



# 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

## Synthesis

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# Contents

<b>1</b>	<b>e-SMART Operational and Tactical Roadmaps</b>	<b>5</b>
1.1	The Operational Roadmap	5
1.2	The link with the Tactical Roadmap and countries' general framework	6
1.3	Main transnational actions and measures	7
<b>2</b>	<b>The e-SMART Operational Roadmap - Italy</b>	<b>8</b>
2.1	Territorial analysis	8
2.2	Objectives, operational measures and indicators	9
<b>3</b>	<b>The e-SMART Operational Roadmap - Slovenia</b>	<b>11</b>
3.1	Territorial analysis	11
3.2	Objectives, operational measures and indicators	12
<b>4</b>	<b>The e-SMART Operational Roadmap - France</b>	<b>13</b>
4.1	Territorial analysis	13
4.2	Objectives, operational measures and indicators	14
<b>5</b>	<b>The e-SMART Operational Roadmap - Germany</b>	<b>15</b>
5.1	Territorial analysis	15
5.2	Objectives, operational measures and indicators	17
<b>6</b>	<b>The e-SMART Operational Roadmap - Austria</b>	<b>18</b>
6.1	Territorial background	18
6.2	Objectives, operational measures and indicators	19
<b>7</b>	<b>Comparing the five Operational Roadmaps</b>	<b>21</b>

# Abbreviations

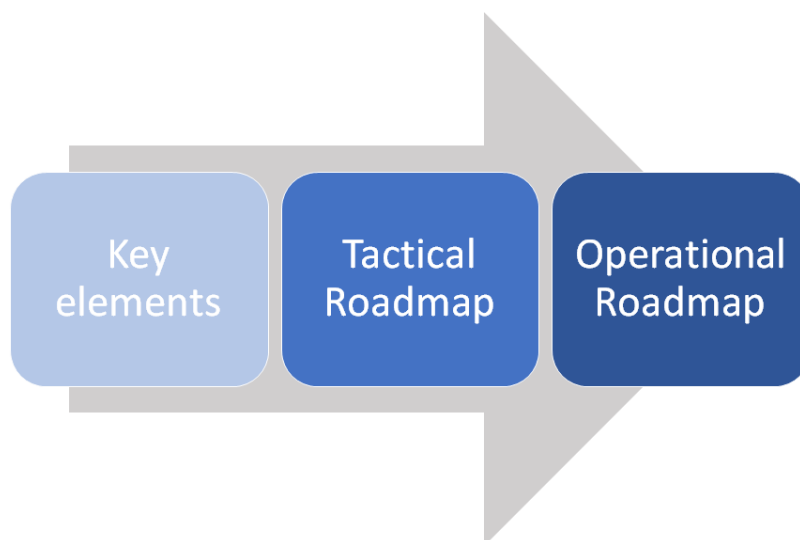
AS	Alpine Space
E-CS	Electric Charging Stations
EU	European Union
LML	Last-Mile Freight Logistic
LPT	Local Public Transport
OBS	Project Observer
PA	Public administration
PP	Project Partner
RLL	Regional Living Lab
SMT	Smart Monitoring Team
TLLN	Transnational Living Labs Network

# 1 e-SMART Operational and Tactical Roadmaps

## 1.1 The Operational Roadmap

The e-SMART project gathers **5 countries (Italy, Slovenia, Austria, Germany, France)** that aim to improve and develop e-LPT and e-LML transnational planning and management in the Alpine Space region.

The **Operational Roadmap (ORM)** represents the link between the **Tactical Roadmap (TRM)** and the territory. The ORM contains customized regional and local needs, objectives, business models, incentive and financial sources. It represents an operational instrument to be adopted by regional and local PAs in the field of e-mobility charging infrastructure planning for public transport and last mile logistics. It has been adopted after the identification of relevant actors on the territory and any challenge and the living labs work, to link them with relevant EU policies (Green Deal, Digital Europe...).



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

### Main objectives of ORM

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.

## 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 summarized in the **next five steps**:

1. **Identify all the potential actors, 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;
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**;
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 digitalization 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.

## 1.2 The link with the Tactical Roadmap and countries' general framework

A roadmap serves as a communication medium and visually represents an overview of the steps to be taken over a strategically defined period. The **e-SMART Tactical Roadmap (TRM)** is intended to support national and regional energy and mobility planning in the Alpine Space region. It is a **guide for public and private decision makers to identify the needs for e-mobility services** such as smart grid network, smart charging, renewable energy production, dedicated lanes, smart traffic lights, etc.).

