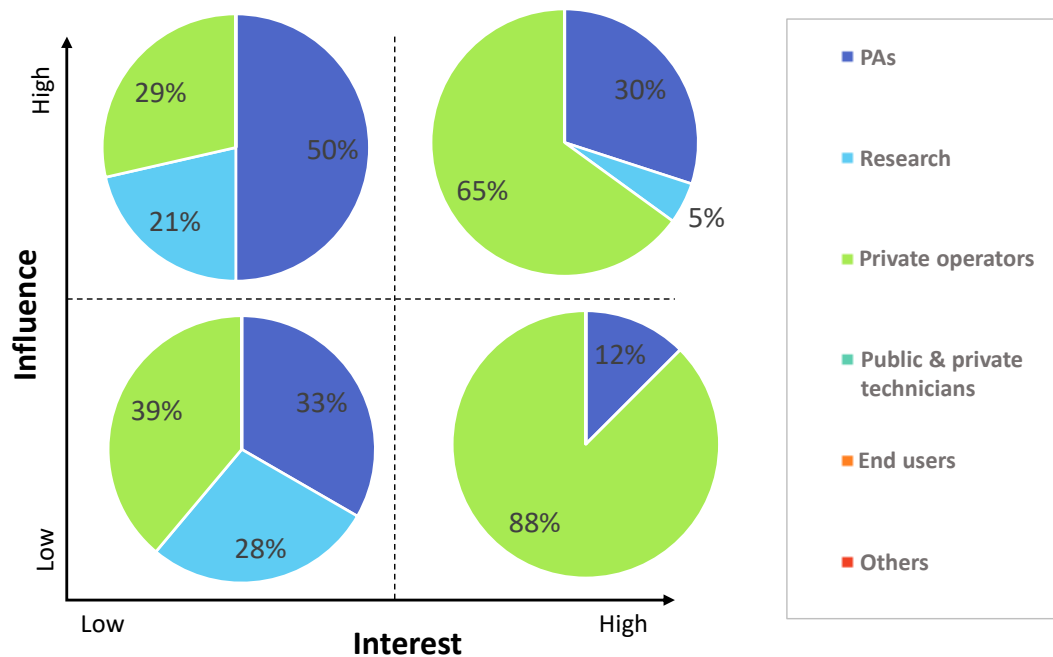


Figure 6-1 – Level of interest and influence for each type of actors (Germany)

Figure 6-1 represents the level of interest in relation to the influence of each local actor in Germany. The analysis highlighted the important role of PA (at various territorial levels) and privates.

Between the actors with high interest, the share of the private operators is particularly high, although it is smaller in the section of high influence. Confronting the influence between the PAs with high interest it shows that their share is more than double in the section with high influence. Actors from the field of research generally can be influential but the chart shows that their interest is relatively low in comparison to the other actors. Generally, it can be said that the private operators have quite a big share, especially in the fields of high interest but are depending on the PAs that vary especially in their interest.

Conclusion LML & LPT

Even if e-Mobility does not have a clear prioritisation in last mile logistics, it can be well combined with holistic concepts (bundling measures, traffic regulations, e-smart distribution). All the efforts made in the direction of e-Mobility, charging infrastructure and network expansion are aligned with climate targets but, despite extensive education and information, the image of electromobility as a sustainable alternative is below its potential, especially with regard to the consumption and the responsible use of raw materials (GIZ, DERA).

Some transport companies are planning the complete changeover (Hochbahn, Heag, bvg) not only e-buses but also hydrogen is on demand, but still very expensive, transport companies calculate a factor of 3 for the costs (incl. running costs and administration).

In the end, e-Mobility is not the priority for the public transport stakeholders. Mobility services and alternatives for individual transport are the top priority, but even if the industry is open minded towards new technologies to achieve climate goals nothing works without funding. This might quickly change with new regulations and funding lines on national and European level.

6.1.4 Existing instruments

StandortTOOL and FlächenTOOL

To reach the objectives the National Center of Charging Infrastructure is working with two different Tools, the StandortTOOL (locations tool) and the FlächenTOOL (plot tool).

First one, the location tool, enables the Centre to plan charging infrastructure for cars through Germany up to the year 2030 and to calculate the further expansion requirements. Infrastructure planning for the commercial vehicle sector (battery and hydrogen) is envisaged for the future, which makes it also very interesting for e-SMART objectives.

With the FlächenTOOL (plot tool), the National Centre for Charging Infrastructure is creating a digital platform to provide an overview of potential plots in Germany that are suitable for the development of necessary charging infrastructure and to bring the owners of such plots and investors together.

Contact: NOW GmbH Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie / Fasanenstr. 5/10623 Berlin/Telefon: 030 311 61 16-00/E-Mail: kontakt@now-gmbh.de

OBELIS

Online platform for the reporting of all funded charging stations of the federal funding program for charging infrastructure. It also monitors the usage and utilization of the charging infrastructure to identify bottlenecks. OBELIS shares data with the StandortTool, this means that the districts have access to the data and can take it into account in planning.¹²

mFUND

With the mFUND (Modernity Fund) research initiative, the Federal Ministry of Transport and Digital Infrastructure has been funding research and development projects related to digital data-based applications for Mobility 4.0 since 2016. In addition to financial funding, the mFUND supports networking between stakeholders from politics, industry and research with various event formats and access to the mCLOUD data portal. In 2020 there are 169 projects within the mFUND initiative, all related to digital and smart transport and mobility solutions (www.bmvi.de).

Among the instruments implemented in order to foster e-Mobility is e-car sharing. In this frame, Tuebingen launched in May 2020 "COONO", a new sharing service: 40 e-scooters and 10 e-cars were made available to the inhabitants of Tuebingen.

¹² Source: Federal Masterplan Charging Infrastructure

mCLOUD

mCLOUD is a digital platform which is provided by BMVI. Targeting the digital connection with vehicles, it gathers data in the field of traffic, climate, weather, aerospace and infrastructure. Access is offered to developers in enterprises, researchers and administrators with the aim to foster the processing of innovations.

For example, it offers a demand model providing pattern-based predicted rides within the city area of Munich. The available data refers to the hour within an average operating week. Other information available is the measurement of dynamic data in Munich (private and public vehicles). Between 2017 and 2020, data concerning the use of rental cargo bikes in Freiburg im Breisgau were gathered (<https://www.mcloud.de/>).

MDM

MDM is an interactive platform which provides the offering, researching and subscribing mobility data. The necessary contractual and commercial requirements are completely up to you, the MDM merely provides an organisational framework with its terms and conditions.

You can get information on measurements from traffic and environment detectors as well as resulting data about traffic situations and travel time, parking information, information on road works, charging stations and weather data (<https://www.mdm-portal.de/datenkategorien/>)

ScooP - Design and piloting of a nationwide multi-operator platform for sharing electric scooters

The aim of the project is to design uniform legal, technical and organisational standards for the cooperation of cities and municipalities with sharing providers of e-trade rollers. To this end, the development of a digital multi-operator platform for sharing e-trade rollers will first be tested and then piloted. The platform should allow cities to minimise their effort in working with sharing providers. The providers, in turn, should be able to use the platform to introduce their sharing services more quickly and reliably in new municipalities through uniform standards.

The project investigates how a structured data exchange (e.g. geodata, trip statistics, contract documents) between municipalities and sharing providers can take place. For this purpose, technical standards and interfaces as well as a framework contract will be designed.

For this purpose, expert interviews and workshops with cities, municipalities and providers will be conducted. It is also planned to make part of the collected and evaluated data available as OpenData for follow-up research.

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Carrypicker - Yield management in the freight forwarding industry

The project uses state-of-the-art mathematical methods from the field of artificial intelligence, machine learning and predictive analytics in a highly scalable cloud environment to develop models for dynamic price-volume control. The aim is to maximise revenues while reducing idle capacity. The goal is to create an intelligent software platform that makes it possible to price transport orders through active yield management, distribute them in real time to existing empty capacities or actively request necessary additional capacities and bundle everything into highly efficient optimal tours.

Within the framework of the project, several million real price and tour data are consolidated and cleaned in databases. With the help of this data, a market simulation environment will be built. In parallel, different methods of yield management are combined with methods of

machine learning algorithms and statistical control loops to develop a dynamic online pricing platform and tour optimisation and allocation. The different models are validated and further developed in parameter studies of the simulation environment. In addition, general robustness parameters are developed and applied to evaluate the solution quality.

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6.1.5 Territorial needs and gaps

Analysis of data collected in survey and during RLL, which was collected in spider diagrams presented in this document (Annex 1 – Actors' roles) show the following:

e-Mobility Planning is about finding solutions for effective usage of electric vehicles that not only serves the overall goal of the diffusion of e-Mobility by offering an alternative to conventional internal combustion engines, but also allows economic planning. However, as few business models and solutions for e-Mobility are currently economically or permanently tested, a large part of e-Mobility planning is carried out by service companies in collaboration with the public administrations and the manufacturers. In this case, the ICT service providers are considered as service companies, which include digital tools and analytics in their offers. Energy service providers are often included in the collaboration, but it's necessary to pay more attention while planning accordingly to the results of the survey.

In contrast, the energy service providers play a major role in the actual e-Mobility management (alongside the service companies). This may be due to the responsibility transferred for power supply and load management. Here, too, there are few or no independent ICT providers; instead, the digital tools that ensure smart energy management, for example, are integrated into the energy service providers or service companies.

The Planning of the Local Public transport is usually the work of the public administrations and transportation operator in consultation with the local energy service provider. Nevertheless, the manufacturers and sellers are still over-proportionally important for the planning of electric local transport, because supply cannot yet sufficiently meet demand and market saturation has not yet occurred. For this reason, manufacturers are also directly involved in the planning phase, not least because the corresponding charging infrastructure must be built to match the vehicles.

This phenomenon can also be partially applied to the management of public transport. Public authorities are only involved indirectly. Most of the management of e-LPT, especially in terms of the charging infrastructure, is done by the suppliers in cooperation with the manufacturers and the energy service providers. In order to be able to guarantee an optimal charging management, it needs strong interest from all three parties.

The usage of e-LPT depends on the availability of the vehicles. Therefore, concerning the use, the vehicle manufactures, and the service providers are responsible for it, pushed by several factors like public awareness, city regulations, CO₂ targets in the sense of a more sustainable transport, while the energy service providers have the most influence on the usage – no energy, no use! This point is missing in the results or it did not occur in the first place, which is another sign that the role of the energy service provider has not yet achieved the status it needs. This may change quickly, as the number of e-vehicles grows and energy demand increases.

E-Mobility in the Last Mile Logistic and Logistics in general is a very young economy that is only just establishing itself. It was found that, depending on the application, no leading technology has yet been able to establish itself. In the heavy-duty segment, hydrogen and battery cells are on an equal footing. In urban applications, e-pedelecs and small electric-powered vehicles are dominating the field. It is therefore difficult to assess e-logistics at present. The issue is that it is a rapidly growing sector of the economy that is attracting the attention of the entire

industry. This is also shown by the results of the survey. The manufacturers play a decisive role in the planning of the LML. In collaboration with service companies, concepts are brought to the road, especially in pilot projects and lighthouse projects.

Similar to the results of the LPT Management and Planning, the results show the great influence of manufacturers and sellers in the field of the management of e-LML. Again, this might be due to the dependence to implement the corresponding charging infrastructure, which is far from being a kind of standard solution and often has to be customised individually to the needs of the vehicles and the operators.

As mentioned, the choice and type of electrical logistic solution is extremely dependent on the application. It is therefore not surprising that the manufacturers in particular also play a major role in the use.

Following, a schematic representation of needs and gaps for Germany. All the elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project are listed in detail in Annex 2 – Needs and gaps.

Green Deal – Green Europe chart

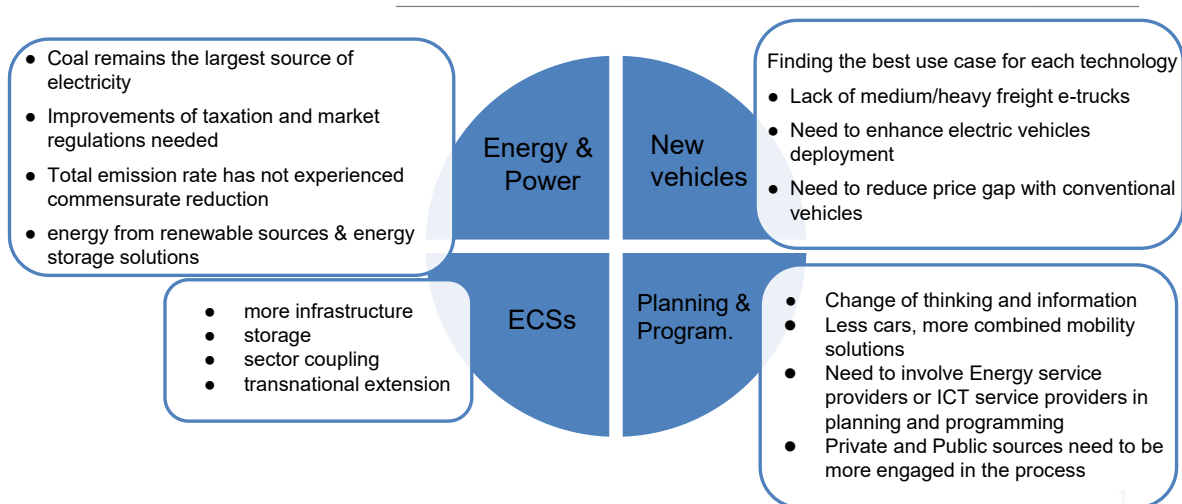


Figure 6-2 – needs and gaps for Germany-in-eSMART territory, in Green Deal policy

Digital Europe – Smart Europe chart

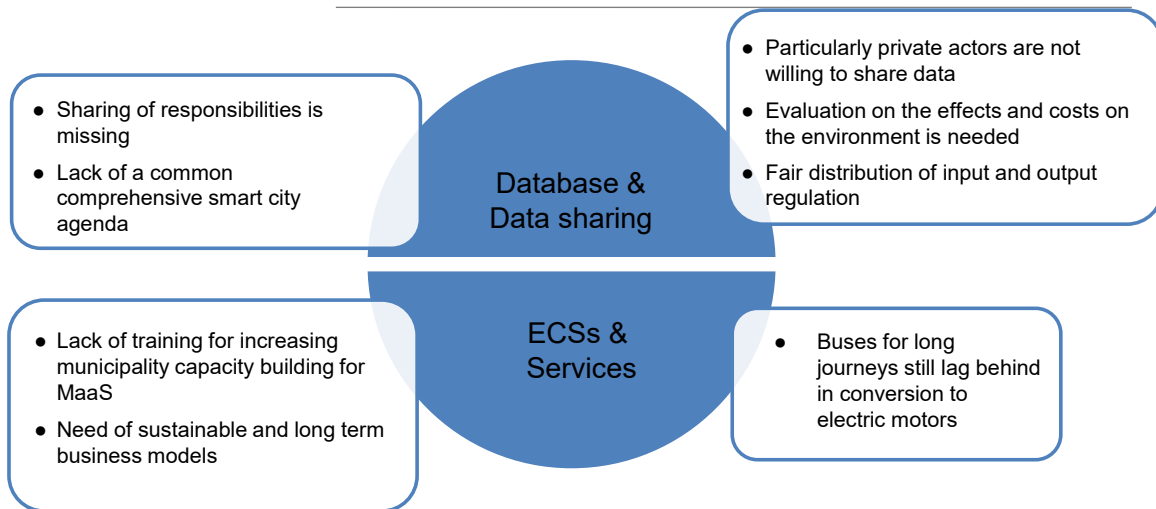


Figure 6-3 – needs and gaps for Germany -in-eSMART territory, in Digital Europe policy

Europe for Citizens – Smart PA chart

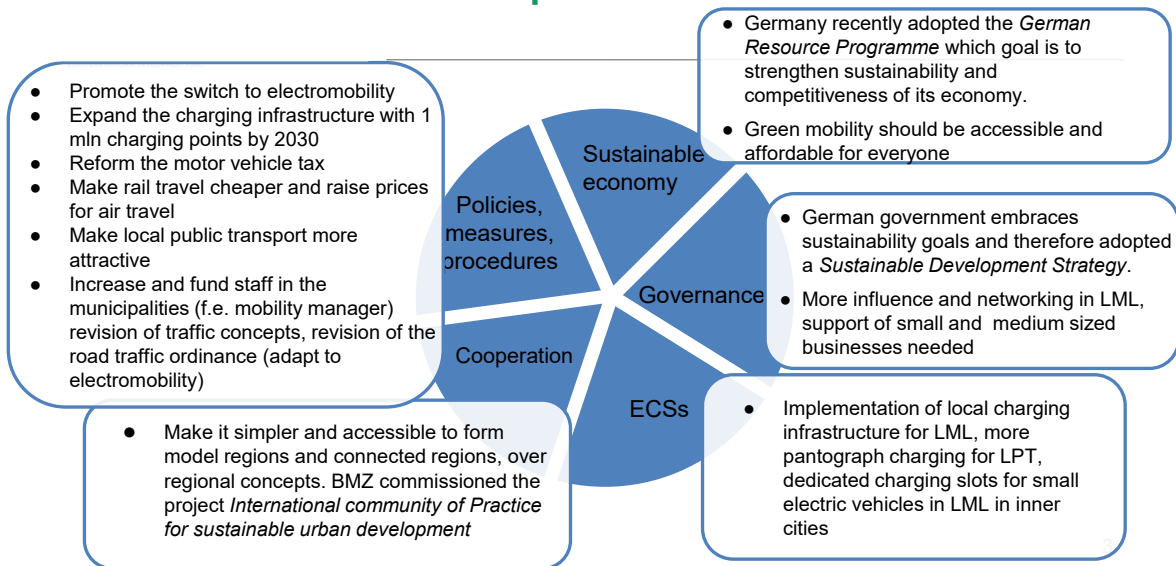


Figure 6-4 – needs and gaps for Germany -in-eSMART territory, in Europe for Citizens policy

6.2 Objectives, operational measures and indicators

The operational measures identified for Operational Road Map of Germany are listed in Table 6-1. Each measure is related with Country Objectives and with the Transnational Key Elements defined for the Tactical Road Map.

The last three columns show the qualitative evaluations of three main criteria: Impact on e-LML/LPT diffusion, Time and Estimated Cost.

More details and a complete description of each operational measure can be found in Annex 3 – Operational Measures.

