Recommendations for the Development of E-mobility in Croatia

Zagreb, April 2017

AmCham

American Chamber of Commerce in Croatia Američka gospodarska komora u Hrvatskoj

Contents

Introduction

The rapid industrialization and technological development of the last 150 years has faced the global community with serious challenges regarding limited fossil fuel resources and global warming caused by excessive CO_2 emissions. In the second half of the 20th century, it became clear that human behavior significantly affects changes in the environment, with potentially negative consequences for the ecosystem, climate, and human health and quality of life.

This is why developed countries are placing an increased emphasis on the green economy, which is characterized by the sustainable use of renewable resources and the intelligent use of non-renewable resources. Through energy and resource efficiency, the green economy promotes the substitution of fossil fuels with "clean" energy with low greenhouse gas emissions, which mitigates and slows climate change, promotes the development of green jobs, and reduces dependency on energy imports. In the last several years, the European Union (EU) has launched a large number of green, sustainable economy projects, while Croatia is developing a low-carbon economic strategy. However, the elements of the green economy are represented to a certain extent only in the Croatian energy sector, while its developmental potential is not sufficiently recognized by the industry in relation to achieving more competitive production and increasing the employment rate.

Transport as a human activity, both in Croatia and globally, accounts for 30% of CO_2 emissions, so measures to reduce CO_2 emissions in this segment certainly make sense. Until recently, technology that could significantly contribute to the fulfillment of ecological requirements through the use of low carbon fuels at affordable prices was not available. However, scientific and technological development, as well as lower battery prices, made it possible for the first electric car to see the light of day in 2009. This enabled remarkable progress in the field of CO_2 emission reduction, especially in urban areas, which has been recognized by many advanced countries. As a result, there has been increased demand for vehicles independent of fossil fuels with low or zero CO_2 emissions and for corresponding charging infrastructure – i.e. e-mobility.

AmCham believes that a good regulatory framework is crucial to the development of e-mobility in Croatia, as it would enable strategic planning for the development of the needed infrastructure, as well as further encourage citizens and business entities to use electric vehicles.

International legal achievements

An international climate policy was established in 1997 with the Kyoto Protocol, which was adopted at the United Nations Framework Convention on Climate Change. The parties to the protocol undertook to reduce emissions of six harmful greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride (SF6).

In 2011, an agreement was reached in Durban to extend the Kyoto Protocol until 2020. Work on a new international protocol which would limit global warming to 2°C above average preindustrial temperatures also began. According to the 2012 Doha Amendment to the Kyoto Protocol, the EU committed to reducing greenhouse gas emissions by up to 20% compared to levels in 1990 during the second commitment period of the Kyoto Protocol. This commitment was nearly achieved by the end of 2013, with a reduction of 19%.

The 2014 "Lima Call for Climate Action" called for an international, legally binding agreement that would "address in a balanced manner issues such as climate change mitigation, adaptation, finance, technology development and transfer, capacity building, and transparent action and support." For the first time, this would include all 195 members of the United Nations Climate Convention and express the principle of the "common, but differentiated responsibilities and respective capabilities" of each country.

Topics of great importance for the EU within the framework of international climate change negotiations are: ambitious and legally binding targets, strong compliance mechanisms, multilateralism, and reliance on scientific evidence.[1]

[1] European Parliament, Climate change and the environment, downloaded: http://www.europarl.europa.eu/atyourservice/hr/displayFtu.html?ftuId=FTU_5.4.2.html

E-mobility

E-mobility represents an environment in which the use of electric power from the grid is available for charging vehicle batteries, which are then used for individual and business needs in transport. E-mobility consists of "software" and "hardware". Software includes a range of stimulating measures, activities, and legal regulations necessary for the development of not only the electric-powered vehicle (EPV) market, but of the charging infrastructure as well. Hardware signifies a network of various, publicly available charging stations for electric vehicles.

EPVs are vehicles that either completely or partially use energy from power batteries rechargeable from the electric grid for propulsion, and such vehicles can be divided into: electric vehicles (EV), plug-in hybrid electric vehicles (PHEV), and plug-in hybrid vehicles (PHV). Vehicles that cannot use energy from the electrical grid for charging their batteries, such as hybrid vehicles (HV), are not part of e-mobility. Unlike EVs, which use exclusively electric power for propulsion, PHEVs and PHVs use both electric power and fossil fuels, according to the user's needs. PHEVs and PHVs actually emerged as an industry response for overcoming the most common user complaints, which included limited range with one battery charge and relatively long recharge times. When the power batteries are drained, the conventional engine activates, either automatically or upon request, and provides the energy needed to move the vehicle.

