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Editor(s)	Šime Erlić, Katja Hanžič
Authors:	Constantin Dan Dumitrescu, Ionela Țișcă, Iosif Hulka, Ilie Tăucean, Matei Tămășilă (UPT) Dr. Daniel Amariei, Johannes Bachler (CERE) Šime Erlić, Ruđer Bošković, Ivan Šimić (ZADAR) Libor Špička, Eva Gelová, Jaromír Marušinec (CDVB) János Dósa, Sebő Sánta (DDTG) Alina-Georgiana Birau, Vlad Stanciu, Dr.Olga Amariei (ROSENC) Soňa Šestáková (VUD) Christian Horvath (TOB) Dr. Sebastijan Seme, Gregor Srpčič, Katja Hanžič (UM) Milanko Damjanović (ULCINJ) Dejan Jegdić (REDASP)
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Key messages

- A number of strategies and directives of the European Union (EU) are being developed in the last 5 years.
- Necessary key steps that would enable a faster uptake of electric vehicles are recognised.
- Every EU partner country has a form of incentive for the purchase of electric vehicles.
- The development of charging infrastructure across the EU has significantly increased in the last 5 years.
- The implementation of lighter e-vehicles is recognized as very important for urban transport development.
- The technical specifications of charging stations are standardised.
- Due to high prices of electric vehicles, the uptake of the electric vehicles is slower than expected.

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List of abbreviations:

AC – Alternate Current
ASFINAG – Die Autobahnen- und Schnellstraßen-Finanzierungs-Aktiengesellschaft. Managing company of Austrian highways
BEV – Battery Electric Vehicle
CE –Conformity Marking
CENELEC – European Committee for Electro technical Standardization
CNG – Compressed Natural Gas
DC – Direct Current
eGUTS – Electric, electronic and Green Urban Transport Systems
EPAC - Electronically Power Assisted Cycles
ERDF – European Regional Development Fund
EV – Electric Vehicle
FS – Cohesion Fund
FZOEU – Fund for Environmental Protection and Energy Efficiency
GHG – Greenhouse Gas
HUF – Hungarian Forint
IDS - Intrusion Detection System
IEC – International Electro technical Commission
IROP – Integrated Regional Operational Programme
ITS – Intelligent Transport System
LED – Light Emitting Diode
LNG – Liquid Natural Gas
NAP CM - National Action Plan Clean Mobility
NPSE - National Programme Reduction of Emissions in the Czech Republic
OPD – Operational Programme Transport
OPII – Operational Programme Integrated Infrastructure
OPR&I – Operational Programme Research and Innovation
ÖBB – Österreichischen Bundesbahnen. Austrian Federal Railways
PHEV – Plug in Hybrid Electric Vehicle
SEAP – Sustainable Energy Action Plan
SEK – National Energy Conception
SIMPLA – Sustainable Integrated Multi-sector PLAnning
SR – Slovak Republic
SUMP – Sustainable Urban Mobility Plan
UNECE – United Nations Economic Commission for Europe
VLOTTE – Electro mobility in Vorarlberg (project)

Introduction

The feasibility study on the local and regional eMobility policies should provide the necessary information and insight into activities that are conducted on a local level in the partner countries to the end users, the developers of local action plans. Although the EU policies, directives, strategies and guidelines are rather straightforward and apply for all of the EU member states, policies and incentives on local and regional level differ in details because of the specific context of each country. By providing a comprehensive view and a larger source of data regarding policies on one place, the developers of the local action plans can have a more complete view on how to develop their own documents.

The promotion of electro mobility, in terms of policies is embodied into documents that have reduction of emissions as their primary goal. Overall, the way how electric vehicles are promoted in each participating country is quite similar. All of EU countries have large scale strategic documents that have the goal of introducing new, low emission technologies in order to decrease CO2 emissions. Beside electric vehicles, the strategies include the introduction of other lower emission vehicles, like CNG vehicles, hybrid and plug in hybrid vehicles. The overall consensus is that these types of vehicles represent a transition solution from conventional diesel and gasoline power vehicles to a fully electric car park in the future as soon as the conditions, like the battery prices and the available infrastructure are affordable and available.

Policies on a local and regional level, in general, should provide the following;

- a clear framework
- guidance on how to implement activities
- data and expert conclusions in order to be legitimate.

Policies shown in this document are showing the different approaches and attempts in participating partner countries. Even though, as the members of the European Union, the countries have common EU policies and directives they are following and adopting, approaches on the local and regional level differ. The main differences are the different baseline conditions of the countries, notably in terms of available charging infrastructure and the level of acceptance from the general public. This may be however linked the different purchasing power in different countries.

Chapter 2. "Review and a brief description of existing policy initiatives" covers an overview and description of existing policy initiatives regarding eMobility in partner countries. Overview of existing policy initiatives regarding eMobility are the basis for the preparation of the local action plans. There is an overview of policy initiatives regarding eMobility on EU level and the overview and a description of policy initiatives regarding eMobility at a regional or local level of the partner countries.

Chapter 3. "Review and a description of policies concerning standardization of charging stations" offers the review of policies concerning standardization of charging stations which is a very important part of the feasibility study from the standpoint of preparation of eGUTS standards and the local action plan. This chapter offers an overview of policies concerning standardization of charging stations (size of charging stations, charging stations in urban areas, charging infrastructure, types of connectors, supply power, etc.) on EU, local and regional level.

Chapter 4. "Plans and incentives for further development of eMobility", describes strategies and plans for further development of eMobility in each participating partner countries. Also, there is an overview of incentives for further development of eMobility and different competitions in the field of eMobility in each partner country.

2. Review and a brief description of existing policy initiatives

2.1. EU policy initiatives

The introduction of electric vehicles into the everyday lives of the European citizens is one of the highest priorities of the European Union. Energy dependency, climate change, poor air quality in larger urban areas and a desire of the European union to be the forerunner in a technology that will eventually be the replacement for conventional vehicles and opening for wider use of electric vehicles.

The basics for contemporary strategic documents and policies of the EU regarding transport and low emission vehicles are the 2020 Energy and Climate Policy Framework and the 2011 Transport White Paper. The 2020 Energy and Climate Policy Framework has set three goals, 20% GHG emissions reduction compared to 1990, 20% EU primary energy to be renewable and a 20% improvement in energy efficiency. The transport sector is one of the most important parts of the framework.

The 2011 Transport White Paper is a long-term vision of transport development until 2050. One of the most important targets of the Paper is the need to cut CO2 and pollutant emissions in order to improve air quality particularly in cities.

One of the directives that derived from these documents, and that is favouring electric vehicles is the Clean Vehicle Directive. The Clean Vehicle Directive mandates public procurers to consider fuel consumption, CO2, and pollutant emissions when purchasing road transport vehicles, giving them various options to do so.

The introduction of electric vehicles and the infrastructure for the charging of electric vehicles, for the EU is important in the context of the need to have a certain independence from imported oil for transport. The most important strategy for the faster introduction of electric vehicles is the European Alternative Fuels Strategy and the accompanying Directive on the deployment of alternative fuels infrastructure. The strategy is responsible for all modes of transport and what is required on the development of the alternative fuels infrastructure, common technical specifications, consumer acceptance and technological development, including advanced biofuel production in order to increase the uptake of low emission vehicles, among them electric vehicles. The Directive required Member States to submit to the Commission national policy frameworks for the market development of alternative fuels and their infrastructure by November 2016. It specifies the required coverage and the timing by which specific infrastructure in the different modes must be put in place, the development of harmonized EU-wide standards for recharging points for electric vehicles and

refuelling points for natural gas (LNG, CNG) and hydrogen, and the provision of consistent and clear consumer information.

At the end, the European commission has developed the Strategy for Low-Emission Mobility. The conclusion of the Study is that Low-emission mobility will be needed to support the shift to a low-carbon economy, which will also contribute towards reducing the dependency of transport on oil, diversifying its energy sources and increase energy efficiency in line with the Energy Union strategy. The combination of these two documents leads to a number of conclusions and recommendations which are necessary for the electrification of road transport.

The need for charging infrastructure and its integration within the electricity grid in order to;

- enable users to charge their vehicles anywhere in Europe.
- improve local grid connection and capacity.
- enable Smart charging and vehicles to grid electricity supply
- Electricity storage needs to be fully enabled.
- lower connection cost for high power capacity.
- increase availability of recharging points in private buildings.

Increase user awareness and acceptance to support electric vehicles commercialisation:

- proven lack of customer information and awareness of the benefits of electric vehicles.
- Lack of coordinated effort.
- lack of electric vehicle models at affordable prices
- Electro-mobility is not fully considered in urban mobility policies. Actions are needed to fully integrate electric vehicles in urban mobility policies.
- support the market uptake of electric buses and other electric vehicles through e.g. public
- procurement.

Technical development of batteries to meet higher range and lower vehicles cost:

- The improvement of the range of electric vehicles to 400–500 km.
- important to develop short range (up to 150 km) low cost electric vehicles, including light electric vehicles such as two wheelers (scooters and motors), which can be very effective in city environments. Deployment of European based battery "competence centres"

Missing common technical specifications at the EU or global level:

- Common connector interfaces between electric vehicle and infrastructure have been set in Directive 2014/94/EU but the development of a common protocol for charging has not been addressed. Common interfaces for e-buses and for inductive charging are still to be developed.
- The work on smart charging standardisation, communication protocols and related test procedures needs to be completed and harmonization of rules for type approval of electric

vehicles at United Nations Economic Commission for Europe (UNECE) needs to continue, including upgrading of current batteries to more efficient ones.

Even though there are a number of existing EU policies and directives, there is flexibility for cities to encourage the usage of clean and efficient vehicles through their own policy documents. One of the documents that has the possibility to better define such initiatives is the SUMP, or the Sustainable Urban Mobility Plan. The mentioned document is being encouraged by the European Union to be used by cities in order to establish sustainable urban transport system, by encouraging sustainable means of transport. The document is promoting suppression of motorized personnel transport and promoting sustainable means of transport, like walking, cycling and public transport. Electric vehicles can be used for cycling, by the usage of ebikes in public bike system and electric buses in public transport systems.

In order to minimise the number of documents and strategies that are being produced and to avoid confusion, there are attempts to combine documents that deal with low emission vehicles, like SEAPs with SUMPs. Even though there are some differences between the documents, there are some contact points like;

- electric vehicles
- promotion of walking and cycling
- actions aimed at reducing the number of private vehicles.

Regarding this topic, there are a number of EU funded projects that are dealing with this issue, like the SIMPLA project.

2.2. National policy initiatives

2.2.1. Austria

In Austria, the various local authorities (federal, state and municipalities) as well as other actors have established direct subsidies to the electro mobility.