Table 6-1 – Operational measures for Germany-in-eSMART Roadmap

EU Key elements	ORM Objectives	Operational measures	Impact on e-SMART pillars ¹	Impact on carbon footprint ²	Time ³	Cost ⁴
Green Deal - Green Europe (Urban Mobility Planning; Zero emission vehicles; Alternative fuels)	Increase zero emission solutions in transport; reduction of cars, promote combined mobility solutions; change of thinking and information & mix of solutions; Finding the best use case for each technology and provide best practises including planning, business case and funding	Defined use cases for e-LML & Business models applied	1-3-4	1;2	2	3
		Raise public awareness in e-CS	1-3-4	1;2	2	3
		Database to collect information on LPT vehicle and services	2-3-4	2	1	2
		Training and capacity building for Public Authorities	3	2	2	2
Green Deal - Green Europe (development of infrastructures, LPT specific mobility policies, procurements) + Europe for Citizens – Smart PA (charging infrastructures)	Increase investment in e-LML and e-LPT	Renewal of the LPT fleet	2-3-4	1	1-2	3
		Creation of a charging infrastructure network for LPT	2-3-4	2	1-2	3
		Renewal of the LML fleet and building up of charging infrastructure	1-3-4	1;2	2-3	3
Europe for Citizens – Smart PA (new scheme of interconnection among PA and private SH, participatory approach, cooperative scheme for small municipalities)	Increase cooperation among stakeholders and sectors	Multi-disciplinary working tables within Public Authorities	1-2-3-4	2;3	1	1
		Roundtables with Public Authorities and private sector	1-2-3	2	2	1
		Citizen involvement in planning via citizen science and consultations	1-2-3-4	2;3	2	1
Index: 1 Impact on e-SMART pillars: 1=LML, 2=LPT, 3=e-Mobility, 4=energy grid 2 Impact on carbon footprint: 1=direct on emission, 2=indirect (i.e. on awareness or behaviour), 3=none 3 Time: 1=short (2025), 2=medium (2030), 3=long (2050) 4 Estimated costs: 1=low, 2= medium, 3=high						

The proposed monitoring instrument is based on the description of the progress of the achievement of the action goals (see table “action description”). The percentage of achievement during action time life will be the measure of the action progress.

The system of indicators identified for monitoring the Roadmap progress is presented in Table 6-2. It includes more than 30 indicators which aim to verify the progress of measures and the results.

Table 6-2 – Operational measures for Germany-in-eSMART Roadmap - indicators

Operational measures	Indicator	Description
Defined use cases for e-LML & Business models applied	Progress indicator	• Nr. of funding options relied to e-LML
	Result indicator	• Nr. of project implementations • Nr. of startup and business development
Raise public awareness in E-CS	Progress indicator	• Fairs, workshops, study material
	Result indicator	• Nr. of fairs, workshops • Nr. of lectures and studies dedicated to E-CS
Database to collect information on LPT vehicle and services	Progress indicator	• Nr. of accessible data sets
	Result indicator	• Nr. of retrieved data sets
Training and capacity building for Public Authorities	Progress indicator	• Nr. of requests and issued participants certificates
	Result indicator	• Nr. of successful participants
Renewal of the LPT fleet	Progress indicator	• Nr. of purchased e-vehicles
	Result indicator	• Number of e-vehicles within the fleet (per year) / 100% e-vehicles
Creation of a charging infrastructure network for LPT	Progress indicator	• Preparation of a concept • Number of LPT charging stations / size of charging power
	Result indicator	• Charging stations supply the whole fleet with sufficient (100% renewable) electricity
Renewal of the LML fleet and building up of charging infrastructure	Progress indicator	• Nr. of purchased e-vehicles • Preparation of a charging concept and number of charging stations / size of charging power
	Result indicator	• Number of e-vehicles within the fleet (per year) / 100% e-vehicles • Charging stations supply the whole fleet with sufficient (100% renewable) electricity
Multi-disciplinary working tables within Public Authorities	Progress indicator	• Nr. of workshops and roundtables with at least 3 different city departments
	Result indicator	• Development of integrated planning strategy

Operational measures	Indicator	Description
Roundtables with Public Authorities and private sector	Progress indicator	• Nr. of participating stakeholders
	Result indicator	• Nr. of resulting cooperations & out-comes
Citizen involvement in planning via citizen science and consultations	Progress indicator	• Nr. of workshops, consultations etc. open to the general public
	Result indicator	• Summary of citizen involvement activities

Electrifying the LPT and the LML sector is only one part amongst many others in reaching an emission-free transport sector. For this reason, you find in the following reading recommendations (including brief summaries) of one recent study and two guidelines, which describe both, general pathways as well as concrete measures proposals (especially in the LML sector) to reach the goal of an emission free transport sector in Germany.

Study: „Zero 2035 – CO₂-neutral by 2035: Key points of a German contribution to maintain the 1.5°C limit“ (by Wuppertal Institute):

The study “Zero 2035” examines, which measures need to be implemented in Germany in order to “achieve at least approximate greenhouse gas neutrality by 2035” in the key sectors “energy, industry, transport and space heating”. For the transport sector, the study argues that the following paths must be taken:

Reducing the overall traffic volume, for example through:

- The transformation of cities towards “cities of short distances”
- Virtual mobility (home office etc.)

Shifting traffic to climate-friendly modes of transport, for example through:

- In LPT: The massive expansion of the rail network and public transport in general, as well as through moving away from the paradigm of car-friendly cities
- In LML: Shifting 30% of the truck traffic to the railway system through the “removal of bottlenecks in the rail network, reactivation of sidings and automated hubs”

Improving the efficiency (vehicles and transport systems) and transition towards alternative drives, for example through:

- In general: Transformation of the fleet (renewable drives) – but since e-vehicles still consume far more energy than public transport and rail freight transport, this cannot be the only solution.
- In LML: Electrification of light commercial vehicles and expansion of a catenary system for trucks on motorways.

To realise these measures, the study proposes a **combination of instruments** (for example in the fields of urban and traffic planning, regulatory law, multimodal transport and price incentives).

For more detailed information, download the full study (in German only):
<https://wupperinst.org/p/wi/p/s/pd/924>

Guideline: „Delivering without a burden“ (by Agora Verkehrswende):

The guideline “Delivering without a burden: How municipalities and the logistics industry can make urban freight transport sustainable” argues that even though municipalities sometimes depend on the regional and federal government as well as on private logistic companies, they still have numerous possibilities to play an active role in forming a sustainable city logistics. Following this, the guideline points out concrete steps municipalities could take in order to shape a sustainable city logistics. Besides others, the following measures and instruments are proposed:

- “Creating **more space** for freight traffic in the city” (for example through more loading and pedestrian zones)
- “Accelerating the **switch to emission-free** and roadworthy commercial vehicles” (for example through the renewal of the van fleet, cargo bikes, charging infrastructure at the company locations, and zero emission zones)
- “Enabling and supporting **new logistics concepts**” (for example through establishing concepts of per-recipient bundling, consolidation of construction site traffic, and stopping the dismantling of sidings)
- “Using **pricing mechanisms** to make the use of transport infrastructure more efficient” (for example a nationwide toll system)

The guideline concludes with policy demands directed to the German federal and state governments, as well as with eleven portraits of concrete measures. *It can be downloaded here (in German only).*

Guideline: „Making urban delivery traffic sustainable. An instrument box for municipalities“ (by BUND – Friends of the Earth Germany):

Similar to the previous one, also this guideline states, that “due to federal and state legislation, the municipal scope for action for shaping urban delivery traffic is partly restricted”, and that “the implementation of logistical solutions depend to a large extent on private-sector actors”. Nevertheless, the guideline states that still there are some approaches municipalities can use to take actions within the existing legal framework. The proposed measures are structured in four different fields:

- **Logistical Solutions** (for example using bike logistics, micro depots, e-vehicles and bundling concepts)
- **Planning Solutions** (for example using urban building and land use, as well as clean air and noise reduction planning)
- **Structural Solutions** (for example through understanding urban freight transport as cross-cutting task and through the collection and provision of data)
- **Regulative Solutions** (for example through setting up and developing pedestrian, delivery and environmental zones, and through introducing a city toll)

Following this, the guideline too lists suggestions on how the German federal and state governments could support municipalities. It concludes with 14 Best Practice examples from different European cities as well as with a list of recommended literature. *It can be downloaded here (in German only).*

7 The e-SMART Operational Roadmap AUSTRIA

7.1 Basic elements

7.1.1 Territory of reference



Figure 7-1 – Austria and its 9 federal states (Source: Statistik Austria)

Austria is a central European landlocked country with around 8.9 million (1.1.2019) inhabitants and an area of about 84,000 km². It is divided into nine federal states called Vorarlberg, Tyrol, Salzburg, Upper Austria, Lower Austria, Vienna, Styria, Burgenland and Carinthia. The federal state of Vienna is both the federal capital and the most populous city in the country. The population density is lowest in Carinthia, which is situated in the southern part of the country.

The country is also known as the Alpine republic because more than 70% of the national territory is mountainous. The highest mountains in Austria are three thousand-metre peaks, which are located in the Eastern Alps. At 3798 metres, the Großglockner is the highest mountain. There are almost 1,000 three-thousand-metre peaks in Austria.

The current development of a growing and ageing population in Austria will continue in the future. According to this, Austria's population will grow from 8.88 million (2019) by 6% to 9.45 million by 2040, and finally by 12% to 9.93 by 2080 million¹³.

Warm summer, cold winter and valuable precipitation are the characteristics of Austria's central European transitional climate.

¹³ Source: Population forecast published by Statistics Austria

7.1.2 Policies and governance models

Austria is a federal republic and thus many policies are developed and applied on the federal state level. The overall policies are thus rather generic.

The Austrian Ministry for climate action, Environment, Energy, Mobility, Innovation and Technology mainly supported by other national bodies drives the definition of the policies related to electric mobility for Transport, Innovation and Technology. It covers a range of policy fields such as mobility of the future, electric mobility in general and in urban areas in particular, as well as energy research.

The Federal Government continuously states that Austria needs a shift when it comes to the mobility policies, with a shared commitment to reach a CO₂-neutral transport sector by 2050, a transition to low- and zero-emission mobility based on renewable sources of energy and a clear focus on electrification as a key solution to achieve clean transport. For this goal, public and logistic transport has to expand and zero-emission vehicles based on renewable energy will have to be actively promoted.

In 2020, the federal government agreed on a government program for the next four years, which contains suitable framework conditions and effective measures to deal with the climate crisis. Measures will be developed to avoid traffic, to shift traffic and to significantly increase the share of the environmental network (pedestrian and bicycle traffic, public transport and shared mobility).

Among many goals, the following is agreed:

- Pioneering role of the public sector (emission-free vehicles will become standard) and a comprehensive package of measures towards emission-free road traffic in Austria
- Strategy for using alternative energy in the logistic sector with a focus on the carbon footprint
- There are three national associations that deal with electric mobility at the federal level:
- The Austrian e-Mobility alliance, founded in 2009, which represents the research, mobility and ICT sectors;
- The Austrian Electromobility association (2015), representing national and local energy utilities;
- The Federal initiative eMobility Austria (2013): it is a network for SMEs active in the field of electric mobility, green energy and intermodality.

The main private actors in the field of E-CS are SMATRICS that operates the largest network of publicly accessible E-CS in Austria, ELLA AG, TIWAG AG, and the regional/local energy suppliers (Energie Klagenfurt AG, Salzburg AG, KELAG for instance).

7.1.3 Territorial Stakeholders analysis

Public Transport

Since the introduction of the Clean Vehicles Directive, the public EU-procurement instrument that incentivizes the production and deployment of clean vehicles by setting demand-side requirements for public contracting authorities, PTOs face a (partial) phase-out of the highly reliable diesel engine.

Government and public authorities must set a high standard when it comes to sustainability. Faster deployment of clean vehicles is an important lever. However, because of potential funding limitations because of the higher CAPEX and OPEX, public authorities (PTAs, PTOs) may resort to the lowest cost technology option instead of the best and most reliable. This potential

risk arises as local authorities have seen their budgets squeezed over recent years and have increasingly limited resources for delivering vital transport services.

Therefore, public authorities should back the CVD procurement demands by offering the necessary funds to PTOs to best meet their challenges.

From a technological perspective, PTOs shall purchase emission-free vehicles such as hydrogen fuel cell and/or battery and/or trolley bus systems. All of these drivetrain technologies require a specific charging (in the case of hydrogen fuel cell: fueling) infrastructure, which must be accounted for in terms of funding support.

Funding support should not only be set out to support the purchase (CAPEX) of the buses and peripheral equipment, but also the higher operating costs expected in different operational areas. Higher operational expenses are to be expected. The following lists some reasons to support this statement:

- An e-bus (if not a trolley or hydrogen fuel cell bus) cannot replace a conventional diesel bus due to range constraints
- The charging infrastructure constitutes an additional element in the system and must undergo maintenance
- In the case of hydrogen fuel cell buses, the hydrogen generation or supply and the storage and dispensing units constitute additional elements in the system and must undergo maintenance
- In the case of trolleybuses, the catenary lines constitute additional elements in the system and must undergo maintenance
- The cost not only of electrical energy but also electrical power and the maintenance of the corresponding power electronics, accumulated, could potentially add to more than the cost of diesel
- Batteries (and fuel cells in the case of hydrogen-powered vehicles) in all type of zero-emission buses will need to be replaced at least once during the lifespan of the buses
- Conventional depot must be reconstructed and adapted to fulfil the new technological requirements

The corresponding know-how must be obtained by, for example, hiring consulting services in the field. Another way to support PTOs would, therefore, be accomplished by providing funds during the planning phase of the technology transition. PTOs must secure reliability in the system.

It is of utmost importance to understand that switching from private to public transportation is one of the most effective ways to reduce carbon dioxide emissions. Supporting electric mobility must go along with the continuous measures to increase the share of public transport usage.

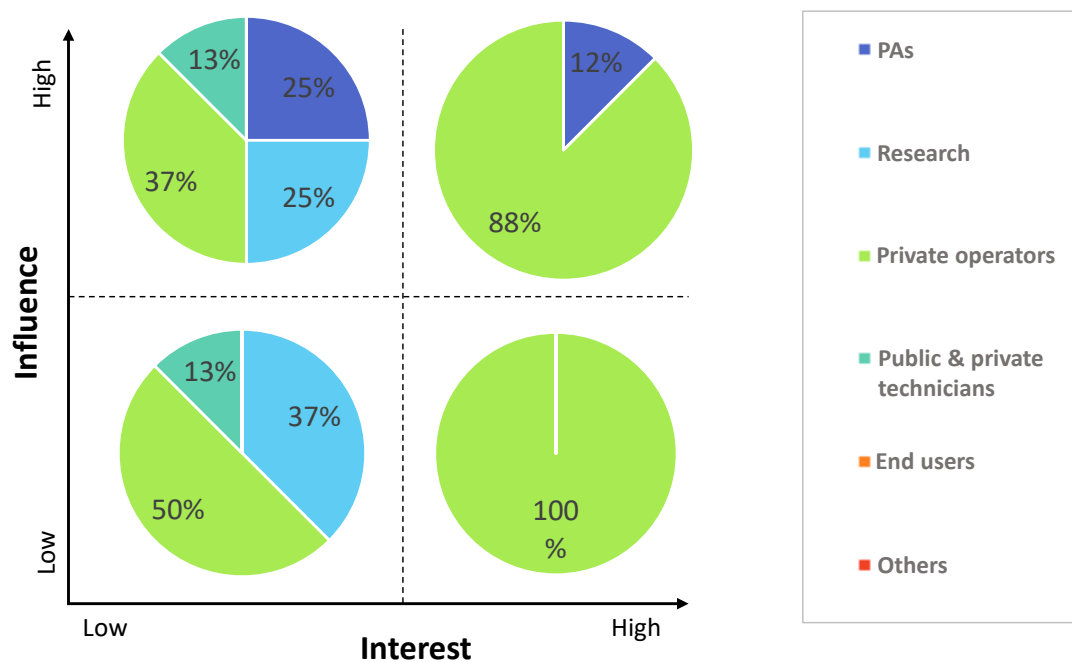


Figure 7-2 – Level of interest and influence for each type of actors (Austria)

Last-Mile-Logistic

LMLs are involved in several field tests from e-trucks to gas-powered trucks that are in use nationally and internationally. In the LML, a distinction has to be made between classic parcel services (3.5t) and the forwarding sector with heavy-duty trucks from 7.5t upwards. For both segments, payload, distance, time and volume are the driving factors. In the case of e-trucks, the battery reduces the payload and, in heavy traffic, it also reduces the volume. In other words, the productivity of the vehicle is currently very limited.

Some LML-companies have set the goal of delivering the last mile 100% electrically across Europe by 2030 (from a certain tonnage size). Currently, eVans, eCanter (trucks with 7.5 t), eTrucks (not the size of overland trucks, 16t and 18t) are used. E-van (courier vehicle) have also been tested for 1 year. Other innovative solutions are also being tested in other countries, such as autonomous driving with electric vehicles.

Many larger logistics companies do not have their own vehicles, but use transport service providers.

In principle, overnight charging would be the charging concept of choice, where load management would play a very important role.

Additional infrastructure shall be planned to make a quick charge in the city centre, while 2-3 deliveries are made. This means that the LML-vehicle is charged while the goods are delivered. Sharing of charging infrastructure with the general public or with PTOs would not be very convenient, because a) total access would need to be guaranteed for LML, b) the charging infrastructure would need to be installed where the goods are delivered, not somewhere else in the city and c) there should be no time where the driver and companion are standing by waiting for the vehicle to charge. Such a so-called “opportunity charging” infrastructure would need to offer relatively high power for the batteries to be charged sufficiently in the limited time available.

7.1.4 Existing instruments

In Austria, the E-control as public authority monitors the development of charging-infrastructure and provides the directory www.ladestellen.at, which is mandatory filled by the operators of public accessible charge points to gain funding. This directory is, therefore, a good and actual overview over existing infrastructure but is actually mainly focused on the individual traffic.

7.1.5 Territorial needs and gaps

As seen in the spider diagrams in Annex, the players involved in e-Mobility, LML and LPT are very different and mostly driven out of the main business of the organisations. e-Mobility is mainly the topic of Energy Service Providers and therefore, due to a low involvement of the LML- and LPT-service providers is maybe not yet focused on the needs of the users.

Following a schematic representation of needs and gaps for Austria. All the elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project are listed in detail in Annex 2 – Needs and gaps.

