National Strategic Framework ‘Clean Energy in Transport’

In fulfilment of the Austrian implementation obligation of

Directive 2014/94/EU
of the European Parliament and of the Council
of 22 October 2014 on the deployment of
alternative fuels infrastructure

Article 3 – National Strategic Framework

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[*Bundesministerium für Verkehr, Innovation und Technologie – bmvit*]
in collaboration with the

Federal Ministry of Agriculture, Forestry, Environment and Water Management
[*Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft– BMLFUW*]
Federal Ministry of Science, Research and Economy
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Burgenland
Carinthia
Lower Austria
Upper Austria
Salzburg
Styria
Tyrol
Vorarlberg
Vienna

Austrian Association of Towns and Cities
Austrian Association of Municipalities

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1. Introduction

1.1. Austria Needs to Change Its Mobility Concept

This document implements parts of EU Directive 2014/94/EU in Austria. The aim of the Directive is to reduce the environmental impact of transport and dependence on petroleum. Measures taken to this end include, among other things, the creation of a National Strategic Framework for the market development of alternative fuels for transport applications and the development of the appropriate infrastructure. This National Strategic Framework will be submitted to the European Commission by 18 November 2016.

The Strategic Framework is in line with applicable environmental and climate protection regulations and with existing climate and energy targets (see Section 1.2) designed to reduce the environmental impact of transport and dependence on petroleum. As a first step, 195 countries agreed on a joint climate agreement in December 2015. Austria was one of the first countries in the world to submit its ratification to the United Nations[1]. The goal of limiting global warming to well below 2 °C in the long term and reshaping the global economy to become largely CO_2 neutral by the end of this century poses a special challenge for the transport sector, which accounts for 35% of Austria's energy consumption. Road transport accounts for 87% of all energy consumed by the transport sector; a share that has risen continuously since 1990. Petroleum covers a large part of energy needs[2]. At present, natural gas, liquefied petroleum gas and electricity account for only 3% of energy supplies in the Austrian transport sector, so their role is very small[3]. At the same time, sustainable biofuels and the relevant legal framework conditions and initiatives are key contributors to decarbonisation in Austria. Under the substitution obligation for fossil fuels in the Austrian Ordinance on Automotive Fuels, around 8.9%[4] of fossil fuels are already being replaced with biofuels. However, these are not the subject of Directive 2014/94/EU and are therefore not included in the National Strategic Framework either.

Road traffic is the largest contributor by far, accounting for just under 99 percent of CO_2 emissions. In comparison, CO_2 emissions by the remaining modes of transport, i.e. (national) air, ship and rail traffic are slightly above 1%.[5] In addition, air and noise pollution poses high health risks.

In particular, diesel and gasoline consumption must reduce significantly in the next decade up to 2030 and beyond. The key challenge is to prevent the increased use of fossil fuel due to the forecasted increased traffic. Forecasts for Austria predict an increase in passenger transport (25%) and freight traffic (33%) by 2030. Currently, 73% of passenger transport is by car, 24% by public transport and 3% on foot or by bicycle[6]. Despite having the highest rate of rail kilometres per capita in the EU and a comparatively high share of public transport in total transport, passenger vehicles remain the dominant means of transport outside of the

[1] https://www.parlament.gv.at/PAKT/AKT/SCHLTHEM/SCHLAG/166Klimavertrag.shtml
[2] Statistik Austria, Gesamtenergiebilanz Österreich [Total Energy Balance in Austria]
[3] Idem
[4] Österreichischer Biokraftstoffbericht 2016 [Austrian Biofuel Report]: https://www.bmlfuw.gv.at/umwelt/luft-laerm-verkehr/verkehr-laermschutz/alternatkraftstoffe/biokraftstoffbericht.html
[5] Umweltbundesamt [Federal Environmental Agency] (2016), Klimaschutzbericht [Climate Protection Report]
[6] BMVIT (2012), Gesamtverkehrsplan für Österreich [Overall Transport Scheme for Austria]

metropolitan areas. In freight transport, rail has a 32% share in Austria, which is very high in European comparison. Here, too, road transport is expected to increase due to a further increase in the volume of traffic and despite a target of 40% in the 2030 modal split. As a result, greenhouse gas emissions, caused almost entirely by road transport, are expected to fall sharply in spite of the ***increased*** traffic.

In addition to the use of first and second/third generation biofuels, the transition to alternative fuels in transportation and electromobility with renewable energy, which requires the development of an appropriate infrastructure, is seen as an important, if not the only step towards achieving low-emission mobility in Austria. The proposed change in mobility has high added-value and employment potential for Austria.

In line with the agreement of the international community to extensively decarbonise the world economy[7] and in keeping with existing climate and energy targets[8], Austria is pursuing the following objectives in the transport sector:

- By 2050, Austria aims to achieve a largely CO_2-neutral transport sector that is social, efficient and secure, guaranteeing the mobility needs of people and goods[9]. In the medium and long term, this requires a major overhaul of low-emission and zero emissions vehicles based on renewable energy sources.
- The achievement of this goal requires a shift to low-CO_2 alternative fuels and electricity from renewable sources across all transport sectors. Austrian transport policy is based mainly on the electrification of means of transport as a building block for a modern and efficient overall transport system.
- The development and production of innovative technologies in the field of alternative fuels and propulsion is supported for the purpose of strengthening competitiveness and creating workplaces. Austria works toward a largely decarbonized transport system as an opportunity to strengthen its industrial base.
- In order to ensure the desired change in mobility, with the objectives of achieving an integrated, low-emission and low-carbon overall transport system, a coordinated approach is required, with intensive cooperation between the EU, the Member States, the federal states, the local authorities and other stakeholders.

To achieve this comprehensive change in mobility, the overall transport plan for Austria, which was developed in 2012, provides a strategic framework for the traffic policy. The aim is to make the transport system more efficient, safer, more socially inclusive and environmentally friendly. Therefore, it focuses, among other things, on developing measures to strengthen and extend public transport, pursuing an active transfer policy on environmentally-friendly railways, promoting cost-effectiveness, intelligent transportation technologies, soft mobility forms such as cycling and walking as well as new services, such as sharing. Also, the general plan provides for alternative building blocks for a modern and efficient transport system, backed by significant

[7] UNFCCC (2015), Paris Convention of the 195 Member States of the United Nations Framework Convention on Climate Change, ratified by the Austrian National Council on 8 July 2016
[8] European strategy for low-emission mobility of the European Commission 501 (2016); Conclusions of the European Council 23/24. October 2014 (EUCO 169/14); European Strategy for Alternative Fuels KOM(2013)017; White paper on traffic KOM(2011) 144
[9] This is the result of the objectives towards a CO_2-free urban logistics by 2030 and the total elimination of conventional fuel in urban transport by 2050, as laid down in the White Paper.

contribution to greening based on the combined use of renewable energy sources in public transport and environmentally-friendly vehicles in private transport. Thus the National Strategic Framework fulfils the task of further developing sub-areas of the general transport plan. Looking ahead, the National Strategic Framework will contribute to the integrated energy and climate strategy in Austria, still in the development phase.

The strategy is based on the guidelines of the underlying Directive and focuses largely on road transport. Additional topics such as partial aspects of inland navigation, air traffic and the planned continuation of the electrification of railway lines are also examined.

Government support measures are being developed for the development of the market of alternative fuels in the transport sector and the construction of the relevant infrastructure. In accordance with Directive 2014/94/EU, electricity, hydrogen and natural gas in the form of compressed natural gas (CNG) and liquid natural gas (LNG) are considered infrastructure-relevant fuels and/or energy sources that are essential for the implementation of these strategies. According to the Directive, these have the potential to replace crude oil in the transport sector, have a better carbon footprint and are responsible for significantly lower levels of pollutant emissions. Directive 2014/94/EU does not cover measures for promoting traditional and advanced biofuels, as these can also be used within existing infrastructures and therefore do not constitute the subject of this strategic framework.

Measures for the use of these alternative fuels are to be developed at all administrative levels and implemented in close dialogue with stakeholders and companies. To this end, the Federal Ministry of Transport, Innovation and Technology (bmvit) is developing the strategy framework in close cooperation with the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW), the Federal Ministry for Science, Research and Economy (BMWFW), all Austrian federal states, the Austrian Association of Towns and Cities as well as the Austrian Association of Municipalities, as representatives of municipalities, other associations of interest and companies.

Important regulatory frameworks for the path towards low-emission mobility are set at EU level, in particular the updating of the exhaust gas limit value as well as the determination of the CO_2 targets for vehicles from 2025 to 2030. Regulatory measures also have an impact on this, but they cannot wholly compensate for the fact that the range of models is rather restricted, the existing technological obstacles, and the high costs of alternative drives and fuels compared with the current very low price of oil. The mobility shift is not only about replacing engine types, but about providing an overall sustainable traffic development and qualitative transport changes. As such, it is a long-term project that requires a joint effort by all the relevant federal ministries, states, municipalities, industry actors and civil society, and encompasses far more than the use of alternative fuels and expanded infrastructure.

In the market development of alternative fuels for transport applications and the construction of the corresponding infrastructure, Austria is in a good starting position. Section 1 of the Strategic Framework describes the strategic context in Europe and Austria and provides an overview of the development process. Section 2 describes the current state of market development and the infrastructure for the traffic-relevant use of electricity, compressed natural gas (CNG), liquid natural gas (LNG) and hydrogen as well as the existing support measures. Market development scenarios and national targets for the construction of the infrastructure for alternative fuels are discussed in Section 3. Section 4 discusses the proposed measures and the evaluations required by provisions contained in Directive 2014/94/EU on specific infrastructure measures

for LNG and electricity for transport applications. Section 5 examines the specific role of municipalities in the market development of alternative fuels for transport applications. Details on measures already in place in Austria are presented in the Annex to the National Strategic Framework.

1.2. Legal and strategic requirements generate pressure to act

In addition to the fundamental agreement reached by the international community on the decarbonisation of the world economy over the course of this century[10], there are a number of relevant market conditions for alternative fuels in transportation and infrastructure development, which are in part legally binding:

- By 2020, 10% of the final energy in transportation must be generated from renewable energy sources, in line with the objectives of Directive 2009/28/EC on the promotion of renewable energy. In addition, greenhouse gas emissions originating from the marketing of fuels must be reduced by 6% pursuant to the provisions contained in Directive 2009/30/EC, i.e. the Fuel Quality Directive.

- Emission standards were set with the aim of reducing CO_2 emissions by both passenger cars (M1) and light commercial vehicles (N1)[11]. By 2021, the emission threshold values for new vehicles in a manufacturer's fleet will average a maximum of 95 g (M1)/147 g (N1) of CO_2/km. A reduction of these threshold values is currently being negotiated for the period 2025-2030. With the European strategy for low-emission mobility presented in July 2016, the European Commission announced similar emission standards for trucks as well as urban and long-distance buses.