Regarding already existing measures all over the analysed countries, Italy still lacks public charging stations, even though their number increased these past years thanks to several national guidance documents from the government. As Slovenia aims to become carbon neutral, it wants to establish a network of fast charging stations throughout the country. France main objective is to deploy a dense charging stations network, both for public spaces and for private areas or companies. Germany mainly promotes sustainable mobility and established a purchase grant for electric vehicles. Of all the countries, Austria is at the forefront of developments in this field. It provides 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, etc.

If the regulatory framework varies from a country to another, it goes the same way for actors and stakeholders' roles. In all countries, e-mobility planning, management and usage interests more stakeholders than LML.

Giving the diverse context in each country, a survey has been carried out to decide on which **key elements** knowledge should be increased. The main ones 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**.

### **1.3 Main transnational actions and measures**

This project and the roadmap aim to **apply the European strategic documents and legislations related to emission standards for new vehicles, to alternative fuels or to electricity generation from renewable energy sources**. In addition, the EU has also developed **common rules for the internal electricity market and promoted collective public transport**.

These actions are also reflected in national and regional policies, with the deployment of EV charging infrastructure, **reduction of bureaucratic procedures, accessibility standards** for charging stations and **fleet renewal**, and **promoting research** in the field, **promoting electric public transport** and **intermodal services**.

## 2 The e-SMART Operational Roadmap ITALY

### 2.1 Territorial analysis

#### 2.1.1 Territory of reference and governance models

The e-SMART project in **Italy** (indicated in the document as *Italy-in-eSMART*) covers **Piedmont, Lombardy, Liguria, Valle d'Aosta, Friuli Venezia Giulia, Veneto, Trentino-Alto Adige**.

At the national level, the Ministry of Transport promoted alternative mobility and fuels, both to expand the vehicle fleet and to build charging infrastructures. Several decrees estimated the need for charging points and defined the minimum requirements and technologies for an effective public charging infrastructure network. Criteria and modalities have also been established to favour the diffusion of the integration technology between the electric vehicles and the electric network.

The **regions outline the priority areas of intervention**, define the governance of the processes and some have also allocated contributions for the purchase of electric vehicles.

Lastly, **municipalities are the real key players**, as they are responsible for setting up recharging infrastructures in their territory by issuing calls for tenders for the private market operators.

#### 2.1.2 Territorial stakeholders' analysis

The level of interest/influence of each local actor in Italy varies. Some analysis highlighted the **important role of PAs** (at various territorial levels) **and private companies (especially energy service providers)** for e-mobility planning.

A request was also made for the **simplification of bureaucratic practices** and for the realization 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, ...). Stakeholders highlighted the importance of deepening the knowledge of the available technologies for ECSs.

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.

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

#### 2.1.3 Existing national instruments

Several tools, ICTs, ITSs, administrative documents or actions, fundings, are currently being used to manage e-mobility. Piedmont region uses a **regional database for the unified management of information on LPT buses** (habits, lines...). It is available for the public transport agencies and institutions throughout the region.



Piedmont also launched a **financing programme for enterprises**, to increase the commercial vehicles fleet. At the general level, Piedmont regulations aim to promote the replacement of old vehicles.

### 3.1.5 Territorial needs and gaps

All these infrastructure and technology-oriented challenges are interconnected with the existing **political and legal procedures**. Therefore, the latter should be simpler in order to have an efficient transition to e-mobility.

**Data collection and sharing** will play a **vital role** in harmonization of all these activities. The surveys conducted during project partner and stakeholder meetings showed that the project should be in line with the overall European policies, such as:

- **Green Europe/Green deal:** upgrading the energy grid and develop smart grids, activate technologies like V2G, knowledge of technical standards, local renewable energy production, adequate charging hubs...
- **Digital Europe/Smart Europe:** real-time data collection platforms between public stakeholders and between public and private operators, platforms for sharing best practices and information necessary for the construction of charging hubs, WiFi coverage, landscape planning...
- **Europe for Citizens/Smart PA:** simplify and uniform administrative procedures, circular economy networks, charging infrastructures for LML and LPT, cooperation between LPT/LML companies, PA with a clear strategy to accompany the various stakeholders.

