

# Supporting the bottom-up road transport decarbonization for local level decision makers: a White paper

## Abstract

This white paper brings the current state of decarbonization of road transport in one of the countries of Alpe-Adria clean transport alliance. It summarizes the current most relevant figures on the types of propulsion systems in passenger cars and light commercial vehicles and the measures currently in force to decarbonize transport in accordance with the EU legislative framework and national strategic documents. It also provides the recommendations for faster implementation of EU and national strategies on the local level, according to the feedback of decision makers from local communities.

## Problem Statement

Transport is one of the challenges for any local and regional government. Creating conditions for the use of electromobility, alternative fuels and new technologies is a permanent goal of the energy transition.

Alpe-Adria clean transport alliance aims to support and empower the **local and regional government bodies, private funding bodies and civil society (both local action groups and civil society cooperatives)**. The goal is to **supply them with the complete picture on the energy transition in road transport, it's connection to the changes in energy systems, as well as channels for funding of projects aimed at electrification and decarbonization of transport**. This includes possible funding options in grants, commercial bank loans and community funding options. Also, **local and regional government bodies** are usually lacking in capacity to perform such projects, so the know-how and experiences are being transferred from larger government units (large cities with dedicated officials for transport and procurement) and from stakeholders on the similar level from other EU countries (e.g. The climate and energy model regions, local action groups). Urban planning departments at local level are in the focus of planning the location plan of new installations.

Projects and decisions that the target group is being trained for include:

- Developing measures for local road transport decarbonization
- Decisions that support development of local infrastructure
- Green public procurement in the transport sector
- Drafting of action plans that support road decarbonization
- Understanding of embedment of road transport decarbonization in wider energy and climate transition framework

## Background

Recognizing the importance of combating climate change, the European Union has focused its development on a low-carbon economy in the 21<sup>st</sup> century. This culminated in the signing of the Paris

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Agreement, which committed 186 countries (including China, the US and the EU) to prevent 2 ° C global warming in 2050 and "do everything in their power" to keep global warming below the projected 1.5 ° C [1]. These goals are also the goals of the Republic of Croatia as a member of the European Union. The low-carbon economy is achieved through increased energy efficiency, the use of renewable energy sources (RES), the implementation of a circular economy, improved infrastructure and interconnections, increased mobility and competitiveness, and carbon capture and storage (CCS) technologies [2]. In addition to the obvious benefits of reducing emissions, the high share of renewable energy sources reduces Europe's dependence on fossil fuels, which Europe, compared to some other countries and areas, does not have much. Electric vehicles, when their production and the source of electricity used to charge batteries are taken into account, are smaller emitters than vehicles with internal combustion engines (ICE) [3]. In the transport sector, the EU roadmap for 2050 described in the White Paper on Transport is the absence of conventional fuel in cities, the use of 40% sustainable low-carbon fuels in air transport and a 40% reduction in emissions from the transport of goods, and roads so as to take over 50% of intercity traffic. It is estimated that all these measures should reduce greenhouse gas emissions in Europe by 60% [4].

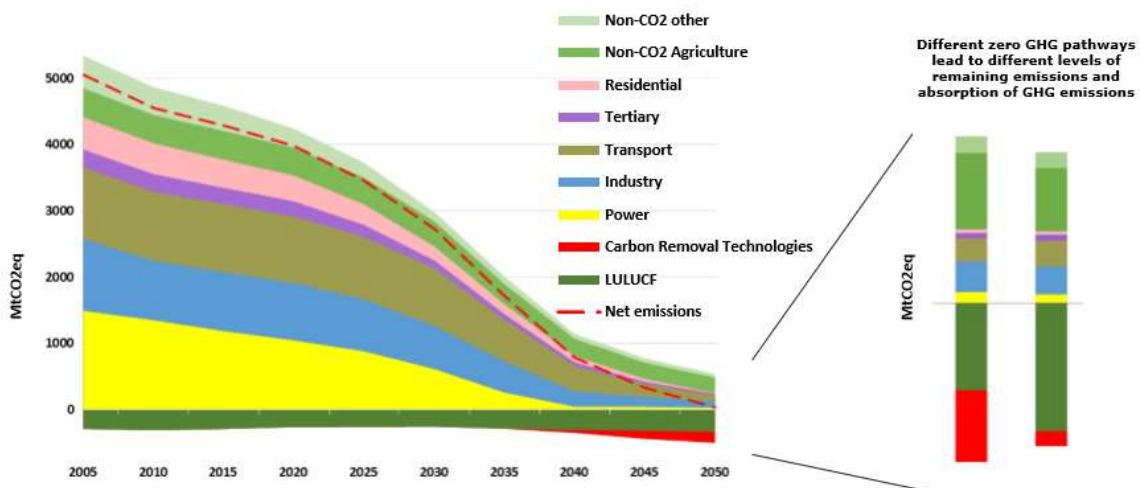


Figure 1 Vision of zero-emissions system of EU by 2050 [5,6]