- By 2030, greenhouse gas emissions must be reduced by at least 40% EU-wide compared to the 1990 level. In the non-EHS sector (including the transport sector), the CO_2 reduction target is 30%[12].In July 2016, the European Commission presented proposals for binding national annual targets for the reduction of greenhouse gas emissions by the Member States in the period from 2021 to 2030. Related to 2005, for Austria a 36% reduction of CO_2 emissions is proposed in the sectors of the Effort Sharing Regulation[13]. The transport sector in Austria is responsible for 45% of CO_2 emissions in the sectors of the Effort Sharing Regulation. Given the expected increase in passenger and freight transport, which has so far been accompanied by continuously rising emissions, these objectives require ambitious measures to decouple the environmental impact and the increasing performance.

- The European Strategy for Low-Emission Mobility (2016), the Energy Union (2015), the European Strategy for Alternative Fuels (2013) and the Transport White Paper (2011) identified a number of objectives at EU level, clearly aimed at replacing mineral oil as the main source of energy in the transport sector and creating a competitive and sustainable transport system based on a zero-emission scenario, particularly in road

[10] UNFCCC (2015), Paris Convention of the 195 Member States of the United Nations Framework Convention on Climate Change, ratified by the Austrian National Council on 8 July 2016
[11] Regulation (EC) No 443/2009 and Regulation (EC) No 333/2014 of the European Parliament and of the Council for passenger cars and Regulation (EC) No 510/2011 for light commercial vehicles
[12] A distinction is made between emissions trading in the EHS (electricity sector and industry) and the non-ETS sector, which is subject to the Effort Sharing Decision and thus remains the sole responsibility of the Member States. In this respect, the largest emitter is the transport sector.
[13] http://europa.eu/rapid/press-release_MEMO-16-2499_de.htm

transport.

- The Directives on air quality and clean air in Europe (2008/50), on the promotion of the use of energy from renewable sources (2009/28), energy efficiency (2012/27), which have already been implemented in Austria, or the directive on the promotion of clean and energy-efficient road vehicles (2009/33) are aimed at reducing emissions of CO_2, particulate matter ($PM_{2,5}$) and nitric oxide (NO_X) in road transportation.

The European guidelines provide the basis for the already adopted Austrian strategies, which also set the course for a change in mobility:

- The Austrian Climate Protection Act (KSG) adopted in 2011 sets emission ceilings for a total of six sectors and regulates the elaboration and implementation of effective climate protection measures outside the EU emissions trading. For a total of six sectors, including the transport sector, the KSG established maximum emission levels for the years 2008 to 2012 (Annex 1 to the Act) and the years 2013 to 2020 (Annex 2, as amended by the 2013 KSG Amendment). In order to achieve the objectives set for the sector, the federal government – represented by the respective federal ministries - and the federal states worked together to create a first programme of measures for 2013 and 2014 and further measures for the period 2015-2018. This programme was approved by the Council of Ministers on 16 June 2015.

- Based on reference year 2010, the 2012 Overall Transport Scheme for Austria stipulates that CO_2 emissions in the transport sector must be reduced by 19% by 2025, particulate emissions by around 50% and NO_X emissions by about 70%. According to the overall transport scheme, the Austrian traffic policy relies on electromobility as one of the building blocks for a modern and efficient overall transport system.

- The scheme for the implementation of electromobility in and from Austria, drawn up by the BMLFUW, bmvit and BMWFW in 2012 and approved by the Council of Ministers, listed 65 measures to promote electromobility.

- To develop an integrated energy and climate strategy for Austria, the BMWFW, BMLFUW, bmvit and BMASK presented a Green Paper in June 2016. On this basis, the integrated energy and climate strategy will be developed by 2017 via a broad consultation process. The measures contained in the present Strategic Framework do not constitute a prejudice for any action taken in the context of the integrated energy and climate strategy, but should be incorporated into the development process.

- In addition to these national strategies and objectives, there are a large number of state and municipal action plans in Austria that promote the use of clean energy for transport applications (see 0 and Annex). Electromobility strategies containing specific political objectives have been adopted in three out of nine federal states. Lower Austria has defined a target of 5% of e-vehicles in the total passenger car fleet by 2020. In Vorarlberg, an objective of 10 000 cars by 2020 was defined, with a sub-target of 300 vehicles in the public sector. In the electromobility strategy presented in the autumn of 2016, Styria set 10 000 electric vehicles as a target for 2020 and 225 000 for 2030, together with corresponding targets for the charging infrastructure. Salzburg also presented a new state mobility concept to be implemented before 2025,

requiring a clear increase in the share of electric vehicles in the official state fleet of vehicles as well as a statewide strategy for the introduction of alternative engines. In its 2015 strategy Vienna focused on infrastructure development. Carinthia adopted a new mobilization master plan in July 2016. Upper-level negotiations on long-term mobility and energy strategies, including sectoral electric mobility and energy strategies are currently underway in Upper Austria and Tyrol, and are expected to come into force during the following months. In Upper Austria, the reduction of climate and environmental pollution caused by transportation, the promotion of alternative and environmentally friendly drives and fuels as well as electromobility are among the ten highest priority measures in the transportation segment of the energy strategy. In particular, promoting electromobility in rural areas is one of the pillars of the current government programme in Burgenland. The current National Strategic Framework does not repeat the measures contained in all these documents, but builds on them and defines additional measures for the transition to a low-emission mobility.

1.3. The conversion of the traffic system requires joint action

The National Strategic Action Programme 'Clean Energy in Transport' implements parts of Directive 2014/94/EU. In the negotiation phase of this Directive, around 80 representatives from federal ministries and institutions, associations, companies, states and municipalities formed a national-level working group, who were regularly informed of the status of negotiations and asked for contributions.

Following the publication of the Directive in October 2014, a national control group was formed, with the participation of the three involved ministries, the AustriaTech Federal Agency for Technological Measures Ltd., the A3PS Platform, Energie-Control Austria as well as the Federal Environmental Agency. In addition to that, the federal states as well as the Association of Towns and Cities and the Association of Municipalities were also included.

Since the beginning of 2015, the bmvit, with the support of AustriaTech, has carried out a sweeping stakeholder process to prepare the National Strategic Framework, which brought together around 300 participants from the administration, the industrial and research sector as well as the associations. The activity had the following objectives:

(1) to identify the regulatory need for adaptation with regard to promoting alternative fuels for transport applications and developing the appropriate infrastructure; and

(2) to adapt the framework conditions and develop initiatives at the level of the federal government, the federal states and the municipalities, as early as in the implementation phase.

Therefore, the national implementation of Directive 2014/94/EU included the following activities:

- Nationwide online consultation on 'Clean energy for transport' initiated by the Austrian Association of Towns and Cities and AustriaTech in the spring of 2015 (all federal states, eight cities, ten associations and 27 companies responded, submitting a total of 70 feedback items)[14];

- Working groups on infrastructure-relevant fuels (electricity, CNG, LNG and hydrogen)

[14] AustriaTech (2015), Gemeinsam zu sauberer Mobilität [Together for a Clean Mobility]

from Spring to Autumn 2015, with the focus on developing measures for the National Strategic Framework (around 85 participants in total);

- Series of workshops entitled 'Einbindung der Lander im Rahmen der Umsetzung zu RL 2014/94/EU' [Involving the Federal States in Implementing Directive 2014/94/EU], with participation from regional governments and other regional representatives from the business sector and associations, in all nine federal states from summer to autumn 2015, focusing on alternative fuels for transport applications as well as legal and administrative regulations (about 120 participants in total);
- Series of workshops entitled 'Saubere Energie im kommunalen Verkehr' [Clean Energy in Municipal Transport], with participation from the Austrian Association of Towns and Cities and the Austrian Association of Municipalities, in Graz, Salzburg and Innsbruck in the Spring of 2016, focusing on the integration of municipal level measures into the National Strategy Framework (about 75 participants in total);
- BMLFUW hearing on environmental effects and mobility aspects of electromobility 2020/2030, together with the Federal Environmental Agency in the spring of 2016 (about 50 participants in total).

In order to ensure good cross-border coordination and dialogue with other Member States and representatives from industry and associations in Europe, the implementation process for Directive 2014/94/EU also included the following:

- Workshop for the regional implementation of Directive 2014/94/EU, with the participation of representatives from the involved ministries and downstream agencies from Germany, Czech Republic, Slovakia, Slovenia, Italy and Croatia (Spring 2016, bmvit), with the aim of developing planned measures for the market launch of alternative fuels for transport applications;
- Ongoing representation of Austria at the Sustainable Transport Forum of the European Commission (AustriaTech, bmvit), and in the subordinate working groups 'Implementation of Directive 2014/94/EU' AustriaTech, bmvit), 'Alternative Fuels in Cities' (BMLFUW), 'Biofuels' (BMLFUW) and 'Electromobility Market Services' (E-Control for CEER);
- Ongoing representation of Austria in the interministerial Government Support Group Alternative Fuels, headed informally by the Netherlands and Germany.

The implementation process for the development of the 'Clean Energy in Transport' National Strategic Framework was based on the understanding that Austria already has a wide range of energy and transport policy strategies at federal, state and municipal level. This means that intensive cooperation, coordination at administrative level, a high level of participation and solutions adapted to local situations are indispensable for actually implementing measures considered as important. The aim was to clearly define measures that promote the use of alternative fuels and the development of the necessary infrastructure across all modes of transport and start implementing them during this process. For example, licensing procedures for charging infrastructure were simplified in Lower Austria (building regulations), Vienna (charging gases) and Styria (decree by the trade authority)[15]. In Tyrol, a new passage related to empty conduit lines in buildings will soon be included in the construction law. During the

[15] Detailed information on licensing procedures can be found in the Annex to the National Strategic Framework.

implementation process, a requirement for 700 vehicles was included in the framework of a demand survey and the following invitation to tender for alternative vehicles operated by the federal procurement agency [*Bundesbeschaffungsgesellschaft*].

A much greater range of models (particularly for electric vehicles) and lower vehicle prices are essential for the market development of alternative fuels for transport applications and the development of the corresponding infrastructure. In addition to this, there is significant cooperation between the public authorities and private enterprises and associations. This cooperative approach was also used for creating the present National Strategic Framework.

The reporting on the implementation of the National Strategic Framework and, where appropriate, the level of implementation of the individual and total targets referred to above, follows the provisions of Article 10 of Directive 2014/94/EU.