Green Deal – Green Europe chart

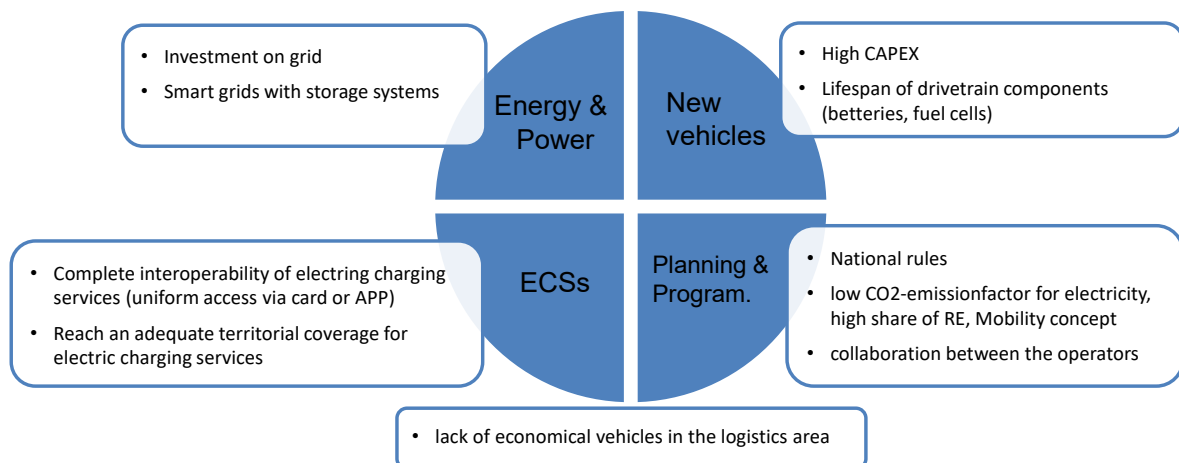


Figure 7-3 – needs and gaps for Austria-in-eSMART territory, in Green Deal policy

Digital Europe – Smart Europe chart

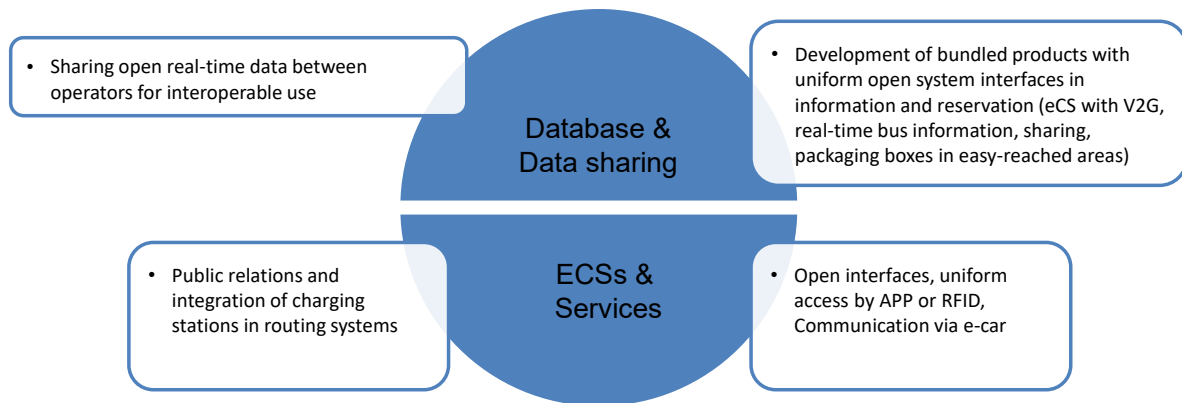


Figure 7-4 – needs and gaps for Austria-in-eSMART territory, in Digital Europe policy

Europe for Citizens – Smart PA chart

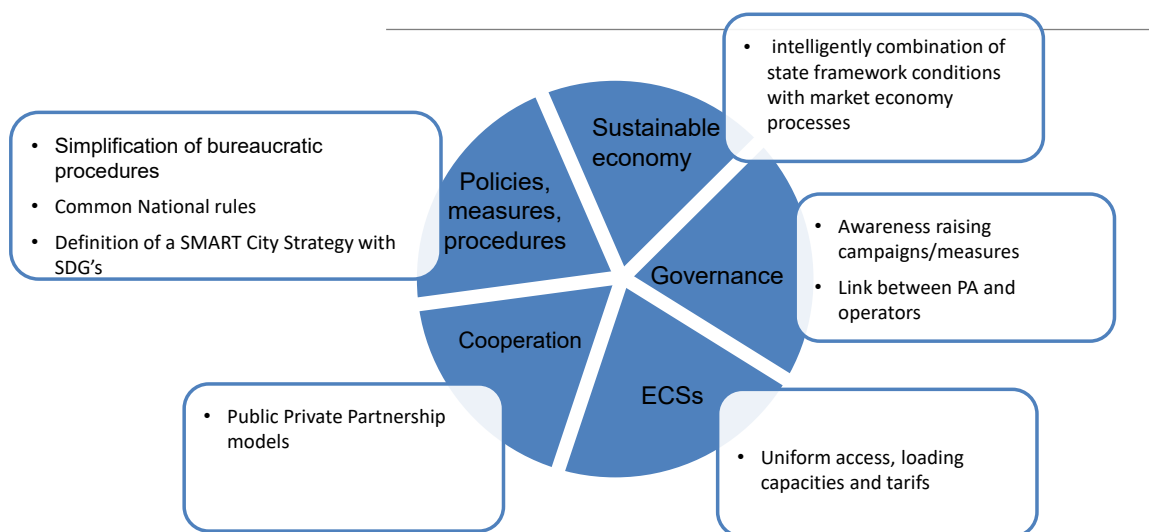


Figure 7-5 – needs and gaps for Austria-in-eSMART territory, in Europe for Citizens policy

7.2 Objectives, operational measures and indicators

The operational measures identified for Operational Road Map of Austria are listed in Table 7-1. Each measure is related with Country Objectives and with the Transnational Key Elements defined for the Tactical Road Map. The last three columns show the qualitative evaluations of three main criteria: Impact on e-LML/LPT diffusion, Time and Estimated Cost. More details and a complete description of each operational measure can be found in Annex 3 – Operational Measures.

Table 7-1 – Operational measures for Austria-in-eSMART Roadmap

EU Key elements	ORM Objectives	Operational measures	Impact on e-SMART pillars ¹	Impact on carbon footprint ²	Time ³	Cost ⁴
Green Deal - Green Europe (zero emission vehicles, alternative fuel, charging concept for LML/LPT, new business model for e-Mobility, environmental assessment and cost/benefit analysis)	Increase the level of awareness and know-how on e-Mobility regarding LML and LPT, with particular reference to the types of vehicles available on the market, the different recharging technologies available, the maintenance of e-vehicles, business models, funds, best practises	Know-how dissemination through educational programs at different levels (schools, universities, all types of media)	1-2-3-4	2	2	1
		Trainings on funding	1-2-3-4	2	1	1
		Database of different classes on availability of e-vehicles	1-2	2	1	1
		Technical trainings	1-2-3-4	2	1	2
		Feasibility analyses	1-2-3-4	1	1	2
		Development of regional electrification strategies	1-2-3-4	1	2	2
		Continuous Market study	1-2-3-4	1	1	1
		Continuous Fleet monitoring	1-2-3-4	1	1	1
Green Deal - Green Europe (development of infrastructures, LPT specific mobility policies, procurements) + Europe for Citizens – Smart PA (charging infrastructures)	Adaptation of existing electricity grid	Analyses of existing grid's limitations	4	1	1	1
		Development of charging infrastructure deployment strategies	4	1	2	3
Recovery and Resilience Facility (RRF) (sustainable construction, sustainable mobility – vehicles and infrastructure)	Rapid deployment of e-vehicles for LPT and their corresponding infrastructure	Competitive funds	1	1	1	3
		Feasibility analyses	1-2-3-4	1	1	2
		Development of regional electrification strategies	1-2-3-4	1	2	2
		Continuous Market study	1-2-3-4	1	1	1
Digital Europe – Smart Europe (data sharing, data lakes, data exchange platform among Companies and Pas)	Information availability	Data sharing through open source platform	1-2-3-4	2	2	2

EU Key elements	ORM Objectives	Operational measures	Impact on e-SMART pillars ¹	Impact on carbon footprint ²	Time ³	Cost ⁴
Europe for Citizens – Smart PA (new scheme of interconnection among PA and private SH, participatory approach, cooperative scheme for small municipalities)	Increase cooperation among stakeholders	Workshops with PAs and private entities	1-2-3-4	2	2	1
Index: 1 Impact on e-SMART pillars: 1=LML, 2=LPT, 3=e-Mobility, 4=energy grid 2 Impact on carbon footprint: 1=direct on emission, 2=indirect (i.e. on awareness or behaviour), 3=none 3 Time: 1=short (2025), 2=medium (2030), 3=long (2050) 4 Estimated costs: 1=low, 2= medium, 3=high						

The proposed monitoring instrument is based on the description of the progress of the achievement of the action goals (see table “action description”). The percentage of achievement during action time life will be the measure of the action progress.

Table 7-2 presents the system of indicators identified for monitoring the Roadmap progress. It includes more than 30 indicators which aim to verify the progress of measures and the results.

Table 7-2 – Operational measures for Germany-in-eSMART Roadmap - indicators

Operational measures	Indicator	Description
Know-how dissemination through educational programs at different levels (schools, universities, all types of media)	Progress indicator	<ul style="list-style-type: none"> number of training courses/seminars organised per year setting up a digital platform to share knowledges and info about e-LML and e-LPT (yes/no)
	Result indicator	<ul style="list-style-type: none"> number of people enrolled in courses number of accesses per year
Trainings on funding	Progress indicator	<ul style="list-style-type: none"> number of courses organised
	Result indicator	<ul style="list-style-type: none"> number of people enrolled in courses number of projects financed at regional/ local level per year number of projects financed/co-financed with public funds, at regional/local level, per year
Database of different classes on availability of e-vehicles	Progress indicator	<ul style="list-style-type: none"> setting up the specific web portal
	Result indicator	<ul style="list-style-type: none"> number SH (private/public) registered number of accesses per year average number of access per user, per year

Operational measures	Indicator	Description
Technical trainings	Progress indicator	• number of SH registered
	Result indicator	• grades on exams
Feasibility analyses	Progress indicator	• involvement of key stakeholders
	Result indicator	• Comprehensive cost analysis
Development of regional electrification strategies	Progress indicator	• Involvement of key stakeholders
	Result indicator	• Master plans, reference base strategy
Continuous Market study	Progress indicator	• Number of vehicles on database
	Result indicator	• Database, number of vehicles
Continuous Fleet monitoring	Progress indicator	• Amount of data, number of vehicles monitored
	Result indicator	• Database, enhancement measures
Analyses of existing grid's limitations	Progress indicator	• Number of areas covered
	Result indicator	• Mapping of existing supply and demand balances
Development of charging infrastructure deployment strategies	Progress indicator	• Involvement of key stakeholders
	Result indicator	• Master plans, reference base strategy
Competitive funds	Progress indicator	• Number of institutions participating
	Result indicator	• Number of submitted funding proposals
Data sharing through open source platform	Progress indicator	//
	Result indicator	//
Workshops with PAs and private entities	Progress indicator	• Number of working tables organized per year
	Result indicator	• Number of actions of planning and governance resulting, per year

8 Comparing the five Operational Roadmaps

This chapter intends to report the results of the comparative analysis of the 5 Operational Road Maps to highlight similarities and differences among countries, both with reference to the macro-objectives identified to promote e-LPT and e-LML, and to the operational measures indicated.

As shown in Table 8-1, the comparison has highlighted the need to create a network between stakeholders as a priority: the only objective common to all the countries is, in fact, the creation of moments of cooperation, exchange of ideas, sharing experiences and problems between stakeholders (private and public).

In order to promote e-Mobility in the LPT and LML, it is also important to aim for an increase in the investments dedicated to these two sectors, as well as the development of charging infrastructure networks and greater use of electric fleets.

Greater knowledge of the general aspects of e-Mobility in public transport and last-mile logistics (vehicle types, types of recharging, operating models, business models, ...), as well as the promotion of data sharing among stakeholders, are also objectives with some relevance.

Table 8-1 – ORM Macro objectives per country

Macro Objectives	Italy	Slovenia	France	Germany	Austria	All
Increase cooperation among stakeholders	X	X	X	X	X	5
Increase investment in e-LML and e-LPT	X	X	X	X		4
Increase use of e-LML, e-LPT (more vehicles, more infrastructures)		X	X	X	X	4
Increase the level of knowledge on e-LML and e-LPT	X			X	X	3
Promote data sharing between stakeholders	X	X	X			3
Change of thinking and & mix of solutions			X	X		2
Develop measures to support e-mobility		X	X			2
Adaptation of existing electricity grid					X	1

Table 8-2 presents a schematic but comprehensive comparison of the operational measures proposed by the five countries. The wording of the measures shown in the column “operational measures” has been revised in order to highlight the main topic; for the details of the specific measures please refer to the country Operational Road Map. For each country it is indicated whether the measure is a part of the ORM or not.

Twenty-seven different measures covered a total of 9 subjects (ranging from education & training to smart grids or data and experience sharing), of which 8 measures with a frequency higher than 1.

The selection of the most frequently considered measures is shown in Table 8-3.

As already pointed out for the objectives, a common need for cooperation emerges (creating working tables involving PAs and private entities, as well as internal meetings within PAs), but also a great need to create or improve the network of charging infrastructures for public transport.

In addition to infrastructure, the most frequent measures also concerned the vehicles, with a particular reference to the renewal of LPT fleets.

Finally, among the most common measures are those related to training (to train experts in the sector and new professionals, but also on the subject of funds and funding) and the creation of a DB to gather information about LPT vehicles and services.

In general, it is possible to note that, although public transport is thought of several times in a specific way, the topic of last-mile logistics is never explicitly mentioned.

Table 8-2 – ORM Operative measures per country (It:Italy, Slo:Slovenia, Fr:France, Ger:Germany, Aus:Austria)

Subjects	Operative Measures	It	Slo	Fr	Ger	Aus	All
Education & training	Educational programs at different levels (schools, universities, vocational training)	X				X	2
	Training on funding	X			X		2
	Training and capacity building for Public Authorities				X		1
Share data and knowledge	Database on availability of e-vehicles					X	1
	Database to collect information on LPT vehicle and services	X			X		2
	Web platform to share data	X		X	X		3
	Web portal to share knowledge	X	X				2
	Web platform to collate collected data from existing smart city platforms		X				1

Subjects	Operative Measures	It	Slo	Fr	Ger	Aus	All
Cooperation	Multi-disciplinary working tables among PAs	X	X		X		3
	Working tables with PAs and private entities	X	X		X	X	4
	Citizen involvement in planning				X		1
	Develop a regional coordination of the stakeholders			X			1
Strategies & funds	Development of regional electrification strategies					X	1
	Development of charging infrastructure deployment strategies					X	1
	Competitive fundings for a rapid deployment of e-vehicles for LPT and their corresponding infrastructure					X	1
	Develop dedicated fundings and support measures		X	X			2
	Continuous Fleet monitoring					X	1
R&D	Continuous Market study (vehicles and infrastructures)				X		1
	Encourage experimentations (vehicles, infrastructures)			X			1
	Feasibility analyses (vehicles, infrastructures)					X	1
e-mobility	Develop e-LPT			X			1
	Promote the use of e-mobility			X			1
Charging infrastructures	Creation/expansion of a charging infrastructure network for LPT	X	X	X	X		4
	Setting up of electric recharge HUBs	X					1
Vehicles	Renewal of the LPT fleet	X	X	X	X		4
e-grid	Analyses of existing grid's limitations					X	1
	Promote the use of renewable electricity to charge the vehicles			X			1

Table 8-3 – ORM most frequent operative measures

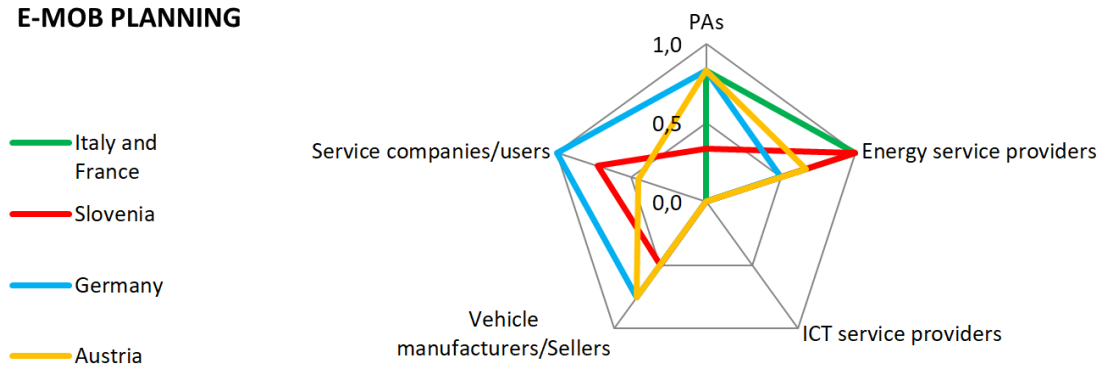
Operational Measures (selection)		
Education and Training	Educational programs at different levels (schools, universities, vocational training)	2 (AT, IT)
	Training on funding	2 (GER, IT)
Share Data and Knowledge	Database to collect information on LPT vehicle and services	2 (GER, IT)
	Web portal to share knowledge	2 (IT, SI)
	Web platform to share data	3 (GER, FR, IT)
Cooperation	Multi-disciplinary working tables among PAs	3 (GER, IT, SI)
	Working tables with PAs and private entities	4 (AT, GER, IT, SI)
Strategies and funds	Develop dedicated fundings and support	2 (FR, SI)
Charging Infrastructures	Creation/expansion of a charging infrastructure network for LPT	4 (GER, FR, IT, SI)
Vehicles	Renewal of the LPT fleet	4 (GER, FR, IT, SI)

9 Annexes

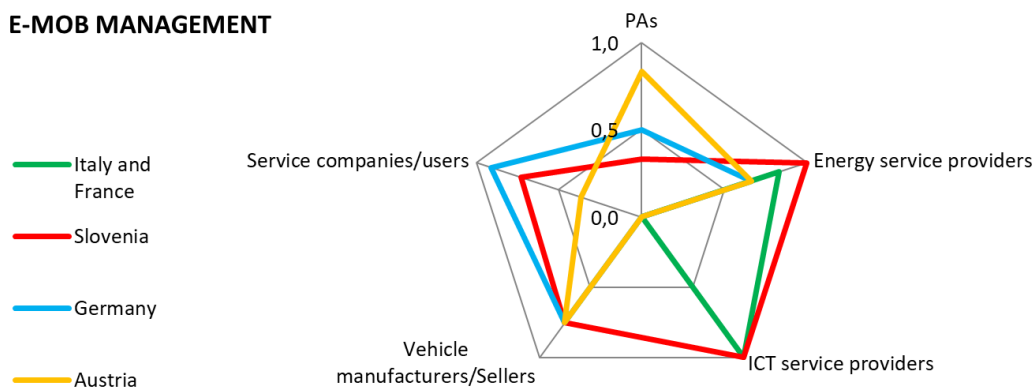
Annex 1 – Actors' roles

Here below the actors/roles spider diagrams for the five nations involved in the project.