## 2.2 Objectives, operational measures and indicators

The operational measures identified for Operational Road Map of Italy are listed according to the EU objectives.

**Regarding the Green Europe goal**, national missions are related to employment policies, manufacturing system, education and services, as well as renewable energy and sustainable transports. The **ORM objectives in Italy** are then to increase the level of knowledge on electric mobility, especially related to LML and LPT, and to increase the investments. This can be done through vocational trainings and university education, web portal and database sharing. **At the energy level**, operational measures that have been identified are the creation of a charging infrastructure network for LPT, the setting up of electric recharge hubs, and the renewal of the vehicles fleet. The **impact of those measures** is more or less important whether it targets e-SMART pillars or carbon footprint reduction.

**Regarding the Digital Europe goal**, the national strategies focus on digitization and competitiveness among the manufacturing system. The ORM of Italy then aims to simplify the processes leading to the realization of charging infrastructures enabling easy sharing of spatial information (energy distribution network, WI-FI coverage, urban and landscape constraints...). The **concrete operational measure** to reach that objective is to create a web platform to share data, which would have a good impact on the e -SMART project and on carbon footprint reduction.

**Regarding the Europe for Citizens goal**, the ORM objective is to increase cooperation among stakeholders by implementing multi-disciplinary working tables among PAs and between PAs and private entities.

To follow the success of those measures and their implementation, the Italian ORM presents several **progress indicators** along with the **result indicators**:

- Number of training courses/seminars organized per year and number of people enrolled.
- Effective set up of a digital platform, of web portals and of digital tools and number of accesses per year/percentage of PAs or companies that report their fleet data.
- Effective creation of a charging infrastructure network for LPT or private vehicles, and number of e-vehicle or ratio between the number of LPT electric vehicles and the total number of LPT vehicles.
- Renewal of the LML vehicles and total number of vehicles.

# 3 The e-SMART Operational Roadmap SLOVENIA

## 3.1 Territorial analysis

### 3.1.1 Territory of reference and governance models

In regard to e-SMART project, in **Slovenia 2 statistical regions** are most relevant, Central Slovenia (**Osrednjeslovenska**) and Upper Carniola (**Gorenjska**), indicated in the document as ***Slovenia-in-eSMART***.

The main public actors in e-CS planning are in order of importance on the national level Ministry of the Environment and Spatial Planning (MESP) and Ministry of Infrastructure (MI). On local level policies are created by the municipalities. Private actors are, with a few exceptions (large energy providers), excluded from policy making, although they are the ones operating the largest e-CS infrastructure networks.

### 3.1.2 Territorial stakeholders' analysis and existing national instruments

According to stakeholders, the **most important actors in guiding electrification are PAs**, which should work on long term strategies and incentives. On the other hand, the private sector needs longer notices before PAs decide to close city centres to ICE vehicles.

Slovenia has a T-2 Smart City platform, which is an **automated data collection and communication platform**. It provides municipal authorities and residents with information about local areas. The aim is to build a telecommunication infrastructure. Slovenia also released a website called Gremo na elektriko, that is **Slovenia's charging station finder**, to find a station where to plug your electric vehicle.

### 3.1.3 Territorial needs and gaps

Both surveys conducted during project partner and stakeholder meetings and analysis of data collected during RLL clearly show the **importance of energy services providers for e-mobility planning** in general, mostly because of potential pressure of e-mobility on power grid.

**E-mobility management stays in control of ICT service provider and energy service providers.** Usage of e-mobility solutions is focused mostly on the private sector and general public users.

Regarding **LPT planning**, the largest steps are made by **vehicle manufactures and sellers**, as in the other territories. LPT management shows similar information as e-mobility management in general, where the connection between ICT providers and energy service providers shows their leadership. e-LPT usage is still extremely limited.

**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.

**Technologically, the main challenges are development of interconnected and harmonized 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.

**Needs and gaps** for Slovenia for each overarching objective of the EU strategies are the following:

- **Green Deal/Green Europe:** upgrades to power grid and grid efficiency via smart grids, availability of vehicles, more predictable funding sources, ECS hub in older residential neighbourhoods and rural regions, street charging points...
- **Digital Europe/Smart Europe:** open and free data collection and sharing platform, providing security and privacy, new business models and ICT tools for eCS location and electricity grid.
- **Europe for Citizens/Smart PA:** simplification of administrative practices, transnational and transregional cooperation in data sharing, clear future strategies on e-mobility...