2. Status quo: The first steps towards cleaner energy in traffic have been taken

The federal government, the states and the local authorities have been providing support for the research, development and market development of alternative fuels for transport applications for several years. Furthermore, various activities have also been promoted in the area of training, awareness-raising and market implementation. As a result of these initiatives, Austria has developed a nationwide basic coverage supporting the required amount of charging and refueling infrastructure, despite the fact that the total number of both electric and natural gas (CNG) vehicles in the road transport sector is low. With a high share of renewable energy in the electricity mix, Austria offers especially good conditions for the supply of the transport sector with electricity.

Despite a number of projects and promising activities, natural gas, liquefied petroleum and electricity still play a minor role with only 3% of the total energy supplies in the transport sector. Biofuels have been successfully used in Austria since 2005. At present, 8.9% of fossil fuels were substituted with biofuels in 2015, which corresponds to a CO_2 reduction of 2.1 million tonnes.

The current state of market development in the area of electricity, natural gas and hydrogen (vehicles and infrastructure) as well as the current state of public incentives are presented below. Detailed information on the topic is included in the Annex to the National Strategic Framework. The presentation of the status quo and of the planned measures, as indicated in Section 4, follows the reporting scheme proposed in Annex I to Directive 2014/94/EU.

2.1. Current status of the market development of alternative fuels for transport applications

Table 1: The number of alternative fuel vehicles in Austria (Statistic Austria)

Alternative fuel vehicles	Number of vehicles (30 June 2016)
Class M1 electric vehicles (BEV & PHEV)	9 225
Class N electric vehicles (BEV)	1 178 (of which 1 177 N1)
Class M2, M3 electric buses	148
Class L electric-powered vehicles	5 895
Class M1 CNG vehicles	4 933 (including petrol/natural gas bivalent)
Class N CNG vehicles	1 931 (including petrol/natural gas bivalent)[16]
Class M2, M3 CNG buses	186[16]
Class N LNG heavy goods vehicles	no data
Class M2, M3 LNG buses	no data
Class M1 hydrogen vehicles	12

[16] as of 31 December 2015

2.1.1. Electricity

69% of the Austrian rail network is electrified. However, as the grid mainly covers high-frequency passenger and freight lines, the percentage of electrified train kilometres is even higher. The electrification of road transport occurs at a slower pace. Nevertheless, the number of electric vehicles is steadily increasing. At the end of 2015, 0.14% of the entire vehicle fleet, consisting of almost 4.7 million passenger cars, was electrically driven, of which 5 032 were purely battery-driven electric vehicles (BEV) and 1 512 were plug-in hybrids (PHEV).

At the end of the year 2015 the remaining vehicle classes encompassed 6 532 pure battery-electric vehicles. The low number of registrations can be traced back to the still very limited model selection, and the costs that are sometimes significantly higher compared to conventional vehicles.

In the first months of 2016, there was a significant increase in new registrations. This effect was due to the amendment of the taxation for company cars, which entered into force on 1 January 2016. For example, BEVs are entitled for input tax deductions and benefits in kind. As a result, 2 008 new BEVs were registered In the first half-year of 2016, an increase of 146.7%, or nearly 2.5 times, compared to the same period of the previous year.

In 2016, with a 1.5% increase in new registrations, Austria is within the first third of European countries with regard to the new registrations of electrically operated passenger cars. As of 2016, 17 BEV and 15 PHEV models are available.

A nationwide charging infrastructure has been established for electric vehicles. Thus a nationwide coverage is available in the TEN-V core network, including urban and suburban metropolitan areas and other densely populated areas (see Annex). A nationwide fast-charging infrastructure with more than 22 kW charging capacity was built within the framework of the Central European Green Corridors TEN-V project. In addition, there are regional initiatives that build publicly accessible charging points at specific distances (e.g. 15 km for standard infrastructure and 60 km for fast-charging infrastructure).

As of the end of 2015, almost 90 fast-charging stations with around 250 charging points are in operation. By the end of the first half of 2016, this figure had risen to 124 fast-charging stations with 316 charging points[17]. Pursuant to Annex 2 of Directive 2014/94/EU, a total of around 1 650 publicly accessible charging points are currently installed at 828 locations, and this number is steadily increasing[18].

Interoperability in electromobility, i.e. the unhindered use of charging stations by different operators, is currently a challenge. All Austrian operators are working intensively on interoperable solutions that can be used on an ad hoc basis, both within Austria and integrated into the corresponding pan-European infrastructure.

With regard to shore-side electricity for inland waterway vessels, Austria has a basic supply. However, its environmental advantages and its acceptance by ship-owners is low, while the investment costs are high. Electricity for stationary aircraft is available at all Austrian airports.

[17] The vast majority of fast-charging stations in Austria are multi-standard, i.e. they can be used by both vehicles with CHAdeMO and Combo-2-CCS connectors. Depending on the design, the fast-charging stations have two to three fast-charging points.
[18] The information is based on self-made reports of the operators regarding the number of charging points and public accessibility.

2.1.2. Natural gas CNG

Compressed natural gas (CNG) is the most environmentally friendly fossil fuel. Despite the well-developed, nationwide filling-station infrastructure and certain tax advantages, only 4 775 class M1 passenger cars were registered in Austria as of 31 December 2015. Thus, the number of vehicles remained virtually unchanged compared to the previous year. There is a wide range of CNG production vehicles available for passenger cars, buses as well as light and heavy commercial vehicles, together with a nationwide network of filling stations.

As of June 2016, CNG is available in Austria at 171 public filling stations, of which five are pure biomethane filling stations. The number of CNG filling stations is falling, as it stood at 175 at the end of 2015. Currently, the TEN-V core network provides nationwide coverage in both urban and suburban metropolitan areas and other densely populated areas (see Annex). The unit for the assessment of natural gas or CNG is fundamentally in contrast to petrol or diesel in kilograms. In 2016, CNG was included in the fuel price calculator (www.spritpreisrechner.at) operated by E-Control. A separate function was also introduced for the conversion into equivalents of diesel or Super 95, to ensure the comparability of CNG with petrol and diesel.

The market development of CNG in Austria is sluggish despite the expanded infrastructure and the existing technical and regulatory framework. In addition, the vehicles are not yet widely advertised.

2.1.3. Natural gas LNG

Liquid natural gas (LNG) provides an alternative for ships and for heavy goods traffic, allowing a reduction in the sulphur content of marine fuels required by ship sector regulations and providing a cost-effective fuel alternative for heavy goods vehicles, allowing them to meet the emission limits in the Euro VI standards. Since at present LNG does not play an important role in inland shipping or heavy goods traffic in Austria, expanding the LNG infrastructure was not a priority issue.

In Austria, it is currently assumed that for financial reasons, LNG cannot offer a viable alternative at locations where the network of natural gas pipelines is already developed. Nonetheless, there is potential for future use and therefore the Austrian institutions are intensively working on feasibility studies and pilot applications such as the Rhine-Main-Danube LNG Master Plan project.

2.1.4. Hydrogen

So far, vehicles with fuel cell drives using hydrogen as the source of energy (FCEVs) have had low market penetration rates in Austria. This is mainly because such vehicles are still a relatively recent product on the market and still need further development. The construction of a publicly accessible infrastructure must go hand in hand with the development of vehicles. As of 31 December 2015, six fuel cell vehicles were registered in Austria. This number doubled by the end of 2016. FCEVs benefit from the same tax advantages for company cars as BEVs.

Boasting Europe's first indoor hydrogen fuelling system for supplying the hydrogen-powered vehicle fleet at a logistics centre (E-LOG BioFleet), Austria promotes innovative industrial

applications. Inaugurated in 2015, the 'Wind2Hydrogen' pilot plant produces renewable hydrogen used for refuelling vehicles, among other things.

Considering the current number of vehicles, Austria fulfils the requirements of Directive 2014/94/EU, with three filling stations in full operation in Vienna, Innsbruck and Linz.

2.2. The situation of infrastructure construction for alternative fuels

Table 2: Publicly accessible infrastructure for alternative fuels in Austria

Fuel/energy source	Type of charging point/filling station	Number of stations Q2/2016	Source / Weblink
	Street: Standard charging point with a charging capacity of max. 22 kW	1 327	https://e-tankstellen-finder.com
	Street: Fast-charging point with a charging capacity of more than 22 kW	316	VBW Study
	Shoreside electricity supply for inland waterway vessels	Standard equipment	
	Power supply for stationary aircraft	The Austrian airports have a sufficient number of stationary and mobile ground power units at the Vienna International Airport and a sufficient number of mobile aggregates on federal airports. For example, 42 stationary infrastructure units for supplying power to stationary aircraft are in operation at the Vienna Airport.	
Natural gas CNG	For road transport	171	http://www.erdgasautos.at/
Natural gas LNG	For heavy goods vehicles	0	no data
	For inland waterway vessels	0	no data
Hydrogen (700 bar)	For road transport	3	http://www.omv.at

2.3. Existing incentives and measures in the public sector

The federal government, the states and the municipalities are already implementing a series of measures promoting alternative fuels for transport applications and the development of appropriate infrastructure. The section below lists the reporting requirements defined in Annex I of Directive 2014/94/EU and includes the following measures:

Table 3: Overview of measures taken by public authorities under Annex I to Directive 2014/94/EU

Legal measures	Legal and administrative provisions for the promotion of the infrastructure for alternative fuels, such as building codes, building permits for parking, etc.
Political measures	- direct incentives for the purchase of means of transport using alternative fuels or for building the infrastructure; - Tax incentives; - Funding for alternative fuels in the context of public procurement; - demand-side non-financial incentives, for example preferential access to restricted areas, parking policy and dedicated lanes; - technical and administrative procedures and legislation with regard to the authorisation of alternative fuels supply, in order to facilitate the authorisation process.
Promotion of infrastructure construction and production facilities	Funding for the construction of the infrastructure for alternative fuels and the promotion of alternative fuel technologies
Research, technological development and demonstration	Means of funding for research, technological development and demonstration of alternative fuels

2.3.1. Legal measures

The already implemented legal measures to promote alternative fuels for transport applications and construct the relevant infrastructure focus on construction law, which falls under the competence of the federal states in Austria. The approval procedures (see also Section 2.3.2.5) and empty conduit lines regulations are particularly relevant for ensuring the transport power supply.

Table 4: Construction law measures for the transport power supply

Construction law – approval procedures for the establishment of the charging infrastructure for electric vehicles	- Development of a guideline for the approval process for the establishment of the loading infrastructure. Part I of the status quo on construction law has already been published.[19] - In Lower Austria, the approval procedure was simplified in April 2016. There is no longer an obligation to report the construction of charging stations (LGBl. No 37/2016). In February 2016, Vienna made it clear that garages with electric charging stations do not require special exhaust systems. A Styrian ordinance of 15 September 2015 stipulated that commercial charging stations are subject to commercial law but do not require authorization. This position is now shared by the other states as well.
Construction law – empty conduit lines in buildings and storage facilities in the charging infrastructure	Currently, five out of nine federal states have corresponding provisions in place. In Lower Austria, specific provisions were included in the building regulations for the first time in 2011, which went on to be extensively amended in 2014 (NÖ BO 2014). The corresponding Section 64(3)-(8) contains the most stringent guidelines in Austria. The regulations in Styria and Upper Austria are roughly equivalent to the NÖ BO before their amendment in 2014, and are, correspondingly, less detailed, missing such provisions as the specifications for residential buildings. In Vienna, the focus is on garages and building regulations. In Carinthia, the respective building authorities are referenced. Only the parking space regulations of Klagenfurt draw on this possibility and contain specific guidelines.