At the federal level, electro mobility promotions and initiatives have been around 75 million EURO since 2002. For research and development demonstration programs such as “lighthouse projects” on electric mobility have been created and implemented since 2009 in way that relevant knowledge is gathered. For tenders of “demonstration projects and lighthouse projects” around 34 million EURO were released to be available. The “model regions” have are in place since 2008 with 16.2 million EURO in around eight e-mobility projects.

Through the program “klimaaktiv: mobil” (https://www.klimaaktiv.at/mobilitaet.html) EURO 17.1 million were subsidized from 2008 to 2014 for e-mobility and alternative engines/fuels. The state of

Austria promotes electro-mobility with funding in a wide range of areas. These range from classic research funding through demonstrations to the implementation of, for example, e-car sharing and "e-taxi projects". Direct grants are also offered.

Vorzeigeregion Energie[1] (best practise region for Energy)

In the Vorzeigeregion Energie, innovative energy technologies from Austria will be used to develop and demonstrate prototype solutions for intelligent, safe and affordable energy and traffic systems of the future. The focus is on an efficient interplay between production, consumption, system management and storage in an overall system optimized for all market participants with a timely supply of up to 100% renewable energy.

Modellregionen der Elektromobilitat [2] (model region for e-mobility)

In the model regions of e-mobility, the Federal Ministry for Agriculture, Forestry, the Environment and Water Management, as well as the Fund for Climate and Energy, has been supporting the development of e-mobility regions since 2008. In 2017, 7 model regions for e-mobility have been supported. In the summer of 2015, they were able to apply again in the framework of an invitation to tender in order to develop further in the areas of "awareness raising: tests in practise for user groups", "interoperability of charging stations" and "promotion of electric vehicles for commuters".

Leuchtturme der Elektromobilitat[3] (light house projects of e-mobility)

"Leuchttürme der Elektromobilität" is a research and demonstration program of the Federal Ministry of Transport, Innovation and Technology together with the "Fund for Climate and Energy" in the area of sustainable mobility and energy supply. Large-scale, far-reaching projects that address the topics of vehicles, users and infrastructure contribute significantly to the strengthening of the Austrian business location and to the visibility of the e-mobility, are promoted as well as integrated system solutions for e-mobility. In the year 2015 the 7th tender of the lighthouses of the electric mobility with the emphasis "low-emission Electric Fleets" took place. This aims at a significant reduction in greenhouse gas emissions caused by Austrian vehicle fleets.

Mobilitat der Zukunft[4] (Mobility of the Future)

The "Mobility of the Future" program supports research projects that provide medium-term long-term solutions for the mobility-relevant social challenges and create new markets through innovations. The program will provide annual calls for "innovation technologies" or "innovate passenger mobility".

There are direct promotions from KlimaAktiv such as „klimaaktiv mobil – Innovative klimafreundliche Mobilitat für Regionen, Stadte und Gemeinden"[5] (innovative climate-friendly mobility for regions, cities and communities).

[1] https://www.ffg.at/vorzeigeregion-energie/
[2] https://www.klimafonds.gv.at/
[3] https://www.ffg.at/leuchttuerme-der-elektromobilitaet-0
[4] https://www.ffg.at/mobilitaetderzukunft

Within the scope of mobility management for companies, property developers and fleet operators, operational environmental protection measures in the mobility sector are promoted, which go beyond the promotion campaigns of the climate-active mobility promotion program.

2.2.2. Croatia

Since the Republic of Croatia has been a member of the European Union from 1st of July 2013, the take up of European directives has been lagging behind the other EU member states. Therefore, incentives for the purchase of electric vehicles were first introduced in 2014. The incentive was conducted by the Croatian Fund for Energy efficiency and environmental protection, which is under the direct supervision of the Croatian ministry for environmental protection, responsible for the implementation of the low carbon strategies.

The only example was the incentive/project of the national Fund for energy efficiency and environmental protection (FZOEU) called "Vozimo ekonomično" ("Lets drive economically").

Figure 1: 2014 »Vozimo ekonomično« leaflet

Through this project, the FZOEU has encouraged the usage of energy efficient vehicles in Croatia, among them, it cofounded the purchase of full electric, hybrid, plug in hybrid vehicles and electric motorcycles and scooters. The end users of the project were Croatian citizens and companies, which could apply for the fund after they purchased one of the mentioned vehicles.

The co-financing rate for the end users was as following;

Full electric vehicles 70.000,00 HRK (9.333,33 €)

Plug in hybrids and electric vehicles with range extenders 50.000,00 HRK (6.666,67€)

Hybrid vehicles 30.000,00 HRK (4.000,00 €)

[5] http://www.publicconsulting.at/uploads/ka_mobil_infoblatt_klima_aktiv_mobil_betriebe.pdf

Electric motorcycles and scooters, from 7.500,00 HRK (1000€) till 30.000,00 € (4.000,00 €).

Citizens could buy up to one vehicle and the one of the conditions set by the FZOEU was that they had to keep the vehicle in their ownership minimally one year. Companies could buy up to 5 vehicles and 700.000,00 HRK (93.333,33 €). The condition set by the FZOEU for companies was that they could not sell the vehicles for three years. Most of the companies that used these funds were taxi companies that purchased mostly hybrid vehicles.

In total, there were two calls, in 2014. and 2015. In 2014. the budget was 11,2 mil. HRK (1,5 mil. €) and in total 340 vehicles were co-financed; 313 hybrid vehicles, 24 electric vehicles and 3 plug in hybrids. In 2015. the budget was 18,5 mil. HRK (2,5 mil. €) and in total 506 vehicles were bought; 314 hybrids, 179 full electric vehicles and 13 plug in hybrids.

Figure 2: Mitsubishi i-MieV, the most sold electric vehicle in Croatia in 2014

As a direct result of this project, the number of electric vehicles rose from 13 in 2012 to 224 in 2016., and hybrid vehicles from 354 in 2012 to 1843 in 2016. Also significant increase of electric vehicles bought from 2014. to 2015. Was due to the fact that many car producers offered their electric vehicles on the Croatian market and made the first step in the market penetration of electric vehicles in Croatia. The project was suspended in 2016.

Also, the FZOEU had, during 2015. In the scope of same project “Vozimo ekonomično” another call for the purchase of other means of electrically powered transport and the appropriate infrastructure. The purchase of electric bicycles with the maximum power output of 0,25 kW. Most of the users were local authorities that have mostly established bike sharing system with electric bicycles. The users could purchase from 5 to 15 eBikes with a co-financing rate ranging from 40% to 80%, depending on the level of development of the local authority that was the end user.

2.2.3. Czech Republic

National Energy Conception of the Czech Republic (SEK)

The main mission of the National Energy Conception (SEK) is to ensure reliable, safe, and environmentally friendly energy supply for the needs of the population as well as Czech economy. The long-term energy vision of the Czech Republic is based on reliable, price affordable, and long-term sustainable energy supply to households and the national economy. This vision is summarized in three strategic goals of the Czech Republic that concern safety, competitiveness, and sustainability. The SEK vision for the field of transport is as follows:

- Reduce dependency on oil and its derivatives
- Increase the share of alternative fuels in transport
- Build infrastructure for CNG, LNG and electric powertrains
- Reduce negative impacts (emissions, barrier effect)
- Maintain or improve population mobility at all levels

Transport Policy of the Czech Republic for 2014-2020

Transport Policy of the Czech Republic for 2014–2020 is a document that identifies main issues of the transport sector and designs measures to deal with those issues. The main aim of the transport policy is to create conditions for the development of a high-quality transport network based on the use of technical, economic, and technological properties of individual transport modes as well as principles of market competition while considering its economic and social impacts and impacts on the environment and population health. Regarding the energy supply for transport, the Transport Policy follows the National Energy Conception (SEK) and brings about other aspects that are neglected by SEK. In order to meet goals in this area, the policy designs a range of measures. Some of the measures have direct impact on the development of eMobility:

- to increase the share of energy efficient public transport (with lower energy consumption and bigger share of alternative energies) at national, regional and local levels.
- in the system of performance charging for the infrastructure use, to prioritise means of transport with lower nominal energy consumption and lower emissions; to divide tariffs for the use of the infrastructure by different vehicle categories and by their nominal consumption.
- to create conditions for equipping the transport infrastructure with charging and filling stations for alternative energies.
- to reduce emissions of NOx, VOC and PM 2.5 from road traffic by renewing the vehicle fleet in the Czech Republic and by increasing the share of alternative fuels.
- to continue in electrification of rail and public transport; to reduce the share of passenger and freight transport using energy from oil, and to gradually move on to transport systems based on a higher share of energies from renewable resources.

The follow-up strategic document to reach the goals of the Transport Policy is the National Action Plan Clean Mobility.

National Action Plan Clean Mobility (NAP CM)

NAP CM is based on Directive 2014/94/EU of the European Parliament and the Council of 22 October 2014 on the deployment of alternative fuels infrastructure. The document approved by the government on 20 November 2015 specifies the requirements for the construction of charging stations in the time period of 2020-2030 in compliance with this directive. The material contains a number of other measures that should be gradually implemented so that the number of e-cars and alternative fuel vehicles could be increased and the corresponding infrastructure could be built. NAP CM expects that the state administration will have at least one quarter of vehicles with alternative drives (not only electric vehicles) by 2020. The tool to assure the requirement is met should be a government regulation which specifies binding tender conditions for public contracts for vehicle acquisition.

National Programme Reduction of Emissions in the Czech Republic (NPSE)

The basic conception material in the area of air quality improvement and emission reduction from air pollution sources "National Programme Reduction of Emissions in the Czech Republic" (NPSE) is produced on the basis of S. 8 of the Act No. 201/2012 Coll., on air protection, as amended. NPSE contains an analysis of the condition and trends in air pollution in the Czech Republic, development of pollution, pollutant emissions from individual economic sectors, air pollution trend scenarios, and international commitments of the Czech Republic and how they are met. NPSE specifies procedures and measures to improve the existing unsatisfactory air pollution limits, targets related to reduction levels of air pollution, and deadlines. In addition, NPSE designs the following priority measures:

- Support to faster renewal of personal vehicle fleet
- Stimulation of the use of alternative fuels in road freight transport through a reduced road tax rate
- Support to the acquisition of vehicles with alternative drives for public transport
- Support to construction of the filling and charging infrastructure for alternative powertrains in transport
- Support to the acquisition of environmentally friendly personal vehicles
- Exchange of the state administration vehicle fleet for vehicles with alternative powertrains.

