

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

Abstract

This white paper gives an overview about the situation in the field of decarbonization of road transport in Austria with a special view on the province of Styria.

Problem Statement

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, its 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 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

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- Understanding of embedment of road transport decarbonization in wider energy and climate transition framework

Situation in Austria

E-mobility with renewable energy is an essential building block for the implementation of the World Climate Agreement of Paris and serves as the key to fulfilling the national and EU requirements on air quality, emission control, as well as the energy and climate packages for 2020 and 2030 and the strategies for a low-carbon economy.

As a focus of the Austrian Federal Government, e-mobility is therefore a key measure for the decarbonization of transport.

The reduction of the climate and environmental pollution caused by traffic and the lowering of the dependency on fossil fuels are central challenges that must be consistently pursued in the coming years and decades - not only in Austria.

Austria wants to achieve a largely climate-neutral transport sector by 2050. In addition to the shift in traffic, the expansion of public transport and the promotion of active forms of mobility, this also means the predominant switch to zero-emission vehicles in road traffic based on renewable energy. In particular this includes the electrification of road traffic (public transport, logistics traffic and individual traffic).

Electromobility is an important building block for a modern and efficient overall transport system. It is about more than replacing the combustion engine with an electric motor. Electromobility will help to make transport more efficient and environmentally friendly

- as part of a combined use of public transport and environmentally friendly vehicles in private transport,
- in connection with efficient and renewable energy sources and

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- embedded in an intelligent and intermodal overall traffic system.¹

In Austria, traffic contributes around 29% to greenhouse gas emissions. Since 1990, emissions in the transport sector have risen by around 74%. In 2017, greenhouse gas emissions from traffic rose by around 3.2% or 0.75 million tonnes of carbon dioxide equivalent compared to 2016.²

New cars with less CO₂-emissions

In 2017, the Commission proposed new CO₂ emission reduction targets for car fleets. These provide that the average CO₂ emissions for cars must be 37.5% lower in 2030 than in 2021, for light commercial vehicles (vans) by 31%.

Less CO₂ emissions in the heavy commercial vehicle fleets

In 2018, the Commission adopted new CO₂ emission reduction targets for heavy commercial vehicle fleets. These provide that the average CO₂ emissions in 2030 must be 30% lower than in 2019.

Alternative fuel infrastructure

Environmentally friendly, alternative fuels are to become more widespread in the future. According to EU Directive 2014/94, the necessary infrastructure should be set up. This includes, among others, the infrastructure for partially and fully electric vehicles. The guideline provides for the establishment of an “appropriate number” of public charging points by 2020. For this purpose, each member state had to develop a national strategy framework.³ A first progress report on the national strategy framework “Clean Energy in Transport”⁴ was already submitted to the Commission in November 2019. According to this, Austria has already achieved the most important goals in the infrastructure sector.

Austria's position on electric mobility

In its government program for the years 2020-2024, the Austrian federal government has undertaken a series of measures to reduce emissions in road traffic while at the same time enabling and promoting innovation. The starting point is the federal government's goal of

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achieving climate neutrality in Austria by 2040. For this purpose, a Paris-compatible CO₂ budget and a corresponding reduction path are to be drawn up. As part of a climate protection law up to 2040 and an interim target for 2030, binding sector targets are also to be set. Following this new ambitious goal, the transport sector will also have to make its contribution to a climate-neutral Austria by 2040. Road traffic is by far the largest cause of CO₂ emissions in Austria. Conventional diesel and gasoline consumption must therefore be reduced significantly. In addition to the use of sustainable first and second / third generation biofuels, the switch to alternative fuels in transport and electromobility with renewable energy is seen as an important step. Accordingly, a strategy for the use of alternative energy sources in mobility with a focus on the overall climate balance and energy efficiency is to be developed, together with a hydrogen strategy, which also addresses the traffic sector. Especially in the area of public procurement Austria will lead by example. From 2022, the procurement of emission-free cars will become the standard; from 2027, vehicles with internal combustion engines will generally no longer be purchased. The same applies, for example, to taxis, rental cars and car sharing cars, which are to be operated emission-free from 2025 if they are newly registered.