Table 5: Overview of the empty conduit lines provisions in the Austrian building regulations[20]

Empty conduit lines	**NÖ**	**OÖ**	**STMK**	**BGLD**	**KTN**	**SBG**	**VBG**	**T**	**W**
Empty conduit lines in residential buildings	✓	-	~	-	✓	-	-	-	✓
Empty conduit lines in publicly accessible storage facilities	✓	✓	✓	-	✓	-	-	-	~
Electrotechnical equipment of publicly accessible storage facilities	✓	✓	-	-	~	-	-	-	-

[19] bmvit , federal states (2016), guidelines to the authorization procedure for the charging infrastructure for electric vehicles

[20] NÖ…Lower Austria, OÖ…Upper Austria, STMK…Styria, BDLD…Burgenland, KTN…Carinthia, SBG…Salzburg, VBG… Vorarlberg, T…Tyrol, W…Vienna
✓…Provision available, - Provision not available, ~ Provision partly available

2.3.2. Political measures

2.3.2.1. Taxes and fees

The Austrian tax system offers a range of incentives for alternative fuels in transport:

- Motor vehicle insurance tax: Not for exclusively electrically-powered vehicles. Motor vehicles with combustion engines in connection with the transmission of electrical energy ('electric hybrid vehicles') are taxable. However, the performance of internal combustion engines in such motor vehicles is taken as the exclusive basis for assessment.
- Motor vehicle tax: Tax exempt like the engine-related insurance tax.
- No standard consumption tax [*NoVA*] for vehicles under 90 g CO_2/km.
- 2016 tax reform: In force since 1 January 2016, the tax reform provides incentives in the form of input tax deductions for using M1 and N1 class vehicles with zero CO_2 emissions as service cars. Benefits in kind for private individuals are excluded.
- Tax advantages related to CNG: There is no mineral oil tax; however, the lower natural gas fee applies.

2.3.2.2. Purchase incentives

- At the federal level, the BMLFUW's funding programme for municipalities, companies and associations provides subsidies for alternative vehicles (bicycles, passenger cars, commercial vehicles and buses) and for the establishment of charging infrastructure for electric vehicles. Between 2007 and 2015, EUR 21.6 million was approved in subsidies for electric mobility and alternative drive systems, including EUR 17.1 million for electric vehicles and EUR 0.4 million for charging infrastructure. 15 700 alternative vehicles were subsidized by the BMLFUW, including 13 600 electric vehicles (of which 2 400 electric passenger cars), 9 900 electric bicycles, 500 electric scooters, 800 electric light vehicles. In addition, the construction of around 1 000 electric charging stations was also funded in the context of the programme. In 2016, an additional EUR 10 million was made available for electromobility in two funding packages.
- Within the framework of the Austrian Climate and Energy Fund, electromobility from renewable energies has been subsidized under the electromobility model regions programme since 2008, to promote electromobility in everyday life. The seven model regions received funding totalling around EUR 20 million. Since 2013, the focus has been on the networking and interoperability of the seven electromobility model regions with renewable energies. In addition, the BMLFUW has funded electromobility projects for 106 rural climate and energy model regions through the Austrian Climate and Energy Fund since 2014. In these projects, the focus was on setting up rental systems with electric vehicles and testing/adding them to car fleets and providing them to commuters. In addition, driver's education and training was

promoted in workshops for the relevant target groups.

- In almost all federal states, private individuals, companies and public institutions are offered purchasing premiums as well, which mainly include subsidies for electric vehicles and CNG vehicles, but also for buses, taxis and car-sharing vehicles.
- In addition, transport measures such as the replacement of vehicle fleets or the construction of charging infrastructure were adopted as part of the implementation of the Energy Efficiency Act.

2.3.2.3. Procurement

Currently, there are no public procurement targets for alternative vehicles in Austria. However, the states have proposed certain initiatives:

- The eco-procurement service [*ÖkoBeschaffungsService*] in Vorarlberg had a tender procedure for 40 electric vehicles for municipal use. By mid-2016, a total of 54 electric vehicles were registered by the local authorities and the state administration.
- In certain other states, such as Carinthia, Styria or Salzburg, procurement initiatives have been announced and vehicle fleets have been analysed.

In several municipalities, e-car-sharing schemes, such as the EMIL system in Salzburg, are also available. Alternative fuels are used for buses. The entire bus fleet in the city of Linz runs on natural gas, a number of cities use zero-emission buses, and the Vienna bus routes are serviced by battery-electric buses. The Post AG operates Austria's largest fleet of electric vehicles.

Table 6: Overview of political measures for promoting clean energy for traffic applications

	Federal Government	NÖ	OÖ	STMK	BGLD	KTN	SBG	VBG	T	W
Purchasing premiums for companies and local governments	✓ EV + CNG	✓ EV + CNG	✓ EV + CNG	✓ EV + CNG	✓ EV + CNG	✓ EV	✓ EV + CNG	✓ CNG	✓ CNG	✓ CNG
Purchasing premiums for private individuals		✓ EV + CNG	✓ CNG	✓ EV + CNG	✓ EV + CNG	✓ EV	✓ EV	✓ EV + CNG	✓ CNG	✓ CNG
Electromobility strategies	✓	✓	✓	✓	-	-	-	✓	-	✓
Procurement initiatives	✓	-	-	-	-	-	-	✓	-	✓

2.3.2.4. Non-financial incentives

Non-financial incentives for the use of clean energy for transport applications primarily consist of municipal measures such as adapting the parking policy. Several cities, such as Graz,

Klagenfurt, Villach, Krems, Innsbruck, Wörgl or Wels, waive parking fees for electric vehicles. Electromobility and the use of other alternative fuels must be integrated into local strategies and overall transport objectives. In Austria, several municipalities have developed customized municipal and operational strategies in coordinated participatory processes using 'e-action plans' and are thus building on the European approach of the Sustainable Urban Mobility Plans (SUMPs).

Currently, there are no environmental zones for passenger vehicles in Austria and there is no priority access to areas with access restrictions.

2.3.2.5. Technical and administrative procedures

The approval procedures related to the implementation of the infrastructure for alternative fuels mainly concern the supply of electricity and hydrogen for transport applications. In many cases, licensing procedures for the private and public charging infrastructure constitute a challenge in spite of a series of amendments to construction regulations and a uniform presentation of the Austrian status quo (see Section 2.3.1). In the course of the implementation of Directive 2014/94/EU, all federal states have expressed support in favour of harmonizing and simplifying the enforcement of relevant federal legislation (such as, for example, the right to operate facilities for the construction of e-charging stations).

2.3.3. Construction of infrastructure and production facilities

A large part of the existing infrastructure for the supply of electricity for transport applications was funded by the BMLFUW as part of the electromobility programmes in model regions. In Austria, the corresponding infrastructure was set up under the Crossing Borders project funded by the bmvit and the Central European Green Corridors TEN-V project, with particular emphasis on the fast-loading network. Many federal states also provide funding for building the charging infrastructure.

Currently, no funding is available for production facilities, but the potential for electromobility was investigated in 2016[21] and research is focusing on funding priorities. However, the federal government and the states have numerous business development programmes for companies, such as the 'Innovation and Growth Programme for the Economy of Upper Austria'. This programme provides funding for investment projects, such as the expansion of industrial plants or the construction of new buildings.

[21] KLIEN (2016), E-MAPP: E-Mobility and the Austrian Production Potential

Table 7: Overview of infrastructure funding

	Federal Government	NÖ	OÖ	STMK	BGLD	KTN	SBG	VBG	T	W
Infrastructure	✓	✓	✓	-	✓	-	-	✓	✓	-
Production facilities	-	-	-	-	-	-	-	-	-	-

2.3.4. Research, technological development and demonstration (RTD&D)

The Federal Government promotes research activities for alternative drives and fuels in the framework of various funding programmes such as 'Leuchttürme der Elektromobilität' ('electromobilitiy beacons'), 'Mobilitat der Zukunft' ('mobility of the future', 'Smart Cities' (bmvit) or the three Christian Doppler Labs (BMWFW). For example, more than EUR 40 million in grants has been awarded since 2009 within the framework of the 'Leuchttürme der Elektromobilität' programme, which promotes technologies and business models along the entire electromobility value chain. In addition, there is a public-private partnership funded by bmvit with the Austrian Association for Advanced Propulsion Systems (A3PS) as well as a research and industry partnership for technology development in the area of alternative drives and fuels.[22]

The states provide funding for research activities related to clean energy in transport as well. For example, Upper Austria and Styria jointly finance projects on 'smarter mobility and automated production processes'.

Table 8: An overview of funding provided for research, technological development and demonstration

	Federal Government	NÖ	OÖ	STMK	BGLD	KTN	SBG	VBG	T	W
Research support for alternative fuels, infrastructure and production	✓	✓	✓	✓	-	-	-	-	✓	✓

In addition to these measures, training and qualification are also important in the context of the Austrian projects. Special education materials for school students have been developed in recent years, particularly in the field of electromobility, as well as a special training module on high-voltage drives for car technicians. Furthermore, education materials related to the use of LNG in logistics were produced for high school and university students in the framework of the LNG Masterplan.

[22] A3PS (2015), Roadmap Eco-Mobility 2025^{plus}

Awareness raising and environmental effects are also important. There are a number of initiatives in this regard, such as tourism mobility, the www.autoverbrauch.at website, the EL-MOTION conference organized each year jointly by the Chamber of Commerce and the relevant federal ministries as well as studies on the ecological performance of alternative drives, commissioned by the Federal Environmental Agency.

3. Outlook: Future development of clean energy in transport

The National Strategic Framework uses the forecasts of greenhouse gas emissions in the transport sector issued by the Federal Environment Agency and the development of fuel volumes in the transport sector by 2030 as a scenario method for target definition. These were developed by the Federal Environment Agency in cooperation with the BMLFUW, taking into account the relevant energy sources and the opinion of external experts. These are based on scenarios for the climate reporting requirements of Austria within the framework of the EU climate and energy package, which develop scenarios every two years WEM (with existing measures) and WAM (with additional measures) based on current economic forecasts, population development and political agendas. In the transport sector, the degree of motorization, mileage and technology distribution (including infrastructure development) are emphasized. In addition, the WAM Plus scenario includes ambitious measures from 2021 onwards.