### **3.2 Objectives, operational measures and indicators**

Slovenia took some **operational measures to apply the Operational Road Map (ORM)** in line with the **European Green Deal**, such as the use of and investment in e-mobility solutions in LML and LPT through charging infrastructure expansion and fleet updates.

Concerning **Digital Europe and Smart Europe**, the ORM objective is to develop cooperation and to promote data sharing among stakeholders. The operational measures to be adopted would be a web platform to collate collected data from existing smart city platforms, and action committees among PAs and between PAs and private entities.

Some indicators (both **progress indicators and result indicators**) have been determined to monitor the roadmap progress:

- LPT charging infrastructure expansion and updates of the LPT fleet will be measured thanks to the funds allocated for incentives and the number of new stations or the percentage of e-LPT vehicles.
- Renewal of the LML vehicles will also be measured according to the funds allocated for incentives, the percentage of e-LML vehicles in comparison to ICE vehicles.
- The effective implementation of web platforms to collate collected data from existing smart city platforms, and the number of entities participating in data sharing.
- Action committees among PAs and between PAs and private entities are measured through the number of actions per year.

# 4 The e-SMART Operational Roadmap FRANCE

## 4.1 Territorial analysis

### 4.1.1 Territorial analysis and governance models

The territory of reference for e-SMART project (indicated in the document as **France-in-eSMART**) is the **Auvergne-Rhône-Alpes region (AURA)** and **a part of Franche-Comté**.

French regulatory framework on mobility is based on **two main laws**, one on **energy transition** and one on **sustainable mobility orientations**. They are **completed by specific decrees**, one on low-emissions buses and coaches, and one on depots for bus charging.

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 and the most impact on the political decisions taken. On the opposite, citizens remain very little interested in the development of public policies on electric mobility. Therefore, **developing cooperation between the various stakeholders is important**.

In AURA, the SRADDET (regional planning tool for land planning, sustainable development and territories) contains some measures related to e-mobility. There also is the TERRISTORY tool which gives access to municipalities to a wide range of indicators on their territory (energy consumption, mobility...). It aims at integrating more indicators on e-mobility through the e-SMART project.

### 4.1.2 Territorial needs and gaps

In France, **e-mobility planning (LPT and LML) is of high-interest and highly influenced by the PAs** (and managed at the local level) **and mainly managed by the energy service providers** (whether they are ICT service providers or energy service providers). E-mobility usages are oriented and managed by the service companies together with the end-users.

Regarding **electric public transport**, the **main obstacles** to its development concern the **costs**, the **autonomy**, the **regulation on depots**, the **lack of ambitious strategies**, the **environmental impacts of the batteries**.

Regarding **e-LML**, the **major problems** are related 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**.

Overall, there would be a need for reduction of operation costs and for financial support, to help companies transform their fleet. Another challenge is to improve autonomy by developing long-lasting batteries and developing charging solutions during night-time and that are directly connected to renewable energies.

Following a schematic representation of need and gaps for France, collected during project partner and stakeholder meetings:

- **Green Deal/Green Europe**: have a greener energy mix in the vehicles fleet and in the energy distribution services, develop a standardized and smart charging infrastructure

to manage local peaks, continue to work on the development and research on smart charging, provide financial support to e-LML and e-LPT.

- **Digital Europe/Smart Europe:** real-time data collection platform for a better management, reduction of the operation costs of e-LML and e-LPT through the sharing of best practices.
- **Europe for Citizens/Smart PA:** simplification of administrative rules and work on general public acceptance of e-LML and e-LPT, sharing of best practices, cooperation between PAs and private operators, support municipalities in the development of ambitious strategies for e-mobility and e-technologies.

## 4.2 Objectives, operational measures and indicators

The **operational measures**, related with the country's objectives and the transnational key elements (Smart PA and Green Deal), are identified in the Operational Road Map of France as following:

- The ORM objectives are mainly to help municipalities build ambitious strategies to choose the right technologies and to encourage people to change their behaviours and to encourage synergies between all stakeholders (public, private, citizens). The operational measure would then be to develop a regional coordination between the stakeholders.
- Reorganize the delivery schemes and lower the costs and bring more financial support and support measures by promoting the use of e-mobility.
- Improve the energy mix by supporting renewable energy production and develop smart charging both at the private level than for LPT, by encouraging experimentations and research.
- Develop more charging points and improve interoperability between charging points, by allowing payment with a unique card and by developing more reliable charging infrastructures.
- Develop data platform to ease the delivery schemes.

