



DIRECTIVE

Alternative Fuels Infrastructure Action Plan Programming Document

1. Terms

The following terms are used in this action plan:

- 1) „alternative fuels“ – fuels or sources of energy which are at least partially used in vehicles instead of fossil oil sources and which have a potential to contribute to reducing CO² emissions of transport and to the improvement of the environmental performance of the transport sector. These include, inter alia:
 - electricity;
 - hydrogen;
 - biofuels – liquid or gas fuel used in transport which is produced from biomass;
 - natural gas, including biomethane, in gaseous state (compressed natural gas) and in liquefied state (liquefied natural gas);
 - liquefied oil gas.
- 2) „electric vehicle“ – a vehicle which is equipped with propulsion systems which have at least one non-peripheral electrical equipment with energy converter, together with electric rechargeable energy storage system which can be externally recharged;
- 3) „charging point“ – the interface by which one electric vehicle can be recharged at a time or a battery of one electric vehicle can be replaced at a time;
- 4) „usual charging point“ – a charging point which allows the transmission to the electric vehicles of electricity with the power up to 22 kW, except for equipment which power supply is 3,7 kW or less which are installed in a private home or which main task is not the charging of electric vehicles and which are not generally available for use;
- 5) „fast charging point“ – a charging point which allows the transmission to the electric vehicles of electricity with the power up to 22 kW;
- 6) „shore-side electricity supply“ – supply of electricity obtained from the mainland for sea-going vessels at berth by a standardised interface;
- 7) „public charging point or area“ – a charging point or filling station offering alternative fuels, access to which is not discriminative for the users. Non-discriminative access may include different conditions for authentication, usage and payment;
- 8) „filling station“ – a facility where fuel, except liquefied natural gas, is supplied by stationary or mobile device;
- 9) „filling station of liquefied natural gas“ – a facility where liquefied natural gas is supplied by stationary or mobile device, a device located at sea or other system.

2. Introduction

The aim of the alternative fuels action plan is increasing the proportion of alternative fuels in Estonian transport system and it shall focus in particular on developing different alternative fuels charging infrastructures. Extended use of alternative fuels is very much dependant on the existence of the infrastructure and the funding of the investments being made in it. A European-wide charging net in accordance with the same standards, which creation has begun, gives an additional effect. The European Parliament and the Council have issued Directive 2014/94/EU which sets out, inter alia, technical requirements for the charging infrastructure and the labelling of alternative fuels.

The alternative fuels action plan is also needed having regard to the energy security aspect. The energy security strategy of the Commission presented in May 2014 indicated how the EU remains vulnerable to external power failures and, accordingly, the member states were invited to ascertain the choices connected to the reduction of our dependency on certain fuel types, energy suppliers and supply routes.

3. EU policy orientation

The Commission's 2011 White Book „Roadmap to a Single European Transport Area — Towards a competitive and resource efficient transport system“ calls for reduction of transport's dependency on oil. This is to be achieved through a number of policy initiatives, including sustainable alternative fuels strategy and development of adequate infrastructure. In the Commission's White Paper, it is also proposed to reduce greenhouse gas emissions from transport by 60 % by 2050 compared to the levels of 1990. The Directive 2009/28/EC of the European Parliament and the Commission sets the objective to achieve in the case of transport fuels 10 % market share for the renewable energy sources.

A coordinated approach is needed for taking account of long-term energy needs of all modes of transport. Alternative fuels usage policy should in particular be based on the use of alternative fuels, focusing on the specific needs of each transport mode. In developing the national policy frameworks of the member states, the needs of different transport modes present in the territory of these member states should be taken account of, including the needs of these transport modes for which the access to the alternatives to fossil fuels is limited.