2.2.4. Hungary

Milestones

In March, 2014 - Announcement of the prospective E-mobility plan, the Jedlik Plan by Mihály Varga the Minister for National Economy

September, 2014 - The Jedlik Cluster has been founded under the supervision of the Ministry for National Economy and the National Innovation Office.

- broad consensus and social acceptance
- innovative companies from the sector

February-March, 2015 – Expected confirmation of the Jedlik Plan by the Hungarian Government

- in harmony with EU actions and rules
- in accordance with industry strategy policy of Hungary supporting electromobility
- in line with the policy of developing education and creating new jobs

Description of existing policy initiatives regarding eMobility

- In the frame of Jedlik Plan – the ministry launched a call for project proposals – every towns, which have more than 15.000 inhabitants can participate in this program – establishing a charging station, city with more than 20.000 inhabitants can apply for 2 charging stations, city with more than 100.000 inhabitants can apply for 10 charging stations.
- these cars have a green number-plate
- tax benefit (no registry fee)
- no parking fee
- 2007. year LXXXVI. law („VET-about the electricity law") deals with e-mobility policy
- but 2015. year CLXXXVI. law (effective of 01.01.2016.), 2016. year LXXXI. law (effective of 01.07.2016.) deal with charging of e-vehicles, establishing and operating charging station. These policies define the terminologies of e-vehicle, charging of e-vehicle, charging station operators (as system users). It contains, that the charging of the e-vehicles is activities subject to licensing.

Activity as a charging of e-vehicles can be exercised based on the permit by Hungarian Energy and Public Utility Regulatory Authority expects if the retail costumer of non-retail customer charge the e-vehicle with own-user equipment (which activity is not profit goal, financial gain). The permit by the Authority is a permit of an indefinite duration. Regulation of Government 281/2016 (IX.21.) deals with the detailed regulations according to the e-charging station and the permit requirements. These regulation and law are still at an early stage according to the developments and investments of e-mobility.

2.2.5. Romania

The "Green Charging infrastructure program"

The Ministry of Environment, Waters and Forests has launched a financing program that supports the acquisition of EV charging stations.

The Environmental authorities have decided to promote the use of electric vehicles, even though at this point the EV aren't so popular in Romania, mainly because of lack of charging infrastructure. In this respect, the authorities have created a financing scheme to create 6000 EV charging stations by 2020, even though there are about 120 charging stations in all the country.

The program was conceived as a multiannual, with an indicative target of 6000 charging stations installed by 2020. For the year 2017, about 16 million EUR are to be granted for about 400 stations with quick charging and 400 stations with slow charging. The "Green Charging infrastructure program" is destined to be granted by legal entities: local administrations of urban areas with more than 50,000 inhabitants, public institutions and economical actors of these urban areas. The chargers are to be installed in public parking spaces, highways, national roads, commercial centres, hotels, train stations, airports and special destinations that can be easily accessed.

The Rabla Plus Program

The Rabla Plus Program, is a program special designed for granting the procurement of Electric Vehicles or hybrid cars. The program was granting about 1,000 EUR for hybrid cars procurement and up to 4,500 EUR for electric vehicles until 2016, when the Ministry of Environment, Waters and Forests doubled the amount for grants (2,000 EUR for hybrid, up to 10,000 EUR for EV).

2.2.6. Slovakia

National level

The ***Strategy on development of electric mobility in the Slovak Republic and its influence on the national economy of the Slovak Republic*** was approved by the SR Government Resolution No. 504/2015 ***on 9 September 2015.***

Subsequently, the Slovak Republic has also proceeded in transposition of the European Parliament and Council Directive 2014/94 / EU on the deployment of alternative fuel infrastructure. Under the responsibility of the Ministry of Economy of the Slovak Republic, the *National policy for deploying alternative fuel infrastructure in the conditions of the Slovak Republic* and the ***National Political Framework for the Development of the Alternative Fuels Market*** was elaborated and subsequently ***approved by SR Government Resolution No. 504 of November 9, 2016***.

Strategy on development of electric mobility in the Slovak Republic and its influence on the national economy of the Slovak Republic

The Ministry of Economy of the SR has prepared ***eighteen measures to support the Slovak electric car market***. In the next and following years, according to the Ministry's estimates, the measures prepared for the Slovakia could attract to Slovakian roads from 600 to 4 thousand hybrid and electric vehicles. The state budget would thus cost between 200,000 and 1,5 million euros per year when implementing the proposed measures. According to ***a conservative estimate***, there could be ***10,000 plug-in hybrid and electric vehicles in Slovakia in 2020***. ***Optimistic scenario*** even says up to ***25,000 of these cars***.

Forgive tax and charges

One of the most interesting support for future owners of electric cars should be **indirect support** in the form of ***forgiveness of*** charges linked to the operation of an electric car such as a ***tax on motor vehicles or a registration fee***. Indirect support by forgiving some of the costs is the most transparent and, at the same time, administratively the least demanding way of financially stimulating the development of interest in electric vehicles. Support is real and time-dependent on the use of an electric vehicle and is thus minimized by its abuse. Future electric car owners, however, should note that ***this support is planned*** to be provided by the state ***only until 2020***.

Depreciation of electric vehicles

An equally interesting measure for legal entities should be the accelerated depreciation of electric vehicles and charging stations for electric vehicles. Legal entities owning electric vehicles and charging stations could use accelerated depreciation after buying them. The goal is to motivate the private sector to invest in building charging infrastructure and electric cars.

Green procurement

Electric mobility in Slovakia should also increase the rigorous application of the principles of green procurement in the purchase of motor vehicles, as defined in the law on the promotion of energy-efficient and environmentally-friendly motor vehicles. By applying green procurement principles, public administration will be an example not only for the use of purchased electric cars but also for an overall approach to procurement, respecting the economy and environmental friendliness of the procured products.

Construction of charging stations

It would not also be forgotten to build a sufficient network of charging stations. Several measures have been prepared in this area by the economic sector. The administrative process for the construction of the charging infrastructure should be simplified. The goal is that the design documentation for the electrical installation and the audit review report are sufficient for the charging stand placement process. At present, the construction of charging stations is subject to an unreasonably burdensome authorization process. So it should be introduce legislation that would

impose an obligation to build a charging infrastructure already in the process of building new parking spaces.

Vouchers for municipalities

The Ministry wants to contribute financially to self-governments to build publicly-available charging infrastructure, by so-called vouchers. This voucher would be acquired by a new electric car owner who would decide to hand it over to the self-government of his choice. The allocation of the voucher thus gives the affected municipality the subsidy for the construction of the charging infrastructure. The goal is to build a charging infrastructure at its demand. The electric car owner decides on the approximate location of the publicly available charging station.

Benefits for owners

After the real introduction of the proposed measures into praxis, the owners of electric cars would get easier into the city centres and find a parking space easier. The Ministry of Economy proposes to introduce legislation to allow municipalities in their territory to declare low emission zones. Parking places should be reserved for electric car owners not only in the place of residence but also in the narrower city centres. By purchasing an electric vehicle, the owner automatically acquires the possibility of reserving one parking space in the immediate vicinity of his home or a place where he usually resides for the entire period of ownership of an electric car. Getting parking and getting closer to narrower city centres and pedestrian zones for electric cars has a synergic effect on several levels. The pedestrian zones, which are most often located in the historic centres of the city, are generally perceived as zones of peace and relaxation, so noise and emission levels are the highest priority right here.

Support for science and research

Increasing electric mobility in Slovakia should also the support of science, research, development and innovation. Electric mobility can greatly, by right direction of supportive policies, contribute to innovation in industry, transport, energy, and services. Electric mobility science and research should be funded mainly through the European funds.

Importance of electric mobility

According to the Ministry of Economy, support for the development of electric mobility in Slovakia is very important. In addition to the automotive industry, electric mobility is also extremely important for other aspects of the national economy. Electricity consumption for electric vehicle charging will be largely off-peak hours, resulting in more efficient use of electricity, transmission and distribution systems. Electric mobility may positively influence the increased use of alternative fuels in transport in the long run, thereby contributing to reducing Slovakia's dependence on imports of motor fuels.

Some specific goals of the Strategy on e-mobility:

- New parking places:

- 10% of new parking spaces for residential parking (designed for night-time parking) will be equipped with a charging point for slow charging and another 30% of the places will be equipped at least with an electrical installation for mounting such a charging point,
- In other parking lots, it will be equipped with a slow charging point 5% of parking places and electrical installation to install the charging station will be carried out to 15% of parking spaces.

- Charging stations:
  - The National Network of Charging Centres will be set up in cooperation between the public and private sectors. The public sector will contribute indirectly, in particular by providing suitable land, transport planning and education (the use of EU funding is envisaged).
  - More detailed description:
  - Building the ***National Network*** will continue in stages in order to reach the final state of charging network ***with 60 km intervals in 2020 at all highways and speedways in the SR (about 50 centres*** on all major resting areas built in the sense of STN 73 6101 every 30 - 70 km).

Although the Slovak strategy on electric mobility deployment was approved in autumn of 2015, in the fact by today there is no, respectively only very few concrete tangible measures of electric mobility support in Slovakia.

National Policy Framework for Alternative Fuels Market Development

"The National Policy Framework for Alternative Fuels Market Development" was submitted by the Ministry of Economy of the SR in cooperation with the Ministry of Transport, Construction and Regional Development of the SR in relation to Article 3 of Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure and in relation to the SR Government Resolution of 1 April 2015 and to SR Government Resolution No. 2015/504/B/1 of 9 September 2015.

The aim of the document is to use the determined measures to support the development of the alternative fuels market in the area of transport and the development of the relevant infrastructure with a focus on:

- assessing the current condition and the future development of the alternative fuels market in the area of transport, also with regard to their potential simultaneous and combined use and development of the infrastructure for alternative fuels, potentially considering a cross-border continuity;
- national targets and intentions in the area of biofuels, supplies of electric power for transportation, supplies of natural gas for transportation and, if necessary, supplies of hydrogen for road transportation, including the deployment of infrastructure for alternative fuels; such national targets and intentions are determined based on the assessment of the

national, regional or European-wide demand and they may also be reviewed on such basis, while it is necessary to ensure compliance with the minimum requirements for infrastructure;
- measures necessary to meet the national targets and intentions and measures which may help deploy the infrastructure for alternative fuels in public transport;
- determining urban/suburban agglomerations, other densely populated areas and networks in which publicly accessible recharging points will be located depending on market needs, in harmony with the requirements for supplies of electric power for transportation;
- determining urban/suburban agglomerations, other densely populated areas and networks in which publicly accessible refuelling points for compressed natural gas will be located depending on market needs, in accordance with the requirements for deployment of an appropriate number of publicly accessible refuelling points for compressed natural gas;
- assessing the need to deploy refuelling points for LNG in ports which do not belong to the TEN-T core network;
- considering the need to install electric power supply equipment at airports for the needs of aircraft at stands.