Research and development for the mobility of the future

Sustainable mobility concepts rely on a multimodal traffic mix in which individual and public, motorized and non-motorized mobility complement each other to form a low-emission system. Electromobility is seen as a central component in the future mobility system. Switching to electromobility means much more than just introducing new vehicles. This not only affects the automotive industry and its suppliers. With the concrete implementation, various new players will enter the market. First, of course, this is the energy industry, which has to manage the power supply (preferably from renewable sources) and the development of the appropriate charging infrastructure. In addition, information, and communication technologies (ICT) are playing an increasingly important role. Intelligent concepts are required for the networking of users, vehicles, charging stations and energy providers. The level of complexity of the required data link will be significantly higher than usual. In Austria in particular, the entry into electromobility is also seen as an impetus for promoting intermodal transport concepts. In view

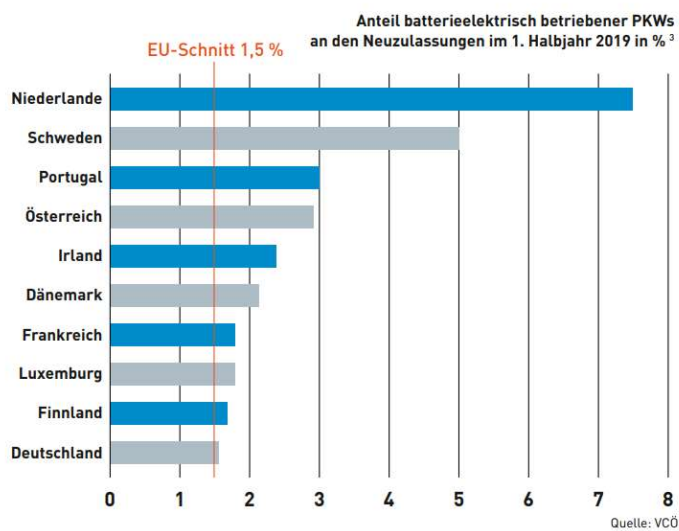
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of this broad range, there are many research fields in connection with electromobility. In addition to technology concepts and component developments for vehicles and infrastructure, the topics also include systemic, political, economic, and social aspects.

In the EU, the share of purely electric cars among new registrations is only increasing slowly. In 2018, only 1% of new cars were purely electric cars, in the first half of 2019 it was 1.5%. Austria is above the EU average here (with a share of 2.8% purely electrically powered cars in new registrations in the first half of 2019), but in contrast to the years 2016 and 2017, it is no longer in the top group in the EU. The front runner are the Netherlands. In 2018, 5.4% of new cars were electric cars, and in the first half of 2019 the proportion rose to 7.5%. When it comes to public charging stations, Austria is among the top 10 in Europe, with 56 per 100,000 inhabitants, Norway leads the way with 237 charging stations per 100,000 inhabitants.

Graph1: Share of battery-powered cars among new registrations in the first half of 2019_s



Electric mobility in Austria – opportunities and perspectives

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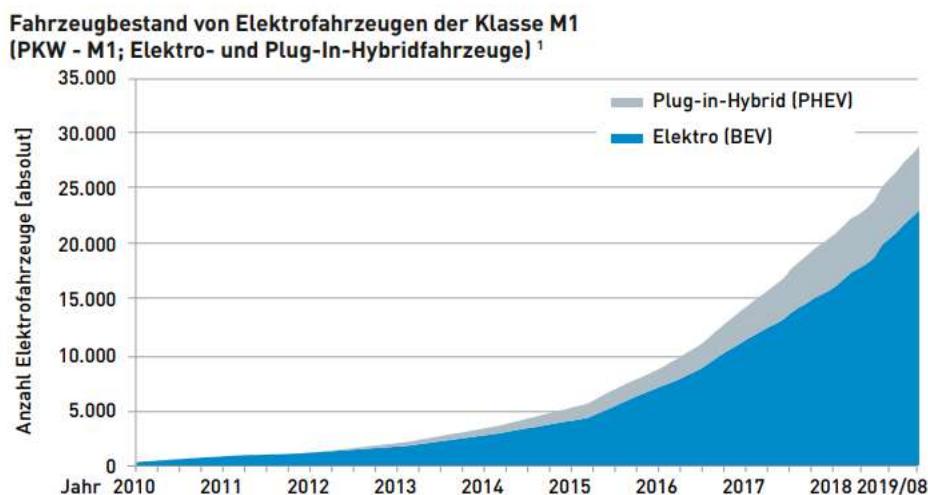
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In Austria, the high proportion of renewable energies in electricity generation means that there are good prerequisites for a sustainable, environmentally friendly mobility system. Electromobility as one of the key technologies has great potential to generate high added value and employment in Austria in the long term. Austria's industry and many innovative companies deliver cutting-edge technology for vehicles, infrastructure and smart mobility solutions. The acceptance of electromobility in Austria has been growing for years. Public transport in urban areas is already being increased in many places with environmentally friendly hybrid and electric buses. E-taxi and e-car sharing concepts are being further developed and tested in various regions. The number of electric cars in Austria is increasing continuously. While 989 electric and plug-in vehicles were still on Austria's roads in 2011, there were already 33,757 cars in August 2019. This corresponds to a share of the total portfolio of 0.67%. In the period from January to August 2019, 6,414 BEV and 1,043 PHEV were newly registered. Compared to August 2018, new BEV registrations have increased by 105 %. Nevertheless, electric vehicles are still a niche product in private transport. Research institutions and companies are therefore working intensively on new solutions to remove the known inhibitions (low range, high acquisition costs and inadequate charging infrastructure).