A greater share of EPVs in traffic is expected in the near future, especially PHEVs and PHVs, due to the numerous advantages of e-mobility:

- Improvement of quality of life in cities by reducing pollution and noise;
- Reduction in greenhouse gas emissions and their impact on the environment;
- Higher integration of renewable energy sources;
- Reduction of costs and dependence on fossil fuels;
- Increase in energy efficiency;
- Reduced dependence on other energy sources;
- Improved user experience;
- Creation of synergies and new added values with other smart city systems.

The use of electric cars in transport and a developed network of charging stations make it possible to create a system of “smart energy grids”, characterized by the smart interaction of vehicles and the electrical energy grid. Since modern electric cars have battery systems with a relatively large capacity, the user could place a certain share of his vehicle’s battery capacity at the electric power distributor’s disposal, depending on his daily needs, and the distributor could draw energy from the vehicle when there is a lack of electrical energy on the grid and return it when there is a surplus.

This would to a great extent resolve the basic disadvantage of electric power generation from wind and solar energy. It therefore follows that the use of electric vehicles offers great potential for the development of an efficient energy storage system, which is posited as the final aim of e-mobility.

Recommendations for the Development of E-mobility in Croatia

Establishing a body responsible for E-mobility development

E-mobility is currently under the jurisdiction of three ministries: the Ministry of Environmental and Nature Protection, the Ministry of Economy, and the Ministry of Maritime Affairs, Transport and Infrastructure. It will soon become necessary to include the Ministry of Tourism as well, since EPVs are gaining popularity in developed EU member states (it is estimated that EPV market share in sales of new vehicles will be 20% by 2020), whose citizens are the Croatia's most frequent guests and who often travel to Croatia by car.

Therefore, the interests of all four ministries should be represented by a single body – for example the Croatian Energy Regulatory Agency (HERA). This would enable faster development of e-mobility, strategic big picture overview, and more efficient resolution of key issues for stronger growth of e-mobility (drawing resources from EU funds, optimizing parafiscal charges, resolving the issues of motorway concessions, etc.).

The responsible body should carry out a comprehensive analysis of the existing legislative system and its degree of harmonization with EU rules and guidelines, identify the main obstacles, and enable the organization of all stakeholders in resolving and planning the further development of e-mobility. In addition, it should provide support to all stakeholders in resolving regulatory and practical issues in relation to the system of e-mobility.

Creating the e-mobility infrastructure in line with national and EU priorities

Croatia needs to create a legal framework for the use of alternative fuels for the development of its transport system in line with the Directive 2014/94/EU. In order to achieve this aim the Ministry of Maritime Affairs, Transport and Infrastructure is preparing the National Policy Framework for the Deployment of Alternative Fuel Infrastructure in the Republic of Croatia (NOP)[2].

The EU is ambitious when it comes to the development of e-mobility. The aims are to reduce the use of conventional vehicles in urban transport by 50% and to develop CO_2-free city logistics in major urban centers by 2030, to gradually phase out internal combustion engines from cities by 2050 and to create a long-term link between "clean" fuels and urban mobility. On the other hand, there are significant obstacles to the development of e-mobility in Croatia, including the lack of clearly defined differentiation between "private" and "public" charging stations, caused by the lack of a national strategy to optimize resources and direct efforts towards the achievement of outlined goals.

[2] National Policy Framework for the alternative fuels infrastructure of the Republic of Croatia, 14 July 2015, downloaded: http://www.mppi.hr/default.aspx?id=21836

To enable better understanding of resource optimization challenges, we list the main characteristics of the three types of EPV chargers:

- **Wall box** – 3.7kW of power, price cca. HRK 10,000; recharge time: 5h – 10h
- **AC** – 10kW to 20kW of power, price cca. HRK 30,000; recharge time: 4h – 8h
- **DC** (ChaDeMo & Combo) – 22kW to 50kW of power, price cca. HRK 200,000; recharge time (to 80%): 15 min – 30 min

The costs of installation, setup and installed power (approx. HRK 1,800/kW) should be added to the charger's procurement cost.