Within this document were adopted 10 measures, of which the following directly address the topic of e-mobility:

- Stimulating the support of sales of low-emission vehicles for all types of use (for the private sector, fleets of municipal companies operating vehicles collecting municipal waste, postal companies and for fleets of transport companies ensuring urban public transportation and public passenger regular transport)
- Promoting alternative fuels infrastructure
- Decreasing the fee for registration in the Vehicles Register of the SR for alternative fuel vehicles by 50%
- Introducing low-emission zones
- Raising awareness of road users about the location, type and equipment of recharging and refuelling points through IDS systems
- Raising awareness at schools; informing about new skills and knowledge in the school system. Two above mentioned governing documents to support e-mobility and other alternative fuels are less ambitious and too general. This is claimed by eight signatories calling for a more active approach from the Cabinet in support of "green" transport in Slovakia. According to the signatories, these documents only contain general measures, of which it is unclear what ambition the state wants to engage in, or when and how to implement individual measures in practice.

Since the creation of the Working group on e-mobility in 2011, on the Ministry of economy has been conducting a debate on the promotion of e-mobility, since the year of 2015 as well as on alternative fuels. The role of the state in the development of this sector has always been rather passive, the development of the e-mobility sector was driven predominantly by the private sector. The strategy for

the development of e-mobility, which was approved by the government in 2015, was the impetus for adopting concrete measures.

In connection to above mentioned documents, very first measure put in the practice in SR is *contribution of 5 000 € for BEV and 3 000 € for PHEV* (in details described in Chapter 4).

Operational programmes and tools in the SR enabling the support of development of alternative fuels (including electricity) in transport:

Integrated regional operational programme 2014-2020

Priority axis 1: Safe and environmentally friendly transport in regions.

Investment priority No. 1.2: Development and improvement of environmentally friendly, including low-noise transport systems, including inland waterways and maritime transports, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility.

Supported activities aimed at the enhancement of the bus fleet quality include the purchase of buses for urban public transport and/or suburban bus transport, highly environmentally friendly low-floor buses together with the construction of a corresponding supply infrastructure.

An indicative allocation of EUR 99 million has been earmarked to support public passenger transport as a part of IROP.

Operational programme Integrated Infrastructure 2014 – 2020 (OPII)

As for the sphere of public passenger transport and sustainable urban mobility, mainly large residential-urbanistic agglomerations will be supported through promoting the integration of transport systems and the renewal of vehicles ensuring rail, passenger and urban public (rail) transport of passengers.

The current wording of OPII does not pay special attention to the issue of the introduction of alternative fuels in road transportation. In the sphere of public passenger transport, OPII resources will be used to support rail transport (railway and tram transport) and trolleybus transport, while the network of electric tramways will be extended as well. To support public passenger transport, a special priority axis has been created in OPII and an indicative allocation of EUR 332 million has been earmarked (including national co-financing).

Operational programme Research and Innovation

The support from OP R&I, in the part for MoE SR, is not determined based on sectors. It envisages a horizontal support of industry while particular conditions or limitations will be determined in calls related to the following topics:

- Enhancing the quality and efficiency of the production and technological processes through increasing the technological and innovation level in companies with a focus on
- Promoting research, development and innovation activities
- Placing innovative products and services on the market

- Networking of companies, including clusters and technological platforms involved in R&I activities.

2.2.7. Slovenia

Transport Development Strategy of the Republic of Slovenia[6]

The purpose of the Transport development strategy of the Republic of Slovenia is to:

- display starting points, needs and opportunities for the development of key transport sectors;
- prepare a coordinated program of development of key transport sectors;
- ensure prior fulfilment of the conditions for obtaining EU funds for the period 2014-2020 for the transport sector.

In the Transport development strategy some of the key points also refer to electric mobility.

The committee, which composed the strategy, has concluded that a major obstacle for the introduction of alternative fuels on the market and acceptance by consumers is the lack of infrastructure for alternative fuels and non-uniform technical specifications for the connection between vehicles and charging infrastructure. The committee proposed mandatory coverage with minimal infrastructure for electricity, hydrogen and natural gas, which is crucial for accustoming consumer to new alternative fuels and for ensuring interest of industry for further development of new technologies regarding vehicles on alternative fuels. The committee also refers to the European Parliament and Council Directive on establishing an infrastructure for alternative fuels. The Directive stipulates that each EU country must adopt its program in this field. In this program coverage for alternative fuel infrastructure must be determined for:

- electric vehicles by 2020,
- CNG for passenger cars by 2020,
- LNG for trucks and ships by 2025 and
- hydrogen for vehicles up to 2025.

The strategy also mentions environmental pollution and greenhouse gas emissions. The committee indicted that the highest air pollution is around the highways of Slovenia, as it can be seen from the picture below.

[6] http://www.mzi.gov.si/si/dogodki/strategija_razvoja_prometa_v_rs/
http://www.mzi.gov.si/fileadmin/mzi.gov.si/pageuploads/Dogodki/Strategija_razvoja_prometa_v_RS-koncna_razlicica-popr_tabela_okt2016.pdf
http://www.mzi.gov.si/si/dogodki/nacionalni_program_razvoja_prometa_v_rs/

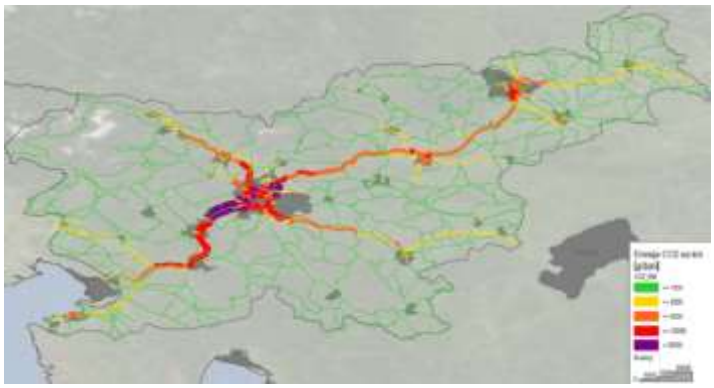

Figure 3: Emission of CO2 on Slovenian roads.

The committee stated the following measures in order to reduce emissions:

- Introduce an efficient and competitive public, especially rail transport system with an extensive introduction of P+R parking spots at the state level.
- Construction of rail network for competitive freight transport.
- Promote the use of public transport, walking and cycling.
- Promote the use of alternative energy sources and hybrid and electric vehicles.
- Limit the speed of vehicles on motorways, highways and regional roads at 80 km/h in the areas exceeding the limit values for PM10, when these values are exceeded.
- Implementation of measures for sustainable urban mobility.

According to the environmental requirements at the national level a network of charging stations for electric vehicles has to be build and purchase of hybrid or electric vehicles has to be encouraged. By 2030 at least 15% of the transport work must be done without greenhouse gas emissions on Slovenian roads. It is necessary to provide financial incentives that would encourage individuals to purchase vehicles with environmentally friendly motor fuel (electricity).

Public tender for co-financing of a sustainable urban mobility plans (SUMPs)[7]

Ministry of Infrastructure published a Public tender for co-financing sustainable urban mobility plans in the Official Gazette of RS no. 78/2015. This tender will be implemented under the Operational program for the implementation of European cohesion policy for the period 2014-2020. The subject of the tender is to award grants to individual municipalities or a consortium of several municipalities for the implementation or renovation of existing sustainable urban mobility plans.

Subject of co-financing are operations, which will contribute to the development of urban mobility, improvement of air quality in cities, better integration of urban areas with their hinterland, reducing of traffic congestion, improving the quality of life in urban areas and increase traffic safety.

[7] http://www.mzi.gov.si/si/javne_objave/javni_razpisi/

National program 2013-2022[8]

The National Program on Road Traffic Safety is a strategic document, which deals with national security policy and technically demanding and most transparent security problems in the field of road traffic safety in the Republic of Slovenia for the period 2013-2022.

The national program gives vision and targets for priority areas and sets out measures to be taken to effectively ensure the safety of road traffic. The primary objective of the program is to reduce the worst consequences of accidents in road transport (fatalities and severe injuries).

The national program refers also to training procedures for technical inspection of vehicles. Technical inspection procedures must follow the technical progress of vehicles and their trailers.

New and updated procedures are required for training of inspectors on roadworthiness tests (gas-powered vehicles CNG and LPG, hybrid versions of vehicles, electric vehicles, electronic equipment passive and active safety and modified vehicles for people with disabilities ...).

Law on the annual charge for use of vehicles on the road[9]

The obligation to pay annual fees for the use in the Republic of Slovenia registered motor vehicles and trailers in road transport is regulated by this act. By paying an annual charge a person acquires the right to use the registered vehicle on the road. When determining the amount of the annual charge the following criteria is taken into account:

- for motorcycles and cars - engine capacity of the vehicle;
- buses - the number of seats;
- trucks - the maximum permissible weight.

Article 6 of the referred law states:

"Annual charge is NOT paid for motor vehicles which are equipped with only an electric drive motor."

Decree on the approval of vehicles with battery electric drive[10]

This decree applies to safety requirements for all road vehicles of categories M and N, with a maximum design speed exceeding 25 km/h and have an electric drive. By this decree design requirements regarding the electric battery, protection against electric shock and operational safety of electric vehicles are regulated. Homologation and roadworthiness testing of electric vehicles is also mentioned in the decree.

[8] https://www.avp-rs.si/management-varnosti-cestnega-prometa/nacionalni-program-2013-2022/. https://www.avp-rs.si/wp-content/uploads/2015/11/NPVCP_knjižica.pdf

[9] https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina?urlid=200857&stevilka=2414

[10] https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/1997-01-3570/odredba-o-homologiranju-vozil-na-akumulatorski-elektricni-pogon-glede-posebnih-pogojev-za-njihovo-konstrukcijo-in-funkcionalno-varnost-st--100-00#

Motor vehicle tax[11]

Motor vehicle tax is paid for vehicles to be put into road traffic for the first time or first registered on the territory of the Republic of Slovenia (imported vehicles). The tax rate depends on the amount of CO2 emissions and the type of fuel used for propulsion (petrol, LPG, diesel, hybrid car, electric drive). For vehicles with 100% electric drive the tax rate is only 0,5%.