Estimates of vehicle development, market development with regard to electricity, CNG, LNG and hydrogen, and infrastructure expansion targets are also developed. These infrastructure targets are strongly oriented towards the expansion announced in the context of the National Strategic Framework and can be adapted to the future market development.

3.1. Market development of alternative fuels for transport applications

3.1.1. Forecasts for market development (WEM/WAM/WAM+)

The WEM scenario produced by the Austrian Federal Environmental Agency forecasts the development of alternative fuels in the transport sector, taking into account the measures that have already been adopted *(business-as-usual).* The Agency's WAM scenario includes measures that have not yet been adopted.

The third scenario - WAM Plus – depicts a change in trends in the transport sector, with assumptions and far-reaching measures that go beyond the WAM scenario, such as the modal split in passenger and freight transport or environmentally-friendly modes of transport that have greatly reduced annual MIV mileage.

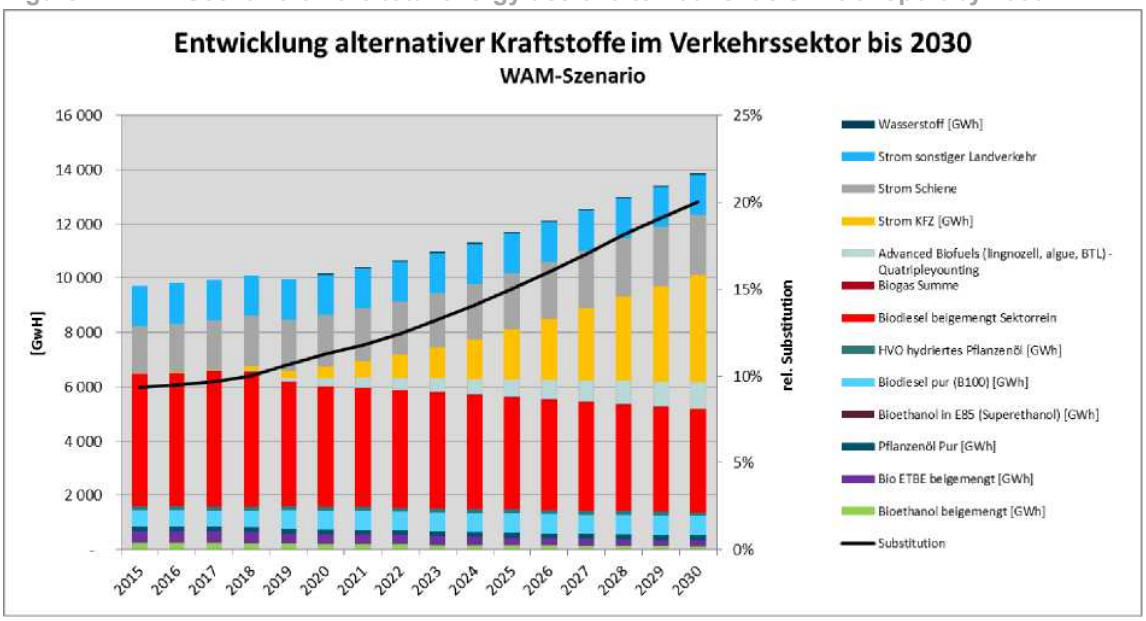
Table 9: Greenhouse gas emissions in the transport sector (in million tonnes of CO2 equivalent)

	2014 (Inventory)	2020	2030	2050
WEM	21.73	22.9	22.7	21.1
WAM		18.4	16.2	13.8
WAM+		17.9	13.5	6.8

According to these data, CO_2 targets for 2030 can only be achieved in a WAM or WAM+ scenario. It should be noted in both scenarios that significant GHG reductions have already been calculated in the approximate amount of 18 million tonnes of CO_2 in the period up to 2020.

Figure 1 indicates the projected distribution of total energy input to individual alternative fuels, assuming decisions on additional measures (WAM scenario). The main difference compared to the WEM scenario (in addition to the differences in energy levels) is the consideration of hydrogen and second generation biofuels. Also, a much larger share of electromobility is assumed.

Figure 1: WAM Scenario on the total energy use of alternative fuels in transport by 2030[23]



The development of alternative fuels in the transport sector by 2030 WAM scenario

- Hydrogen (GWh)
- Electricity for other overland transportation
- Electricity for railroads
- Electricity KFZ (GWh)
- Advanced biofuels (lignocellulosic biomass, algae, BTL) - [undecipherable]
- Total natural gas
- Admixed pure biodiesel sector
- HVO hyrdated vegetable oil (GWh)
- Pure biodiesel (B100) (GWh)
- Bioethanol in E85 (superethanol) (GWh)
- Pure vegetable oil (GWh)
- Admixed bio ETBE (GWh)
- Admixed bioethanol (GWh)
- Substitution

[23] German Federal Environmental Agency, 2016

The future challenge will be a restricted approach to the achievement of objectives for year 2030 and beyond. The various scenarios prepared by the Federal Environmental Agency discuss a wide range of measures, the implementation of which is under examination by the relevant authorities.

3.1.1.1. Electricity –outlook

The electrification of road transport shall play a major role in the following years. In the electromobility scenarios, the Federal Environment Agency assumes a broader introduction of electric vehicles from 2017 onwards, because new vehicle models have been announced in several vehicle classes, ensuring a broader vehicle offer. In addition, the higher ranges and lower costs anticipated for battery systems will make these vehicles increasingly attractive, both for commercial and private use. In the WEM scenario, the number of electric vehicles (battery-powered vehicles and plug-in hybrids) will rise to around 64 000 electric vehicles by 2020, with far-reaching additional measures such as further economic incentives and the substantial expansion of infrastructure. By 2030, in the WEM scenario this will increase to 930 000 electric vehicles, while in the WAM scenario this will increase to just under 1.7 million electric vehicles, almost 75% of which are purely battery-powered.

Currently, adequate charging infrastructure is available nationwide for the number of vehicles in Austria. However, the publicly accessible infrastructure is becoming more and more exhausted regionally. Therefore, more infrastructure needs to be established at mobility nodes such as railway stations and P&R facilities. In Styria, public charging stations will be established for electric vehicles at 15 km distance from each other within the framework of the 'Panther' project by the end of 2017. In Vienna, there are plans for the construction of 1 000 charging points by the end of 2017.

3.1.1.2. Natural gas CNG –outlook

In spite of the up to 20% reduction in fuel emissions compared to conventional fuels, the elimination of harmful nitrogen oxide emissions to a minimum, the nationwide availability of filling stations and the public incentives, the uptake of the technology is still lacking in Austria. For a broader uptake, changing the behaviour of car manufacturers and dealers is crucial with regard to achieving an at least equivalent marketing and use of CNG vehicles. If natural gas's fuel-potential is not more widely used, the existing infrastructure will be dismantled in the medium and long term. Based on the widely differing acceptance of CNG vehicles at regional level, only Tyrol is planning a demand-oriented expansion of filling stations, which will probably equate one station per year. Altogether, the construction of three or four combined LNG-CNG filling stations is planned in the Linz-Enns-Wels-Steyr agglomeration in the medium term, i.e. by 2020/22. In any case, whether the substitution of fossil fuels is meaningful and ecological in the medium and long term remains to be discussed.

3.1.1.3. Natural gas LNG –outlook

Compared to diesel, the use of LNG reduces the emissions of sulphur oxide and fine dust by almost 100%, nitrogen oxide emissions by about 80-90% and CO_2 emissions by almost 20%.

Due to the difficulties in transportation, LNG has most potential in maritime shipping,

especially on coastal areas that are not supplied with natural gas.
For Central Europe, the use of LNG is unprofitable at present. The construction of a proposed liquefaction plant in Bratislava could turn this situation around. In the current conditions, transporting LNG to the interior of the continent would negatively impact the carbon footprint. The use of LNG in the heavy goods transport sector is also difficult to imagine under current market conditions.
In any case, whether the substitution of fossil fuels is meaningful and ecological in the medium and long term must be thoroughly examined.

The refuelling market for heavy-goods vehicles could be expanded along the TEN-V corridors, especially the West-South corridor, using the central position of Austria and its transit routes to supply the major cities and motorways. In shipping, low demand precludes the construction of LNG filling stations for refuelling ships on lakes within Austria. Only the construction of a single stationary LNG terminal, possibly fitted with additional equipment for refuelling road transport in the TEN-V area along the Danube, would be realistic. The Danube shipping sector is develop in the same way as its northwest European counterparts, where the construction of an LNG refuelling infrastructure has already begun. The TEN-V port of Linz is particularly popular, due to its proximity to the Voestalpine AG, which is responsible for the bulk of shipping traffic. The TEN-V port of Enns-Ennsdorf offers similar opportunities. Both ports are suitable for the storage and distribution of LNG as a source of energy and as a fuel for heavy road transport. At present, Austria anticipates the construction of at least one dual-use LNG filling station by 2030.

3.1.1.4. Hydrogen – outlook

Austria is planning the construction of a hydrogen supply network for road transport. Due to the high construction costs associated with hydrogen filling stations, the infrastructure is closely tied to trends on the vehicle market. Austria's approach for expanding the hydrogen filling station network according to the actual number of fuel cell vehicles on Austrian roads is in line with Germany's plans in this area.

For this reason, it is not useful to prescribe a number of filling stations. The filling station network can only be expanded in future in coordination with the neighbouring countries, in particular the south-eastern regions, which do not regard the construction of the hydrogen supply network as a priority in their national strategies for road transport.

In case of a parallel roll-out of fuel cell vehicles and hydrogen filling stations, the agglomerations (Vienna, Linz, Graz and Innsbruck) and the TEN-V corridors (Scandinavia – Mediterranean → Innsbruck; the Baltics – the Adriatic → Vienna, Graz; Rhine – Danube → Asten, Vienna) will be served first. Subsequently, the rest of Austria could be supplied as well, including the areas far from the TEN-V network, depending on the conditions on the market and the frequency of the traffic.

3.2. Publicly accessible infrastructure: Targets

The market developments and objectives set out below for the establishment of the infrastructure for alternative fuels, including charging points for electric vehicles and natural gas (LNG and CNG) as well as hydrogen filling stations, were proposed after close consultation with the industry as well as the local and regional authorities. Thanks to the very good basic supply of CNG and electricity in Austria, which already meets the requirements of Directive 2014/94/EU, no agglomeration areas were flagged for priority infrastructure development. In the case of the establishment of a private charging infrastructure, it is assumed that one private charging point is created per passenger car.