The lack of strategy is visible in the number of fast DC charging stations in Croatia. Even though a hundredth charging station in Croatia was officially opened in April 2016[3], only ten fast DC stations have been installed (or are being installed), all of which in urban areas and not on major highways. On the other hand, these ten fast DC charging stations would completely meet the infrastructure needs on the Zagreb - Split highway in both directions, while an additional twenty DC charging stations would cover all major highways.

We therefore propose the following measures:

- Aligning the technology (AC, DC ChaDeMo and Combo standards) with priority locations according to national needs through the National Policy Framework for the Deployment of Alternative Fuel Infrastructure in the Republic of Croatia (NOP) - for example, by installing DC charging stations mainly on major routes (highways) 50-100 km from each other, taking also into consideration national interests from the aspect of tourism development.
- Enabling market participants to install EPV charging stations on highways – for example through a concession contract model for the plots of land on which charging stations could be constructed.
- Enabling all EPV charging station owners who are not electric power distribution companies to charge fees for the service of charging the vehicle.
- Exempting EPV charging stations from paying installed power fees (Slovenia is for example working on a proposal for introducing a 1 EUR fee for connecting charging stations to the distribution network).
- Revision of the Competitiveness and Cohesion Operational Program for 2014-2020 in relation the goals for the development of the charging stations network in Croatia:
    a. The current program sets the goal of 5 charging stations by 2023, which has already been surpassed with more than 130 charging stations currently publicly available in Croatia;[4]
    b. The program is the basis for the withdrawal of EU funds for further development of the charging stations infrastructure.

[3] Poslovni dnevnik „U Hrvatskoj otvorena jubilarna 100-ta punionica za električna vozila", 22 April 2016, downloaded: http://www.poslovni.hr/hrvatska/u-hrvatskoj-otvorena-jubilarna-100-ta-punionica-za-elektricna-vozila-311963

[4] Puni.hr, downloaded: www.puni.hr

- Positioning and marketing of charging as a digital service (Charging-as-a-Service) with the aim of facilitating the creation of new ICT services with high additional value.
- Development of the national roaming system that would connect different operators of charging station networks, which currently do not exchange data on the status of the existing infrastructure and thereby undermine the key EU principle of interoperability.

Other forms of ecologically acceptable motor fuels, such as CNG (Compressed Natural Gas), should also be taken into consideration when building a charging station network that would contribute to e-mobility. CNG has a number of advantages over conventional fuels (gasoline, diesel), including lower CO_2 emissions, and requires a stable and adequate electric grid for fast-charging station compressors. There are currently 1.2 million CNG vehicles in Europe, and an increase of up to 10 million vehicles is expected in the following 5-6 years.[5]