Legislation regarding e-bikes[12]

In general, electric bicycles and electric scooters are among the vehicles, which are regulated by the Decree on homologation of two- and three-wheel motor vehicles. In Article 3 of the mentioned decree is also stated, that this rules do not apply for vehicles equipped with an electric motor of less than 0,25 kW of which the output power is progressively reduced and finally cut off as the vehicle reaches a speed of 25 km/h or sooner, if the cyclist stops pedalling. For this reason are such bikes included among the machinery. They must comply with the essential requirements of the Machinery Safety Rules. Requirements for EPAC bicycles are also regulated by a European standard EN 15194:2009+A1:2011 (Cycles – Electrical power assisted cycles – EPAC Bicycles).

According to the Regulation on machinery safety each machine or EPAC should be legibly and indelibly marked with the CE mark, designation of type, serial number, if it exists and the year of manufacture. According to the standard of SIST EN 15194 each EPAC bike should be marked with the top speed at which electrical power is interrupted and maximum rated power.

2.2.8. Serbia

At the moment there are no existing policy initiatives regarding eMobility in Republic of Serbia.

2.2.9. Montenegro

The national legislative body barely considers the field of use of electric vehicles. Also, there is no such initiative for advancing of this field, especially concerning the affirmative use of electric vehicles. Hence, no special measures are applied for use of electric vehicles in public transport, nor for personal use.

[11] http://www.fu.gov.si/fileadmin/Internet/Davki_in_druge_dajatve/Podrocja/Davek_na_motorna_vozila/Opis/Predloga_Podrobnejsi_opisi_Davek_na_motorna_vozila-2._izdaja__julij_2015_.pdf

[12] http://www.ekolesa.si/zakonodaja

3. Review and a description of policies concerning standardization of charging stations

3.1. EU policies concerning standardization of charging stations

On the 22nd of October 2014. the European parliament and the council of the European union, have adopted the DIRECTIVE 2014/94 on the deployment of alternative fuels infrastructure that is based on the European alternative fuels strategy. The most important aims of the strategy are:

- Establish a coherent policy framework that meets the long-term energy needs of all transport modes by building on a comprehensive mix of alternative fuels.
- Support the market development of alternative fuels in a technologically neutral way by removing technical and regulatory barriers.
- Guide technological development and private investments in the deployment of alternative fuels vehicles, vessels and infrastructure and give confidence to consumers.

The Directive 2014/94 foresees the build-up of infrastructure for electricity, hydrogen, and natural gas, including bio-methane, in gaseous (CNG) and liquefied form (LNG). In order to tackle the missing links to the single transport market, the Directive is setting out the following;

- The build-up of an EU-wide network of recharging and refuelling points
- The development of harmonized EU-wide standards and common technical specifications
- The provision of relevant, consistent and clear consumer information

Regarding the development of harmonized EU-wide standards and common technical specifications i.e. standardisation, the Commission proposed that the standard recharging points for electric vehicles shall be equipped, for interoperability purpose, with a Type 2 connector as described in standard EN62196-2:2012. Alternate Current (AC) fast recharging points for electric vehicles shall be equipped, for interoperability purposes, with Type 2 connectors as described in standard EN62196- 2:2012. Direct Current (DC) fast recharging points for electric vehicles shall be equipped, for interoperability purposes, with Type "Combo 2" connectors as described in the relevant EN standard.

3.2. National policies concerning standardization of charging stations

3.2.1. Austria

The number of newly registered electric vehicles has been growing dramatically since the beginning of 2016. Accordingly, a lot of new charging infrastructure in the private and public / commercial sectors will be needed in the coming years. So the legal starting point for the handling of loading charging infrastructure in licensing processes also has been developed in the recent time. In Burgenland E-charging stations are not explicitly mentioned in the Burgenland BauG (law), but are understood as buildings with supply and disposal lines. These are excluded from the scope of application in accordance with §1 Abs (2) Z4 of the Burgenland Building Act. Thus, no authorization is required for the erection of a charging station, provided no supplementary buildings, e.g. foundations.

Umweltförderung[13] (Fund for Environment)

The implementation of e-charging stations (stands or wallboxes), operated only with electricity from renewable energy sources is available as driving power for electric vehicles, promoted in Austria. E-charging infrastructure is provided to all companies and other business organizations. In addition, public authorities, associations and denominational bodies may also submit.

The requirements to get funded are:

- the place of delivery must be publicly accessible and non-discriminatory
- on working days for at least 8 hours' access to the public is obligatory
- payment for use and electricity purchase must be possible without contract with the store operator

Samples for funding of initiatives and promotions in the different counties of Austria are:

- Normal load on wallbox or stand column with alternating current up to 3.7 kW: 200 Euro
- Normal charging to wall box with alternating current of more than 3.7 kW to 22 kW: 200 Euro
- Normal load on stand with alternating current of more than 3.7 kW to 22 kW: 1.000 Euro
- Accelerated charging with alternating current or direct current of more than 22 kW to 43 kW: 2,000 Euro
- Quick charging with alternating current of more than 43 kW or direct current of ≥ 50 kW: 10,000 €
- E-charging stations with Type 2 plug and Smart-Grid / Smart-Home Ability to earn 600 € or max. 40%.

[13] www.umweltfoerderung.at

- Admission to the federal funding of € 1,000 for Electric cars + 200 € Promotion for private charging infrastructure.
- AC charging systems for electric vehicles are made available for use in publicly accessible locations with high visitor frequency and long residence time. The costs for installation have to be taken by the co-operation partner.
- In the area of TINETZ 50% of the purchase price (max. EUR 5,000) will be promoted at tourist and leisure facilities and shopping centres, provided that these are at least equally supported by the energy supplier.

3.2.2. Croatia

As an obligation to set a framework, resulting from the Directive on the deployment of alternative fuels infrastructure, the Government of the Republic of Croatia has adopted the decision, on the 6th of April 2017 on the national frame for the implementation of alternative fuel vehicles.

The decision was made that charging stations have to be available every 50 km on national highways and in all cities above 20000 inhabitants. Also, the decision was made that in total number of charging stations has to be;

By 2020. year – 296 charging places (222 AC min.power 22/(11) kW, 74 DC min. power 50 kW); on 164 charging stations.

By 2025. – 602 charging places (434 AC min. power 22/(11) kW, 168 DC min. power 50 kW); on 348 charging stations.

By 2030. – 806 charging places (554 AC min.power 22/(11) kW, 252 DC min. power 50 kW); on 479 charging stations.

Based on the latest data, there are a total of 160 charging stations currently installed in Croatia. Out of the 160 charging stations, only 11 of them allow the charging on DC protocols, Chademo and Combo. Besides that, there are 5 Tesla superchargers that are located on one charging point.

3.2.3. Czech Republic

Czech Office for Standards, Metrology and Testing is active in the area of standardization. Technical Committee TC69 comments international and European standards that are under development of Electrotechnical Commission (IEC) and European Committee for Electrotechnical Standardization (CENELEC). The technical standards mostly being used are translated into the Czech language, the other are being taken over in the English language.

Charging stations in the Czech Republic have to meet all relevant technical standards. Requirements on compatibility of charging stations are given by technical standards in the EN 61851 set.

For DC charging stations, certificates on compliance are being accepted in accordance with the "ČSN EN 61851-23 Systém nabíjení elektrických vozidel vodivým propojením – Část 23: DC nabíjecí stanice". The standard is translation of the international standard of IEC EN 61851-23 Electric vehicle conductive charging system – Part 23: DC electric vehicle charging station.

Electronic communication between the charging station and the vehicle governed by the standard of "ČSN EN 61851-24 Systém nabíjení elektrických vozidel vodivým propojením – Část 24: Digitální komunikace mezi stejnosměrnou nabíjecí stanicí a elektrickým vozidlem, která řídí stejnosměrné nabíjení". This standard is a translation of the international standard of IEC EN Electric vehicle conductive charging system – Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging.

There are more technical standards and specifications under development in the EN 61851 set. After their publishing, they will be again taken over to the Czech standardisation environment, either as translated or in English original.

Currently, there is passed Amendment to the Czech Act on fuels and petrol stations. The Amendment sets up an obligation to register a public charging station, and a process of its approval. The Amendment also requires enabling user´s charging without having an agreement with a provider. This Amendment is linked also to the Czech Act on energy, specifying that there is no need of licence for electricity sale in a case of operating a vehicles charging station.

Grant programs set up technical requirements on charging stations. For example, each charging station should be also equipped by alternating charging connector, the IEC 62196 Type 2 connector (commonly referred to as Mennekes).

3.2.4. Hungary

Infrastructure

The charging network must be developed in order to achieve that every part of the country can be reached by electric vehicles.

In Hungary currently there are only 165 charging points are available for the public. On long-term a few thousand charging points are required to make electric vehicles a real alternative.

As part of the Jedlik Plan business associations will be given the opportunity to locate charging points, supposing that offering an appropriate parking place with charger may generate commercial and service increase.

Also local municipalities may have areas that can provide alternative locations for charging points.

- Lightning chargers shall be located like spider's web, moving away from the cities. The charging period of these chargers is 20-25 minutes.

- In the cities service centres or parking lots shall be equipped with fast chargers with charging period of 90-150 minutes.
- At home the normal chargers also can be appropriate. Charging time is around 6 to 8 hours and the chargers are functioning through the household plugs.

Incentive scheme

Current allowances for electric vehicles:

- Registration tax – HUF 0,
- Vehicle tax – HUF 0,
- Exemption from pecuniary transfer duty

Planned allowances

No direct financing is conceivable.

- Allowances shall be limited in time or in quantity.
- charging point owners shall be allowed to trade with current as reseller
- expanding the availability of the „night power" (for at least 8 hours during the night)
- green license plate number
- plug in hybrid, long-range electric vehicles and hydrogen cell vehicles shall be added to the beneficiary category
- parking broads, road markings shall be different
- bus lane usage
- toll discount
- free entry to reserved zones (for example Buda castle)

Community transport and identified possible users

In community transport electric buses may be used in areas where zero emission technology is of higher importance because of the traffic environment or some special endowments despite the fact it will be more expensive than the usage of traditional vehicles (for example Buda Castle, inner districts).

Additional transportation services

- Smart city solutions (street-lighting infrastructure, V2G technology)
- E-taxi
- Car-sharing

Possible users who can add to green transport by using different types of electric vehicles and can be used as pilot projects for introducing electric transport.