Table 10: Infrastructure targets for alternative fuels

Fuel/energy source	Type of charging point/filling station	2020	2025	2030
Electricity	Standard charging point with a charging capacity of max. 22 kW	3 000-4 000	depending on the market situation	
	Fast-charging point with a charging capacity of more than 22 kW	500-700	depending on the market situation	
	Shore-side electricity for inland waterway vessels	Preservation of the existing basic infrastructure and assessment of the additional needs in the context of the bmvit Action Programme Danube until 2022 (measure 07: Requirement analysis for the land infrastructure of berthing areas)		
	Electricity supply for stationary aircraft	Preservation of the existing adequate power supply for the use of stationary aircraft at the Austrian airports.		
Natural gas CNG	For road transport	Preservation of existing infrastructure		
Natural gas LNG	For heavy-goods vehicles	no data	Depending on the market situation, an LNG terminal at the Linz or Ennsdorf TEN-V port with a filling station for heavy-duty traffic and possibly a second LNG port in Vienna (incl. a filling station for heavy-duty traffic)	depending on the market situation acc. to TEN-V
	For inland waterway vessels			depending on the market situation acc. to TEN-V
Hydrogen (700 bar)	For road transport	5	depending on the market situation	

An assessment of the need to install refuelling points for LNG in ports outside the TEN-V Core Network, The entire section of the Danube in Austria is part of the TEN-V network. The market situation means that LNG refuelling stations at other rivers or lakes would appear not to be expedient.

Consideration of the need for renewable jet fuel refuelling points in airports within the TEN-V Core Network. The stakeholders shall act on any potential need for jet fuel refuelling

stations from renewable sources or the adaptation of the existing underground refuelling system at the Vienna International Airport in the TEN-V Core Network only if the economic conditions are adequate.

4. New measures for clean energy for traffic applications

The existing range of models, in particular of electric vehicles, is the result of a clear regulatory signal from the EU Commission and the Member States, which set clear targets through regulations aimed at limiting fleet emissions. These regulations will be further strengthened in 2016. Such binding emission standards have also been announced for heavy goods vehicles and buses.

In the following years, the model range of alternative vehicles is expected to expand across all vehicle classes. Particularly in the case of electric vehicles, greater ranges are likely to be available at lower costs. Some manufacturers are working intensively on widening the range of fuel cell vehicles. It is still difficult to assess the use of LNG in inland waterways shipping and heavy-load traffic in Austria, while the market development of CNG is uncertain, due partly to the reluctance of manufacturers.

The achievement of climate targets in the transport sector and ensuring value creation in Austria requires the development of appropriate measures and initiatives at national, regional and local levels. The use of alternative fuels for transport applications and the development of the appropriate infrastructure must be integrated in a sustainable manner into the overall economic objectives of maintaining and promoting mobility. Currently, Austria's automotive supply industry is export-oriented and it strongly favours combustion technologies. The objective must be to achieve a mobility shift in Austria through maintaining and strengthening innovative, industrial value creation. We can assume that the Austrian automotive supplier industry has special potential in the fields of vehicle components and subcomponents, infrastructure solutions and production technologies[24].

The measures mentioned below were developed based on the reporting requirements included in Annex I to Directive 2014/94/EU, as described in Section 2.

[24] KLIEN (2016); E-MAPP: E-Mobility and the Austrian Production Potential

4.1. Legal measures

Table 11: Overview of legal measures for supporting alternative fuels in traffic

Legislation/measure	Regulation for the promotion of alternative fuels	Responsibility
28th Road Transport Act amendment [*28. StVO-Novelle*] 2016	The Road Transport Act contain a marking and a definition for electric vehicles to keep parking spaces in front of charging stations free during the charging process. The additional panel under Section 54 (in combination with stopping and parking restrictions). Definition: the rechargeable facilities are able to serve all vehicles with connectors and include cable-free future developments (e.g., inductive charging).	bmvit
Vehicle marking	The objective is to ensure that particularly clean and low-pollutant (high zero emission) vehicles of Class L, M1 and N1 are provided with uniform identification.	bmvit
Vehicle registration office act amendment [*ZulassungsstellenVerordnung-Novelle*] 2016	Registration certificate amended to include the field 'electrical range'.	bmvit
Austrian law on motor vehicles [*Kraftfahrgesetz - KFG*]	Implementation of Directive (EU) 2015/719 amending Directive 96/53/EC on laying down the maximum permitted dimensions for certain road vehicles in national and international traffic in the Community and establishing the maximum weights in international traffic in the KFG. Among other things, this Directive increases the maximum permissible weight for two- and three-axle vehicles with an alternative drive by the additional weight required for the alternative propulsion technology, but a maximum of 1 t.	bmvit
Driving Licence Act [*Führerscheingesetz - FSG*]	FSG amended to increase the permissible total mass for purely electric small transport vehicles to 4.25 tonnes with Class B driver's license (extension of the scope of the class B driver's license to purely electric small transport vehicles with a maximum permissible total mass up to 4.25 tons).	bmvit
Passenger Cars Consumer Information Act [*PKW VIG-Novelle*] 2016 amendment	Amendment of the Passenger Cars Consumer Information Act, which provides consumers with information on fuel consumption and CO_2 emission values of new passenger cars. Implementation of Article 7 (user information) of Directive 2014/94/EU.	BMLFUW
Fuel Act [*Kraftstoffverordnung*]	Implementation of the technical specifications for the hydrogen offered at hydrogen filling stations	BMLFUW
Harmonization of licensing procedures	Charging infrastructure: Assessing the simplification and de-bureaucratization of all notification and approval procedures for the charging infrastructure for electric vehicles. Clarifying that charging stations generally do not require a business operation license, except for individual cases when there are specific unusual or dangerous local circumstances that require a license. Hydrogen filling stations: The BMWFW is working together with the states and industry actors to establish the basis for the unification of various licensing procedures for various types of operational facilities. These procedures are published on the BMWFW website as well. The development of an assessment base for hydrogen filling stations.	BMWFW Federal states
Technical standards	Implementation of technical specifications for charging points, hydrogen filling stations and gas stations according to Annex II to Directive 2014/94/EU. Technical specifications apply only for the publicly accessible charging points under the Directive.	Verification of jurisdiction

The creation of a register for publicly accessible charging stations	Implementation of Article 7(7) of Directive 2014/94/EU, if the location information for publicly accessible filling stations and charging points is available to all users in an open and non-discriminatory manner. Information on CNG filling stations is already available in the E-Control fuel calculator. Examination of the eventual recording of real-time information about the accessibility of charging stations.	BMWFW
Ongoing analysis and verification of adaptations in the building regulations of the states	Creating a viable infrastructure for electromobility, in particular by building empty conduit lines in residential buildings and publicly accessible parking facilities (increase up to 100%), electrotechnical equipment, licensing procedures and harmonization (e.g. in the OIB directives).	all federal states
Adaptation of OIB Directive 2.2	Harmonized clarification of provisions contained in Section 2.2 of the OIB Directive (fire protection in garages, covered parking spaces and parking decks) regarding ventilation systems and fire safety regulations from a technical engineering perspective for the entry of modern electric vehicles in garages, in the sense that there are no additional requirements for garages and parking decks for electric vehicles or electric vehicles under charging. Such a clarification has already been made for CNG.	all federal states
Amendments to the 2011 Tyrolean Building Regulations (TBO amendment 2016)	With a June 2016 amendment of the TBO (LGBl. No 94/2016), provisions contained in Section 21(2) clarified that the establishment and modification of free-standing charging stations for electric vehicles are subject to a notification requirement, with the exception of buildings. Furthermore, the Austrian Administrative Reform Act proposes a statutory regulation for empty conduit lines within the framework of a regulatory amendment to the building regulations, in accordance with the building regulations in force in other federal states.	Tyrol

4.2. Political measures

Funding for the market launch of alternative fuels for transport applications requires a coordinated approach at the European, national, regional and local level, in coordination with industry stakeholders.

The following measures are prepared:

- As part of this National Strategic Framework, the bmvit created the 'Clean Energy in Transport' coordinating body, which meets at least once a year, or when the need arises, with the participation of the relevant federal ministries and institutions (if military defence issues are concerned, the Federal Ministry of Defence and Sports is also included), the states, the Austrian Association of Towns and Cities, and the Austrian Association of Municipalities. This body is responsible for revising the implementation of all proposed measures and discusses further incentives with the representatives of industry actors and associations.
- In addition, the bmvit continues to represent Austria at the Sustainable Transport Forum of the European Commission and consult with other Member States in the Government Support Group Alternative Fuels.

Freight transport, which accounts for about half of all greenhouse gas emissions in the transport sector, is also a priority topic. 95% of commercial vehicles that entered the Austrian

market in the first half of 2016 are Class N1 light commercial vehicles, and potentially offer significant savings, due to an annual CO_2 emissions value of 17 tonnes per vehicle. The bmvit is also committed to increasing the share of alternative drives in the sector as part of the implementation of the logistic action plan as a further development the overall transport plan for freight transport and logistics.

The following measure is proposed:

- Together with representatives of the Federal Government and the municipalities, the Council for Sustainable Logistics organizes logistics-related dialogues, in order to work together in the spirit of civic and environmental responsibility towards achieving CO_2-free municipal logistics by 2030. The objective, within the Strategic Framework, is to develop suitable framework conditions for promoting the use of electric commercial vehicles and investments in the associated infrastructure in municipalities.

4.2.1.1. Taxes and fees

In addition to more stringent emission standards defined at European level, the regulatory system is key for achieving changes in the mobility system.

Details on the existing tax incentives, which are maintained until further notice, can be found in the Annex to the National Strategic Framework. In addition, the following measures must be examined:

- Retention of fiscal benefits for electric vehicles (BEV, FCEV); and abolishing the non-cash compensation for charging privately-owned electric vehicles at company charging stations.

4.2.1.2. Purchase incentives

Currently, alternative fuel vehicles are much more expensive than conventional vehicles, which is generally seen as the main reason for the slow market penetration of alternative fuels for transport applications.

The following measures are prepared:

- The continuation of the BMLFUW's climate-active mobility programme for companies, associations and municipalities for the acquisition of electric and CNG vehicles of all vehicle categories when using electricity from renewable energy sources or a biofuel share of at least 50%; the continuation of the funding programmes for the expansion of the e-charging infrastructure, for both standard and fast charging.

- Continuation of the existing purchase subsidies for private individuals, companies and municipalities in most federal states.

- In the medium term, the funding criteria of the purchase incentives for electric vehicles (e.g. with regard to the minimum range of PHEVs) should be broadly harmonized by the regional authorities.

4.2.1.3. Procurement

The public sector has a pioneering role in the conversion of the traffic system and the procurement of alternative fuels.