E-MOB PLANNING



E-MOB MANAGEMENT



E-MOB USAGE

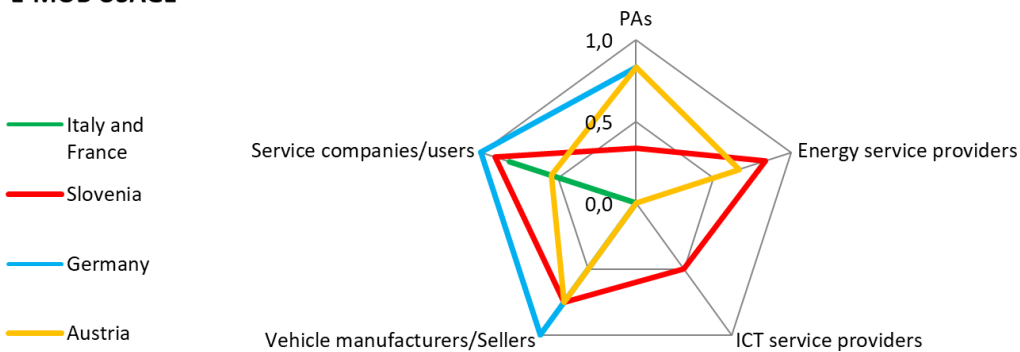


Figure 9-1 – Spider diagram for the e-Mobility data for each PP country

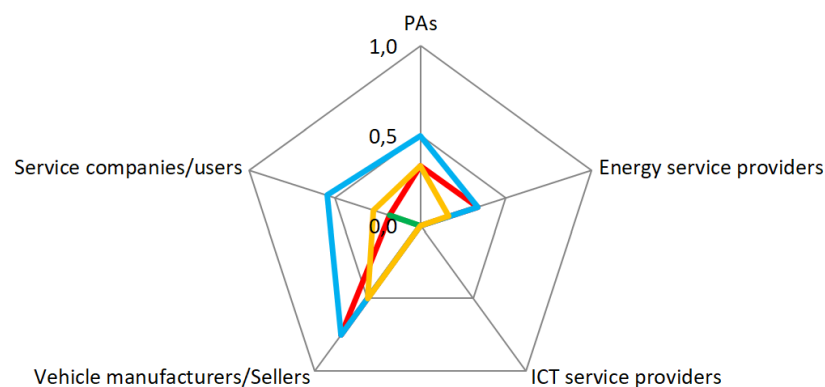
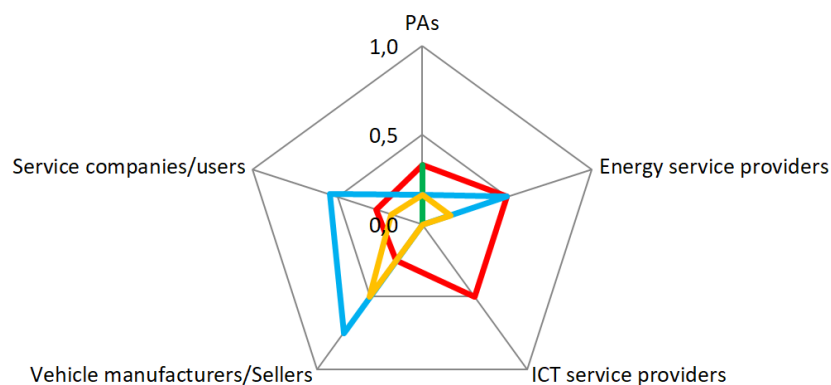
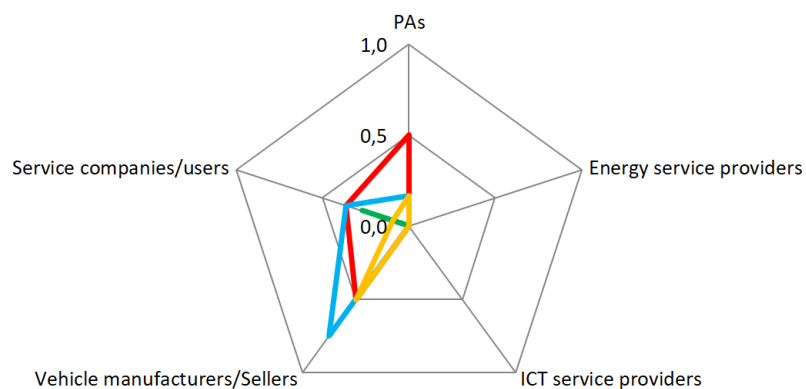
LPT PLANNING**LPT MANAGEMENT****LPT USAGE**

Figure 9-2 – Spider diagram for the LPT data for each project's country

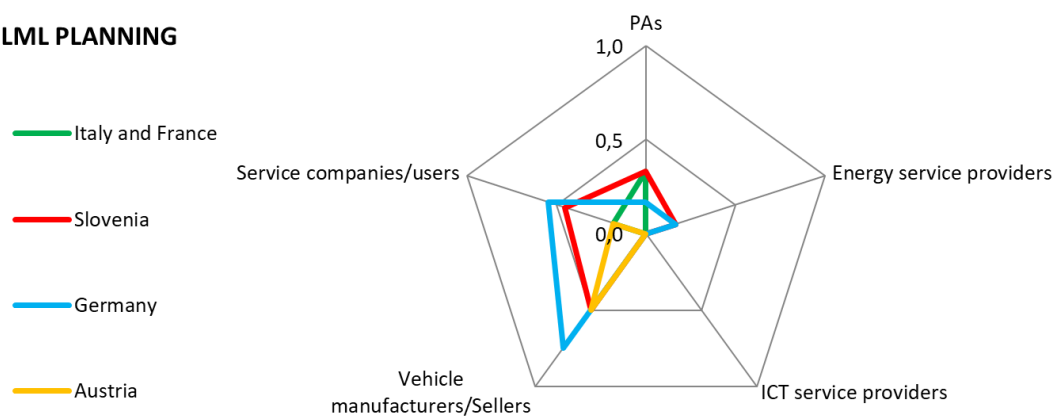
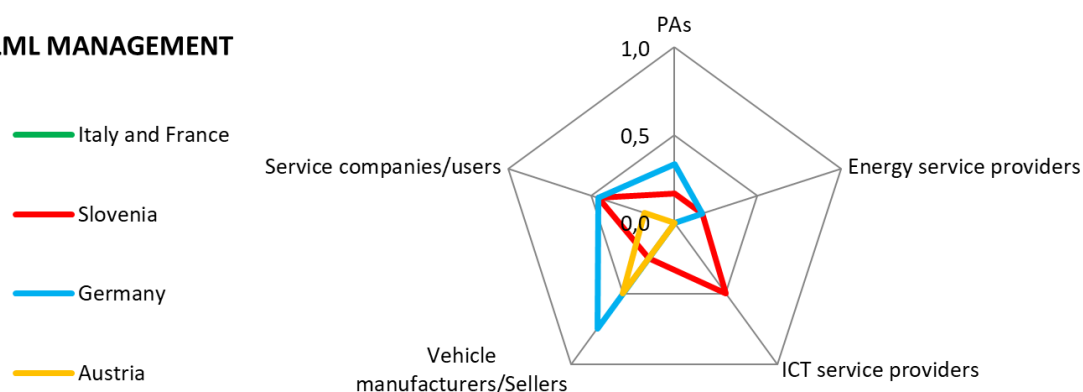
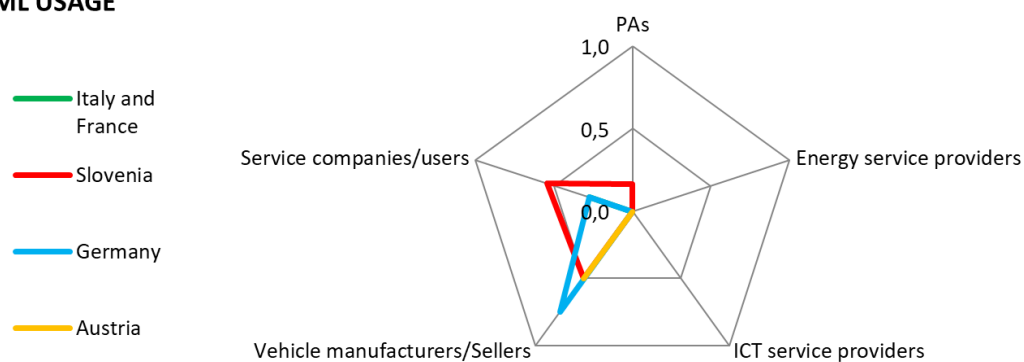
LML PLANNING**LML MANAGEMENT****LML USAGE**

Figure 9-3 – Spider diagram for the LML data for each project's country

Annex 2 – Needs and Gaps

Here below all the elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project.

Italy

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
ENERGY AND POWER	Energy production and RES rate	<p>Understanding how to foster regulations to support local renewable energy sources production</p> <p>Understand if it makes sense to promote the self-production of energy and its role in e-LML and e-LPT</p> <p>Localisation of energy production to minimise infrastructure costs (nearest town)</p> <p>Minimising the overall costs of energy production (renewable energy)</p> <p>Maximize the production of energy coming from sustainable production</p> <p>Agreements between regional providers of LPT and LML companies, in order to maximise the efficiency of energy production and avoid loss of energy</p>	DATA-BASE AND DATA SHARING	Data sharing	<p>Digitalization</p> <p>Willingness of stakeholders and PAs to share data (planning/monitoring, energy/subservice networks, e-buses in operation, e-LML flows/charging patterns to optimize e-CS network, load management, KPIs estimation)</p> <p>Mapping of available power. Without this it is difficult to plan and choose recharging technologies to be adopted</p> <p>Mapping of existing underground services for the construction of charging infrastructures</p>	POLICIES, MEASURES AND PROCEDURES	Policy cycle management	<p>Better understand and improve knowledge on maintenance of policy cycle management</p> <p>National, regional and EU policy makers have to take into account the new needs coming from the transition to e-Mobility (higher costs, incentives, energy production and demand, infrastructure, climate change)</p>

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
	V2V & V2G	<p>Spread of V2G and V2V technologies</p> <p>Network of V2G charging infrastructures</p> <p>Diffusion of V2V infrastructure to manage data coming from V2V cars</p> <p>Motivation and incentives</p>		Big Data	Collect data from energy providers, LPT and LML providers, companies and PAs involved in e-Mobility and smart cities issues		Creative use of policies	Public and private co-operation should define creative solutions to model the new mobility system. Involvement of think tanks, brainstorming between the actors that should be engaged (LML, LPT providers, mobility end-users)
	Energy distribution service	<p>Smart grid network</p> <p>Energy community / microgrid</p> <p>Define an efficient system of distribution of energy, considering local needs (LPT and LML issues in specific locations)</p>		(Open-source) data platform	<p>Better understand and improve knowledge on the benefits of a standard smart territory approach</p> <p>National data platform and a transnational one to develop political decision to foster e-Mobility in EU</p> <p>Platform that helps finding e-trucks' types and ECS' options on the markets</p> <p>Link between logistic tour planning tool and public e-CS infrastructure</p>		Simplification of bureaucratic procedures	<p>Simplification of bureaucratic procedures</p> <p>Telematics portal for administrative practises</p> <p>Less stratified and more homogeneous legislation</p>

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
	Smart grid network management system	Smart grid network management system Centralized public system of management for the grid		Data lakes	Regional data lake, which data can be shared or used to foster e-Mobility	SUSTAIN-ABLE ECONOMY	Circular economy	What is the circular economy in e-LPT & e-LML Mobility must be part of a sustainable system. The concept of circular economy must be fundamental for e-SMART and national decision makers. Materials, technologies, vehicles, waste, entire sectors (mobility, energy, health, etc.) should all be thought of as reusable and useful for something else.
	Grid enforcement	Energy grid reinforcement New electric cabins to guarantee the necessary power where it is needed		Data of goods fluxes			Sharing economy	Improve knowledge on life-style changes for sharing economy in transport, to get realistic scenario for e-Mobility LPT and LML know-how sharing Inside the e-SMART project in Italy, like in the EU, SHs and different actors should work together, sharing their resources. The way to success includes maximising and valorising what is available and what will be developed in the next years.

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
	Power grid stability	<p>Defined mechanism of control and management of energy production (coordinated and maybe centralised through algorithms)</p> <p>Keep the balance between request and furniture of energy, in order to avoid blackout (storage power many times is limited)</p> <p>Cooperation between central authorities, providers and maintainers of the grids</p> <p>Sensor to reevaluate and manage failures.</p>		LML data capturing tools	Data capturing tools (LML, LPT)	COOPERATION	New scheme of interconnection among PA and private SH	PAs and private operators should confront themselves in order to rethink a new, integrated and smart cooperation
	Local peak management	<p>Information systems to manage the energy efficiency</p> <p>Adaptation of energy producers implant or implementation of flexible solutions in energy production, to face energy request peak, to modulate energy production</p>		Data exchange platforms among Companies and PAs	<p>Data exchange platforms among Stakeholders (companies, PA, ...) to get innovative cooperation models to foster e-Mobility in LML/LPT</p> <p>Increase of cooperation between private companies and PAs through data sharing and periodical discussion</p>		Participatory approach	<p>Roundtable with PAs and private actors to better understand how the EU's criteria are met in reaching e-SMART aims</p> <p>PAs and private SHs involved in all the steps of the transformation of the mobility sector</p> <p>Promotion of cooperation between LPT players to allow economies of scale and help supporting infrastructure costs</p>

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
								<p>Creation of representative partnerships for LPT in each area</p> <p>Networks of transport, logistics and industrial companies throughout the Alpine region</p> <p>Private stakeholder collaboration</p> <p>Which topics to submit to participatory processes</p> <p>Which mandatory features for participatory processes</p> <p>Key stakeholders - selection of participants</p> <p>Roundtable with PAs and private actors to better understand how the EU's criteria are met in reaching e-SMART aims</p>
	Services for flexible electric grid operation	<p>How to develop smart charging for public buses</p> <p>Implementation of these services</p> <p>Adaptation of the infrastructures of the cities to allow a flexible distribution of energy in different locations</p>		Cloud computing	Understand and improve knowledge on cloud computing to analyse different types of clouds and to know best practises/ experiences on LPT and LML, in order to define a standardised data storage system		Communication and sensitization	Appropriate communication on e-Mobility issues to raise awareness (electric mobility, sustainable transport, battery power, e-car costs, ...)

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
NEW VEHICLES	Zero emission vehicles	Specialist skills about e-LPT and e-LML research and innovation to decrease emission coming from non-electric vehicles	ITS/ICT	Cooperative Intelligent Transport Systems (C-ITS)			Sensitising municipalities and companies on sustainable logistic solutions	PAs and private companies should be conscious about sustainability in logistics. Private actors, but also other SHs with logistic competences, should point out ways in which to achieve sustainability with efficiency.
	Alternative fuels	Better understand the potential of the alternative fuels production and use, the needs for their distribution Higher investment for alternative fuels studies Test of vehicles feed with alternative fuels Hydrogen tests for cars		Cooperative, connected, and automated mobility (CCAM)		GOVERNANCE	Cooperative scheme for small municipalities	Greater coordination and collaboration between public and private sectors Associations of municipalities regarding energy production, e-vehicles purchase, LML or LPT hubs (for close municipalities)
	Autonomous buses	Electric and autonomous buses to reduce accidents, energy consumption and vehicle decline		LML/LPT instruments (street cameras/sensors/traffic lights)			Governance model	Superordinate body that provides an overview of regulations, laws, new European guidelines and development opportunities for sustainable mobility PA identified as coordinator by law, with clear strategy stated Longer LPT concessions to allow investment in EVs

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
								<p>Understanding whether a top-down or a centric governance model is better</p> <p>Innovative governance model involving participation for shared choices</p> <p>Sustainable model of development, in which the mobility is supported in the e-transition. Sustainability and innovation are the hinges on which every model of governance should be based</p>
CHARGING INFRASTRUCTURES	Battery development	<p>Understand and improve knowledge on:</p> <ul style="list-style-type: none"> • EU battery initiative/benefits for EU economy • battery recycling <p>Investments in batteries development studies to maximize their duration and minimize costs</p> <p>Development of more powerful, durable, economic, easy-recyclable batteries</p>	CHARGING INFRASTRUCTURES AND SERVICES	Sharing charging infrastructure	Charging infrastructures are basic for the development of a new e-Mobility system. Share ECSs is essential to allow the development of this new mobility. ECS, energy furniture, charging hubs.		Global thinking approach	<p>Mobility cannot be thought of as a per se concept. Transport should be revised in a global approach due to the global connections that mobility has right now</p>

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
	Smart charging management system	<p>Smart charging management system</p> <p>Coordinated smart charging hubs</p> <p>Implementation of V2V and V2C technologies that can allow a smarter way to charge (location, time)</p>		Guidelines for interoperability among services	<p>Guidelines for interoperability among services</p> <p>PAs and private companies of mobility sector should define single rules and guidelines to develop a single common mobility system with the same rules</p>	CHARGING INFRA-STRUCTURES	Charging infrastructure	ECSs network for LML and LPT, but also citizens (final users of all the services). Allow citizens to have possibilities to charge easier vehicles is really essential in this transformation
	Charging concept for LPT and LML	<p>Knowledge of positive and negative aspect of e-charging concept for e-LPT and e-LML in order to identify /customize the suitable model for the territory</p> <p>Support the local providers of LPT and LML companies</p>		LML and LPT service agreements	LML and LPT may share charging infrastructures and hubs, minimizing costs and allowing a better energy infrastructure and furniture		Centralised distribution sites	Charging hubs and or centralised sites where buses or freight vehicles can be charged to avoid many infrastructural and supply issues
	Standardized charging infrastructure	<p>Technical standards (possibly open standards) to which everyone must have recourse</p> <p>Define which is the charging infrastructure under the guidance of central PA</p>						

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
PLAN- NING AND PRO- GRAM- MING	Develop- ment of infrastruc- ture (mobil- ity, energy, parking, financial issue)	<p>ECSs network for LML and LPT</p> <p>Smart charging network</p> <p>Keep the charging infra- structure updated with new technologies of charg- ing and/or production of energy</p> <p>Charging infrastructure inside parking places</p>						
	Mobility As A Service (MaaS)	<p>Training for increasing mu- nicipality capacity building for MaaS</p> <p>Development of MaaS in cities, integration of this system with other smart city systems and sectors</p> <p>Digital transition of the Ital- ian cities</p>						
	Urban Mobility Planning	<p>Cooperation between PAs and private actors to de- fine a new plan for urban mobility</p> <p>Consider needs coming from end-users</p> <p>Sustainability, efficiency, costs saving as the basic features of new urban mobility plans</p>						

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
		National plan to implement the electric transition of the mobility sector (public transport and private)						
	Planning of LPT and LML hubs location	Planning of LPT and LML charging hubs location considering energy needs, costs and time-saving issues. PAs and private operators should be involved.						
	New business models for e-Mobility	Business model for e-LML/e-LPT LML and LPT charging scheme Digitalization and smartness for new e-Mobility business models						
	LPT specific mobility policies (dedicated lanes, smart traffic lights, ...)	Dedicated hubs and energy grid						
	Development of unified services for LPT	Centralised LPT services (ticketing, payment modality, multiservice mobility)						

