Ministry of Infrastructure
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AFID Directive Monitoring Report

Monitoring for the purposes of the EU Directive on the deployment of alternative fuels infrastructure (AFID)

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Conclusion

This report describes the efforts made by the Netherlands towards achieving the targets and objectives with regard to the alternative fuels infrastructure to be created for road transport. For other means of transport, such as inland and maritime shipping, innovation is now making good progress. On the basis of the monitoring of the national policy framework, it can be seen that the Netherlands is well on the way to achieving most of the infrastructure targets. Moreover, a discernible development is that the deployment of infrastructure is at least keeping pace with, or is even ahead of, the development of the vehicle fleet. However, this differs from one fuel to another:

- For electricity, the public charging infrastructure for road transport has already exceeded the target under the AFID National Policy Plan of 25 000 recharging points. With the development of the vehicle fleet and the Government's objective to sell only electric cars from 2030, demand for 1.7 million recharging points by 2030 (public, semi-public and private) is taken into account.
- There has already been good progress in the number of shore-side electricity supply points in inland ports for inland shipping: in 2018, there were 280 points. Shore-side electricity supply points for maritime shipping are currently available at four ports, although it should be noted that the installation in Den Helder is for defence purposes and the installation in the Hook of Holland has been constructed specifically for ferries.
- Concerning aviation, the Dutch Climate Agreement includes the ambition that all land-based activities of the airports must be zero emission by 2030. At Schiphol Airport, 73 of the aircraft stands are currently equipped with fixed ground power units.
- As of 2018, there are four hydrogen refuelling points accessible to the public. However, a number of initiatives have been taken by public authorities and/or market participants, for example for public transport buses to run on hydrogen. Consequently, there will shortly be at least an additional 11 refuelling stations which should be operational in 2020. The aim is to increase their number to 20 in 2020.
- The deployment of LNG refuelling infrastructure, as well as the number of vehicles, is increasing steadily. The Netherlands now has an adequate refuelling infrastructure for heavy-duty road transport (27 refuelling stations) in an incipient market deployment phase. This number is expected to grow to 30 by 2025.
- For maritime shipping, there is only one flexible bunkering facility for LNG, although two flexibly deployable bunkering pontoons are being developed.
  With a view to enabling the movement of inland waterway vessels along the TEN-V core network, the aim is set out in the National Policy Plan to achieve six fixed and seven mobile bunkering points by 2030. At present, i.e. the beginning of 2020, there are six mobile bunkering points and one fixed point in Doesburg.
- The number of CNG refuelling stations is still rising and increased in 2017-2018. There is already a nationwide network and the low energy tax makes it a cheap fuel. CNG vehicles are therefore on the increase. The aim is to maintain this network.

There are currently two approaches of importance for the construction of alternative refuelling and charging infrastructure in the Netherlands. A National Charging Infrastructure Action Plan is to be drawn up, mapping the national requirements and actions with respect to the electric charging infrastructure.
Now that the broad outlines of an energy and climate agreement exist, this will be converted into an investment programme for the fuel vision. This will be an 'Implementation and Investment Plan for Innovative Energy Carriers of the Future', and should be ready by the end of the year.

Contents

Introduction

European Directive 2014/94/EU of 22 October 2014 on the deployment of alternative fuels infrastructure (or the Alternative Fuels Infrastructure Directive - AFID) requires European Member States to produce national policy frameworks for the development of the market for environmentally compatible fuels / energy carriers and the relevant infrastructure. In these policy frameworks, Member States outline their national targets and objectives, and supporting actions for the development of the market as regards alternative fuels, including the deployment of the necessary infrastructure to be put into place.