The Directive 2014/94/EU of the European Parliament and the Council establishes a common framework of measures for the deployment of alternative fuels infrastructure in the union to reduce the transport system's dependence on oil and to alleviate the environmental effects of the transport. That Directive sets out the minimum requirements for creation of the alternative fuels infrastructure, including electric vehicles charging points and filling points of natural gas (liquefied and compressed natural gas) and hydrogen which are to be implemented through member states' national policy frameworks for such charging points and filling stations' common technical specifications and requirements for information to users. The guidelines for the Trans-European transport network (TEN-T) outline that alternative fuels can at least partially replace fossil oil sources in the energy supply for transport and contribute to the reduction of transport's CO₂ emissions and to the improvement of the environmental performance of the transport sector. TEN-T guidelines require, concerning the new technologies and innovation, that TEN-T must enable to reduce the CO₂ emissions of all transport modes, fostering energy efficiency and usage of alternative propulsion systems and the creation of adequate infrastructure. TEN-T guidelines also require the inland and maritime ports, airports and roads of the core network established by the Directive (EU) no 1315/2013 of the European Parliament and the Council [\(7\)](#) to provide the possibility to use alternative fuels. TEN-T financial instrument's 'Connecting Europe Facility' has considered eligible the introduction in the transmission system of those new technologies and innovation, including clean alternative fuels infrastructure. In addition, in relation to the

introduction of clean alternative fuels, the financial aid is given in the wider common network from the Connecting Europe Facility through procurement and financial instruments, for example, in the form of project bonds.

The member states should ensure the creation of a publicly available infrastructure to supply electricity, compressed natural gas in gaseous state or compressed biomethane to the motor vehicles. In order to determine in their national policy frameworks the necessary number of publicly available charging points, the member states should have the possibility to take account of the publicly available charging points already existing in their territory and their technical specifications, and to make the decision to focus on the introduction of usual or fast charging points.

In order to develop towards a competitive and resource-efficient transport system, the primary objective of both Estonia and the rest of Europe is to contribute to reducing the transport's dependency on oil. Both different political initiatives and this alternative fuels action plan contribute to it.

Within the meaning of European Union, the fragmentation of the internal market because of uncoordinated placing on the market of alternative fuels should be avoided. Therefore, the coordinated policy frameworks of all member states should give long-term security which is needed for public and private sector investments into vehicle and fuel technology and creation of infrastructure to serve a double purpose: to reduce oil dependency and alleviate the environmental impact of transport. The member states should, if appropriate, cooperate through consultations or common policy frameworks in regional or macro-regional level with other neighbouring member states, especially when it is necessary to ensure the cross-border continuity of alternative fuel infrastructure coverage or to build near national borders a new infrastructure which would include different non-discriminative access possibilities to charging points and filling stations.

4. Description of the current situation

The continuous growth of transport energy supply in the form of fossil fuels ruins the balance of the natural carbon cycle. In addition, as a result of the prioritisation of road transport in the transport sector the air pollution and greenhouse gas emissions are constantly increasing.

The usage of alternative fuels in the engines of the means of transport is in Estonia in an early stage due to different reasons – higher price of the vehicles, problems in the engine's supply and lubricating systems, lower calorific value, higher production costs, lack of skills and experience. Implementation of alternative fuels in shipping has recently greatly accelerated, which is largely due to three regulations already in force or coming into force in the near term. All three regulations' requirements are already hard to comply by using conventional marine engines – for use of the current heavy fuel, additional technologies must be installed on the vessels to reduce different emissions. Since these technologies are expensive, the alternative fuels are a suitable substitution.

4.1 Electricity

4.1.1 Electricity usage in road transport

Electricity usage in the means of transport used on road is still quite moderate, although, with gas, the usage of both these alternative fuels has remarkably increased in last years. About 1,4% of new vehicles currently bought in Estonia are either consuming electricity or hybrid and, according to a poll, one third of Estonians would be interested in the acquisition of electric cars. Using of electricity is environment-friendly and the maintenance cost of an electric car is

remarkably lower than the cost of the car with an internal combustion engine, but the proliferation of electricity usage is hindered by the remarkably higher price of the cars using electricity for fuel compared to the vehicles with internal combustion engine and, in principle, in Estonia there is currently no secondary market for vehicles using electricity for fuel. Using high-tech batteries makes it more expensive, but as the technology advances, the equalization of prices can be predicted in the coming years.

In March 2011 the Estonian government signed an agreement with the Mitsubishi corporation for the sale of the emission allocations (AAU) to initiate in Estonia the electricity mobility programme (ELMO). The aim of the programme is to support and promote the introduction of electric cars and rechargeable hybrids.

The programme divided into three parts.