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Graph 2 shows the Vehicle fleet of electric vehicles (class M1)



¹ Quelle: Statistik Austria; Datenstand: jeweils 31.12. des entsprechenden Jahres bzw. 31.08.2019; Wasserstofffahrzeuge sind aus darstellungstechnischen Gründen nicht in dieser Abbildung enthalten; Darstellung: AustriaTech

Smart infrastructure

The number of charging stations and charging points e.g. in front of shopping centers, petrol stations, in garages and on public parking lots, is increasing all over Europe and in Austria. With 56 public charging stations per 100,000 inhabitants, Austria is among the top 10 in a European comparison. In total, there are more than 5,500 publicly accessible charging connections in Austria. All charging stations in Austria and Europe are recorded on the e-tankstellen-finder.com platform. This includes public charging points from operators such as energy companies, supermarkets and hotels. As of november 2019 there were around 2,100 publicly accessible charging points up to 22 kW, around 1,800 up to 45 kW and 389 with a charging capacity higher than 45 kW. The eleven leading energy companies of the Federal Association of Electromobility Austria operate the BEÖ charging network (around 3,000 public charging stations) with electricity from renewable energy. SMATRICS offers a comprehensive high-performance charging network with 450 charging points (including around 210 high-speed) with electricity from 100% hydropower. In 2019, the partner companies of BEÖ and SMATRICS set an important milestone and networked their charging stations to form Austria's

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largest and fastest charging network. Since then, 3,500 publicly accessible charging points have been available between Vienna and Bregenz. For E-car drivers, this partnership means that they can activate both BEÖ and SMATRICS charging stations with their respective charging cards. Numerous apps offer live information on free charging points. In most cases, billing is not in kilowatt hours, but in units of time to avoid waiting times for other users.⁶

Situation in the province of Styria (one of the nine provinces of Austria)

With the "State Strategy Electromobility Styria 2030", the province of Styria is setting the framework for introducing electromobility across the whole province of Styria. The goals set by the State Strategy Electromobility are quite ambitious: In 2030, around 200 Park & Ride facilities should have charging options and new mobility offers for electromobility. By then, there should be over 200,000 charging points in Styria for the approximately 225,000 registered electric vehicles.

The country strategy is divided into two phases.

Phase 1: Up to 2020 supports the switch to electromobility, especially for public and company fleets as well as for private individuals. For this phase, there is an implementation program with 21 measures in four key areas:

- The role model function of the public sector
- Legal framework for expanding the charging infrastructure
- Support of infrastructure development and vehicle procurement
- awareness raising and bring together various actors

Phase 2: The period from 2020 to 2030 provides electromobility paired with new e-mobility offers across the country.