- Government fleet
- Municipalities
- Medical institutes
- Educational institutes

- State companies
- Health-care support
- Municipal waste collection
- Hungarian Post, other parcels

Description of policies concerning standardization of charging stations

The content of the Jedlik Plan, which covers the regulation and policies on national and on municipality level:

Policies & regulations on national level

- Develop a national vision with EV as part of a sustainable transport solution
- Measures have to be aligned over all administrative and political levels (from the city to the EU).
- Develop incentive programs, like tax reductions or subsidies e.g. for fleet owners, employee charging
- Set up legal framework that enables municipalities to support EVs e.g. exclusive parking, opening fast lanes or zero emission zones
- Set up regulations that facilitate installation of home chargers e.g. EV ready buildings, rules for installation of charging infrastructure in multifamily houses
- Organise national monitoring structures to create insights in the progress of reaching national goals and targets
- Intervene or stimulate with the gained knowledge

Policies & regulations on municipality level

- Make EVs a part of your Sustainable Urban Mobility Plan
- Standardize and optimize work processes like permits and licenses for building activities, parking and charging spots and other electro mobility services
- Organize local exchange platforms for stakeholders to develop a joint vision and plan identify barriers, create awareness and engagement
- Increase the demand of chargers by stimulating private initiative by granting subsidies by well-defined market regulation
- Claim public engagement in exchange for granted benefits oblige EV sharing companies to open parts of their installation for private users return for licenses

Gain knowledge by monitoring the progress of number of charging poles and EVs.

3.2.5. Romania

As Romania is still in process of developing the electric mobility, the national policies are yet to appear. Still, there are some initiatives worth mentioning:

1. National Organism for Standardisation of Romania

Standardisation for Smart Cities: In this context, the applicable standards for the design, construction and performance of equipment and components integrated into smart grids and smart buildings or homes are distinguished. The concept of smart cities / networks requires a permanent concern for research and innovation. In close connection with the latter, the attention of the technical standardization committees is focused on developing and reviewing standards that ensure real-time interoperability of systems for efficiency

Services for urban communities (ex: power supply, water and food, health, secure communications networks at all levels, etc.). Romania is aligned to EU Standards EN 61851 (SR EN 61851) concerning Electric vehicles conductive charging system and to M/468 EN concerning the charging of electric vehicles.

2. The Ministry of Transport

In 2003, Order no .211/2003 concerning cars homologations defined for the first time the use of electric and hybrid vehicles and technical requirements.

- updating the existing format of car registering by generating a new category: hybrid/electric;
- Legislation introduction of a new category regarding vehicle consumption: "electric energy"

3.2.6. Slovenia

Standardization of electric charging stations in Slovenia[14]

Standardization regarding electric charging stations and plugs does not differ from EU standards. As it can be seen from the following graph Slovenia is also dealing with the problem of many different types of plugs to connect electric vehicles to charging stations.

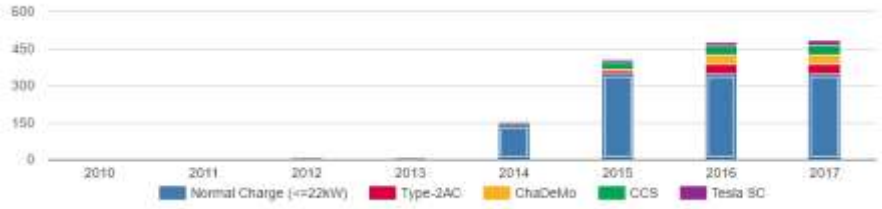

Figure 3: Types of charging stations by year in Slovenia.

In Slovenia there are 348 normal charging stations with power less than 22 kW. 38 charging stations are Type-2AC, 40 ChaDeMo, 37 CCS (Combined Charging System) and there are also 20 Tesla super chargers in Slovenia.

[14] http://www.eafo.eu/electric-vehicle-charging-infrastructure

3.2.7. Serbia

No standards have been conducted in the Republic of Serbia on the topic of electric charging stations. Development of the first document under the name "Strategy to install chargers for electric vehicles in the Republic of Serbia" is in progress.

3.2.8. Montenegro

There are no regulations set on a national level in Montenegro for infrastructure development in terms of installation of charging stations for use of electric vehicles.

3.3. Summary on standardization of charging stations in reviewed countries

A large proportion of countries mentioned in this chapter have started to adopt the standardisation processes that are necessary in order to boost the uptake of electric vehicles in Europe. The number of charging stations at the moment is not satisfactory. The majority of charging stations has power outputs that are below 22 kW, with a relatively small number of high power charging stations with power outputs above 22 kW. Another conclusion would be that there is a relatively larger proportion of direct current “ChaDeMo” connectors that are going to be phased out of the EU charging network due to, in this text, mentioned EU regulations and replaced by “Combo 2” type connectors. The final conclusion would be that the member states have a minimum that they have to fulfil regarding the number of charging stations, power output and the types of connectors. The financial incentives for establishing such an infrastructure are relatively none existing, due to the large commercial interest of large electricity companies that want to be a part of the new promising market. Table 1 with overview of current situation described concludes this section.

Table 1: Overview of charging stations per eGUTS country (Source: https://openchargemap.org/site/country)

Country	Current situation
Austria	1790 charging stations on 616 locations. Biggest part of connection types are: type2, chademo, combo. 3 type of services available on current charging stations: charging made phone call, reservation through mobile app, open charging stations.
Croatia	129 charging stations on 70 location. Use of charging stations is mostly operated by RFID cards or through mobile apps. Most of charging stations are type2, Chademo and Combo.
Czech Republic	323 charging stations in 275 location. Each charging station should be also equipped by alternating charging connector, the IEC 62196 Type 2 connector.
Hungary	399 charging stations in 222 locations. Most of charging stations have connection types: type2, Chademo and Combo.
Romania	45 charging stations in 29 locations. Charging stations have connection types: type2 and Chademo.
Slovenia	115 charging stations (number without Tesla super chargers) on 74 locations. 38 charging stations Type-2AC, 40 ChaDeMo, 37 CCS, 20 Tesla super chargers in Slovenia, charging stations have different ways of operating (from RFID cards, mobile apps, …)
Serbia	16 charging stations in 8 locations. Charging stations have connection types: type2 and Chademo.
Montenegro	Not applicable.

4. Plans and incentives for further development of eMobility

4.1.1. Austria

At the end of 2016, just about 12,000 registered electrified cars (pure electric, plug-in hybrid, hydrogen) were travelling on Austrian roads, with the new registrations in 2016, Austria was third in Europe after 3,826 purely electric vehicles and within the EU-28 even in the first place. At the end of October, EU-country comparisons (transport scoreboard 2016) were published; Austria is third in the comparison of e-charging points across Europe. Compared to the number of existing vehicles, Austria already has very good basic equipment with charging infrastructure. All Austrian operators are working intensively on the fact that they will be better and easier to use in the future. Studies show that approximately 85-95 per cent of charging takes place in the private area, e.g. at home or in the workplace. However, the public charging infrastructure must also be compacted in order to make Austria more energy efficient by 2020. With this initiative, ÖBB and ASFINAG are also committed to the development of publicly accessible charging infrastructure at railway stations as well as on motorways and expressways. In addition, a number of federal states, including Vienna, have already presented ambitious expansion plans for the next two to three years. To operate public charging infrastructure economically is still a challenge. The broader distance from the home charging option, the higher price for power should cover these costs in future. Nevertheless, the e-market is growing, not only with regard to charging stations, but also with respect to the number of companies that offer retail services. Accordingly, there are many different tariffs and as soon as a supplier is asking for higher prices, he will be likely less successful with his offer than his competitors. [15]

In some regions of Austria, the expansion of a professional cahrging infrastructure is currently actively promoted. As part of the VLOTTE project (www.vlotte.at), charging stations have been put already into operation in Vorarlberg. A system key (park & charge key) is required to use the power station. In order to be allowed to park at the charging station, a vignette has to be provided on the vehicle. A charging station is operated by photovoltaic panels on the roof. A noteworthy feature is the open access of the Linzer system: every holder of a bank card with Quick function can load his batteries. However, as welcomed the initiatives for charging stations may be, it is evident that a variety of different systems are currently in operation in Austria. In order to use the infrastructure at present, various memberships and membership cards are required. The public authority is asked to take efforts

[15] https://infothek.bmvit.gv.at/faq-e-mobilitaet-wie-komme-ich-zur-foerderung/

for customer friendly solutions, e.g. The Quick Access in Linz to ensure an open charging station system in Austria.[16]

4.1.2. Croatia

Electric vehicles (e-cars and pedelecs) overall are a relatively new term in Croatian legal system. At the moment, there are no laws or other legal documents that would regulate electric vehicles and their use. Following the accession of the Republic of Croatia a number of European directives and strategies had to be adopted and developed. Many of the strategies that are developed or currently being developed are the precondition for the use of European funds that are available after the accession.

Even though there are a number of strategies developed, that would mention electric vehicles, just a few explicitly have electric vehicles as an integral part. These strategies are the following;

1. Transport development strategy of the Republic of Croatia
2. Sustainable development strategy of the Republic of Croatia
3. Low carbon development strategy of the Republic of Croatia

The Transport development strategy of the Republic of Croatia (2014-2020) is a document that was adopted in 2014. As such, it is giving guidelines for the set-up of the Croatian transport system until 2030. Among other, the need for the usage of more efficient and environmentally friendly vehicles is mentioned in the Objective 6. of the strategy "Improvement of the Transport System Organisational and Operational setup to ensure the efficiency and sustainability of the system". This objective has several goals, and those that mention electric vehicles are the following;

Goal 6e "Reduction/mitigation of the environmental impact" aims at avoiding, reducing or mitigating the environmental impacts of transport related activities. In particular, the Strategy aims at the reduction of transport-related GHG emissions (transport sector is one of the main sources) and atmospheric pollution. This will be achieved by a set of interventions both on mobility habits (modal shift to public transport, environmental friendly and soft modes such as pedestrians and bicycles) and improvement in vehicles technologies (more efficient and cleaner).

Goal 6f "Improvement of the energy efficiency" aims at improving energy efficient mobility habits. To achieve this objective, the strategy promotes a more efficient usage of the transport network, in particular shifting users to public transport and soft modes. It also promotes the use of modern, more efficient and cleaner vehicles that use alternative fuels and use energy recovery technologies.

The second strategy that mentions the use of electric vehicles is the "Sustainable development strategy of the Republic of Croatia" that was adopted in 2009. An important part of the Strategy is developing the transport infrastructure based on principles of sustainable development. Concrete goals that are set in this strategy, that are connected with the encouragement of the use of electric vehicles are as follows;

[16] https://www.energyagency.at/fileadmin/dam/pdf/publikationen/berichteBroschueren/Endbericht-markteinfuehrung_emobilitaet.pdf

Goal 1. To encourage the usage of clean fuels and technologies and the transition on energy efficient forms of transport.

Goal 3. To enhance collective transport means, improve the quality of sustainable transport means and increase the use of cycling and pedestrian lines.

Goal 5. Encourage the efficient use of personnel vehicles (efficient fuels, efficient was of driving).

Goal 10. To increase the overall safety and the investments in the infrastructure for pedestrians and cyclists.