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
	Improved knowledge of one's territory stakeholders' LML flows	Better knowledge on one's territory stakeholders' LML flows						
	Environmental assessment and cost/benefit analysis	<p>Knowledge of management, use, costs, environmental benefits, and other benefits of EVs (LPT / LML)</p> <p>Define a cost/benefit analysis (PAs, private companies involved) considering the impact of energy production on environment</p> <p>Studies to better define impact of batteries on the environment</p>						
	e-LPT and e-LML financing	<p>Knowledge of funds available at different levels (EU, country, region) and knowledge on how to access the credits</p> <p>More National/regional/EU funds</p> <p>Investment coming from a public-private partnership that allow the economic sustainability of the e-transition</p>						

Green Deal - Green Europe			Digital Europe – Smart Europe			Europe for Citizens – Smart PA		
Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs	Key elements macro group	Key elements	Related needs
	PPP - Project Financing	Understand and improve knowledge on PPP - Project Financing in order to understand how to use it to foster decarbonization policies and energy transition in the territories Increasing funds coming from EU/State/Regions to develop digital tools regarding e-Mobility-smart cities						
	Procurements	Incentives for LPT providers in buying e-buses						
	Fair, safe, resilient mobility	A new mobility based on fair, safe, resilience, sustainable for the planet but also for citizens						

Slovenia

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Energy production and RES rate	Significant rise in electricity production is needed for SLO. PA and private (or semi-private) energy providers are the only ones involved in future developments in this field. Stable RES need to be considered, expert opinions need to be introduced to the general population in order to gain public support for sustainable electric energy production from stable sources of RES.	Data sharing	Legislation for non-PA entities to share data	Policy cycle management	PA laws are long overdue for renewal, with focus on alternative fuels, Connected, cooperative and automated mobility (CCAM) and sharing economy.
V2V & V2G	NOT IDENTIFIED AS A short – mid-term need	Big Data	First smart city data platforms are in pilot stages, so needs are yet to be identified. Platforms are developed in public private partnerships	Circular economy	Increased PA support through to innovative incentive scheme to develop and implement new business models
Urban Mobility Planning	Local PAs need additional support from national PAs, to implement advanced urban mobility strategies.	(Open-source) data platform	First smart city data platforms are in pilot stages, so needs are yet to be identified. Platforms are designated as “open” but are not truly open source, because source code is not freely available. ICT providers should be more open to share their information.	Sharing economy	Private companies are providing new shared mobility solutions. End users are using these solutions. Most important needs are simplification of bureaucracy, which should be tackled by PA's and ICT providers (smart contracts...)
Zero emission vehicles	There is a need for better engagement of national and local PAs.	Data lakes	First smart city data platforms are in pilot stages, so needs are yet to be identified.	Governance model	Focused incentives for municipal level on the national KPIs for the electrified LPT and LML vehicles and infrastructure, without the possibility of relocation. Regional development agency should continue to support, monitor and report on this issues, as is current practice

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Alternative fuels	Higher engagement of PAs is needed, particularly to adopt legislation to support incentives for electrified LML and LPT solutions.	PPP - Project Financing	National PAs should support local PAs in starting PPP in regards to smart infrastructure procurement	Participatory approach	Municipalities require additional expert assistance to implement e-LPT and e-LML projects and keep the financial incentives for covering the price gaps for electric vehicles.
Mobility As A Service (MaaS)	Urban areas are well covered with individual services of public transport, mostly by private companies in cooperation with local PA. PAs should still focus on cooperation with the private sector in development and support of solutions for MaaS Projects. For example Ministry of infrastructure is preparing an integrated mobility service platform enabling support environment for private MaaS APPs	Procurements	Modernization of public procurement legislation to support green technologies and to introduce quotas for electrified vehicles in LML and LPT	Fair, safe, resilient mobility	Increased support for electrified, innovative mobility solutions and local public transport. At the same time increasing quality of service, by implementing MaaS, door to door services and flexible provision of transfer combined with digital solutions
Services for flexible electric grid operation	Continued support to those services for flexible grid operation	Cloud computing	Not identified as a need	Communication and sensitization	Communication and information sharing should be focused on providing comprehensive information to targeted subjects in accordance to their needs and motivations..
Local peaks management	Local peak management is a persistent issue, which will increase with increased user base and should be addressed comprehensively, from new technical solutions to business model adaptations.	Cooperative Intelligent Transport Systems (C-ITS)	NOT IDENTIFIED AS A SHORT – MIDTERM NEED	Autonomous buses	Increased support of, development, testing and use of autonomous buses. Support for establishment of large scale testing environments and when possible the use of automated buses.
Power grid stability	Significant rise in electricity production is needed for SLO. PA and private (or semi-private) energy providers are the only ones involved in future developments in this field, PA should support projects aimed at improving grid stability.	Cooperative, connected, and automated mobility (CCAM)	Establishment of large scale testing grounds for testing CCAM related technologies, focused funding of CCAM related technical and business model developments.	Charging infrastructure	Achieve national KPIs in regard to charging infrastructure such as: support creation of a comprehensive infrastructure network for e-LPT and e-LML and opportunity charging infrastructure for transit.

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Energy distribution service	Significant rise in electricity production is needed for SLO. PA and private (or semi-private) energy providers are the only ones involved in future developments in this field. Support smart solutions, infrastructure reducing energy losses and enabling higher power charging service on opportunity charging for e_LML and e-LPT.	New business models for mobility	Private companies are providing new shared mobility solutions. End users are using these solutions. Most important needs are simplification of bureaucracy, which should be tackled by PA's and ICT providers (smart contracts...)	Centralised distribution sites	Not identified as a need
Battery development	Battery development is strongly based in fundamental research, with lack of applied research solutions More incentives for applied research for public and private research are needed	Data of goods fluxes	Cooperation between PAs and logistic companies is required to provide data needed to populate databases in data platforms.	Global thinking approach	Global thinking approach is required to study best practises for implementation and in power supply questions, to provide end users with economically sensible renewably sourced power.
Standardised charging infrastructure	Charging infrastructure should be harmonised with EU standards.	Sharing charging infrastructure	Lack of charging points, especially in older residential neighbourhoods with large apartment buildings. Private companies are developing solutions	Creative use of policies	Not identified as a need
e-LPT and e-LML financing	Midterm solutions, especially for LPT, because of extremely high costs involved. LPT providers must be assured years in advance about funding policy so they can budget appropriately	Guidelines for interoperability among services	Strong need for PA to create rules for interoperability, lack of any guidelines in the segment of electrified LPT and LML opportunity charging infrastructure	New scheme of interconnection among PA and private SH	Not identified as a need

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Environmental assessment and cost/benefit analysis	Not identified as a need. Already implemented.	LML data capturing tools	Private companies are capturing their data but are unwilling to share. Any progress in this area needs extensive debate especially in terms of benefits.	Cooperative scheme for small municipalities	Cooperative schemes for small municipalities are needed to promote cross municipal integrated solutions for electrified LPT services Such schemes would also provide mutual support between smaller municipalities in the promotion of electrified heavy duty vehicles.
Development of infrastructure (mobility, energy, parking, financial issue)	Strategic and integrated Long- term plans for development of infrastructure are required.	LML and LPT service agreements		Simplification of bureaucratic procedures	Needed across board form subsidies to smart city platforms and electrified LPT services
Charging concept for LPT and LML	Concepts should be determined by investors on case by case analysis	LML instruments (street cameras/sensors/traffic lights)	NOT IDENTIFIED AS a need	Sensitising municipalities and companies on sustainable logistic solutions	Municipalities should be informed that they are the ones who can accelerate electrification, by use of legislature/traffic planning (closed city centres for ICE) and they should also lead by example.
Improved knowledge of one's territory stakeholders' LML flows	Most of the private LML companies are unwilling to share their data	Data exchange platforms among Companies and PAs	Complete lack of data sharing between private companies and PA's. Increased number of public private partnerships is needed, while simultaneously providing dissemination of their identified benefits		
Development of unified services for LPT	Wider IMPLEMENTATION OF SOLUTIONS ALREADY IN DEVELOPMENT OR IN USE				
Smart charging management system	Continued and increased implementation of smart charging management systems is needed to support growing numbers of heavy duty electrified LPT and LML				

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Smart grid network management system	Continued and increased implementation of smart grid network management systems is needed to support growing numbers of electrified vehicles.				
Grid enforcement	Strategic grid enforcement is necessary to implement change from ICE based mobility to electrified mobility.				
LPT specific mobility policies (dedicated lanes, smart traffic lights,...)	Smart solutions together with CCAM, require legislature and funding to be implemented				
Planning of LPT and LML hubs location	Both LPT and LML hubs should be established on locations that would benefit both public and private actors. Dialogue between PAs and private entities is needed to choose those locations.				

France

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Energy production and RES rate	Develop charging solutions that are connected to renewable energies	Data sharing	Reorganise delivery schemes	Policy cycle management	Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs
V2V & V2G	Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements	Big Data	Reorganise delivery schemes	Circular economy	
Urban Mobility Planning	Reorganise delivery schemes	(Open-source) data platform	Reorganise delivery schemes	Sharing economy	
Zero emission vehicles	Try to have an energy mix in a fleet and do not head towards one single technology	Data lakes	Reorganise delivery schemes	Governance model	Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs
Alternative fuels	Try to have an energy mix in a fleet and do not head towards one single technology	PPP - Project Financing	Lower the costs, give financial support for LPT + Reduce operation costs and bring financial support for LML	Participatory approach	Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs + Help people change their behaviour and understand better how to use an electric car
Mobility As A Service (MaaS)		Procurements		Fair, safe, resilient mobility	
Services for flexible electric grid operation	Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements	Cloud computing		Communication and sensitization	Help people change their behaviour and understand better how to use an electric car + Bring more knowledge on vehicle market solutions

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Local peaks management	Try to develop more private charging during night time	Cooperative Intelligent Transport Systems (C-ITS)		Autonomous buses	
Power grid stability	Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements + Try to develop more private charging during night time	Cooperative, connected, and automated mobility (CCAM)		Charging infrastructure	Try to develop more buses with pantograph charging which lead to smaller batteries in the vehicles, fewer costs and better autonomy
Energy distribution service	Develop charging solutions that are connected to renewable energies	New business models for mobility	Lower the costs, give financial support for LPT + Reduce operation costs and bring financial support for LML + Improve the business model by making subscription costs less expensive when the vehicles are more used	Centralised distribution sites	Reorganise delivery schemes
Battery development	Avoid big batteries which have a shorter lifetime	Data of goods fluxes	Reorganise delivery schemes	Global thinking approach	Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs + Help people change their behaviour and understand better how to use an electric car
Standardised charging infrastructure	Improve interoperability between charging points and allow payment with a unique card	Sharing charging infrastructure	Improve interoperability between charging points and allow payment with a unique card	Creative use of policies	Improve the business model by making subscription costs less expensive when the vehicles are more used

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
e-LPT and e-LML financing	Lower the costs, give financial support	Guidelines for interoperability among services		New scheme of interconnection among PA and private SH	
Environmental assessment and cost/benefit analysis	Reduce operation costs and bring financial support for LML and LPT	LML data capturing tools	Reorganise delivery schemes	Cooperative scheme for small municipalities	Help municipalities build an ambitious strategy on transport and help them choose the right technology according to their needs
Development of infrastructure (mobility, energy, parking, financial issue)	Try to develop more buses with pantograph charging which lead to smaller batteries in the vehicles, fewer costs and better autonomy + Improve interoperability between charging points and allow payment with a unique card + Develop more charging points dedicated to LML	LML and LPT service agreements		Simplification of bureaucratic procedures	
Charging concept for LPT and LML	Try to develop more buses with pantograph charging which lead to smaller batteries in the vehicles, fewer costs and better autonomy + Develop more charging points dedicated to LML	LML instruments (street cameras/sensors/traffic lights)	Reorganise delivery schemes	Sensitising municipalities and companies on sustainable logistic solutions	Help people change their behaviour and understand better how to use an electric car + Bring more knowledge on vehicle market solutions
Improved knowledge of one's territory stakeholders' LML flows		Data exchange platforms among Companies and PAs			

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Development of unified services for LPT					
Smart charging management system	Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements				
Smart grid network management system	Develop smart charging to keep the charging load under 600 kVA and avoid heavy regulatory requirements				
Grid enforcement					
LPT specific mobility policies (dedicated lanes, smart traffic lights,...)					
Planning of LPT and LML hubs location					

Germany

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Energy production and RES rate	energy from renewable sources & energy storage solutions	Data sharing	n.d.	Policy cycle management	increase and fund staff in the municipalities (e.g. mobility manager) revision of traffic concepts, revision of the road traffic ordinance (adapt to electromobility), create mobility concepts
V2V & V2G	n.d.	Big Data	make it secure	Circular economy	work on second life and recycling of the battery, avoid the dependency on resources in uncertified countries, more manufacturing and supply in EU
Urban Mobility Planning	less cars, more combined mobility solutions	(Open-source) data platform	fair distribution of input and output regulation	Sharing economy	make it more attractive (lower prices), bundle the services (MAAS)
Zero emission vehicles	change of thinking and information & mix of solutions	Data lakes	secure privacy	Governance model	More influence and networking in LML, support the small and mid-sized businesses
Alternative fuels	Finding the best use case for each technology	PPP - Project Financing	simplify the funding process	Participatory approach	identify the people's needs to make it easier and more attractive to use e-LPT or e-LML, raise awareness, inform, find real alternatives for combustion car users
Mobility As A Service (MaaS)	mobility concepts	Procurements	n.d.	Fair, safe, resilient mobility	green mobility should be accessible and affordable for everyone
Services for flexible electric grid operation	smart charging concepts	Cloud computing	n.d.	Communication and sensitization	raise awareness, inform

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Local peaks management	n.d.	Cooperative Intelligent Transport Systems (C-ITS)	n.d.	Autonomous buses	depending on regional needs
Power grid stability	more infrastructure, storage, sector coupling and transnational extension	Cooperative, connected, and automated mobility (CCAM)	n.d.	Charging infrastructure	implement local charging infrastructure for LML, more pantograph charging for LPT, dedicated charging slots for small electric vehicles in LML in inner cities
Energy distribution service	integration in sustainability reporting	New business models for mobility	sustainable and long-term business models	Centralised distribution sites	define use case scenarios and more public influence on the logistic sector
Battery development	Second life concepts, recycling, social and environmental resource regulations and laws for mining in third world countries	Data of goods fluxes	n.d.	Global thinking approach	access to green mobility and alternatives to combustion should be possible everywhere
Standardised charging infrastructure	user friendly and transparent pricing	Sharing charging infrastructure	business models needed	Creative use of policies	introduce reward concepts for using e-LPT and e-LML
e-LPT and e-LML financing	more funding and financial security for medium sized businesses	Guidelines for interoperability among services	yes	New scheme of interconnection among PA and private SH	specifications for private SH (making it more attractive to cooperate), PAs need more staff dedicated to inter-connection
Environmental assessment and cost/benefit analysis	environmental & social standards along the entire value chain	LML data capturing tools	for defined use cases and scenarios	Cooperative scheme for small municipalities	make it simpler and more accessible to form model regions and connected regions, over regional concepts

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Development of infrastructure (mobility, energy, parking, financial issue)	dedicated parking slots for e-LML, more focus on pantograph charging in LPT	LML and LPT service agreements	n.d.	Simplification of bureaucratic procedures	funding process should be easier and less bureaucratic, especially for small and mid-sized companies
Charging concept for LPT and LML	EU standards and area-wide expansion over the borders	LML instruments (street cameras/sensors/traffic lights)	n.d.	Sensitising municipalities and companies on sustainable logistic solutions	raise awareness, inform, make information accessible
Improved knowledge of one's territory stakeholders' LML flows	define the use cases for LML, find most efficient solutions for each use case, more influence needed from the government	Data exchange platforms among Companies and PAs	n.d.		
Development of unified services for LPT	n.d.				
Smart charging management system	smart charging needed with renewable energies				
Smart grid network management system	integration of renewable energies into smart charging				
Grid enforcement	grid enforcement over the borders on a transnational level needed				

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
LPT specific mobility policies (dedicated lanes, smart traffic lights,...)	pantographs for charging, combination of technologies, making it more attractive for car users				
Planning of LPT and LML hubs location	at best, not sealing any new surfaces				

Austria

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Energy production and RES rate	Funds, production areas	Data sharing	communication between the power supply utilities or charging infrastructure and e-vehicles	Policy cycle management	
V2V & V2G	Technology exchange, energy sharing	Big Data	Secure access	Circular economy	
Urban Mobility Planning	Collaboration LPT, LML and individual private transport	(Open-source) data platform	Good data base and ongoing data update	Sharing economy	
Zero emission vehicles	Funds, regulations	Data lakes	Privacy protection regulations	Governance model	
Alternative fuels	Wide accessible infrastructure	PPP - Project Financing	Financial instruments	Participatory approach	
Mobility As A Service (MaaS)	Easy access, common platform/App	Procurements	best cost/benefit ratios for different procurements	Fair, safe, resilient mobility	
Services for flexible electric grid operation	Smart charging for LPT	Cloud computing		Communication and sensitization	awareness campaigns
Local peaks management	Storage systems	Cooperative Intelligent Transport Systems (C-ITS)	Real-time-data	Autonomous buses	Awareness campaigns
Power grid stability	Investments are needed	Cooperative, connected, and automated mobility (CCAM)		Charging infrastructure	interoperable

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Energy distribution service	Electric grid expansion, smart charging	New business models for mobility		Centralised distribution sites	Economy models
Battery development	Standardisation of battery systems, foster sustainability	Data of goods fluxes		Global thinking approach	Definition of a smart city strategy
Standardised charging infrastructure	Technical interface and interconnectivity	Sharing charging infrastructure	Economy models	Creative use of policies	
e-LPT and e-LML financing	Combination financing (public funds, bank financing, own resources)	Guidelines for interoperability among services		New scheme of interconnection among PA and private SH	Public-Private Partnership models
Environmental assessment and cost/benefit analysis	Criteria based evaluation	LML data capturing tools	Centralised data management	Cooperative scheme for small municipalities	Merger to form a model region
Development of infrastructure (mobility, energy, parking, financial issue)	Mobility concept, collaboration between the operators	LML and LPT service agreements		Simplification of bureaucratic procedures	Adaptation of regulations
Charging concept for LPT and LML	Smart Charging and Grid System	LML instruments (street cameras/sensors/traffic lights)		Sensitising municipalities and companies on sustainable logistic solutions	Information campaign /awareness raising

Green Deal - Green Europe		Digital Europe – Smart Europe		Europe for Citizens – Smart PA	
Key elements	Related needs	Key elements	Related needs	Key elements	Related needs
Improved knowledge of one's territory stakeholders' LML flows	Exchange of knowledge (workshops)	Data exchange platforms among Companies and PAs	Willingness to exchange the data (both sides)		
Development of unified services for LPT	National Regulations				
Smart charging management system	State of the Art - Grid				
Smart grid network management system	Investments on the grid				
Grid enforcement					
LPT specific mobility policies (dedicated lanes, smart traffic lights,...)	Internally defined guidelines and rated goals				
Planning of LPT and LML hubs location	Definition of POIs depending on high grid power				