The following measures are prepared:

- Invitation to tender published by the Federal Procurement Agency [*Bundesbeschaffungsgesellschaft - BBG*] on vehicle fleet management for alternative drives (Class M1, N1, buses, L), consultancy and vehicle fleet analysis as well as offers for operating leasing (electricity, CNG, hydrogen) in the autumn of 2016.
- Defining a strategic procurement target for the conversion of low-emission vehicles for federal ministries and institutions, including vehicle fleet analyses, considering special requirements for vehicles, in particular those for military defence.
- Significant strengthening of sustainable public procurement requirements and the revisions of the adjustment of procurement guidelines for vehicles, e.g.
    - verification of the introduction of total cost of ownership (TCO), which is compulsory throughout Austria, for the procurement of vehicles for publicly accessible carpools to compensate for the disadvantages of alternative vehicles, with the exclusion of purchase costs.
    - Testing whether the changes in procurement guidelines ensure that, in the event of routine replacement procurements, it is not the procurement of an alternatively-driven vehicle that needs to be justified, but rather the rare exceptional circumstances when such a vehicle is out of the question (e.g. the requirements of the country's military defence).

4.2.1.4. Non-financial incentives

Municipalities play a key role in the introduction of new technologies and mobility concepts as well as the market launch of alternative fuels. Therefore, Section 5 of the National Strategic Framework sets out the position of the Austrian Association of Towns and Cities and the Austrian Association of Municipalities separately.

The municipal framework for action is determined by the legal provisions at state and federal level. One planned measure is the introduction of uniform labelling for particularly clean and low-pollutant vehicles and for use as a basis for developing non-financial incentives.

4.2.1.5. Technical and administrative procedures

The partly non-uniform administrative practices in areas such as the (public and private) charging infrastructure for electric vehicles or the procurement of alternative fuel vehicles is a challenge for the market development of alternative fuels for transport applications and the development of the corresponding infrastructure. The development of uniform administrative practices requires access to a uniform information base.

The statutory requirements defined in the Austrian Weights and Measures Act for measuring instruments for electricity, CNG, LNG and hydrogen are also taken into consideration.

The following measures are prepared:

- All administrative levels should be provided with uniform information and guidance such as civil law issues in housing law, licensing procedures for the charging infrastructure or procurement procedures. In the context of the 'Clean Energy in Transport' coordinating body, an administrative dialogue is established, with the objective of creating a unified information base and uniform administrative practices, in particular with regard to the development of the private and public charging infrastructure for electric vehicles.
- In order to facilitate the construction of a hydrogen infrastructure in Austria and to provide legal security for the far-reaching investments in the sector, a uniform base of assessment must be developed for the required licensing procedures.

The grid integration of charging stations and the conversion to smart grids are also relevant topics in the context of ensuring the supply of power for transport applications. Smart grid technologies must be implemented in view of the requirements of electromobility in terms of time, technology and regulations. Significantly faster charging services in the future will require better network compatibility and more economical procedures. An up and running electromobility market will create demand for the installation of private charging infrastructure (up to 11 kW connections) in buildings and parking facilities. This requires an in-depth analysis of the necessary technical measures such as, for example, the reinforcement of the local distribution network in conjunction with dynamic load management, the examination of the feasibility of the energy and housing law and any amendments necessary.

Issues such as connecting the private charging stations to the power grid in multi-party homes pose a significant challenge. In many cases, the charging station must be physically connected to the electrical mains of the houses, which could create considerable burdens in terms of construction and housing law. Therefore, a solution must be developed for a simpler and more flexible integration of private charging stations at parking lots in multi-party buildings.

The following measures are prepared:

- The establishment of a working subgroup with the participation of the federal, state and local governments on 'Electromobility and its effects on the grid' (based on existing projects and preparatory work), structured with the interactions at the level of different networks, and discussion of the technical and legal aspects of ongoing issues such as flexibility, local grid management, load management, V2G, storage integration, decentralized self-consumption optimization etc. The subgroup is chaired by the BMWFW.
- The establishment of a working subgroup with the participation of the federal, state and local governments on 'Electromobility and its impacts on building standards and equipment', structured with the effects of the market launch of electric mobility on

new or existing buildings. Development and adaptation of planning bases for new buildings, (administrative) regulations for the necessary electrotechnical development of existing buildings (increase of grid connection performance, cost-sharing with owner-owned joint ventures etc.). The subgroup is chaired by Lower Austria.

4.3. Funding for infrastructure construction and production facilities

The establishment of a demand-driven infrastructure is of crucial importance for the market launch of alternative fuels for transport applications. It should be noted that Austria has a strong industrial landscape, especially in the field of electromobility components. Failing to exploit alternative fuels can lead to significant disadvantage in value creation and employment in the Austrian automotive industry.[25] Therefore, the public sector provides incentives for the construction of both infrastructure and production facilities.

The following measures are prepared:

- The continuation of the BMLFUW's climate-active mobility programme for companies, associations and municipalities.
- All states are planning to expand the charging infrastructure for electric vehicles according to demand. Some existing state subsidies for charging infrastructure will continue (e.g. Vorarlberg). In Burgenland, municipal charging stations will be funded with a budget of EUR 50 000 in 2016.
- The 'Light Emissions/Low Cost Industrial Production for Electromobility' programme in the context of the 'Leuchttürme der Elektromobilitat' bmvit programme is still underway in 2016, with a subsidy budget of EUR 5 million.
- The 'Produktion der Zukunft' and 'IKT der Zukunft' FTI initiatives will be continued.

4.3.1. Measures that can promote the deployment of alternative fuels infrastructure for public transport services

- With the purpose of electrifying diesel routes, the bmvit plans an intensive programme for rail electrification, which involves both the electrification of remaining diesel sections and the possibility of using railroad vehicles with alternative fuels or electric drive on the remaining diesel routes. A guideline for the electrification of railway lines is currently under development, supported by the ÖBB's investment decisions.

The creation of public access points at public transport stations is another focus of Austrian activities:

- The bmvit's 'Charge & Ride' initiative will be used to develop new guidelines for the

[25] KLIEN (2016), E-MAPP: E-Mobility and the Austrian Production Potential

construction of park & ride facilities, including the construction of the charging infrastructure for electric vehicles and corresponding arrangements for operators.

- In addition, a significant part of railway stations in Austria are scheduled for equipment with charging infrastructure in order to enable a combined use of public transportation and environmentally friendly vehicles in private transportation, in line with the overall transportation plan.

4.4. Research, technological development and demonstration (RTD&D)

Since 2002, the bmvit has been promoting research, technological development and demonstration for alternative fuels, mainly alternative drive systems and the required energy supply, as well as large-scale lead projects in the field of electromobility. The Austrian FTI roadmap for the mobility of goods includes topics such as 'designing new models for the integration of environmentally friendly modes of transport' or 'integration of vehicles with alternative drive systems'. For future automated and electrified vehicles, the bmvit published an action plan[26] in June 2016. The bmvit is working on a new version of energy research strategy, which will focus on the energy system aspects of mobility. The federal states also provide funding for the use of alternative fuels in transportation and the related infrastructure. Austria is closely involved in the relevant European and international research networks such as the European Green Vehicles Initiative (EGVI), the Fuel Cells and Hydrogen Joint Undertaking or the Hybrid and Electric Vehicle Implementing Agreement of the International Energy Agency. BMWFW also supports research activities in the field of alternative drives.

The following measures are prepared:

- The continuation of planned multi-year FTD programmes for electromobility, such as the 'Leuchttürme der Elektromobilitat'.

- The continuation of the 'Mobilitat der Zukunft' programme and the funding of research projects in the field of fuel research with a budget of around EUR 1.5 million per year.

- Austria's participation in a joint call within the framework of the ERA-NET Co-fund Electric Mobility Europe (EMEurope).

- The continued integration of electromobility and lightweight construction into research programmes such as the energy research programme or the 'Stadt der Zukunft', the 'Smart Cities Demo' and the 'energy model regions' programmes of the bmvit and the Austrian Climate and Energy Fund.

- Continued funding of the Christian Doppler Laboratory for Renewable Syngas Chemistry (about EUR 1.3 million from 2012-2019), lithium batteries (about EUR 1.5 million from 2012-2019) and the boundary in metal-based electrochemical energy converters (about EUR 1.2 million from 2014-2021).

[26] bmvit (2016), Automatisiert – Vernetzt – Mobil: Aktionsplan Automatisiertes Fahren

- The continuation of various research funding programmes of the states.
- Project evaluation and monitoring of potential energy and environmental impacts across all FTI funding lines and instruments as well as the market transition of technologies and successes, including appropriate support and incentives for project consortia.

A number of pilot projects have been proposed:

- In Upper Austria, the pilot project 'LNG für den Schwerverkehr in Oberösterreich' [LNG for Heavy Traffic in Upper Austria] is under preparation.
- Tyrol is planning to test the pilot plant for reducing CO_2 emissions in the cold chain logistics in order to test plant management and to gain knowledge for electrically powered mobility applications. The plant in Vomp is one of the ASFiNAG's three pilot plants intended to establish electrical supply stations for refrigerated lorries at service areas. By the end of 2016, electric supply stations with uniform technical standards and interoperable billing systems will be installed at the three pilot sites, i.e. Kesselhof service area on the A1, the lorry park at Vomp on the A12 and the Schwechat service station on the S1. A further rollout will be decided after these three sites are established and evaluated.
- In the autumn of 2016, a pilot project will be launched in Graz, in which two electric buses equipped with so-called supercapacitors will be used on an electrified bus test track.
- In a study, the ASfiNAG will examine the possible development scenarios for future challenges on the high-level motorway and express road network. This should also include a concept for the establishment of a nationwide charging infrastructure on the ASFiNAG network.

5. Clean energy in municipal transport

Cities and municipalities have a decisive role in the introduction of new technologies and mobility concepts. In recent years, they already taken a number of measures related to vehicle parking, awareness-raising campaigns or parking policy, among other things. To take account of the particular role played by municipalities, a series of workshops on clean energy in municipal traffic were held in the course of the implementation of Directive 2014/94/EU. In Section 5 of the National Strategic Framework, the Austrian Association of Towns and Cities and the Austrian Association of Municipalities provide a list of current challenges and measures for clean energy in municipal traffic.

Local challenges are dependent on various traffic factors. Larger cities place a particular emphasis on walking, cycling and public transportation. A key issue is which measures are required to shift traffic further towards green transportation and make the remaining motorized private transport, logistics and buses cleaner in the future. As electromobility is the only currently available solution for achieving zero-emission targets, the aim is to increase the share of electric vehicles in various fleets. An increase in the proportion of electric vehicles in municipalities must be included in the objectives of the cities and municipalities (mobility concepts and zero emissions traffic). For example, electric car sharing has great potential for reducing overall vehicle stocks in both the rural and urban areas. Through a wide rollout of electric car sharing, which offers an affordable public accessibility solution, the vehicles can be better utilized and the private vehicle stock can be lowered.