To monitor the achievement of those action goals, **progress and result indicators** have been chosen to follow the implementation of operational measures in France. The main indicators are the **number of meetings** gathering private and public stakeholders, of **training sessions** and of communication campaigns. The **amount of funding** spent per year is also a good indicator to measure the involvement of public authorities for instance. Regarding data, the measurement is done by the **effective share of electricity consumption of vehicle charging**, a **map of charging stations**, the number of municipalities with electric buses etc., these datasets being all shared on one single platform.

# 5 The e-SMART Operational Roadmap GERMANY

## 5.1 Territorial analysis

### 5.1.1 Territory of reference and governance models

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

The transport sector is the third-largest emitter of greenhouse gases after the energy sector and industry. Therefore, the German government, presented **key points for a 2030 climate protection programme**. It aims to promote the switch to electromobility, expand the charging infrastructure, implement tax incentives, making LPT and rail travel more attractive...

There are more and more **investments in Commercial Electric Vehicles (EVs)**, thanks to immense funding directives in the country. There is also a variety of research and development programmes in several ministries in the field of sustainable transportation.

Even though LPT is quite developed, there should be improvements to have more electric buses. However, this can only be done through the **expansion of the charging structure**. Both regional and national authorities push towards this.

### 5.1.2 Territorial Stakeholders analysis

A territorial analysis of the German stakeholders, based on studies and personal interviews, was realized. It evidenced the **big role played by the PAs and policymakers in promoting e-mobility**. Therefore, they must provide more planning certainty and a simplification of administrative procedures for mobility and charging infrastructures, energy production and nodal points for LPT and LML. It is therefore important to have a strong political will. However, the goal's setting should be left to the private sector. Germany is however conscious about the problems related to e-mobility such as the **production of batteries, raw material sourcing, lack of space for big charging stations, new road traffic regulations**, etc.

All efforts made in the direction of e-mobility (mainly for LPT), should be used for LML and logistics as well. Some transport companies are planning a complete changeover, but it remains very expensive.

### 5.1.3 Existing instruments

Germany implanted two tools, the StandortTOOL (locations tool) and the FlächenTOOL (plot tool). The first one is related to **charging infrastructures planning**. The second one is 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.

Another **online platform** exists for the **reporting of all funded charging stations**, OBELIS. It also monitors the usage and utilization of the charging infrastructure to identify bottlenecks.



It shares data with the StandortTool, this means that the districts have access to the data and can take it into account in planning.

Other **various digital platforms** have been created such as mCLOUD (provided by BMVI, gathers data of the traffic, climate weather and aerospace infrastructure); mFUND (ministerial research initiative related to digital data-based applications for shared mobility); or MDM (provides the offering, researching and subscribing mobility data).

Germany also developed several projects such as ScooP (Design and piloting of a nationwide multi-operator platform for sharing electric scooters), that aims to design uniform legal, technical and organisational standards for the cooperation of cities and municipalities with sharing providers of e-trade rollers. Carrypicker (Yield management in the freight forwarding industry) aims to develop models for dynamic price-volume control through artificial intelligence.

### 5.1.4 Territorial needs and gaps

Analysis of data collected in survey and during RLL shows that **e-mobility planning is related both to technical solutions and to economic planning** (through business models, digital tools and analytics). Therefore, **energy service providers play a major role** in the e-mobility management. However, ICT service providers are not directly involved as their services are integrated into the actions of other service companies.

Regarding LPT planning, PAs, transportation operators and local energy service providers work altogether. The manufacturers and sellers are still over-proportionally important for the planning of electric local transport, especially concerning the charging infrastructures, because supply cannot yet sufficiently meet demand and market saturation has not yet occurred.