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Based on the country strategy, action plans are implemented in the three periods 2016–2020, 2021–2025 and 2026–2030. Each of these action plans defines the specific measures required by the state administration for these periods. The action plan for 2021-2025 is at the time of creation of this white paper in the final phase of elaboration and coordination.⁷

Focus of the state strategy for electromobility

The state strategy for electromobility 2030 aims to stimulate the market for electromobility in Styria in a meaningful and effective way. It considers the goals of the overall transport concept 2008+, the regional mobility plans currently being drawn up and the climate and energy strategy (KESS 2030) of the province of Styria. The state strategy for electromobility therefore focuses strategically on two priorities:

- Strengthening the environmental network (use of public transport, cycling and walking) as part of multimodal or intermodal road chains
- Stimulation the technology transfer from fossil-fueled combustion engines to electric motors that are supplied with renewable energy

Regarding the various vehicle types, electromobility can basically be used in freight transport, motorized individual transport and public transport. The state strategy for electromobility focuses on the area of motorized individual transport. The market preparation has been carried out for this segment. Now it is important to support the further market ramp-up up to the mass market. E-vehicles for heavy goods traffic and busses have not yet reached this market and technology maturity. These vehicles are currently at the stage of pilot applications and research projects. Battery-powered e-vehicles for regular bus transport are in test phases in many places, and a market ramp-up in this sector is expected from 2020. The expansion of rail-based electromobility is not dealt within the scope of the state electromobility strategy. Train and tram traffic are part of the overarching strategies such as the overall traffic concept 2008+ and the climate and energy strategy.

Target groups

It is necessary to prioritize the use of resources to effectively promote electromobility. Eight areas of application for electric vehicles can be derived from the specific charging requirements

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and ranges of the drive technologies. The first four areas of application are in focus up to 2020, the remaining four are suitable as a focus for the period up to 2030:

1. Public fleets - Administration of the province of Styria, companies owned (jointly) by the province of Styria and municipalities: the distances covered are often routine and move at almost constant distances that can be managed with electric mobility. Cost savings are possible through bundled procurement processes. In addition, the public sector distinguishes itself as a pioneer with a multiplier effect and market-shaping impulses.
2. Operational fleets - trade, industry and tourism: the mobility needs are similar to those of public fleets - high annual mileage and investment subsidies ensure the profitability of electromobility.
3. Taxis: in the first phase, plug-in hybrids were particularly suitable. Thanks to the promotion of e-taxis, they have a broad public impact and enable risk-free and cost-neutral access to electromobility.
4. City-Logistic - letter and parcel deliverers, delivery services: There is a wide range of light commercial vehicles for this service segment, which can be used thanks to manageable and easily plannable distances.
5. Individual commuter traffic - trips by employees to / from the workplace: These routes are characterized by relatively short and regular driving routines that can be served by one- and two-lane e-vehicles. The combination with public transport is particularly desirable for medium-long and long distances. The direct use of e-vehicles in this segment is currently still hampered by the current use of one's own car as a universal vehicle for all mobility needs in leisure and for work. The change from owning to using (from a pool of vehicles) requires an intellectual rethinking process and sufficient offers in the close range of the users.
6. Private traffic - urban as well as regional leisure and shopping traffic: here too, the strategy of "using instead of owning" should be striven for. A further complicating factor in this application group is that journeys can occur irregularly and spontaneously, both in terms of time and location.

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7. Buses and coaches: battery-powered electromobility is still in an early phase in this segment; first tests are being carried out in the area of urban buses. With the overhead line system, there is an established alternative or supplementary option for regular bus traffic.

8. Freight road transport: in this area, due to technology, the use of electromobility is only realistic from 2025 onwards.⁸

Recommendations and Conclusion

Based on the state strategy for electromobility 2030 and the state strategy on climate and energy 2030 of Styria, in particular the following topics should be taken to continue the efforts in the field of decarbonization of road transport at the municipal and regional level in the coming years:

- E-mobility packages for municipalities
- E-mobility packages for private individuals
- E-mobility packages for companies
- E-mobility packages for housing developers
- E-mobility packages for tourism regions
- Action plans for local authorities
- Support with funding ideas for sustainable mobility in coordination with the Province of Styria
- Regional and supra-regional networking with relevant stakeholders
- Conducting workshops with stakeholders
- Stimulate mobility plans (in municipalities)
- Linking with spatial planning
 - Provide data on mobility needs, infrastructures and potentials
- Anchoring integrated location assessment across all sectors (mobility, electricity, heating) in spatial and building regulations
- Interface to logistics center
- Ongoing coordination with the Province of Styria
- Promotion of cooperation with e-car sharing operators
- Bring together decision makers and creating networking opportunities

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