Cities and municipalities can lead the way by making the transition to electromobility in their municipal fleets. This is in fact already happening, as shown by the climate protection survey carried out in 40 municipalities by the Austrian Association of Towns and Cities in 2013.

5.1. Challenges for clean energy in municipal traffic

Currently, the cities and municipalities experience the following major challenges:

5.1.1. Procurement

For smaller commercial vehicles, electrification is already possible without any problems, so strategies for vehicle fleets should be examined. However, larger vehicles, such as electric buses, are still very expensive. This is why purchasing subsidies play such a major role.

In the case of municipal procurement processes, there should be a growing trend to transition from current practices towards the establishment of municipal car parks. In order to promote a consideration of life cycle costs, the current procurement rules still need some adjustments, also with regard to acquisition costs.

A nationwide procurement campaign is required for the purchase of alternative commercial vehicles for municipal fleets. The Federal Procurement Agency has drafted a framework agreement to this end (see Section 4.2.1.3), which the Austrian Association of Towns and Cities has notified to its' members.

5.1.2. Establishment of the charging infrastructure for electric vehicles

The topic of electromobility always includes issues related to parking spaces and the charging infrastructure. In this regard the Austrian Association of Towns and Cities and the Austrian Association of Municipalities has noted that as in the case of all other vehicles, the policy for electric vehicles is to relocate parking spaces from public areas to privately owned land. In urban areas, a large number of charging points for electric vehicles should be funded and constructed at street level, i.e. in the public domain. In certain cases, charging points should be provided with a fast-charging option as well. Each municipality is entitled to decide whether to create and operate charging facilities for electric vehicles on public land.

Up to now, only the building regulations of Carinthia, Lower Austria, Upper Austria, Styria and Vienna contain provisions for the construction of electric charging stations, and garage operators frequently prevent the use of their charging systems, even for vehicles with lithium-ion batteries. Progress in this area would be welcomed. From the perspective of the Austrian Association of Towns and Cities and the Austrian Association of Municipalities, the following are the most important issues:

- making legal and technical specifications available in guidelines
- simplifying the construction of charging infrastructure in multi-storey buildings and making uniform information on the legal situation available.
- ensuring that uniform information is made available on the compulsory construction of charging facilities in the building and/or garage regulations and that experts are given uniform information on topics relevant to fire protection in the OIB directives.
- ensuring that uniform licensing procedures are accessible for charging infrastructure throughout Austria, by simplifying and standardizing the implementation of the relevant federal laws (see the measure for the harmonization of licensing procedures in Chapter 4.1).

5.1.3. Logistics

Austrian municipalities are working towards achieving an essentially CO_2-free municipal logistics in urban centres by 2030, in line with the 2011 EU white paper on transport. Existing and new instruments should progressively help make logistics and goods transport in metropolitan areas smarter and more efficient.

The municipalities could give preferential treatment to suppliers using electric vehicles in the area of freight trips and taxi services using electromobility.

Especially in the old parts of towns, noise and air pollution from traffic is considerable. Bundling goods deliveries with electric supplier solutions could create added value. Systemic solutions would still be needed here, which could then be applied to smaller cities as well.

Under the 2012-2014 annual programmes of the Austrian Climate and Energy Fund, preparatory work was carried out for a new programme line, 'Smart Urban Logistics' (or 'Effizienter Güterverkehr in Ballungszentren' in German). As a next step, it would be important to build on the knowledge gained in this process, to continue this funding track and

to make funding available for specific municipal implementations.

5.2. Measures enacted for providing clean energy in municipal traffic

When measures promoting the use of electric mobility in the public sector are introduced, the incentives must be clearly communicated, especially if the individual measures or subsidies are only available for a limited time.

With regard to the measures, timetables and roadmaps should be developed in cooperation with transport operators, industry actors, municipalities, states and the federal government, in order to avoid duplication and to enable coordinated activities. Pilot projects are, and will continue to be, an important part of the promotion of electromobility. The current fixed funding amounts for the procurement of such vehicles, in particular electric buses or vehicle fleet conversions, should be carried forward and expanded. From the point of view of the Austrian Association of Towns and Cities and the Austrian Association of Municipalities, the following measures are the most urgent:

Table 12: Municipal measures

Measures	Need for adaptation
Procurement	There is urgent need for the clarification of legal requirements with regard to the consistent shift towards considering total cost of ownership (TCO) instead of the cost of acquisition. Furthermore, a nationwide campaign is needed for the procurement of alternative commercial vehicles for municipal fleets, such as the establishment of a framework agreement by the Federal Procurement Company.
Parking space regulations / Planning permission	Parking place regulations must be made more flexible in order to adapt to the new forms of mobility, such as electric car sharing. Moreover, in the medium term, there is a clear need for the expansion of the charging station infrastructure in the course of the development of residential and commercial buildings. Considering the already high construction costs, a solution must be found for ensuring that this will not lead to the further increase of costs.
Funding	Subsidies should continue to be provided for the acquisition and development of e-car sharing, e-buses, e-stations, fleet conversions etc. at both the level of the states and the federal government. However, the funding regime should be substantially simplified at federal level, in particular. In terms of city logistics, what is particularly important is funding that builds on the results of the existing 'smart urban logistics' research programme to further system solutions and the practical implementation of measures. Funding for demand-oriented transport systems running on alternative drives, such as car sharing, call buses, taxis systems etc. as well as the promotion of electric and alternative buses and commercial vehicles must be continued.
Adaptation of the StVO	A great number of measures can be developed with regard to the marking/definition of electric vehicles. Also, legislation to ban other cars from blocking access to the charging stations would also be useful (ban on parking for all vehicles other than electric vehicles for the time it takes for them to charge).
Fiscal law	Review of the abolition of benefits in kind provided for recharging privately owned electric vehicles at company charging stations.

Non-financial incentives, such as the exemption from certain types of parking fees are regarded from a different angle by the Austrian Association of Towns and Cities, since parking space management is based on the space requirements of vehicles. A number of Austrian cities use incentives, such as the exemption from parking fees for electric vehicles,

but other cities reject such incentives for the above reasons. The top priority in urban areas is the transition to public transport, the use of clean buses, e-car sharing, clean logistic services and the use of e-taxis.

5.3. Measures enacted for providing clean energy in public transport (buses)

The transport sector is dependent on fossil fuels, leading to high emissions of pollutants and greenhouse gases. As a result of the high degree of electrification for trains, public transport has become a pioneer in the transition from fossil fuels to electricity. Trams, buses and subway trains have also played a decisive role in the transition to a virtually CO_2-free transport system, and will keep doing so in the future.

As a result of the dynamic development of electromobility in the last few years, it is now also possible to start the electrification of the fossil fuel-operated segment of the public transportation system. Electric vehicles using electricity from renewable energy sources offer high energy efficiency and climate-friendly mobility.

With regard to electric buses, the Austrian Association of Towns and Cities commissioned the Austrian Energy Agency to prepare a brochure on the vehicle models and technologies available on the market, such as pure electric vehicles, plug-in hybrids and fuel cell vehicles. This also includes pricing information from the manufacturers and an overview of current forms of funding provided for the purchase of electric vehicles, in particular electrical busses, as part of the BMLFUW climate programme.

Since the conversion to electric buses is very cost-intensive for municipalities, existing funding offers an important incentive that should be pursued.

6 Glossary

A3PS	A public-private partnership funded by bmvit with the Austrian Association for Advanced Propulsion Systems (A3PS) and a research and industry partnership for technology development in the area of alternative drives and fuels
ASFiNAG	Autobahnen- und Schnellstraßen-Finanzierungs-Aktiengesellschaft, an Austrian publicly owned corporation that plans, finances, builds, maintains and collects tolls for the Austrian autobahns.
AUSTRIATECH	Federal Association for Technology Policy Measures
BBG	Bundesbeschaffungsgesellschaft [Federal procurement agency]
BEV	Battery electric vehicle, a vehicle operated purely by a battery
BMASK	Bundesministerium für Arbeit, Soziales und Konsumentenschutz [Federal Ministry of Labour, Social Affairs and Consumer Protection]
BMLFUW	Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft [Federal Ministry of Agriculture, Forestry, Environment and Water Management]
bmvit	Bundesministerium für Verkehr, Innovation und Technologie [Federal Minister for Transport, Innovation and Technology]
BMWFW	Bundesministerium für Wissenschaft, Forschung und Wirtschaft [Federal Ministry of Science, Research and Economy]
CNG	Compressed natural gas
CO_2	Carbon dioxide
ESD	Effort Sharing Decision
EGVI	European Green Vehicles Initiative
EIWOG	Electricity Industry and Organization Act 2010
ERA-NET activity	Networking the European Research Area, supports the co-ordination of national and regional funding programs in Europe
EV	Electric vehicle
FCEVs	Fuel cell electric vehicle
FTD	Research, technological development and demonstration (RTD&D)
FTI	Research, technology and innovation
GWh	Gigawatt hours
KFG	Kraftfahrgesetz 1967 [Motor Vehicles Act]
km	Kilometres
Class L	Mopeds and motorcycles, quad bikes and other small motorcycles with three or four wheels.

Class M	Motor vehicles with at least four M1 wheels used for passenger transport: passenger vehicles & station wagons M2, M3: Vehicles for passenger transport with more than eight seats (buses)
Class N	Motor vehicles used for the transport of goods N1: Vehicles intended for the transport of goods with a maximum permissible mass not exceeding 3.5 tonnes:
LNG	Liquefied natural gas
NoVA	Austrian car registration tax
NOx	Nitrogen oxides, nitrous oxide and nitrous gases emitted by motorized vehicles
MIV	Motorized private transport
OIB	Österreichisches Institut für Bautechnik [Austrian Institute of Construction Engineering]
PBStV	Prüf- und Begutachtungsstellenverordnung [Inspection and assessment regulation]
PHEV	Plug-In Hybrid
CAR	Passenger vehicle
PKW VIG	Personenkraftwagen-Verbraucherinformationsgesetz [Passenger Vehicles – Consumer Information Act]
PM2,5	Particulate matter
StVO	Straßenverkehrsordnung 1960 [Road Transport Act]
SUMP	Sustainable Urban Mobility Plan
Syngas	Synthesis gas
TCO	Total cost of ownership
TEN-T	Trans-European Transport Networks
WAM	With additional measures
WAM+	With additional measures +
WEM	With existing measures
Wind2Hydrogen	Conversion of wind power into hydrogen (project)

Annex

The Annex to the Austrian National Strategic Framework 'Clean Energy in Transport' provides detailed information on the legal and strategic framework conditions presented in the main document as well as on the status quo of the market development of alternative fuels for transport applications, the corresponding infrastructure and the existing state sector measures in Austria.

This is an additional document to the National Strategic Framework.