Regarding LML and logistics, it is a very young economy that is only just establishing itself. In collaboration with service companies, concepts are brought to the road (mainly pilot projects for the moment). **Manufacturers and sellers then play a great role for e-LML.**

Based on elements collected during the project partner and stakeholder meetings and through the surveys conducted during the project, listed below there are the needs and gaps for Germany, linked to each EU overarching principle:

- **Green Deal/Green Europe:**
  - » New sources of renewable energy to replace coal mines, thanks to a better taxation system and the construction of infrastructures and storage
  - » Optimize the use of each technology to reduce price gap with conventional vehicles and to enhance e-mobility deployment and medium freight e-trucks
  - » Reduce the overall amount of cars by enhancing shared mobility solutions
  - » More important engagement from all stakeholders (PAs, private actors...)
- **Digital Europe/Smart Europe:**
  - » Lack of several major elements such as trainings, business models, shared responsibilities and smart city agenda
  - » Private actors are not willing to share data
  - » A better evaluation of the effects and costs on the environment is needed
  - » Long-journey buses still lag behind in conversion to electric motors
- **Europe for Citizens/Smart PA:**
  - » Adopt efficient regulations to expand the charging infrastructure and the e-vehicles fleet, and to reform the motor vehicle tax.
  - » Make LPT more attractive and accessible, especially at the transnational level



- » Implementation of German Programmes for the sustainability and competitiveness of the economy (support so SMEs, accessible and affordable green mobility, implementation of local charging infrastructure form LML and LPT).

## 5.2 Objectives, operational measures and indicators

Based on each EU key elements, the operational measures identified for the ORM of Germany are listed below:

- **Green Deal/Green Europe:**
  - » The ORM objective is to increase zero emission solutions in transport, by reducing the number of cars and promoting shared mobility solutions, and by changing behaviours and using technologies in the most adapted way. Planned operational measures are to raise awareness, use database, define use cases for e-LML and business models, and train PAs.
  - » It also aims to increase investments in e-LML and e-LPT, by renewing the LPT and LML fleet and building the adapted charging infrastructures.
- **Europe for Citizens/Smart PA:**
  - » The ORM aims to increase cooperation among stakeholders and sectors, by organizing multi-disciplinary roundtables between the various public authorities and private actors (both companies and citizens).

**Progress and results indicators to monitor each operational measure are the following:**

- The definition of use cases for e-LML and business models shall be measured through the number of funding options related to e-LML and the project implementations/startup development.
- The raising of public awareness and the citizen involvement will be measured through the number of fairs, workshops, lectures, and studies dedicated to e-CS and/or open to the public. The same type of indicators is used to measure the training and capacity building for PAs (number of successful participants).
- Database and information collection on LPT will be measured through the number of accessible and retrieved data sets.
- The renewal of the LPT and the LML fleet and building up of charging infrastructure shall be measured through the effective number of purchased e-vehicles per year, the number of charging stations, as well as the efficiency of the CS (can it supply the whole fleet?)
- The efficiency of multi-disciplinary roundtables with PAs and between PAs and private actors shall be measured through the number of participating stakeholders and the outcomes of the meetings.

# 6 The e-SMART Operational Roadmap AUSTRIA

## 6.1 Territorial background

### 6.1.1 Territory of reference

As **Austria is a federal republic**, many **policies** are **developed** on the **federal State level** but **implemented** more at the **local level**.

The Austrian Ministry for climate action, Environment, Energy, Mobility, Innovation and Technology drives the definition of the policies related to electric mobility. 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 four-years program 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), to use alternative energy in the logistic sector...

Three national associations deal with electric mobility at the federal level (The Austrian e-mobility alliance, The Austrian Electromobility association, The Federal initiative eMobility Austria). There are also major private actors such as operators in the field of e-CS, or regional/ local energy suppliers.

### 6.1.2 Territorial Stakeholders analysis

Austrian government and public authorities must set a high standard when it comes to sustainability, given the introduction of the Clean Vehicles Directive (that incentivizes the production and deployment of clean vehicles by setting demand-side requirements for public contracting authorities).

However, since there are **potential funding limitations**, public Austrian authorities 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 develop funding strategies to best meet their challenges.

PAs should purchase emission-free vehicles such as hydrogen fuel cell and/or battery and/or trolley bus systems and enhance the construction of the adequate infrastructure. **Higher operational expenses are to be expected**, for several reasons:

- An e-bus cannot replace a conventional diesel bus due to range constraints
- The charging structure must undergo maintenance
- Additional costs for energy supply and storage
- Installation of catenary lines for e-buses
- Batteries replacement and/or recycling
- Construction of conventional depots

It is of upmost 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.