- 1) 507 Mitsubishi iMiev's were acquired for social workers to use.
- 2) The electric charger infrastructure covering the whole country was developed. Currently, 165 CHAdeMO quick charge stations have been installed and 3 stations have been purchased in reserve. 108 stations have 63 amps current, 28 stations have 80 amps current, 1 station has 100 amps current and 26 stations have 125 amps current. 125 amps stations are in the locations where two chargers are alongside. The average distance between two chargers is 40 – 60 km.
- 3) The state subsidy was granted to the purchasers of an electric vehicle up to 50% of the price of the vehicle, but no more than 18 000 euros. It proved to be popular and due to the termination of funds, the reception of purchase supports was terminated by the end of 2014.
- 4) For getting the experience of electric car usage, electric car sharing service was launched in Tallinn and Tartu.

4.1.2 Electricity usage in marine transport

In the last years, there have been no significant developments in the respect of only electric powered vessels, but the hybrid engines are looked at as innovative solutions, because only electric powered vessels have too great problems with saving electricity (the amount and size of batteries in large ships is not reasonable with the existing technology). Using electricity in maritime sector is particularly appropriate in the view of the ports – connecting ships to shore power is widespread to avoid producing electricity from main engines during ship's standstill in a port, which would cause local pollution. The current challenges in promoting shore energy have been in the development of common electrical connection standards which has not yet reached its very end. The Port of Tallinn, in cooperation with some other Baltic Sea ports, has elaborated a memorandum of cooperation, according to which a common system is implemented in these ports.

Estonian TEN-T ports are currently equipped with shore-side electric power and in the case if there is demand and the costs are proportional compared to benefits, including environmental benefits, the Estonian state is considering the establishment of shore-side electric supply to other ports by 2025.

4.1.3 Electricity usage in railway transport

132 km of railway infrastructure is electrified in Estonia. The electrified railway includes whole Harjumaa and Tallinn – Narva direction up to Aegviidu.

4.1.4 Electricity usage in aviation

In aviation, Estonia currently has already ensured the power supply to aircrafts standing in airports serving international flights.

4.2 Gas

4.2.1 Gas usage in road transport

Two different gases are currently used in Estonia as transport fuels. One of them is LPG which is a naturally occurring petroleum gas liquefied at moderate pressure. LPG is the most popular type of alternative fuel in the world and it is becoming increasingly popular also in Estonia. The second gas being used is CNG which is compressed natural gas. There are currently about 2000 vehicles registered in the vehicle register which use CNG as fuel or have installed an additional device enabling to use it and about 3000 vehicles which use LPG as fuel or have installed an additional device to use it. There are currently more than fifty LPG filling stations in Estonia and this number is growing rapidly.

There are currently only 6 CNG filling stations and it is one of the reasons because of what the usage of CNG vehicles is not widespread. Encouraging the creation of a comprehensive network of filling stations is until 2020 in this field the main challenge which would help to bring biomethane to the market as renewable transport fuels.

4.2.2 Gas usage in marine transport

In shipping, the future is seen in particular for LNG or liquefied natural gas. LNG usage creates no sulphur emissions and nitrogen emissions have also significantly reduced. The CO₂ emissions are also reducing. The liquefied natural gas is an attractive alternative fuel for the ships, because in the sulphur emission control areas (SO_x Emission Control Areas) the sulphur content of marine fuels must be reduced and it concerns half of the European short sea shipping vessels, as is established in Directive 2012/33/EU ⁽¹²⁾ of the European Parliament and the Council.

Regardless of the environmental victories, the prospects of LNG usage is also largely determined by the gas price compared to conventional heavy fuels. LNG usage has currently better perspective especially for short-sea-shipment where the distances between the ports (and thus between possible bunkering times) are short and bunkering possibilities better – with the development of bunkering possibilities the usage of LNG may become possible and rational also for ocean vessels.

4.3 Hydrogen

4.3.1 Hydrogen usage in road transport

Hydrogen is an alternative fuel with great potential for reducing greenhouse gas emissions which usage possibilities are being researched more and more in different areas. Currently in Estonia there are no hydrogen powered vehicles in the road transport and the first parts of the charging infrastructure are still in planning.

4.3.2 Hydrogen usage in marine transport

Hydrogen usage on vessels has not been used in the world, although the technologies for hydrogen usage are still being researched. The problem is that the hydrogen under pressure has extremely low energy, thus needing ca 6 times bigger container than in the case of using the usual heavy fuel for getting the same amount of energy – keeping the frozen hydrogen under ca –

250 C is also technically difficult and also expensive. Thus, currently, in shipping, the usage of hydrogen in usual vessels can not be foreseen.