The third strategy that is probably the most relevant for the use of electric vehicles in Croatia is the "Low carbon development strategy of the Republic of Croatia" that is still in development. The draft documents of the strategy indicate that this document is the most comprehensive in terms of defining the use of electric vehicles. The strategy is being developed by the Ministry of Environment and Energy.

As a part of the process, the Ministry and the team of external experts have developed the White book for the development of the Low carbon development strategy that will serve as the base for the strategy. In the scope of this White book the scenario that was used for all calculations of CO2 reductions regarding transport is the following;

- Increase of the share of electric cars to 2% of total cars in Croatia till 2030 i.e. 70000 vehicles and 25% share in 2030 i.e. 498000 vehicles.
- Increase of the share of hybrid and plug-in hybrid vehicles up to 40% share (20% hybrid and 20% plug in hybrid) till 2050.
- Increase of the usage of electric energy in public transport buses to 6% by 2050.

Interestingly, promotion of cycling and the development of cycling infrastructure has a relatively small part in the Strategy even though it can have a large impact on the reduction of CO2 emission in everyday transport.

The conclusions from the white book will be translated to the final version of the strategy in with a complete set of measures how to achieve those goals.

Most of the incentives for the usage of electric in Croatia will derive from the "Operational programme for competition and cohesion" for the programme period 2014. – 2020.

4.1.3. Czech Republic

Strategies and plans for the development of eMobility are embedded in the National Action Plan Clean Mobility (NAP CM). The vision of the development, including individual strategic goals and measures contained in NAP CM, is to reach 250,000 vehicles with electric drives in operation by 2030. 5 strategic goals were designed in order to reach this condition. Their overview, together with the designed measures, is shown in Table 1.

Table. 1 Overview of strategic goals for eMobility development

Strategic goal	Designed measures
Easier construction of charging infrastructure in the field of eMobility	Investment support to construction of public charging infrastructure. Investment support to construction of charging infrastructure for city public transport (non-public). Investment support to construction of enterprise charging infrastructure (non-public). Unified methodology for the approval process of construction of charging stations infrastructure. Increased depreciations in the first year of depreciations for charging infrastructure. Obligatory quotas for developers for the connectivity of the charging infrastructure.
Stimulation of demand for e-cars	Increased depreciations in the first year of depreciations for vehicles with electric drives. When purchasing vehicles, introduction of an opportunity for contracting authorities to apply the methodology for the calculation of operational lifetime costs in accordance with Directive No. 2009/33/ES. Support to acquisition of vehicles with electric powertrains for the state and public administration bodies and their subordinates, controlled organizations and established organizations. Support to acquisition of vehicles with electric powertrains for enterprises. Use of innovative financial tools for the support of the acquisition of vehicles with alternative powertrains for natural persons. Support to the acquisition of vehicles with alternative powertrains for vehicle fleets of city public transport companies, transport operators providing public transport, and public intercity transport. Vehicles with alternative powertrains are exempt from paying for motorway stickers. Changed tariffs and rates for road tax for vehicles with alternative powertrains with mass over 12 t.
Creating conditions for better awareness of eMobility by potential customers	Use of traffic lanes for buses and taxis by vehicles with electric powertrains. Parking free of charge in public carparks. Parking free of charge on otherwise reserved areas (blue zones). Reserved road sign for vehicles with electric drives. Labelling of vehicles with electric drives. Meeting the requirements of Directive 2014/94/EU regarding the standards of the charging stations infrastructure. Meeting the requirements of Directive 2014/94/EU regarding conduct of business in the field of operating public charging stations. Education events for specialist community and public in the field of alternative fuels. Provide information for road users on the type and equipment of charging and filling stations through ITS systems.

Improving conditions for conduct of business in fields related to eMobility	Amendment of Decree No. 50/1978 Coll., on professional qualification in electric engineering. Meeting the requirements of Directive 2014/94/EU regarding conduct of business in the field of operating public charging stations.
Coordination of charging infrastructure and distribution network development	No specific measures are currently designed within this strategic goal. Distribution network development plans will be produced taking into account potential development of the charging infrastructure. Emphasis will be put on the development of so-called Smart Grids, or gradual integration of new elements and technologies, into the distribution network and its management. This area is specified by a separate action plan (National Action Plan Smart Grids) and its fulfilment or potential revisions will be coordinated with NAP CM.

The incentives for the development of eMobility in the Czech Republic mostly come in the form of support programmes. The programmes in question currently include National Programme Environment, Operational programme Enterprise and Innovation, Integrated regional Operational Programme, and Operational Programme Transport.

National program Environment - Awareness in the Field of Clean Mobility.

Incentive programme. The support concerns complex projects leading to higher awareness of the issues of urban mobility and their potential solutions, which will contribute to improve air quality and quality of life in urban areas. The aim is to reach a positive change in the population behaviour through higher awareness of advantages of alternative technologies in transport, advantages of public transport, advantages of alternative possibilities of transport, advantages of non-motorised traffic, and potential measures for air quality improvement in urban areas. The programme is being implemented in 16 statutory towns in the time period of 2016-2017.

National programme Environment – Support of Alternative Transport Modes

Incentive programme whose aim is to reduce negative impacts of transport on the health of population and the environment, i.e. in particular reduced emissions from transport and reduced noise, through supported use of vehicles with alternative drives. The receivers of the incentives are public administration units (municipalities and regions) and city administration units of the capital Prague, allowance organizations of public administration units, public organizations, societies and subsidiary associations established by municipalities or regions, incorporated companies with at least 50 % ownership by municipalities and regions, limited liability companies with at least 50 % ownership by municipalities and regions. The subject matter of the support is an acquisition of new or newly converted vehicles with alternative drives. Regarding EVs, acquisitions of vehicles are supported for the categories of L1e, L2e, L3e, L4e, L5e, L6e, L7e, M1, N1, M2, and M3 up to 7.5 tonnes. PHEVs acquisitions are also supported, but just categories M1 and N1 (up to 2.5 tonnes). The support comes in the form of a strictly set funds for individual vehicle categories.

Operation programme enterprise and innovation – Low-carbon technologies (activity – eMobility)

The incentive programme for the acquisition of vehicles with alternative drives and filling or charging stations for company vehicle fleets. The supported vehicle categories are L7e, M1, M2 and M3 up to 7.5t, and N1 up to 3.5t. Acquisitions of higher middle class vehicles, luxury vehicles, off-road vehicles, and sport vehicles are not supported. The eligible expenses include the acquisition of vehicle (percentage of price, e.g. 30 % for L7e category, 45 % for other categories), production of a business plan, construction of charging stations (includes acquisition of machines and equipment, buildings necessary for the installation of the technology, utility networks, preparation of project documentation).

Integrated regional Operational Programme (IROP)

IROP is a wide-scope programme of the Ministry for Regional Development which is to help improve life quality in different parts of the Czech Republic by supporting development of competitiveness, infrastructure, the public administration, and other areas. The call "Low emission and Zero Emission Vehicles" is focused on the support of projects in the following activities: acquisition of road low emission vehicles using alternative CNG or LPG fuels, acquisition of road zero emission vehicles using alternative fuels, electricity or hydrogen, and acquisition of rail vehicles for city public transport (trams and trolleybuses[17]) to provide transport service in accordance with the agreement on public services related to transport of passengers. The eligible applicants in this call are regions and municipalities if they provide public services related to transport of passengers themselves, and public transport operators in accordance with the agreement on public services related to transport of passengers.

Operational Programme Transport (OPD)

In the programme period of 2014 – 2020, OPD is the main financial and technical tool to help to fulfil strategic investment needs and to deal with key issues in transport in the Czech Republic. The programme is funded from two funds: European Regional Development Fund (ERDF) and Cohesion Fund (FS). The main thematic goal is the Support of Sustainable Transport and elimination of obstacles in key network infrastructures. The following issues are concerned within this thematic goal:

- completion of backbone infrastructure and connection of regions to the network TEN-T
- improvement of quality and function
- elimination of existing bottlenecks in the key infrastructure
- support of sustainable mobility with attention to urban areas

EMobility is closely related to priority axis 2: Road infrastructure on TEN-T network, public infrastructure for clean mobility, and road traffic management. The priority axis 2 includes investments into the construction and modernisation of motorways and dual carriageways on TEN-T network, application of ITS on roads and in urban road traffic, and in the development of the infrastructure network of alternative energies on the road network. Incentive receivers include the

[17] According to Czech legislation, the trolleybus is considered to be a rail vehicle (as well as a locomotive and a tram)

owners/administrators of the given infrastructure and means of transport, or potentially other relevant organizations.

4.1.4. Hungary

The vision of the government is to establish electro mobility in Hungary by providing all the possible circumstances that will lead to the more common usage of electric vehicles. Prices of EVs are currently higher but providing the By identifying and collecting in a cluster the possible participants of this half century long plan the government has taken the first step to execute a project of broad social acceptance.

The further steps of Jedlik Plan will be made in line with the intentions of the European community but on the bases of highly anticipated rise of the Hungarian electro mobility industry. Bus manufacturers are ready to make an impact on the market with the capability of providing high-technology vehicles and suppliers are also waiting for the opportunity to develop in an innovative way and getting to be capable of entering the supply chains in the electric vehicle sector.

Most of all the concept of establishing electro mobility is making the future liveable, making transportation comfortable while not contaminating the cities and the countryside. This is the idea behind the concept which has been and will be taken very seriously by the government and will be continued with the utmost confidence of being able to take part in the development of future transportation.

4.1.5. Romania

2017 is the year of changes, as a new legislation initiative regarding the way of functioning for electric vehicles is prepared in the Parliament. The legislative proposal will establish the regulatory framework and measures for the instalment of alternative fuel infrastructure, in order to minimize oil dependence and mitigate the impact of transport on the environment. The legislative initiative transposes the provisions of Directive 2014/94/ EU on the installation of alternative fuels infrastructure.

Some of the aims and objectives of the legislative initiative:

- Expected vehicles using alternative fuels, by 2020, 2025 and 2030;
- National targets achievements in alternative fuels use in transport (road, rail, water and air);
- Yearly verification of national targets regarding Electric infrastructure installation.

Romania has a poor infrastructure for powering electric cars, but official data shows that cars with "zero emissions" are increasingly demanding on the Romanian market.

The first company to start an extensive network of power stations is the Kaufland retailer, in partnership with Renovatio renewable energy producer.

The main Romanian producer of LED illuminating systems and one of the biggest energy suppliers are investing in the development of electric vehicle charging stations and is an active actor in the process of legislation generation.

Also, the Tinmar private energy provider will, in the coming years, carry out a national network of charging stations for electric cars, considering that it is a technology of the future.