National policy framework
The national policy framework stems from the endeavour for clean and efficient modes of transport. This policy is set out, *inter alia*, in the Social and Economic Council (SER) Energy Agreement, the SER Fuel Vision and the Dutch Maritime Strategy. Accordingly, the national policy framework contains national policy which is already being pursued. The targets and the supporting actions are based on the implementation agenda for the Fuel Vision, action plans and Green Deals and the Dutch Maritime Strategy. These are joint ambitions of the stakeholders and the public authorities.
The Netherlands submitted its Policy Framework for Alternative Fuels Infrastructure (or National Policy Framework - NPF) on 26 January 2017. At the end of 2017, the European Commission submitted a report to the European Parliament on the assessment of the national policy frameworks. The European Commission explained and discussed this assessment of the NPF with the Netherlands during a meeting held in February 2018 in Amsterdam.

It is important to note that the Dutch targets have been adjusted compared to the NPF. This is due to the Climate Agreement, which was presented on 28 June 2019. The Dutch climate policy is further developed in this Agreement, which was concluded between a large number of organisations and businesses. The Agreement focuses on achievement by 2030 and in some cases there are also sub-objectives for achievement by 2025.

Monitoring report
Each Member State is also required to submit to the Commission a report on the implementation of the NPF by 30 April 2020, and every three years thereafter. This report outlines the measures taken in a Member State to support the build-up of alternative fuels infrastructure. The object of this report is to map the efforts made by the Netherlands and to see the extent to which the targets and objectives have been achieved in relation to the alternative fuels infrastructure to be created. Annex I to the AFID (Annex 3 to this report) sets out the minimum requirements for the report. These are the following six key issues:

1) Legal measures
2) Policy measures supporting the national policy framework
3) Deployment and manufacturing support
4) Research, technological development and demonstration (RTD&D)
5) Targets, objectives and the Climate Agreement
6) Alternative fuels infrastructure developments

Method
This monitoring report describes the efforts made by the Netherlands in relation to

all the points set out above, mainly looking back to 2017 and 2018. The emphasis is placed on the fuels dealt with in the national policy framework: electricity, hydrogen, CNG and LNG. The AFID also includes obligations for these fuels.

The monitoring starts with an overview of policy measures to support alternative fuels (infrastructure and/or vehicles). This overview is contained in Annex 1 to this report and lists measures from the Alternative Fuels Infrastructure Policy Framework, supplemented by measures from the National Energy Outlook 2017 and the Climate Agreement (focusing on traffic and transport). This was followed by interviews with policy experts in various fuels and modes of transport for supplementary information with respect to the six key issues in this report.

In all chapters, measures are mentioned only if they were in fact implemented for a fuel or mode of transport in 2017/2018. Some measures, such as subsidies, are intended for several fuels, but applied in practice for only one fuel.
The national monitoring developed for the Fuel Vision and the Climate Agreement is used for the monitoring of the targets and objectives: the *Routeradar, Straatbeeldmonitor 2019*.

Reader's guide
The report deals with each of the six above-mentioned key issues in turn, which the Commission lists in Annex I to the AFID as minimum requirements for the report.
One component is described per chapter, from legal measures to infrastructure developments. The conclusion evaluates the efforts made by the Netherlands and a view is given of the challenges and possible efforts in the future.

1 Legal measures

Annex I to the AFID calls for 'Information on legal measures, which may consist of legislative, regulatory or administrative measures to support the build-up of alternative fuels infrastructure, such as building permits, parking lot permits, certification of the environmental performance of businesses and fuel stations concessions'.
Relevant laws and regulations and other (legal) measures are discussed below.

1.1 Laws and regulations

Electricity
On 10 January 2012, the policy with regard to services alongside motorways and other major trunk roads was already amended in part to allow the development of a network of private fast recharging points accessible to the public. Interoperability of these fast recharging points is a condition of the permit.
In March 2017, an amendment to this policy means that only one operator of electric recharging points, as a basic service facility, is authorised at a service station. However, filling stations or roadside restaurants may also install electricity recharging points as an additional facility.[i]

The municipalities and provinces implement the laws and regulations at local level. Good legislation is essential for the installation of electricity charging infrastructure. Municipalities are examining together how to streamline charging infrastructure permit applications and to speed up the installation. The municipalities of Amsterdam, The Hague, Rotterdam and Utrecht (G4) and metropolitan regions are at the forefront in this respect and join forces in partnerships such as the MRA-E (Amsterdam Metropolitan Area-Electric). The installation of recharging points is speeded up by municipalities using only one permit for several potential locations or by providing legal advice for infrastructure on private land.