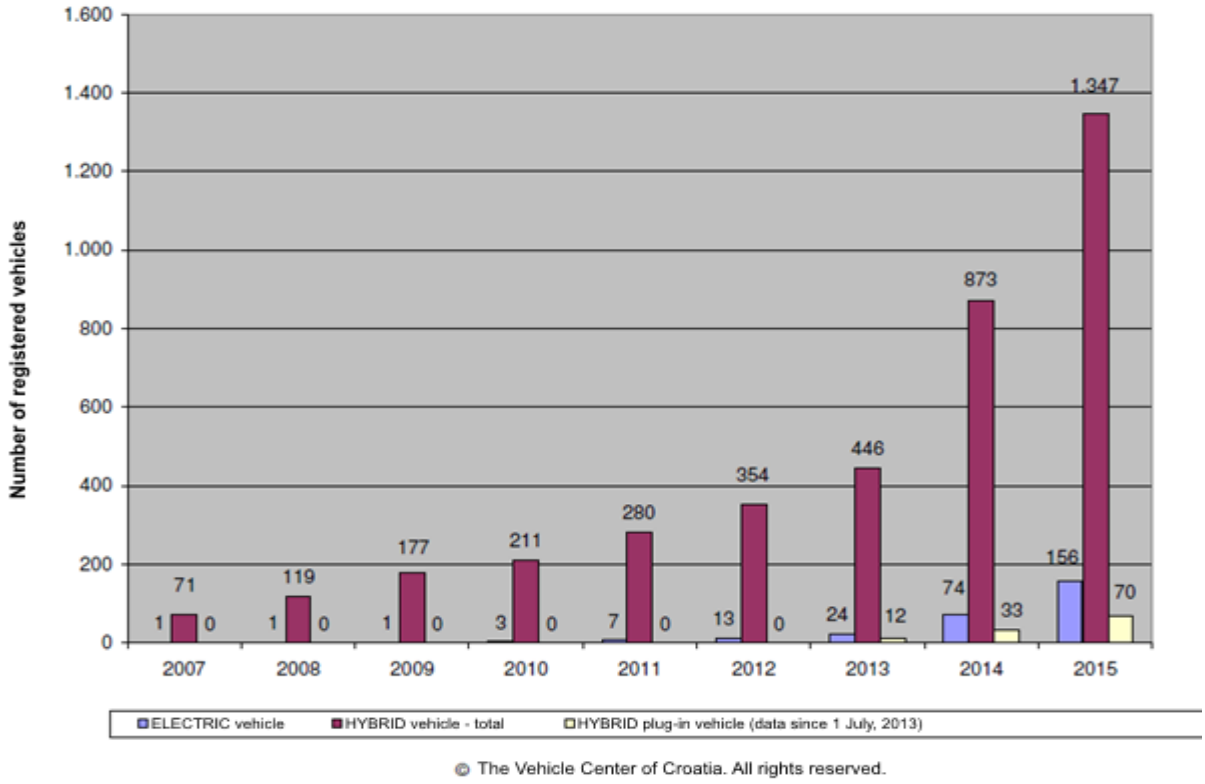
Optimization of subsidies in favor of electric-powered vehicles

Since 2014, Croatia has been one of the countries subsidizing the purchase of ecologically-friendly vehicles, a category that also include HVs. Ecologically-friendly vehicles have been present in transport since 2007, and they saw exponential growth due to massive subsidies in 2014 and 2015. Consequently, 1,347 HVs, 156 EVs and 70 PHEVs/PHVs were registered in Croatia in 2015 (data includes personal and light commercial vehicles)[6].

Even though the existing government subsidies for the purchase of EPVs and hybrid vehicles are praiseworthy and among the highest subsidies in the EU, the fact is that the majority (around 80%) of available resources are spent on the purchase of lower class HVs. HVs, as has been mentioned, do not belong to the EPV category since they use exclusively fossil fuels for propulsion, and not energy from the electrical grid. Even though HVs are much more affordable to the general population than EVs, they are less environmentally friendly than EPVs and generate noise pollution.

The table below shows the growth of HV and EPV use in Croatia from 2007 to 2015.

[5] CNG Europe, downloaded: http://cngeurope.com/
[6] The Vehicle Center of Croatia, downloaded : http://www.cvh.hr/naslovnica/



We believe that where e-mobility is concerned, it is necessary to separate direct (financial) subsidies for electric-powered vehicles from those for hybrid vehicles by defining in advance the share for subsidizing purchases of each within the planned budget in accordance with the national strategy, e.g. 60% EPV vs. 40% HV.

In addition, we suggest the following indirect subsidy measures:

- Exempting electric-powered vehicles from charges
  - as per the Ordinance on the Management of End-of-Life Vehicles
  - for batteries imported as spare parts
  - at annual registration (for EVs equal to 100%, and for PHEVs/PHVs according to distance achieved by purely electrical propulsion),
- Tax exemptions for payment in kind in cases where business-use EPVs are used for private purposes,
- Reserved parking spots for EPVs,
- The use of reserved lanes for public transport,
- Discounted prices for highway tolls,
- Free charging at public charging stations,
- Discounts for parking in public garages (on the basis of hourly parking).

Education on the social benefits of e-mobility

E-mobility is a relatively unfamiliar term, even among experts, so continuous work is required in order to raise public awareness of the social benefits of e-mobility, especially at the local government level.

Average users are also reluctant to adopt new technologies and experience "limited range anxiety". For this reason, it should be noted that all EPVs have more than sufficient range with one charge with respect to their purpose, and as technology develops, their range will increase significantly within a short period of time.

For additional information, please contact:
The American Chamber of Commerce in Croatia
Andrea Doko Jelušić,
Executive Director T: +385 1 4836 777
E: andrea.doko@amcham.hr