Croatian NECP (December 2019), a measure "TR-5: Legislative adjustments for cleaner traffic" proposes increasing the share of RES in final energy consumption in transport and increasing the share of clean vehicles in road transport, supported by adoption of laws and regulations to regulate the conditions for the construction of electric vehicle charging stations at national level. The objectives of the measure are to increase the share of RES in traffic by 2030, 37% of the share of light vehicles meeting the set requirements in the total public procurement of light vehicles at the national level by 2030, 13% of the share of trucks meeting the requirements in the total public procurement of heavy vehicles at the level states by 2030 and 65% of the proportion of buses that meet the set requirements in the total public procurement of buses at the state level by 2030.

### Strategy of energy system development of the Republic of Croatia until 2030 with a view towards 2050.

Predictions of the share of electric and hydrogen vehicles between 2030 and 2050 are also present in current proposals for national strategy documents, such as the Energy Strategy until 2030, with a view towards 2050, where the share of electric and hydrogen vehicles is projected to reach 2.5% even

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without measures in 2030 and 30% in 2050, respectively, while in the accelerated energy transition scenario the forecasts reach 4.5% in 2030 and 85% in 2050, and in the moderate transition scenario the forecast is 3.5% in 2030 and 65% in 2050, respectively 2050.

Low Carbon strategy until 2030 emphasizes the need for improvements in the infrastructure for electrified transport and other means of decarbonization of transport, especially in the public transport, while in the view towards 2050 information technologies are underlined as the expected occurrence in the ask of merging the power production sector and electrified transport sector, while hydrogen produced using RES is underlined as an important fuel in heavy transport. Action plan of the implementation of low carbon strategy has been drafted, introducing measures for support of decarbonization of transport.

National development strategy of the Republic of Croatia until 2030<sup>1</sup> declares: *“Croatia will become a leader in the green economy and the introduction of cleaner, cheaper and healthier forms of transport by promoting a safe and sustainable transport policy. It will invest in digital infrastructure and encourage the introduction of digital solutions in the interest of citizens and the Croatian economy, which will contribute to building the digital future of Europe.”*

### Current status in Croatia

In 2020, 8,080 hybrid and electric vehicles were registered in the Republic of Croatia, of which 1,343 were fully electric vehicles. Hybrid and electric vehicles accounted for 0.11 % of the total number of vehicles in the Republic of Croatia, which is compared to e.g. Norway, which has a 16 % share of fully electric vehicles in the total number of vehicles. Croatia has recognized fostering the use of energy efficient vehicles as one of the key measures to encourage energy efficiency in transport. It is with this goal that the project "We drive economically" was launched in 2014<sup>2</sup>, through which citizens and companies were awarded grants to purchase more energy efficient vehicles. By 2019, a total of HRK 109.5 million was co-financed through this fund, i.e. 3681 energy efficient vehicle (electric, hybrid and plug-in hybrid). A new public call for direct co-financing of the purchase of energy efficient vehicles to citizens by awarding a grant will be issued in March 2021<sup>3</sup>. The charging stations in the Republic of Croatia account for 479 slow chargers (< 22 kW) and 150 fast chargers (> 22kW) [7], which are owned predominantly by two companies. One is national power company (HEP)'s brand ELEN, and the other is Hrvatski Telekom (HT). ELEN network consists of 250 charging stations throughout Croatia, while Hrvatski Telekom operates 330 chargers. Number of charging stations per 100 km of road was 2.3, which is comparable to the situation in Western and Northern Europe. However, if the number of public fast chargers per 100 km of highway is considered, the number is lower than EU average, with only 14 in Croatia, compared to 26 in EU. Until last year, there was no costs for charging in Croatia, but that has changed. HEP, as well as HT, are slowly introducing pricing at their charging stations, and the price should be around HRK 2.5 per kWh. Pricing systems are diverse, from those that are charged by time while some combined methods and also tariff (day and night). ELEN's offer of charging stations includes charging stations with a capacity of 50 kW, but also the first ultrafast charging stations in Croatia, with a capacity of up to 350 kW. The research showed that ELEN can charge more than half