Hydrogen:
Factsheet 35 in the Hazardous Substances series on hydrogen refuelling stations has been issued to assist public authorities and businesses in granting permits. In addition, through the Hydrogen Safety Innovation Programme, various stakeholders are working on:

- laws and regulations (including on transport for bunkering stations)
- uniformity in granting permits
- risk management and incident control

LNG:
The National LNG Safety Programme brings together experts from the business community, the research community, public authorities and incident control. The Regulations and Safety Working Group deals with laws and regulations and permits. The aim is to eliminate legal restrictions on the distribution and use of LNG as a fuel for transport.

All fuels
A start was made in 2018 on a study on service stations after 2024: 'the service station of the future'. Due to the expiry of certain restrictions under the Petrol Act (*Benzinewet*) in 2024 […]. It is still unclear what legal changes will follow and what role alternative fuels will play in this respect.

1.2 Other measures

Under legal measures, the Commission also mentions the certification of the environmental performance of businesses. There are a few certification instruments in this field which support the build-up of infrastructure. These include the BREEAM certification for sustainable buildings, for which a BREEAM quality mark can be obtained. In this respect, points are awarded for the installation of recharging points and solar panels to achieve the quality mark.[ii]

Another form of certification, which is oriented more towards the use of vehicles powered by alternative fuels, is Lean and Green Personal Mobility. It encourages and facilitates organisations to move towards a higher sustainability level by taking efficient measures in the field of the mobility of their employees and operational activities. This also includes the use of greener or zero emission transport. This is possible through road transport, rail or shipping. Organisations can earn a Lean & Green Award or a Star. In addition to cutting CO_2 emissions, participating organisations also benefit from cost savings.

2 Policy measures

Measures supporting the implementation of the national policy framework, carried out in 2017 (and as far as can be seen in 2018), are described below. They are subdivided into six points as set out in Annex I to the AFID.

2.1 Incentives for purchase of vehicles and building infrastructure

This refers to: 'direct incentives for the purchase of means of transport using alternative fuels or for building the infrastructure'.

The Netherlands provides a number of significant direct incentives for the purchase of means of transport using alternative fuels. For instance, as a result of the implementation of *Autobrief II*, there is an exemption from the taxation on the purchase of passenger cars and motorcycles (*belasting van personenauto's en motorrijwielen*, BPM) for fully electric battery or hydrogen-powered vehicles.
In addition, there are local schemes, in which in particular the G4 municipalities and some metropolitan regions are in the forefront. For example, purchase subsidies for electric cars have been introduced within these municipalities, for both private individuals and companies. With respect to vehicles powered by CNG, various provinces and municipalities have introduced a purchase subsidy for CNG cars.

Incentives are also available for the build-up of infrastructure. The most significant measure is the Publicly Accessible Electric Charging Infrastructure Green Deal. As a result, actions are carried out which have reduced the costs of a recharging point by, for example, joint research and process optimisation. The Central Government has also made a contribution totalling EUR 5.7 million for the implementation of charging infrastructure. This involves co-financing by municipalities and the market. Expectations are that it will be used to implement a total of about 10 000 public recharging points. At the end of 2016, a further EUR 1.5 million was made available. This resulted in the implementation of a further approximately 3 000 public recharging points in the period 2017-2018.
In addition to this, the Environmental Investment Deduction Allowance (*Milieu Investeringsaftrek*, MIA) can be applied by businesses and for private recharging points for lease cars. This amounts to up to 36% of the investment which can be deducted from corporate income tax. The precise allowances and conditions can be found in the NPF and on the subsidy page of the Netherlands Enterprise Agency (*Rijksdienst voor Ondernemend Nederland* (RVO) (link).
The creation of hydrogen refuelling infrastructure is promoted mainly by the demonstration scheme for climate technologies and innovation in transport 'DKTI Transport'. Further details can be found in Chapter 4.