Concerning LML logistics, private operators are involved in several field tests from e-trucks to gas-powered trucks. A distinction must be made between classic parcel services (3.5t) and the forwarding sector with heavy-duty trains from 7.5t upwards. According to the weight, the battery won't last the same amount of time (it reduces the payload and, in heavy traffic, it also reduces the volume). Therefore, the **productivity of e-trucks is currently very limited**. Some innovative solutions are being tested for courier vehicles for instance. However, it is limited by the fact that many larger logistics companies do not have their own vehicles, but use transport service providers.

Additional infrastructure shall be planned to make a quick charge in the city center, while deliveries are made. This causes **problems of sharing the charging infrastructure with the general public**, which is inconvenient.

### 6.1.3 Territorial needs and gaps

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 provider** and therefore is maybe **not yet focused on the needs of the users**.

Project partner and stakeholder meetings and surveys conducting during the project allowed to collect data to summarize **needs and gaps for Austria**. They are listed below, according to each EU key principle:

- **Green Deal/Green Europe:** investment on smart grids and storage systems, increase the lifespan of drivetrain components, low CO<sub>2</sub>-emission solutions for e-mobility and collaboration through the various operators, adequate territorial coverage for e-CS.
- **Digital Europe/Smart Europe:** sharing open real-time data between all stakeholders, easy communication solutions and information and reservation interfaces/apps.
- **Europe for Citizens/Smart PA:** simplification of administrative procedures, common national and transnational strategies that can take into account market economy processes and evolutions, public-private partnerships models, awareness raising.

## 6.2 Objectives, operational measures and indicators

The **operational measures** identified for the Austrian ORM are listed below. Each of them is related with the Country Objectives and the Transnational Key Elements defined for the Tactical Road Map:

- **Green Deal/Green Europe:**
  - » The ORM aims to increase the level of awareness on e-mobility (both for LML and LPT) regarding the types of vehicles available on the market, the different recharging technologies, business models and available funds. Planned operational measures are educational programmes and trainings on various topics (mainly funding and technical knowledge), and improvement of databases to monitor the vehicles fleets.
  - » The ORM also plans to adapt the existing energy grid to e-mobility needs, by analysing the existing grid's limitations and developing new e-CS strategies.

- **Recovery and Resilience Facility (RFF):** the main ORM goal is to rapidly deploy e-LPT and the corresponding infrastructure, through strategies, funding, and market studies.
- **Digital Europe/Smart Europe:** the ORM aims to make information more available by providing datasets through open-source platforms.
- **Europe for Citizens/Smart PA:** cooperation among stakeholders should be reinforced, through workshops with PAs and private entities.

To **monitor the achievement of those operational actions, progress and result indicators** have been chosen to follow the implementation of operational measures in Austria. The main indicators are the number of training courses/seminars and the people who enrolled, the setting up of specific web portals and data platforms and the number of accesses per user per year. Regarding the vehicles themselves, the main indicators are related to the number of vehicles that are monitored through databases, the amount of e-CS and the grid/map of areas covered by e-mobility solutions. The number of strategies between PAs and private stakeholders is also taken into account.

## 7 Comparing the five Operational Roadmaps

The comparative analysis of the 5 Operational Road Maps highlights the need to create a network between stakeholders as a priority, to share experiences and resolve problems. In all countries, investments in e-mobility in the LPT and LML sectors should be increased, as well as the development of charging infrastructure networks. The promotion of data sharing among stakeholders is also a relevant objective

**Table 1-1** – 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 1-2 presents a schematic comparison of the operational measures proposed by the five countries.

Finally, Table 1-3 shows the most frequently considered measures. As previously said, it mainly concerns the need for cooperation between various stakeholders, the improvement of the network of charging infrastructures for public transport, and the renewal of LPT fleets. Among the most common measures are also those related to training (to have new experts in the sector) and the creation of a database. It is possible to note that the topic of LML logistics is never really mentioned.

**Table 1-2** – ORM Operative measures per country (It:Italy, Slo:Slovenia, Fr:France, Ger:Germany, Aus:Austria)

Subjects	Operative Measures	It	Slo	Fr	Ger	Aus	All
<b>Education &amp; training</b>	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
<b>Share data and knowledge</b>	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
<b>Cooperation</b>	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
<b>Strategies &amp; funds</b>	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

Subjects	Operative Measures	It	Slo	Fr	Ger	Aus	All
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 1-3 – 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)