<sup>1</sup> [Nacionalna razvojna strategija Republike Hrvatske do 2030. godine \(nn.hr\)](https://www.fzoeu.hr/docs/informativni_letak_vozimo_ekonomicko_v1.pdf)

<sup>2</sup> [https://www.fzoeu.hr/docs/informativni\\_letak\\_vozimo\\_ekonomicko\\_v1.pdf](https://www.fzoeu.hr/docs/informativni_letak_vozimo_ekonomicko_v1.pdf)

<sup>3</sup>

[https://www.fzoeu.hr/docs/javni\\_poziv\\_sufinanciranje\\_kupnje\\_energetski\\_ucinkovitih\\_vozila\\_gradanima\\_2020\\_v1.pdf](https://www.fzoeu.hr/docs/javni_poziv_sufinanciranje_kupnje_energetski_ucinkovitih_vozila_gradanima_2020_v1.pdf)

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of the registered electric vehicles with its charging stations. ELEN's 250 charging stations have the ability to simultaneously charge 500 cars. HT operates in an open access 54 of its charging stations, while access to others is possible only with authorization by T-RFID card, which is sold in T-centers for 200 kuna. The problem for HT is that, unlike HEP, it does not make the decision on payment at an individual charging station alone, since in most cases they do not own the charging station itself but only provide consulting services, collecting necessary documentation, charging station installation, user authorization, payment and customer support. The location of charging stations, and their status can be found on the web<sup>4</sup>.

### Recommendations

Two events organized by Alpe-Adria clean transport alliance project partnership, were held in Croatia. The first project workshop „Fostering the zero-GHG emissions transport – experiences of decision makers on the local and regional level“ was held on 17th of December 2020 in organization of SDEWES Centre, Energy Agency Styria, Regional development centre Koper and University of Montenegro, Faculty of Mechanical Engineering. The event targeted the stakeholders from Split-Dalmatia County in Croatia and transferred the experiences and current state of decarbonization of transport in Austria, Montenegro and Slovenia. The second event was the webinar „Electrification of the road transport and energy transition on the local level“, held on 15th of February 2021, with two panels and more than 60 stakeholders attending. In the first panel, “Role of decarbonized transport in energy transition”, scientific researchers were providing their view on the immediate future of road transport in the context of energy transition. The second panel, composed of the representatives of regional governments, representatives of industry and civil society, discussed “Barriers to the implementation of the measures for decarbonization of road transport on the local level”.

The barriers and needs are presented in the following tables. Table 1 is addressing the introduction of infrastructure for the alternative fuels on the local levels.

Table 1 Barriers and needs concerning infrastructure for local decarbonization of road transport

Infrastructure for alternative fuels on the local level	
Barriers	Needs
<ul style="list-style-type: none"> <li>• Lack of funds</li> <li>• Lack of information for the end-customer</li> <li>• Still a small number of chargers</li> <li>• Ignorance of the general population</li> <li>• Misunderstanding and resistance of existing structures</li> <li>• Current system of incentives is not optimal, needs to be better organized</li> <li>• Lack of information for stakeholders at all levels</li> <li>• Documentation for the construction of public chargers</li> <li>• Lack of understanding between the levels of government</li> </ul>	<ul style="list-style-type: none"> <li>• A clearer top-down strategy (action plan) for the implementation is needed</li> <li>• Additional support is needed for those stakeholders who already plan to build chargers</li> <li>• Examples of documentation and practice examples from implemented projects implemented in Europe</li> <li>• General tailor-made materials on the topic</li> <li>• More public discussion forums and events, but also between local authorities and utilities and the government that decides on the</li> </ul>

<sup>4</sup> <http://www.puni.hr/chargingSpotsMgr.php>

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<ul style="list-style-type: none"> <li>• Technical barriers</li> <li>• Lack of professional and trained staff on the local level</li> <li>• Insufficiently defined legal framework and lack of a strategic document that should more clearly define the road decarbonization strategy and goals</li> <li>• General awareness of the citizens about the pollution from ICE cars</li> </ul>	<p>direction, ambitions in electromobility and the implementation of plans</p> <ul style="list-style-type: none"> <li>• Economic data and relevant guides</li> <li>• Adoption of a new acts and ordinances that will regulate this domain</li> <li>• Well-developed infographics, better dissemination of them, applications for easy management of BEV (charging, locations, useful notifications, etc.)</li> <li>• Participation in the planning of financial expenditures for environmental protection projects (creation of local and regional budgets for decarbonization of road traffic)</li> </ul>
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Second significant topic is possibility to spearhead the transition towards decarbonized road transport through public procurement. Table 2 is addressing the barriers and needs of the stakeholders concerning green public procurement.