Annex 3 – Operational Measures

Italy

MEASURE NAME	Vocational training
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Specific vocational training for mechanics, i.e. professionals capable of working on electric vehicles
PA ROLE	Main role is setting standards for education institutions: vocational programmes should be developed in strong partnership with industry actors, governments and employers, with PA serving as coordinator and facilitator of this work. PA should be involved in monitoring and assessment of the outcomes of the adopted education policies
BOTTLENECK	Content of the training must be aligned with the requirements of the market. Lack of flexible modes of studying might make the training difficult to pursue for people already working. Possible difficulty of integrating systematically work-based learning into vocational programs. Certifications and qualifications should be commonly recognized.
EXPECTED RESULTS	Growth in the number of professionals able of repairing and maintaining electric vehicles
STAKEHOLDER INVOLVED	Training schools and vocational training departments
FUNDING METHOD	<ul style="list-style-type: none"> • European Social Fund (ESF), the European fund that co-finances initiatives aimed at individuals and organizations • National funds • Regional funds
PROCEDURES	Definition of agreements with vocational training schools
BEST PRACTICES	<ul style="list-style-type: none"> • The Regional Training Catalogue (Regional Department of Education and Vocational Training): database allowing to search for a training course active in the territory • The Italian law recognizes the safety risk related to working with EVs. According to Legislative Decree 81/2008 on safety at work and the CEI 11-27 Standard, the assigned employee must be qualified in electrical work, depending on the level of intervention PAV (trained person), PES (expert person) or PEI (suitable person)

MEASURE NAME	University/post-university education
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Creation of courses of study to train people specialized in the design of electric vehicles, but also in fleet management
PA ROLE	Participate in the definition of the specific training objectives of the new courses and the training paths
BOTTLENECK	Achieve and maintain the minimum requirements mandatory for the Ministry of Education to activate and preserve new courses
EXPECTED RESULTS	Growing knowledge of electric mobility
STAKEHOLDER INVOLVED	Memorandum of understanding with Polytechnic/University
FUNDING METHOD	National and/or private funds
PROCEDURES	<p>The definition of the educational offer of the universities/post-university courses goes through an accreditation process. The sustainability of the teaching staff and of the training aspects of the course are verified in accordance with Ministerial Decree 6/2019 “Self-evaluation, evaluation, initial and periodic accreditation of sites and courses of study” (Ministry of Education).</p> <p>For an undergraduate Master’s degree, it is necessary to contact the university and submit the project for approval. The professors can be up to 80% external.</p> <p>For a new postgraduate school, contact must be made with the university, the project must be submitted, and the project must include the establishment of a Council, mostly composed of university professors.</p> <p>For the inclusion of specific seminars in an existing degree course, approval is required within the academic courses/programmes.</p>
BEST PRACTICES	Bachelor’s and Master’s degree courses for new professions organized by the Ministry of Health and the Ministry of Education, under the EU Reach Regulation (Regulation 1907/2006/EC REACH. Integrated legislation for registration, evaluation and authorization of chemicals)

MEASURE NAME	Web portal to share knowledge
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	<p>Develop a web portal to share knowledges and info about e-LML and e-LPT.</p> <p>A virtual place where accredited actors can share experiences and knowledge, request information, create collaborations</p>
PA ROLE	The portal should be under the patronage of PA. Management of the website by PA allows for better organization and harmonization of the stakeholders according to common strategy on regional/national level
BOTTLENECK	Effective facilitation of collaboration and knowledge sharing requires promotion of the portal to reach the critical mass of users
EXPECTED RESULTS	Creation of collaborative initiatives among stakeholders, dissemination of knowledge, e.g. on subsidies and funding opportunities, available technological solutions etc.
STAKEHOLDER INVOLVED	PA as creator and manager of the portal, must publicize the web portal and stimulate the exchange of knowledge and comparison. Associations and e-SMART stakeholders must keep the site alive and up to date
FUNDING METHOD	European, national and regional funds
PROCEDURES	<ul style="list-style-type: none"> • Creation of the web portal as part of European/regional/national projects • Agreements to update and keep site “alive”
BEST PRACTICES	Within the Interreg Alpine Space project SaMBA (Sustainable Mobility Behaviours in the Alpine Region) a web platform on Mobility Behaviour Change (MBC) was developed, designed to promote a change in mobility behaviour in the Alpine Space. The MBC platform is meant to be a transnational virtual community, to give voice to public administrations, individual citizens and companies who want to invest in sustainable mobility and who want to change their mobility habits in more sustainable ways, by promoting mobility behaviour change measures and initiatives.

MEASURE NAME	Database to collect information on LPT vehicle and services
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Creation of a database providing information on the status of the LPT vehicle fleets (type, technology, age, use, emissions, ...)
PA ROLE	The PA should be responsible for the centralised implementation of the database, collecting all the necessary information from all the public transport companies
BOTTLENECK	<ul style="list-style-type: none"> • Resistance by companies to share data • Difficulty in keeping the database up to date
EXPECTED RESULTS	Useful and necessary tool for fleet renewal planning
STAKEHOLDER INVOLVED	PA as DB manager; and LPT Companies for data provision
FUNDING METHOD	Regional funds
PROCEDURES	The data must be requested by the Regions from the LPT companies during the reporting phase. In case of public co-financing, they can also be requested through the mobility agencies
BEST PRACTICES	<ul style="list-style-type: none"> • Regional database for the unified management of information on LPT buses in Piedmont. The service is accessible to authorised users of Piedmont's public transport companies (TPL), the Regional Agency for the Mobility (AMP) and the Piedmont Region. The functions are profiled on the basis of the users who access the system. The activity of updating the data is an exclusive competence and responsibility of the company. AMP and Piedmont Region can consult the data validated by all the LPT companies • Yucca (https://yucca.smartdatanet.it/intro/#/), the smart data platform of the Piedmont Region, created with open source and usable technologies in the cloud. It is a big data platform available to citizens and businesses that offers tools to experiment and create innovative technological solutions linked to the world of data and digital. It provides access via APIs to numerous open data sets (public and private) and makes it possible to create applications in the areas of Internet of Things, Big Data, real-time data flow management, data analytics, etc.

MEASURE NAME	Database to collect information on LPT vehicle and services
BEST PRACTICES	<ul style="list-style-type: none">• Smart Control Room (https://www.venis.it/it/node/987). Located in Venice, it is the most modern operations' center in Europe. It collects data and video streams from the various centers and sensors located in the Venice area. Once collected, the data provided is harmonized with that coming from telephone cells and cameras. All the information is then visually represented on the smart control room's video walls, allowing operators to check any intervention needs in real-time. The high technological and safety level project is unique in Italy. Through this platform, it is possible to know the number of subjects present in the city, the traffic situation and public transport, geolocate accidents, and much more.

MEASURE NAME	Training on funding
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Organizing of training courses for public and private entities on available funds for the realization of recharging infrastructures and for the purchase of vehicles and credit access procedures
PA ROLE	<ul style="list-style-type: none"> • The PAs of the territories make agreements with the individual fund managers for them to organize training courses on the procedures for participation in public funds and the information channels to be followed • the PA can also act as an intermediary between course promoters and potential course participants
BOTTLENECK	Possible difficulties with reaching all the interested parties
EXPECTED RESULTS	<ul style="list-style-type: none"> • Increased awareness of funding opportunities • Increased investments in e-Mobility
STAKEHOLDER INVOLVED	e-Mobility industrial partners and PAs at local level
FUNDING METHOD	Responsibility of fund managers
PROCEDURES	Courses could be organized directly by fund managers or entrusted to the free market. Courses should be publicized for groups of stakeholders, also with the support of the PA, with the aim of reaching actors not already active in the use of the funds
BEST PRACTICES	EU programme information days (i.e. Horizon Europe info days 2021)

MEASURE NAME	Creation of a charging infrastructure network for LPT
RELATED KEY ELEMENTS	Green Deal - Green Europe + Europe for Citizens / Smart PA
MEASURE DESCRIPTION	<p>Creation of an adequate charging infrastructure network for LPT, for exclusive use or shared between LPT companies (a difficult objective to pursue), aimed at supporting the progression of the transition to electric LPT.</p> <p>It is a measure included in the National Strategic Plan for Sustainable Mobility aimed at renewing LPT fleets and improving air quality</p>
PA ROLE	Planning and defining criteria for the implementation of infrastructures (if planned to be shared between several actors). Coordination of projects at local level
BOTTLENECK	<ul style="list-style-type: none"> • Unavailability of funds • Difficulties in managing the possible sharing of LPT charging stations among public transport partners and/or other actors
EXPECTED RESULTS	Implementation of a network of LPT charging infrastructures able to ensuring that public transport services can be provided with an adequate level of service
STAKEHOLDER INVOLVED	PAs, TPL companies
FUNDING METHOD	National funds
PROCEDURES	<p>If public funds are involved: project submission, approval (PAs), contracting and reporting to the PA.</p> <p>Mobility agencies are the link between the PAs and LPT companies.</p>
BEST PRACTICES	/

MEASURE NAME	Setting up of electric recharge HUBs
RELATED KEY ELEMENTS	Green Deal - Green Europe + Europe for Citizens / Smart PA
MEASURE DESCRIPTION	Creation of electric charging HUBs for LML vehicles (possibly including columns for private cars) to be built at the main freight transport nodes (logistic nodes, inter-modal nodes) and urban freight distribution nodes
PA ROLE	Planning and financing
BOTTLENECK	Often private interests do not fit in with public rules
EXPECTED RESULTS	Implementation of an adequate network of HUBs capable of adequately supporting the specific needs of e-LML
STAKEHOLDER INVOLVED	PAs and LML stakeholders
FUNDING METHOD	Private funds, supplemented by public funds
PROCEDURES	Partnerships between public and private actors, private investments or tenders
BEST PRACTICES	<ul style="list-style-type: none"> • INCIT-EV Project. Horizon project (2020-2023) which include, as pilot case, the implementation in Turin (P.zza Caio Mario) development of the power electronics and ICT services needed to model, engineer and develop ten 3.6kW bidirectional conductive charging points for EVs (400V max voltage), one 150kW superfast unidirectional static conductive charging point for cars, one small track 20kW (max) DWPT unidirectional for stationary application for different type of vehicles. A smart and interoperable payment systems will be developed and integrated with the current Regional public transport electronic ticketing system (BIP) • PIEMONTE Region guidelines for interoperability of electric columns. Regional Council Decision No 33-7698 of 12/10/2018. Regional Council Decision No 33-7698 of 12 October 2018. A document containing technical indications aimed at ensuring the interoperability of electric charging stations with the regional electric mobility platform (PUR = regional unique platform) and the national platform (PUN = national unique platform), as well as an adequate information service and use of electric mobility for all users

MEASURE NAME	Renewal of the LPT fleet
RELATED KEY ELEMENTS	Green Deal - Green Europe + Europe for Citizens / Smart PA
MEASURE DESCRIPTION	Renewal of the LPT vehicle fleet to replace older ones with generally environmentally friendly vehicles, in particular, electric vehicles. It is a measure included in the National Strategic Plan for Sustainable Mobility.
PA ROLE	Identification of co-financing criteria
BOTTLENECK	Lack of funds
EXPECTED RESULTS	Increasing the percentage share of LPT e-vehicles
STAKEHOLDER INVOLVED	PAs, public transport companies
FUNDING METHOD	<p>Funds coming from:</p> <ul style="list-style-type: none"> • National strategic Plan for Sustainable Mobility • Cohesion Development Funds • Ecological Transition Fund of the Ministry for the Po Valley Basin (directorate decree RINDEC-2019-0000207 del 27.12.2019) • POR-FESR • The National Recovery and Resilience Plan (NRRP)
PROCEDURES	If public funds are involved: project submission, approval (PAs), contracting and reporting to the PA
BEST PRACTICES	<ul style="list-style-type: none"> • DGR 5-2912 del 26 February 2021. Approval of the Regional Programme, 2019-2023, of investments in LPT by road. General criteria and modalities of implementation and contribution • Motus-e. “Electric buses in public transport. A vademecum”. Guidelines addressing all the main issues related to the electrification of LPT: technologies, procurement options, operation and maintenance, Total Cost of Ownership. The Vademecum aims to be a tool to guide Regions, Local Authorities and LPT companies to the opportunities of implementing a local public transport network of 100% electric buses (Battery Electric Buses - BEBs), in order to support decision making, help obtain maximum benefits and mitigate potential risks. The Vademecum is intended to be a tool to guide regions, local authorities and LPT companies to the opportunities for implementing a 100% electric local public transport network (Battery Electric Buses - BEBs), in order to support decision-making, to help achieving maximum benefits and to mitigate potential risks

MEASURE NAME	Renewal of the LML vehicles
RELATED KEY ELEMENTS	Green Deal - Green Europe + Europe for Citizens / Smart PA
MEASURE DESCRIPTION	Renewal of the LML vehicles to replace older ones with electric vehicles mainly
PA ROLE	Identification of co-financing criteria
BOTTLENECK	<ul style="list-style-type: none"> • Lack of funds • willingness of private actors to join the project
EXPECTED RESULTS	Increasing the percentage share of LML e-vehicles
STAKEHOLDER INVOLVED	PAs, LML companies
FUNDING METHOD	<p>Funds coming from:</p> <ul style="list-style-type: none"> • Ministry of Ecological Transition • Unioncamere • POR-FESR • The National Recovery and Resilience Plan (NRRP). Maybe in the future, because now it is focused on LPT
PROCEDURES	Calls for tenders, if public funds are involved
BEST PRACTICES	DGR 12-1668, 17/7/2020, determination 378/A1602B del 30/7/2020. Provisions for the approval of the 2020 funding programme for the granting of subsidies for the development of an environmental approach in the micro, small and medium-sized enterprises. Interventions eligible for financing: purchase of company vehicles for transporting people or goods; purchase of bicycles for company use; investments for the purchase of goods or services useful for the implementation of smart working

MEASURE NAME	Web platform to share data
RELATED KEY ELEMENTS	Digital Europe – Smart Europe
MEASURE DESCRIPTION	Creation of a web platform for sharing data relevant to the implementation of charging infrastructures (energy distribution points, underground network, open building sites, WI-FI coverage, urban and landscape constraints, etc.)
PA ROLE	Design, financing, management
BOTTLENECK	Difficulty of SHs to share data
EXPECTED RESULTS	<ul style="list-style-type: none"> • Greater knowledge of the territory for planning new charging infrastructures • Reduction in the time needed to build new charging infrastructures
STAKEHOLDER INVOLVED	Municipalities, energy distributors, road managers, communication network managers
FUNDING METHOD	European, national and regional funds
PROCEDURES	<ul style="list-style-type: none"> • Creation: market assignment • Need to define how to update the platform • Need to sign agreements between PAs and stakeholders involved to ensure the platform continuous updating
BEST PRACTICES	<ul style="list-style-type: none"> • Piedmont Region platform YUCCA (see measure “Database to collect information on LPT vehicle and services”): for the framework, not yet for the data, but it is a potential • E015 digital ecosystem (https://www.e015.regione.lombardia.it). The E015 Digital Ecosystem is an initiative promoted by Regione Lombardia together with Confindustria, CCIAA of Milan, Confcommercio, Assolombarda and Unione del Commercio, with the technical and scientific coordination of Cefriel. It encourages the creation of digital relationships between different subjects, both public and private, interested in enhancing their digital assets by sharing them or enriching software solutions for their users with the features and information shared by other participants. The sharing of functionalities and information in E015 takes place through the publication of APIs, according to the guidelines and with the coordination of the Technical Management Board (e015-tmb@regione.lombardia.it)

MEASURE NAME	Web platform to share data
BEST PRACTICES	<ul style="list-style-type: none"> • Roma data platform (https://www.comune.roma.it/eventi/it/roma-innovation-smart-citizenship-dettaglio.page?contentId=PRG18877). The Roma Data Platform is a set of tools, policies and standards that facilitate the development of new application layers in the city by public and private actors. The system is implemented with the aim of: <ul style="list-style-type: none"> - ensure the management of structured and unstructured data from heterogeneous data sources of existing applications; - make available, through a single access point, the static and real-time data of Roma Capitale as well as those of entities (in house, investee companies) that manage fundamental information for the management of the urban territory; - rationalise databases, avoiding duplications and redundancies; - facilitate cross-domain data analysis operations, possibly also through the application of Artificial Intelligence algorithms; - offer an open ecosystem for the adhesion and contribution of third parties to the Data Platform and for the use of data by third parties, also through the creation of a market-place; - defining policies and rules for the use of data and services.