5. Objectives

General description of the objective

Considering that the maritime transport has the greatest negative environmental impact in the transport sector, Estonia focuses on this particular sector in increasing the proportion of alternative fuels. This is also the sector which Estonia is able to impact to a greater extent, considering the development of the technology and the fact that shipping, aviation and road transport all are international businesses which development trends are set in particular on the level of international organizations. At the same time, Estonia is making cooperation at the international level in order to facilitate the introduction of alternative fuels also in these sectors.

The objective of Estonia is to increase the usage of renewable energy sources in road transport to 10% of the spent fuel by 2020. This objective is achieved in particular by the means of three fuel types – liquid biofuels including biodiesel, biomethane and electricity. Liquid biofuels will probably constitute the greatest part of the objective fulfilment, followed by biomethane (ca 20-30% of the objective) and electricity which maximum contribution to the achievement of the objective is ca 0,5%. The proportion of renewable energy in transport sector is calculated and published by Eurostat.

Measure

The proportion of renewable energy in transport sector's final energy consumption.

Indicator/Year	Base level	Intermediate level 2020	Target level 2025
Proportion of renewable energy	0,2%	➤ 10,0%	keeping the intermediate level

5.1 Electricity

5.1.1 Electricity usage in road transport

Currently, Estonia has a functional infrastructure for fast charging of vehicles using electricity which covers the whole country. In the near future, it is planned to correct the infrastructure according to the user needs and to complement it by adding „Combo 2“ sockets in addition to existing CHAdeMO sockets.

Due to the fact that electric transport is a rapidly developing area, the future interface technologies have to be taken account of in the long term, for example, the technologies of wireless charging and changing of batteries. Estonia contributes through its legislation to ensuring the facilitation of the technological innovation.

When it is technically and financially justified, smart metering systems should be used while charging in electric vehicles charging points to increase the stability of the electrical system by charging batteries from the network in the time when the overall demand for electricity is low and allowing secure and flexible data handling. In the long run, it can also allow the electric vehicles to carry electricity from the batteries back to the network in the time when the overall demand for electricity is high.

Measure

The number of the fast chargers meant for public use is at least 100

Indicator/Year	Base level	Intermediate level	Target level 2025
----------------	------------	--------------------	-------------------

		2020	
Number of chargers	> 100	> 100	> 100

5.1.2 Electricity usage in marine transport

Due to the fact that no great innovative reforms in using electricity as fuel on vessels are visible in the coming years, then depending on the growth of demand the shore-side power supply will be expanded and improved. In the framework of Estonian-Latvian cross-border cooperation programme, by 2019 the network of small ports will be created whereby 10 ports will be reconstructed or built which by completion ensure, inter alia, the availability of the shore-side electrical power supply.

Measure

Added ports which offer shore-side electrical power supply

Indicator/Year	Base level	Intermediate level 2020	Target level 2025
Number of ports	> 1	> 11	> 11

5.1.3 Electricity usage in railway transport

No infrastructure expansion is visible in the coming years, but the capacity of current infrastructure will be increased when possible.

5.2 Gas

Gaseous fuels (except LPG) are, in the medium term, most cost-effective alternative fuels with the potential of reducing greenhouse gas emissions. Therefore, the most important activities of the action plan are connected with the promotion of gas transport. The main objective of the action plan is to promote the introduction of methane-based fuels in road transport while creating opportunities for their implementation in the marine transport and analyzing their implementation opportunities in railway transport. The focus on the methane fuels has been chosen because, in the case of this technology, it is possible to introduce the biomethane produced from renewable sources without making changes in the devices. The introduction of biomethane is useful in both environmental and energy security aspects.

5.2.1 Gas usage in road transport

In order to promote gas usage in road transport, the activities have been developed within the Energy Sector Development Plan until 2030 measure 2.1 „Increase of introduction of alternative fuels in transport“. The main focus of these activities is on creation of charging infrastructure that covers the whole Estonia and on promotion of biomethane production. In road transport, in Estonia currently exist 6 CNG filling stations that cover TEN-T main network less than 150 km apart. In order to increase the number of the filling stations, a support scheme „Terms of assistance for consumption of biomethane in transport sector“ has been developed within the above-mentioned measure. The support is given to the activities by which the capability is created for delivery of biomethane and offering the possibility of refueling in a public separate or network filling station and the gas buses consuming biomethane will be introduced in organizing public transport lines. The introduction of gas buses is a direct motivator for creating gas stations, as the projects in Tartu and Võru have shown.