Table 2 Barriers and needs concerning green public procurement

Public procurement	
Barriers	Needs
<ul style="list-style-type: none"> <li>• Management's awareness of the need for cleaner public transport and the procurement of such vehicles is not yet sufficient</li> <li>• Bad incentive awarding process slows down the implementation of plans</li> <li>• Lack of information on the market conditions, specifications and prices</li> <li>• Lack of legislative framework and examples of good procurement practice and defined terms of reference</li> <li>• Lack of funds</li> <li>• Slow cooperation of utility companies and small number of offers on the tenders</li> <li>• Resistance to change</li> </ul>	<ul style="list-style-type: none"> <li>• Examples of similar practices and procedures implemented on realized projects</li> <li>• Public announcement of five-year incentive plans</li> <li>• Short public document with examples of good practice and the possibility of some public funding for setting up such infrastructure and procurement of e-vehicles</li> <li>• Guide for materials to pay attention to, i.e. which are the most common mistakes when announcing project tasks</li> <li>• Expert prices of individual interventions on construction facilities (roads for cyclists, charging stations for vehicles / bicycles), list of potential suppliers of equipment, etc.</li> </ul>

Collected barriers and needs are in line with the implementation logic of the Alpe-Adria clean transport alliance project. The project partnership will aim to provide the local and regional government bodies, as well as civil society with materials and tools corresponding to the needs mapped in the tables above. Through the feedback from experts and the stakeholders on local and regional level, further recommendations can be made:

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- In accordance with the national strategic documents, it is necessary to speed up the adoption of the action plan for the implementation of low carbon strategy and undertake intensive communication with lower level of government on the measures that the action plan proposes. This would provide for more harmonized transition of power generation and electrified transport systems.
- The current system of grant awards for co-financing of acquisition of more efficient vehicles and infrastructure is lacking and needs to be replaced with more transparent and efficient measures.
- Electric vehicles, according to projections, will reach the price parity with ICE vehicles in 2025. This suggest the need to prepare the framework for fostering the infrastructure development in appropriate time frame and dynamics. At the same time, it can be considered to introduce a ban on selling the new ICE vehicles soon after the price parity occurs. On the local level, city centres should be planned to be the “zones without GHG emissions”.
- For local government units, additional training and informative materials are needed on the topic of electrification of transport, costs of infrastructure, good practice examples of how such solutions works and finally the role of decarbonized transport in the energy transition.
- For public transport on the local level, all new public procurements should focus on at least plug-in hybrid vehicles, if the cost of purely electric vehicles is too high at the time of procurement.

### General national level recommendations

Since the reduction towards 0% of GHG emissions from transport needs to be reached by 2050, to make transport compatible with the 1.5 °C target, and the normal life time of a vehicle is almost 20, to avoid stranded costs, the ban on selling of ICE cars needs to be in place by 2030. To achieve compatibility with 1.5 °C by 2030, emissions from transport need to be reduced by 75%, which implies the complete electrification of vehicles being sold right now (the green scenario).

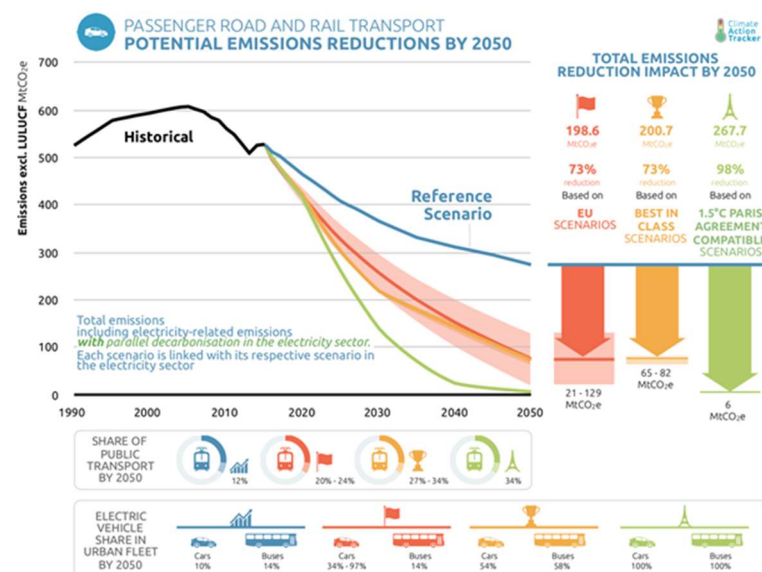


Figure 2 Emissions reduction in road and rail transport [8]

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