MEASURE NAME	Multi-disciplinary working tables among PAs
RELATED KEY ELEMENTS	Digital Europe – Smart Europe
MEASURE DESCRIPTION	Multi-disciplinary working tables between or within PAs, to achieve the necessary competences to manage e-LPT and e-LML. The tables can involve PAs from different regions to facilitate the exchange of information and share problems, solutions and experiences
PA ROLE	PA should have the role of setting up and coordinating the working tables
BOTTLENECK	<ul style="list-style-type: none"> • Difficulty in involving public stakeholders • Difficulty in involving new actors (tables are often attended by the same actors)
EXPECTED RESULTS	The definition of coordinated policies
STAKEHOLDER INVOLVED	Public stakeholders in the territory
FUNDING METHOD	Not applicable
PROCEDURES	Administrative measures to set up the working tables
BEST PRACTICES	<ul style="list-style-type: none"> • The inter-management work table of Piedmont Region for electric mobility and smart mobility (Deliberation n. 42-232 del 4/8/2014) • Basin assemblies at the Piedmont mobility agency

MEASURE NAME	Working tables with PAs and private entities
RELATED KEY ELEMENTS	Digital Europe – Smart Europe
MEASURE DESCRIPTION	<p>Setting up thematic working tables to involve different stakeholders (LML, LPT, CPOs, DSOs, road managers, ...) in order to know, discuss and share, issues, opportunities and problems related to electric mobility in the LPT and LML.</p> <p>There are already many working tables set up by local authorities to discuss different topics: it would be sufficient to bring the topic of electric mobility to the tables.</p>
PA ROLE	Managing and organising meetings
BOTTLENECK	<ul style="list-style-type: none"> • Difficulty in involving public/private stakeholders • Difficulty in involving new actors (tables are often attended by the same actors)
EXPECTED RESULTS	The creation of a strong private/public stakeholder network able to develop electric mobility in the territory with regard to LML and LPT
STAKEHOLDER INVOLVED	PAs, TSO, DSO, CPO, eMSP, Energy provider, eCS manufacturers, fleet managers, LPT operators, LML service operators, ...
FUNDING METHOD	Not applicable
PROCEDURES	Administrative measures to set up the working tables
BEST PRACTICES	North-West logistic round table (Deliberation n. 22-8549 of the Regional Council 15/3/2019): permanent concertation table for the improvement of rail freight transport conditions in the North West (Piedmont, Lombardy and Liguria Regions)

Slovenia

MEASURE NAME	LPT charging infrastructure expansion
RELATED KEY ELEMENTS	Green Deal - Green Europe (zero emission vehicles, alternative fuel, charging for LML/LPT)
MEASURE DESCRIPTION	Public transport providers need to build charging infrastructure, whether for night charging or opportunity charging. Investments in mitigating grid disturbances are needed. PA's should therefore provide incentives or/and support public private partnerships. Such incentives should be predictable, mid-term (2030) or until satisfactory results are shown and financially adequate to construct a modern electric charging infrastructure.
PA ROLE	PA's provide funds for incentives and tender conditions
BOTTLENECK	Lack of funds, small number of LPT providers which are centred in larger towns, high prices of e-buses and infrastructure set up
EXPECTED RESULTS	Uptick BEV LPT vehicle adoption rate
STAKEHOLDER INVOLVED	National and local PA, LPT service providers
FUNDING METHOD	National budget, EU Cohesion fund, private funds and other
PROCEDURES	Public tenders
BEST PRACTICES	City municipalities of Kranj and Maribor

MEASURE NAME	LPT fleet updates
RELATED KEY ELEMENTS	Green Deal - Green Europe (development of infrastructures, LPT specific mobility policies, procurements)
MEASURE DESCRIPTION	Public transport providers need to upgrade their fleets with BEV vehicles, for which PA's should provide adequate measures to support the transition to electrification of the fleets and set up of the charging infrastructure for transit freight transport. Such incentives should be predictable, mid-term and financially adequate to bridge the serious gap in price between ICE vehicles and BEVs
PA ROLE	PA's provide funds for incentives and tender conditions
BOTTLENECK	Lack of funds
EXPECTED RESULTS	Uptick BEV LPT vehicle adoption rate
STAKEHOLDER INVOLVED	National PA, LPT providers
FUNDING METHOD	National budget, EU Cohesion fund
PROCEDURES	Public tenders
BEST PRACTICES	Current incitement schemes for commercial vehicles

MEASURE NAME	LML fleet updates
RELATED KEY ELEMENTS	Green Deal - Green Europe (development of infrastructures, LPT specific mobility policies, procurements)
MEASURE DESCRIPTION	Last mile logistic companies need to upgrade their fleets with BEV vehicles, for which PA's should provide adequate measures. Such measures should be properly promoted to the LML stakeholders. If any financial incentives are possible and sensible in regard to the state aid, they should be mid-term (early adopters for testing phase) to not disturb the market and financially adequate to bridge the gap in price between ICE vehicles and BEVs until BEVs e-HD vehicles are not financially viable. At the same time, PA's should introduce disincentives for most polluting vehicles.
PA ROLE	PA's provide measures, funds for incentives (only if strictly necessary) and tender conditions
BOTTLENECK	Lack of funds, high price of BEV HDV
EXPECTED RESULTS	Uptick BEV LPT vehicle adoption rate
STAKEHOLDER INVOLVED	National PA, LML service providers
FUNDING METHOD	National budget, EU Cohesion fund, private funds
PROCEDURES	Public tenders, tax (dis)incentives
BEST PRACTICES	Current incitement schemes for commercial vehicles

MEASURE NAME	LML infrastructure set-up
RELATED KEY ELEMENTS	Green Deal - Green Europe (development of infrastructures, LPT specific mobility policies, procurements)
MEASURE DESCRIPTION	Last mile logistic companies need set-up charging infrastructure if they electrify their fleets with BEV vehicles, for which PA's should provide adequate measures. Such measures should be properly promoted to the LML stakeholders. If any financial incentives are possible and sensible in regard to the state aid, they should be mid-term (early adopters for testing phase) to not disturb the market. Focus should be put on charging infrastructure for transit HD freight traffic for opportunity charging. Private investments should be supported.
PA ROLE	PA's provide measures, legal conditions, funds for incentives (only if strictly necessary) and tender conditions
BOTTLENECK	Lack of funds, high price of infrastructure set-up, grid capacity - locations
EXPECTED RESULTS	Uptake for charging infrastructure for e-HDV adoption rate
STAKEHOLDER INVOLVED	National PAs, LML service providers, private investors
FUNDING METHOD	Eu funds, private funds, national budget (only if strictly necessary)
PROCEDURES	Public tenders, tax (dis)incentives
BEST PRACTICES	Current incitement schemes for e-LPT infrastructure.

MEASURE NAME	Web platform to collate collected data from existing smart city platforms
RELATED KEY ELEMENTS	<p>Digital Europe – Smart Europe (data sharing, data lakes, data exchange platform among Companies and PAs)</p> <p>Europe for Citizens – Smart PA (new scheme of inter-connection among PA and private SH, participatory approach, cooperative scheme for small municipalities)</p>
MEASURE DESCRIPTION	There is a need for a trustworthy platform that collects, interprets and shares e-Mobility and ECS data, to show progress in the field, location of ECS, operation, ownership, technical properties.
PA ROLE	Creation and management of the platform
BOTTLENECK	Lack of funds, lack of interest from private companies and local PAs, privacy concerns, lack of legislation to get the relevant data from ECS operators.
EXPECTED RESULTS	Creation of the platform, that demonstrates benefits of large-scale electrification
STAKEHOLDER INVOLVED	National PA, ICT providers, Smart city platform providers, Local PAs, LML and LPT providers, ECS operators
FUNDING METHOD	National budget
PROCEDURES	<i>Public-private partnership between ICT providers and PAs</i>
BEST PRACTICES	IDACS

MEASURE NAME	Develop a regional coordination of the stakeholders
RELATED KEY ELEMENTS	Smart PA (global thinking approach, governance model, participatory approach) + Green Deal (urban mobility planning)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> • Take advantage of the regional (RDAs) national co-ordination bodies (GIZ ACS) dealing with Transport to develop the networking activities of the Regional Living Lab. • Set up regional/national committees to follow the development of e-Mobility • Encourage dialogue between public and private actors at a regional scale, especially on e-LPT and e-LML issues
PA ROLE	<ul style="list-style-type: none"> • Provide them with leverage to engage the key regional, local stakeholders. • Be actively present and engaged
BOTTLENECK	Funding, time, defining the leverage
EXPECTED RESULTS	Develop solutions that both suit public objectives and private business activities, quicken the transition to e-mobility, establish better monitoring of progress
STAKEHOLDER INVOLVED	RDAs, Association of City Municipalities, Other local PA, CPO (Charging Point Operator), TSOs, DSOs, eMSP (e-Mobility Service Provider), Vehicle manufacturers, Vehicle sellers, ECS manufacturers, Fleet managers, Taxi companies, Sharing service companies, LPT operators, Local transport agencies, LML service operators, Terminal/port/airport undertakers, Private, commercial sector, Retail companies, Private final users, Private mobility users, automotive clusters
FUNDING METHOD	Annual fees for running the operations.
PROCEDURES	Public/private partnership
BEST PRACTICES	From abroad

MEASURE NAME	Smart city territories and platforms
RELATED KEY ELEMENTS	<p>Digital Europe – Smart Europe (data sharing, data lakes, data exchange platform among Companies and Pas)</p> <p>Europe for Citizens – Smart PA (new scheme of inter-connection among PA and private SH, participatory approach, cooperative scheme for small municipalities)</p>
MEASURE DESCRIPTION	Build a open or semi-open data platform for DSS as a support to strategically plan e-mobility in the segment of e-LPT and e-LML and energy sector.
PA ROLE	Support or co-creation of such a DSS system with relevant stakeholders from the e-SMART sectors.
BOTTLENECK	Lack of funds, lack of interest from private companies, data sharing concerns, lack of legislation to get the relevant data from ECS operators.
EXPECTED RESULTS	Creation of the platform, that demonstrates benefits of large-scale electrification
STAKEHOLDER INVOLVED	National PA, ICT providers, Smart city platform providers, Local Pas, LML and LPT providers, ECS operators, DSO and TSOs.
FUNDING METHOD	Mixed sources of financing
PROCEDURES	<i>Public-private partnership between ICT providers and PAs</i>
BEST PRACTICES	e-SMART DSS prototype

France

MEASURE NAME	Develop a regional coordination of the stakeholders
RELATED KEY ELEMENTS	Smart PA (global thinking approach, governance model, participatory approach) + Green Deal (urban mobility planning)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> • Take advantage of the regional coordination bodies dealing with Transport and Logistics (in particular for Grand Est / BFC region : the Observatoire Régional Transports & Logistique du Grand Est: ORT&L) to develop the networking activities of the Regional Living Lab. • Set up regional committees to follow the development of e-Mobility • Encourage dialogue between public and private actors at a regional scale, especially on LML issues
PA ROLE	Organise exchange meetings with private actors
BOTTLENECK	
EXPECTED RESULTS	Develop solutions that both suit public objectives and private business activities
STAKEHOLDER INVOLVED	Regional PA, Municipal PA, Other local PA, CPO (Charging Point Operator), eMSP (e-Mobility Service Provider), Vehicle manufacturers, Vehicle sellers, eCS manufacturers, Fleet managers, Taxi companies, Sharing service companies, LPT operators, Local transport agencies, LML service operators, Terminal/port/airport undertakers, Private commercial sector, Retail companies, Private final users, Private mobility users, automotive clusters, regional agencies
FUNDING METHOD	No specific funding needed for meetings Energy certificates used for INTERLUD program
PROCEDURES	Public/private partnership
BEST PRACTICES	INTERLUD mechanism which helps to set up charters of sustainable logistic together with public and private actors

MEASURE NAME	Promote the use of e-Mobility
RELATED KEY ELEMENTS	Green Deal (standardized charging infrastructure / e-LPT and e-LML financing + Smart PA (global think approach)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> • Develop training programs targeted at different kinds of stakeholders (PAs, companies, general public) to increase awareness and technical know-how • At the regional levels in partnership with Bourgogne-Franche-Comté Mobilité Electrique and Grand Est Mobilité Electrique, using the “ADVENIR Formation” scheme • Develop a resource centre with data on e-Mobility (Terristory® in AURA region) • Launch a communication campaign on e-Mobility, develop promotional messages • Support electric car sharing so that people can test electric mobility
PA ROLE	Develop e-car sharing on their territory Contribute to the communication on electric mobility
BOTTLENECK	
EXPECTED RESULTS	More knowledge on electric mobility solutions
STAKEHOLDER INVOLVED	National policy makers, Regional PA, Municipal PA, Other local PA, DSO (Distribution System Operator), Vehicle manufacturers, Vehicle sellers, eCS manufacturers, Batteries manufacturers, Fleet managers, Taxi companies, Sharing service companies, LPT operators, Local transport agencies, LML service operators, Terminal/port/airport undertakers, Private commercial sector, Private final users, Private mobility users
FUNDING METHOD	Energy certificates used for ADVENIR trainings
PROCEDURES	Program
BEST PRACTICES	Advenir formations

MEASURE NAME	Develop dedicated fundings and support measures
RELATED KEY ELEMENTS	Green Deal (/ e-LPT and e-LML financing)
MEASURE DESCRIPTION	<p>Propose fundings and pricing incentives</p> <ul style="list-style-type: none"> • At the national level (ADVENIR, Banque des Territoires, ADEME) • At the regional level (CLIMAXION, ADEME)
PA ROLE	Organise call for tenders, offer subsidies
BOTTLENECK	
EXPECTED RESULTS	Foster the development of electric mobility
STAKEHOLDER INVOLVED	National policy makers, Regional PA, Municipal PA, national environmental agency
FUNDING METHOD	Subsidies, tax reduction
PROCEDURES	Program
BEST PRACTICES	

MEASURE NAME	Encourage experimentations
RELATED KEY ELEMENTS	Green Deal (energy production, V2V/V2G, services for flexible electric grid operation, local peaks management, battery development) + Smart PA (Charging infrastructure)
MEASURE DESCRIPTION	Test innovative solutions on smart charging, increase of battery economy, autonomous electric shuttles, solar energy charging of electric vehicles...This activity can be led in partnership with automotive clusters (CARA, Pôle Véhicule du Futur)
PA ROLE	Welcome an experimental project on their territory
BOTTLENECK	
EXPECTED RESULTS	Confirm the interest of new innovative solutions
STAKEHOLDER INVOLVED	To be defined according to the experimentation
FUNDING METHOD	Regional subsidies
PROCEDURES	public/private partnership
BEST PRACTICES	Autonomous shuttle in Crest (AURA region) Smart charging of buses in Valence Romans Agglomeration

MEASURE NAME	Promote the use of renewable electricity to charge the vehicles
RELATED KEY ELEMENTS	Green Deal (energy production, zero-emission vehicles, power-grid stability, energy distribution services, development of infrastructure) + Smart PA (communication and sensitization)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> • Require renewable electricity through public procurement contract • Favour charging stations using renewable energies
PA ROLE	Impose RES for the electricity used by charging in the public procurement
BOTTLENECK	
EXPECTED RESULTS	Foster the use of renewable energies for electric mobility
STAKEHOLDER INVOLVED	National policy makers, Regional PA, Municipal PA, Other local PA, Energy provider, Fleet managers, LPT operators, Local transport agencies, LML service operators, Private final users, Private mobility users
FUNDING METHOD	No specific funding identified
PROCEDURES	Public tender
BEST PRACTICES	

MEASURE NAME	Develop and make more reliable the charging infrastructures
RELATED KEY ELEMENTS	Green Deal (development of infrastructure, standardised charging infrastructure)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> Follow the state of the public charging stations through a regional mapping, identify the places where some needs are not covered, ensure a better interoperability between the various networks Promote the development of private charging stations
PA ROLE	Develop public charging stations where private stations are not installed
BOTTLENECK	
EXPECTED RESULTS	Ensure a good operation of the charging stations
STAKEHOLDER INVOLVED	Regional PA, Municipal PA, Other local PA, Regulatory authorities, Standardisation bodies, TSO (Transmission System Operator), DSO (Distribution System Operator), CPO (Charging Point Operator), e-MSP (e-Mobility Service Provider), BSP (Balance Service Provider), Platform providers, ICT operators/providers, e-CS manufacturers
FUNDING METHOD	
PROCEDURES	
BEST PRACTICES	

MEASURE NAME	Develop electric public transport
RELATED KEY ELEMENTS	Green Deal (Charging concept for LPT, Urban mobility planning)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> • Accompany municipalities towards low emission transport solutions, help them find the most adapted technologies • Promote online charging for buses (pantograph, ...) to reduce the use of batteries • Support the adaptation of depots
PA ROLE	Turn their bus fleet into electric buses
BOTTLENECK	
EXPECTED RESULTS	Less thermal buses used for public transport
STAKEHOLDER INVOLVED	National policy makers, Regional PA, Municipal PA, Other local PA, Regulatory authorities, LPT operators
FUNDING METHOD	<p>Subsidies to provide a dedicated assistance to municipalities</p> <p>Subsidies for investment in pantographs</p>
PROCEDURES	Investment program
BEST PRACTICES	Municipalities have already purchased public buses (Valence Romans Agglo, Vichy Communauté, METRO Grenoble, etc.)

MEASURE NAME	Develop data platforms
RELATED KEY ELEMENTS	Smart Europe (open source, data sharing, data lakes)
MEASURE DESCRIPTION	<ul style="list-style-type: none"> Follow the state and availability of charging infrastructures through a regional mapping Share data on logistics flows, develop knowledge about LML flows at a territorial scale
PA ROLE	Share data
BOTTLENECK	
EXPECTED RESULTS	More knowledge on the e-Mobility use
STAKEHOLDER INVOLVED	Regional PA, Municipal PA, Other local PA, TSO (Transmission System Operator), DSO (Distribution System Operator), CPO (Charging Point Operator), e-MSP (e-Mobility Service Provider), Energy provider, Platform providers, ICT operators/providers, Fleet managers, Taxi companies, Sharing service companies, LPT operators, Local transport agencies, LML service operators, Terminal/port/airport undertakers, Private commercial sector, Retail companies, Private final users, Private mobility users, other (specify).
FUNDING METHOD	To be defined
PROCEDURES	Program
BEST PRACTICES	

Germany

MEASURE NAME	Defined use cases for e-LML & Business models applied
RELATED KEY ELEMENTS	Green Deal - Green Europe (Urban Mobility Planning; Zero emission vehicles; Alternative fuels)
MEASURE DESCRIPTION	The different use cases for e-Mobility in the Last Mile Logistics need to be more analysed and pain points need to be collected, Business model is crucial for further development
PA ROLE	Participating in projects and roundtables; share data; approval
BOTTLENECK	Logistics need individual solutions with analytics and an efficient use of electric vehicles
EXPECTED RESULTS	Project implementations, startups and business development
STAKEHOLDER INVOLVED	Logistic companies; PAs; Energy provider
FUNDING METHOD	Funding available on several levels (regional, national, transnational)
PROCEDURES	Search for partners -> search for funding opportunities -> Application -> Implementation -> Analytics
BEST PRACTICES	Project ZUKUNFT.DE: https://www.now-gmbh.de/en/projectfinder/zukunft-de/

MEASURE NAME	Raise public awareness in E-CS
RELATED KEY ELEMENTS	Green Deal - Green Europe (Urban Mobility Planning; Zero emission vehicles; Alternative fuels)
MEASURE DESCRIPTION	Raising (public) awareness, for example through fairs, workshops, lectures and studies
PA ROLE	Organising events and campaigns, building up partnerships
BOTTLENECK	-
EXPECTED RESULTS	More (public) awareness and knowledge on E-CS
STAKEHOLDER INVOLVED	Public and private stakeholders
FUNDING METHOD	-
PROCEDURES	-
BEST PRACTICES	Regional Roundtables & Networking Events; Newsletter

MEASURE NAME	Database to collect information on LPT vehicle and services
RELATED KEY ELEMENTS	Smart Europe (open source, data sharing, data lakes)
MEASURE DESCRIPTION	collecting data in the field of traffic, climate, weather, aerospace and infrastructure, raising awareness on databases
PA ROLE	Purchasing and implementing data platforms, share data
BOTTLENECK	Lack on data information, missing awareness of data platforms and its funding methods, lack on expertise
EXPECTED RESULTS	Detailed information on traffic data
STAKEHOLDER INVOLVED	stakeholders from politics, industry and research
FUNDING METHOD	Public and private funding methods on national & international level available
PROCEDURES	Search for funding opportunities
BEST PRACTICES	Smart City Project “Kirchheim”

MEASURE NAME	Training and capacity building for Public Authorities
RELATED KEY ELEMENTS	Green Deal - Green Europe (Urban Mobility Planning; Zero emission vehicles; Alternative fuels)
MEASURE DESCRIPTION	<p>Training for increasing municipality capacity building for MaaS</p> <p>Development of MaaS in cities, integration of this system with other smart city systems and sectors Digital transition of the German cities</p>
PA ROLE	<ol style="list-style-type: none"> 1. simplification of bureaucratic procedures 2. specific mobility policies (dedicated lanes, smart traffic lights, ...) 3. increase in mobility infrastructures 4. increase in energy infrastructures 5. increase in charging infrastructure 6. development of smart-grid-nets-management system 7. planification of LPT and LML nodal point
BOTTLENECK	
EXPECTED RESULTS	A bigger involvement and engagement of PA in issues regarding electromobility
STAKEHOLDER INVOLVED	PA
FUNDING METHOD	Public funds
PROCEDURES	-
BEST PRACTICES	-