Measure

Yearly consumption of biomethane in the value of oil equivalent (ktoe)

Indicator/Year	Base level		Target level 2020
Biomethane consumption	0		At least 4000 tons

Number of filling stations with the capacity of biomethane delivery and refueling

Indicator/Year	Base level		Target level 2020
Number of filling stations	0		> 10

Indicator/Year	Base level	Intermediate level 2020	Target level 2030
Proportion of methane fuels in the energy consumption of the road vehicles	0	5%	10%

5.2.2 Gas usage in maritime transport

The number of the vessels using LNG increases yearly and it can be assumed that this trend will continue in accelerated speed during next 5-10 years. The number of LNG ships may grow exponentially when proper LNG bunkering infrastructures will be completed in the ports.

In Estonia, the first LNG vessel started to run in 2017 on Tallinn – Helsinki route. If it will be a profitable project, the gradual transition also of other vessels to LNG may be assumed within a decade.

In 2015 the supervisory board of the AS Tallinna sadam that belongs to the state confirmed the construction of LNG terminal, including LNG bunkering terminal to Muuga port, the deadline of which completion is the first half of the year 2017. As the result of the completion of the terminal, the LNG supply will be guaranteed in Estonian TEN-T main network port. Together with the terminal, the distribution system and the loading facilities for the tank trucks transporting liquefied natural gas will be developed. After the completion of the first terminal, the real interest and need for the construction of filling stations outside TEN-T ports' main network will become clearer.

Measure

Number of LNG terminals in the TEN-t ports

Indicator/Year	Base level	Intermediate level 2020	Target level 2025
Number of terminals	0	> 1	According to demand

5.2.3 Gas usage in railway transport

The gas is currently not used in the railway transport. The state-owned carrier AS EVR Cargo plans to test the locomotive operating based on LNG. After that, the reasonableness of using LNG locomotives can be decided.

5.3 Hydrogen

5.3.1 Hydrogen usage in road transport

Hydrogen is in the long term potentially very important energy carrier in the transport sector, provided that the price of the vehicles with the hydrogen element will be significantly reduced. Estonia has no levers to impact the price of hydrogen vehicles, but the state can, however, promote the construction of hydrogen filling stations when it is seen that the demand is emerging for that. As the first pilot project, in the cooperation of Tartu University and private sector, it is planned for the near future to build hydrogen filling station and manufacturing plant on the TEN-T main network route in Pärnu, to the construction of which the state has expressed its support. Within this project, the acquisition of first hydrogen buses for public regular servicing is planned, after which it is possible to evaluate the potential of hydrogen usage more precisely.

Measure

Number of hydrogen filling stations

Indicator/Year	Base level	Intermediate level 2020	Target level 2025
Number of chargers	0	> 1	Will be decided after the completion of the pilot project

5.3.2 Hydrogen usage in marine transport

Hydrogen usage in marine transport can be considered in the event of wider spread of unmanned ships (similarly to the electric ships), when the security requirements of the ships could be lowered and thus the usage of new fuels experimented more freely. The development of unmanned ships is going on, but believably there will be no fundamental changes seen before 5-10 years.

5.4 Biodiesel and bioethanol

Promotion of the usage of biofuels in transport sector is reasonable in short term until the usage of other alternative fuels has not reached the competition position comparable to the fossil fuels. Therefore, the Estonian energy policy foresees the obligation to add biofuels to the petrol and diesel fuels on sale in the following extent:

- 1) starting from May 1, 2017 at least 3,3% in every liter of fuel allowed for consumption;
- 2) starting from April 1, 2018 at least 6,4% in every liter of fuel allowed for consumption;
- 3) starting 2019 at least 8%, but in every liter of fuel allowed for consumption not less than 6,4%;
- 4) starting from 2020 at least 10%, but in every liter of fuel allowed for consumption not less than 6,4%.

(signed digitally)

Urve Palo

Minister for Enterprise and the Information Technology