Other major players could also enter the market. At the end of November 2017, MOL, the fourth player on the Romanian gas station market, announced that the Hungarian group is considering opening charging points for electric cars in Romania.

4.1.6. Slovakia

Contribution of 5 000 € for BEV and 3 000 € for PHEV.

In cooperation with the Automotive Industry Union (ZAP SR), the Ministry of Economy has prepared a project that will make electric cars more affordable. The project will support the purchase of electric cars by *more than EUR 5.2 million* from the Recycling Fund and the Automotive Union. This is the first serious step in support of electro mobility in Slovakia, which should lead to more ecological and low emission vehicles on Slovak roads.

Support for the purchase of electric cars started 11.11.2016 and will last until the end of 31.12. 2017, or until funds are exhausted (whichever comes first). The condition for payment of funds is registration of a vehicle in Slovakia until 31.12.2017.

Support can be requested by a citizen, a business entity, but also cities and municipalities. Therefore, any person registered in the vehicle register as its owner.

The contribution will be paid in three instalments. The reason for this is to ensure that vehicles remain in the SR and prevent their cross-border exports.

In support of EUR 5,000 for BEV, the owner of the new electric car will, after joining the terms of the contribution and registration of the vehicle, immediately acquire 2,000 euros. The second 1,500 euros will be received next month after the first registration year in Slovakia and the remaining 1,500 euros next month after the second registration year in Slovakia.

The *vehicle must be registered for at least two years in the SR vehicle park*. The control mechanism of whether the vehicle is in the record will be carried out in close cooperation with the Police Force Premises - vehicle registration.

When purchasing a plug-in hybrid electric vehicle (PHEV), the support is 3000 euros, and the same allocation mechanism applies as for BEV.

Electric vehicles (pure and as well as PHEV) in SR are exempt from registration tax and annual circulation tax.

Local incentives to boost e-mobility

The city of Trnava decided, as one of the first in Slovakia, to bet on the card for electric cars. Owners of *electric vehicles* will now have an annual non-transferable *parking card for 10 euros*, which is 40 times less compared to other drivers (the standard price of an annual parking card is 400 euros in the city centre and 150 euros in zone B). A certain advantage should be even for *hybrid vehicles*, in amount of a *50% discount on the annual card price*. At the same time, they decided to start building fast-charging stations in the city and to enter into negotiations with the investor. By the end of the year 2017 it could be installed around *five charging stations*. In addition, *the city hall* itself wants to gradually renew its entire fleet and *replace* existing cars with electric cars.

Capital city of Bratislava wants to promote the development of electric mobility, therefore it considers purchase of 18 e-buses that are environmentally friendly. At the same time, Bratislava joined the Urban-E project through which it wants to address the development of the charging infrastructure for electric vehicles. It is planned to install 50 charging stations for AC and six DC charging stations. City of Košice already has in its bus fleet of Public Transport 14 electric buses (5 since 2014 and 9 since 2016), whereby it is the leader in public e-mobility in SR.

4.1.7. Slovenia

Plans for further development of eMobility in Slovenia[18]

In the Energy concept of Slovenia, a document that provides strategic directions and sets the political framework for the implementation of energy projects in Slovenia, with goals by 2055, are among the headline targets:

- Reduction of greenhouse gas emissions associated with energy use by at least 40% until the year 2035 relative to the level in the year 1990.
- Reduction of greenhouse gas emissions associated with energy use by at least 80% until the year 2055 relative to the level in the year 1990.

A key part of the transition from fossil fuels to renewable energy sources is also the transport sector. Among the key objectives of the Slovenian energy concept is reduction of greenhouse gas emissions in transport by 35% until the year 2035 relatively to the year 2005 and by 70% until the year 2055. The aim is to achieve 100% electric mobility in personal and public transport.

[18] https://www.ekosklad.si/fizicne-osebe/nameni/prikazi/actionID=141

Incentives for further development of eMobility in Slovenia

Incentives for the development of e-mobility in Slovenia are founded through the Slovenian environmental public found – Eco Found. Different incentives for purchase of electric vehicles or development of the network of charging stations are meant for three categories of final consumers – citizens, legal entities and local government.

There are two types of incentives in the form of grants and loans.

Public tender 45SUB-EVOB16 is a about non-refundable financial incentives to individuals for purchase or investment into electric vehicles. An individual is eligible for a grant:

- in case of purchase of a new electric vehicle,
- in case of purchase of a new hybrid vehicle,
- in case of purchase of a new electric vehicle with a range extender or
- in case of converting a vehicle with internal combustion engine into an electric vehicle.

Grants may be awarded for the purchase of vehicles in categories L7e, L6e, N1 and M1 with electric propulsion without CO2 emissions. Incentives can also be granted for the purchase of hybrid vehicles and vehicles with a range extender, however CO2 emissions must not exceed 50 g of CO2 emissions per km.

The amount of the financial incentive is:

- 7.500 € for a new or a converted electric vehicle without CO2 emissions in the category M1;
- 4.500 € for a new or a converted electric vehicle without CO2 emissions in the category L7e;
- 4.500 € for a new hybrid vehicle or an electric vehicle with a range extender with CO2 emissions less than 50 g of CO2 emissions per km,
- 3.000 € for a new or a converted electric vehicle without CO2 emissions in the category L6e.

Each natural person that has a permanent residence in Slovenia is entitled to the mentioned financial incentive.

Public tender 38SUB-EVPO16 is almost the same as the one mentioned above, with the difference that it is meant for legal entities.

Public call for loans for environmental investments 55OB16 (citizens) and 56PO16 (legal entities). The subject of the public call are loans, for environmental investments, of the Eco Fund. Among the environmental investments also fall:

- Purchase of an electric vehicle with zero CO2 emissions.
- Purchase of a hybrid vehicle or a vehicle with a range extender. CO2 emissions of the mentioned vehicle types must not exceed 110 g/km.
- Installation of bicycle sheds, charging stations for charging electric vehicles (legal entities only).

The highest amount of loan for citizens is 40.000 €. The maximum repayment period of the loan is 10 years with interest rate id EUROBOR+1,3 %. For legal entities the maximum repayment period is the same or shorter than the return of investment. In the case of legal entities, the minimum amount of the loan is 25.000 € and the highest amount of the credit is 85% of the recognized investment costs.

Public tender 57LS16 is meant for loans for environmental investments of local communities. Under environmental investments of local communities are among other:

- Purchase of an electric vehicle with zero CO2 emissions.
- Purchase of a hybrid vehicle or a vehicle with a range extender. CO2 emissions of the mentioned vehicle types must not exceed 110 g/km.
- Installation of bicycle sheds, charging stations for charging electric vehicles.
- Implementation of measures related to the promotion of sustainable mobility, in accordance with the adopted municipal transport strategy, as the promotion of multi-modality, introducing systems like "bike sharing" or "car sharing ", construction of bicycle paths, bicycle purchase or other similar measures.
- Purchase of electric labour machines.

The amount of funds for this public tender is 5 million € and is intended only for local communities. Interest rate for this loan is EUROBOR+1,0 % and the maximum repayment period is the same or shorter than the return of investment. The amount of each loan is limited to the minimum amount of the loan, amounting to 25.000 € and the maximum amount of loan amounting to 2 million €.

Public tender 44SUB-EVPOL16 is about charging stations for electric vehicles in protected natural areas and Natura 2000 areas. The subject of the public call are non-refundable financial incentives for the establishment of infrastructure (new charging stations) for electric vehicles, designed to promote electric mobility as an important element of sustainable mobility in protected natural areas and Natura 2000 areas.

The aim is to promote sustainable mobility of residents and staff and to establish proper infrastructure of charging stations for visiting these areas. This will in the long term contribute to reducing greenhouse gas emissions, improving air quality, environmentally-friendly visits to these areas and, consequently, to the preservation of nature. At the same time coverage of protected areas with infrastructure of charging stations for electric vehicles will be provided.

Interest rate for this loan is EUROBOR+1,0 % and the maximum repayment period is the same or shorter than the return of investment. In any case the repayment period should not exceed 15 years. The amount of each loan is limited to the minimum amount of the loan, amounting to 25.000 € and the maximum amount of loan amounting to 2 million €.

4.1.8. Serbia

The transport development planning is not regulated by the existing legal framework at either national or local level, but indirectly.

Serbia has no defined strategy at national level, nor at local for the development of e Mobility.

REDASP further steps as participants within the eGUTS project:

- We will address the relevant Ministries with the initiative for reform of legislatives in the field of electric vehicles.
- Development of a Local Action Plan for the City of Kragujevac.
- Promotion of the concept of e-mobility.

4.1.9. Montenegro

There is no strategy nor initiatives on a national level in Montenegro for future development and use of electric vehicles, nor eMobility.

5. Conclusions

The European Union is fully committed to the development and faster implementation of electric vehicles in the everyday lives of the European citizens. The efforts that are being taken are necessary in increase the speed of the take up of electric vehicles. There are two key elements for the faster take up, and that are being mentioned in all documents, plans and strategies, a there are the improvement of the electric vehicle technology (more battery capacity and cheaper batteries) and the improvement of the charging infrastructure.

These elements are a key part of every European strategy connected with the introduction of low emission vehicles, especially electric vehicles. The policies that EU is developing and implementing suggest a strong devotion to electric vehicles. This technology can solve a lot of European major problems, like the dependency on foreign oil, problem of poor air quality in major European cities, noise pollution and fight against climate change.

Also, it can be a trigger for developing other EU policies, especially those on the higher usage of renewable energy that is a key element in reducing CO2 emission in transport, and transform and open new industrial sectors.

The functional and safety requirements of EV plugs and sockets are defined by the IEC62196 standard. The European counterpart of the IEC, the CENELEC, was asked by the European Commission, in 2011, to define a specific design as the EU standard, but this has not resulted in such a decision yet. Standardization is crucial to the success of EVs, but this can be argued that this had to take place on the infrastructure side and not so much on the car-side. In cars, multiple inlet designs were already in use by different car makers and standardization were supposedly no longer a realistic option. It is the best that car manufacturers provide matching cables for charging with their cars. In May 2012, the ACEA and EURELECTRIC (together with CLEPA, representing automotive suppliers) released a joint statement to call upon the European Commission to finally define a European plug standard. However, according to the accompanying individual statements, the two industries still could not agree on the specific design of such a standard.

The local and regional level, based on the documentation in this study, show signs of readiness for the implementation of the EU policies but there is major lag that is connected with the fact that this technology, at this moment is still relatively expensive for the general population. It can be concluded that if the affordable technology is not present, every effort mentioned in the policy document will not have any sense since the end user is missing.

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