MEASURE NAME	Renewal of the LPT fleet
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Transforming the local/municipal/regional LPT fleet to a 100% green e-fleet.
PA ROLE	Purchasing / Implementing
BOTTLENECK	Prices of e-vehicles and scarce financial resources, charging infrastructure
EXPECTED RESULTS	100% e-vehicles in the fleet
STAKEHOLDER INVOLVED	Municipal Departments, Transport Services, Energy Providers, Private Companies
FUNDING METHOD	<ul style="list-style-type: none"> National Funds: <ul style="list-style-type: none"> BMVI: https://www.bmvi.de/SharedDocs/DE/Pressemitteilungen/2021/025-scheuer-foerderung-elektromobilitaetskonzepte.html; https://www.now-gmbh.de/foerderung/foerderprogramme/busse-mit-alternativen-antrieben/; https://www.ptj.de/projektfoerderung/busfoerderung BMU: https://www.erneuerbar-mobil.de/foerderprogramme/foerderprogramm-fuer-die-anschaffung-von-elektrobussen-im-oeffentlichen Procurement initiatives (see Best Practice i.e.)
PROCEDURES	
BEST PRACTICES	“Initiative Elektrobus” (procurement initiative) (https://www.vdv.de/initiative-elektrobus.aspx)

MEASURE NAME	Creation of a charging infrastructure network for LPT
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Setting up a charging infrastructure for the LPT (depot/city?)
PA ROLE	Drafting a concept (together with other stakeholders?) Setting up/Operating and/or Enabling charging infrastructure
BOTTLENECK	Lacking of financial resources
EXPECTED RESULTS	Having a charging infrastructure to run the LPT e-fleet trouble-free (with 100% renewable energy)
STAKEHOLDER INVOLVED	Municipal Departments, Transport Services, Energy Providers, Private Companies
FUNDING METHOD	<ul style="list-style-type: none"> National Funds: <ul style="list-style-type: none"> BMVI: https://www.bmvi.de/SharedDocs/DE/Pressemitteilungen/2021/025-scheuer-foerderung-elektromobilitaetskonzepte.html; https://www.now-gmbh.de/foerderung/foerderprogramme/busse-mit-alternativen-antrieben/; https://www.ptj.de/projektfoerderung/busfoerderung BMU: https://www.erneuerbar-mobil.de/foerderprogramme/foerderprogramm-fuer-die-anschaffung-von-elektrobussen-im-oeffentlichen Procurement initiatives (see Best Practice i.e.)
PROCEDURES	
BEST PRACTICES	“Initiative Elektrobus” (procurement initiative) (https://www.vdv.de/initiative-elektrobus.aspx)

MEASURE NAME	Renewal of the LML fleet and building up of charging infrastructure
RELATED KEY ELEMENTS	Green Deal - Green Europe
MEASURE DESCRIPTION	Transforming the logistics companies' (last mile) fleets to 100% green e-fleets and setting up the needed charging infrastructure (including a charging strategy).
PA ROLE	The guideline "Making urban delivery traffic sustainable" by BUND (2021) ¹⁴ states that "due to federal and state legislation, the municipal scope for action for shaping urban delivery traffic is partly restricted", and that "the implementation of logistical solutions depend to a large extent on private-sector actors". Nevertheless, the guideline states that still there are some approaches municipalities can use to take actions within the existing legal framework. The proposed measures are structured in four different fields: logistical solutions, planning solutions, structural solutions and regulative solutions.
BOTTLENECK	Prices of e-vehicles, charging infrastructure / charging strategy, unwillingness of private companies to transform their fleets
EXPECTED RESULTS	100% e-vehicles in the fleets and having a charging infrastructure to run the e-fleet (with 100% renewable energy)
STAKEHOLDER INVOLVED	LML companies, Public Administration, Energy Providers
FUNDING METHOD	Investment of logistics companies; National Funds available: <ul style="list-style-type: none"> • BMVI: https://www.klimafreundliche-nutzfahrzeuge.de/foerderung/foerderrichtlinie/
PROCEDURES	
BEST PRACTICES	"Zukunft.de" (publicly funded project to electrify the last mile) (https://www.klimafreundliche-nutzfahrzeuge.de/zukunft-de-elektrifizierung-des-zustellverkehrs-auf-der-letzten-meile/)

14 See <https://www.bund.net/service/publikationen/detail/publication/den-staedtischen-lieferverkehr-nachhaltig-gestalten/> (page 11, in German only)

MEASURE NAME	Multi-disciplinary working tables within Public Authorities
RELATED KEY ELEMENTS	Europe for Citizens
MEASURE DESCRIPTION	Organisation of multi-disciplinary roundtables and workshops within Public Authorities, considering the multiple sectors involved in integrated e-Mobility planning for LPT and LML
PA ROLE	Organiser and pacemaker
BOTTLENECK	Scarce time resources, additional workload of inviting and coordinating multiple departments and interests
EXPECTED RESULTS	Integrated decision making and e-Mobility solutions that consider all relevant aspects of planning, avoidance of results that omit certain mobility necessities
STAKEHOLDER INVOLVED	City departments
FUNDING METHOD	Municipal budget
PROCEDURES	Interactive workshops and roundtable discussions
BEST PRACTICES	

MEASURE NAME	Roundtables with Public Authorities and private sector
RELATED KEY ELEMENTS	Europe for Citizens – Smart PA (new scheme of inter-connection among PA and private SH, participatory approach, cooperative scheme for small municipalities)
MEASURE DESCRIPTION	Organisation of workshops aimed at the collaboration between public and private stakeholders
PA ROLE	Sharing of perspectives and idea regarding e-Mobility issues
BOTTLENECK	Lacking interest from stakeholders who might not be willing to participate or lack of funds to implement decisions and practises
EXPECTED RESULTS	Increase cooperation among stakeholders and sectors
STAKEHOLDER INVOLVED	PA; LML LPT, private sector
FUNDING METHOD	Public funds
PROCEDURES	Key stakeholders - selection of participants Roundtable with PAs and private actors to better understand how the EU's criteria are met in reaching e-SMART aims
BEST PRACTICES	

MEASURE NAME	Citizen involvement in planning via citizen science and consultations
RELATED KEY ELEMENTS	Europe for Citizens
MEASURE DESCRIPTION	To increase acceptance of electric mobility - and the needed installations of renewable energy - public authorities should actively seek to involve citizens in decision making processes already in the planning stage, for example via consultations, workshops, surveys or citizen science
PA ROLE	Organiser of citizen engagement activities
BOTTLENECK	Scarce time resources of citizens; perceived difficulty to include diversity of local stakeholders
EXPECTED RESULTS	Increased acceptance of e-Mobility policies and activities; higher use of electric transport modes
STAKEHOLDER INVOLVED	Citizens, other local actors
FUNDING METHOD	Municipal budget
PROCEDURES	Workshops, Online consultations, Questionnaires, Local media announcements, Social media, etc.
BEST PRACTICES	

Austria

MEASURE NAME	Know-how dissemination through educational programs at different levels
RELATED KEY ELEMENTS	Europe for Citizens
MEASURE DESCRIPTION	Organisation of yearly training courses/seminars and setting up a digital platform for sharing knowledge and info about e-LML and e-LPT
PA ROLE	Funding programs and set up of training courses/seminars, but also dissemination activities
BOTTLENECK	Lack of interest from the stakeholders to participate in the training courses/seminars
EXPECTED RESULTS	Improve the knowledge and acceptance of the younger generation and thus increase the use of alternative forms of mobility
STAKEHOLDER INVOLVED	schools, universities, higher educational schools
FUNDING METHOD	National and Regional Funds
PROCEDURES	Training could be developed by the Ministry of Education in cooperation with the Ministry of Mobility and Environmental Protection. Special training sessions for the teaching persons. The training material has to be updated to the state of the art regularly.
BEST PRACTICES	-

MEASURE NAME	Training on funding
RELATED KEY ELEMENTS	Green Deal – Green Europe
MEASURE DESCRIPTION	Organisation of workshops or seminars for enterprises and public authorities in order to give an overview of actual funding programs and their corresponding funding guidelines.
PA ROLE	Training for public administration employees
BOTTLENECK	Variety of different funding programs and thus variety of eligibility criteria. Complex and time-consuming funding processing.
EXPECTED RESULTS	Trained employees to take part in European and National funding programs.
STAKEHOLDER INVOLVED	Public administration und company employees
FUNDING METHOD	National and Regional Funds
PROCEDURES	Training and development of the training programs through the National Contact Points (NCP)
BEST PRACTICES	-

MEASURE NAME	Database of different classes on availability of e-vehicles
RELATED KEY ELEMENTS	Europe for Citizens and Green Deal – Green Europe
MEASURE DESCRIPTION	Setting up a specific web portal that gives an extensive and updated overview of the available e-vehicles with their specifications.
PA ROLE	Funding sources
BOTTLENECK	The web portal has always been kept up to date. Due to the large number of vehicles, this is very time-consuming.
EXPECTED RESULTS	A good overview for interested parties to quickly find a suitable vehicle by filtering vehicle specifications.
STAKEHOLDER INVOLVED	Public, Companies with fleets, Public administrations, LML-operators
FUNDING METHOD	National and Regional Funds
PROCEDURES	Setting up a platform with all vehicles available on the market and keeping it updated.
BEST PRACTICES	https://www.e-fahrzeuge.info/

MEASURE NAME	Technical Trainings
RELATED KEY ELEMENTS	Europe for Citizens and Green Deal – Green Europe
MEASURE DESCRIPTION	Carry out training for professional groups, who handle electric vehicles and bring them up to the latest standards, such as firefighters, paramedic, automobile garage and automobile associations.
PA ROLE	Coordination and implementation of these training courses
BOTTLENECK	Lack of interest of the stakeholders
EXPECTED RESULTS	Well trained emergency services and service provider and breaking barriers due to e-Mobility
STAKEHOLDER INVOLVED	Public authorities, service provider, emergency services, public
FUNDING METHOD	Regional and Local Funds
PROCEDURES	Organisation of Workshops and dissemination of training materials
BEST PRACTICES	LIFE+ Project CEMOBIL - CO ₂ -neutral e-Mobility in European cities to reduce air pollutants and noise as demonstrated in Klagenfurt on Lake Wörthersee, Austria (2010 – 2016)

MEASURE NAME	Feasibility analysis
RELATED KEY ELEMENTS	Green Deal – Green Europe
MEASURE DESCRIPTION	The technical, economic, political, legal organizational and resource-related feasibility of a project or measure has to be checked. The analysis shows whether a measure can be implemented under the given framework conditions. Possible implementation difficulties can thus be identified at an early stage and considered in further work.
PA ROLE	Providing funding sources
BOTTLENECK	The support for a measure can change in the course of changing political majorities.
EXPECTED RESULTS	A feasibility analysis shows whether a measure can be implemented under the given framework conditions. In addition, new solutions can be sought on the basis of the feasibility analysis, as the feasibility analysis reveals weak points and risks.
STAKEHOLDER INVOLVED	Local Public Transport and Last-Mile-Logistic Operators
FUNDING METHOD	National and Regional Funds
PROCEDURES	Meetings and workshops with LPT/LML, energy operator and vehicle manufacturer
BEST PRACTICES	Some Cities in Austria have already done feasibility analysis for the decarbonization process

MEASURE NAME	Development of regional electrification strategies
RELATED KEY ELEMENTS	Europe for Citizens and Green Deal – Green Europe
MEASURE DESCRIPTION	<p>Based on the results of a comprehensive analysis of the current situation and to the background of the transport policy objectives, a strategic orientation is to be determined. A fundamental decision by the political representatives is required for this.</p> <ul style="list-style-type: none"> • Definition of goals and measures • Establishing of a time horizon <p>The aim should be to provide the public with the most attractive and efficient transport system for their daily trips.</p>
PA ROLE	Political commitment
BOTTLENECK	High investment costs are required to implement the defined measures
EXPECTED RESULTS	Objectives that are quantifiable with specific indicators
STAKEHOLDER INVOLVED	Public, Public Authorities (Regional and Local level), LPT and LML Operators
FUNDING METHOD	EU and National Funding
PROCEDURES	Close coordination through workshops with internal steering group, LML/LPT/Energy Operators
BEST PRACTICES	Smart City Strategy of the City Klagenfurt am Wörthersee - https://www.klagenfurt.at/rathaus-direkt/aktuelle-projekte/smart-city-strategie.html

MEASURE NAME	Continuous Market study
RELATED KEY ELEMENTS	Green Deal – Green Europe
MEASURE DESCRIPTION	The economic potential of electric vehicles considering several different real driving profiles of conventional vehicles and technical/economic data for various scenarios has to be collected periodically.
PA ROLE	National, Regional and Local Funding
BOTTLENECK	Time consuming and high costs
EXPECTED RESULTS	Which vehicles can be expected on the market and what are the inhibiting factors for the dissemination (range, limited availability, long delivery times) but also the promoting factors (willingness to invest more for a new and environmentally friendly technology).
STAKEHOLDER INVOLVED	e-vehicles manufacturer
FUNDING METHOD	National Fund
PROCEDURES	Internet research, interviews with e-vehicles manufacturer
BEST PRACTICES	e-SMART market study – “Use of e-vehicles in the logistic in the area of the City Klagenfurt on Lake Wörthersee”

MEASURE NAME	Continuous Fleet monitoring
RELATED KEY ELEMENTS	Digital Europe – Smart Europe
MEASURE DESCRIPTION	Efficiency enhancements by use of IT-technologies: easy access to vehicles, building strategic digital capacity, increasing the uptake of digital technologies in the private sector and in areas of public interest
PA ROLE	Support of measures, national, regional, local funding
BOTTLENECK	Market penetration, acceptance
EXPECTED RESULTS	Faster market penetration, stakeholder awareness
STAKEHOLDER INVOLVED	Public companies, public authorities, private
FUNDING METHOD	National and EU funds
PROCEDURES	Gap identification, potential analysis, deployment of technologies, monitoring of results, optimization
BEST PRACTICES	https://www.zf.com/mobile/en/stories_31552.html

MEASURE NAME	Competitive funds
RELATED KEY ELEMENTS	Europe for Citizens and Green Deal – Green Europe
MEASURE DESCRIPTION	In order to promote the switch to e-Mobility, it is essential to create appropriate incentives. For which it is necessary to provide appropriate funds. Access to the subsidies should be low-threshold and continuously adapted to the vehicle market in terms of the amount of subsidy. At the same time, the corresponding charging infrastructure must also be promoted.
PA ROLE	Providing funds as incentives for switching to alternative forms of mobility
BOTTLENECK	Lack of funds and complex funding processing
EXPECTED RESULTS	Faster market penetration
STAKEHOLDER INVOLVED	Public, Public authorities and Private actors
FUNDING METHOD	National Funds
PROCEDURES	<ul style="list-style-type: none"> • Exchange with vehicle manufacturers to define the corresponding amount of funding – what is expected on the market? • Conception of a simple processing method • Dissemination activities via newspaper and social media channels
BEST PRACTICES	Austrian Climate and Energy Funds – Domestic environmental funding is a central funding instrument for investments in climate and environmental protection. The attractive funding offers investments in particular in the areas of renewable heating, energy efficiency and climate-friendly mobility.

MEASURE NAME	Workshops with PAs and private entities
RELATED KEY ELEMENTS	Green Deal - Green Deal Europe
MEASURE DESCRIPTION	A regular exchange between the public administration and private entities is essential in order to identify the needs of both sides and to guarantee appropriate measures to spread e-Mobility. This should be done at the earliest possible point in time.
PA ROLE	Coordination and implementation of the necessary defined measures in public area
BOTTLENECK	Different interests due to their internal structures and goals and time horizons
EXPECTED RESULTS	Implementation paper/strategy with schedule
STAKEHOLDER INVOLVED	Public authorities, private entities
FUNDING METHOD	EU, National and Regional Funds
PROCEDURES	Regular workshops between PA's and private entities
BEST PRACTICES	-

MEASURE NAME	Data sharing through open source platform
RELATED KEY ELEMENTS	Digital Europe – Smart Europe
MEASURE DESCRIPTION	Data Lake as collection of all possible relevant data corresponding to traffic, public transport (offer and use,) weather data, charging infrastructure, energy production (renewable, prosumers) and consumption within a regional grid - without determined application but to provide basis data for new business models (eg. estimate usage of charge points and offer variable pricing as incentive/steering for users)
PA ROLE	Data management
BOTTLENECK	interfaces and data management
EXPECTED RESULTS	Support the development of Applications which contribute to climate goals on the basis of this data.
STAKEHOLDER INVOLVED	IT Developers, local and regional public authorities, education and research, energy companies
FUNDING METHOD	EU, National and Regional Funds
PROCEDURES	developing data platform and bringing stakeholders to fill it
BEST PRACTICES	Workshops with PAs

MEASURE NAME	Analysis of existing grid's limitations
RELATED KEY ELEMENTS	Green Deal - Green Deal Europe
MEASURE DESCRIPTION	Analysis of bottlenecks in powergrid with different scenarios of production (renewable energy/prosumers) and demand (charge points for electric vehicles but also heat pumps and electric heating).
PA ROLE	force energy grid operators to provide data about grid or contribute to analyses by incentives/funding
BOTTLENECK	missing national strategy for charging infrastructure deployment and therefore wide variety in scenarios
EXPECTED RESULTS	accelerating charging infrastructure deployment by enabling the selection of cost efficient locations for charging infrastructure
STAKEHOLDER INVOLVED	DSO, private entities
FUNDING METHOD	EU, National and Regional Funds
PROCEDURES	
BEST PRACTICES	-

MEASURE NAME	Development of charging infrastructure deployment strategies
RELATED KEY ELEMENTS	Green Deal - Green Deal Europe
MEASURE DESCRIPTION	<p>Based on the results of a comprehensive analysis of the current situation a strategic orientation is to be determined. A fundamental decision by the political representatives is required for this.</p> <ul style="list-style-type: none"> • Definition of goals and measures • Establishing of a time horizon <p>A quota for chargepoints per electric vehicles, distances between charge points, power-capacity eg. needs to be defined to provide regulation and funding.</p>
PA ROLE	Definition of target values.
BOTTLENECK	Very different situations in urban and rural areas.
EXPECTED RESULTS	Objectives that are quantifiable with specific indicators
STAKEHOLDER INVOLVED	Public, Public Authorities (Regional and Local level), LPT and LML Operators
FUNDING METHOD	EU and National Funding
PROCEDURES	Close coordination through workshops with users, stakeholders in LML/LPT/Energy Operators and Chargepoint operators.
BEST PRACTICES	-