2.2 Tax incentives for the use of vehicles and infrastructure

The AFID states: 'availability of tax incentives to promote means of transport using alternative fuels and the relevant infrastructure'.

- Use of vehicles:
Incentives are provided in the form of tax relief especially for the use of fully electric cars and hydrogen-powered cars. Under the *Autobrief II* (up to 2020), fully electric cars in the business market carry an additional income tax liability of 4% (rather than 22%) up to a catalogue price of EUR 50 000 and are exempt from motor vehicle tax (MRB) and the purchase tax (BPM), from which consumers also benefit.
- Use of infrastructure:
There are also financial incentives in the form of tax relief for the use of infrastructure. This applies to public recharging points, where the tax rate for electricity is halved. The exemption from excise duty on hydrogen and a favourable

tax rate for CNG also provide a financial incentive for the use of this infrastructure. LNG in road transport has been subject to a refund of excise duty since 2014. For 2020 and 2021, this has been converted into a subsidy scheme whereby there is no longer a refund of excise duty, but a discount per 1 000 kg LNG sold.

In addition to tax relief from the government, there are also other financial benefits that promote the use of vehicles or infrastructure. For example, the Rotterdam Port Authority and the Amsterdam Port Authority give discounts on inland harbour dues or sea harbour dues for vessels using alternative fuels (such as LNG).

2.3 Public procurement for alternative fuels

The AFID refers to possible 'use of public procurement in support of alternative fuels, including joint procurement'.

Joint procurement is used for large-scale procurement of public electric charging infrastructure. Provinces, municipalities or metropolitan regions use joint procurement for the installation of recharging points. In 2017 and 2018, this yielded considerable advantages in the form of advantages of scale and a better business case. Under large-scale procurement, the recharging point operator pays for the right of use. In this way, public authorities and market participants both invest in public charging infrastructure. This holds out the prospect that the public authorities will need to invest less as the market for electric vehicles grows.

Furthermore, the Central Government is committed to renewing its own vehicle fleet. Its aim is to have 20% to 25% electric vehicles in its vehicle fleet by 2020. There are ambitions to accelerate this. In 2018, the Central Government procured a further 600 electric vehicles, following the 100 battery-electric vehicles (BEVs) previously procured.
In addition, agreements have been concluded on public and/or joint procurement via various Green Deals. In the Administrative Agreement on Zero-Emission Regional Public Transport (*Bestuursakkoord Zero Emissie Regionaal Openbaar [Vervoer]*), it has been agreed, for example, that all public transport concessions must have the best possible score for well-to-wheel CO_2 emissions per passenger/kilometre. It has also been agreed that from 2025, all public transport concessions will be zero-emission. A number of provinces are currently looking into the possibilities for joint procurement of scores of hydrogen buses for public transport. Other municipalities have jointly procured electric buses.[iii]
Moreover, these various municipalities and provinces aim to renew their own vehicle fleet and include this in their public procurement.

2.4 Non-financial incentives

The AFID asks about 'demand-side non-financial incentives, for example preferential access to restricted areas, parking policy and dedicated lanes'. A few non-financial incentives are applied in the Netherlands, notably at local level. For example, electric cars have priority for obtaining a parking permit in Amsterdam and municipalities have a growing number of parking spaces with recharging points where only electric cars may park. In addition, some municipalities have made it mandatory for inland vessels to use shore-side electricity at berths.

2.5 Renewable fuels in aviation

The AFID asks for consideration of the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network.
In principle, there is infrastructure to Schiphol Airport (which is responsible for 90% of Dutch passenger flights) which can be used for the delivery of renewable fuels. However, the present use of renewable jet fuels is limited and the target for 2030 is

4 PJ, about 2% of the total. Sales will have to increase to bring refuelling infrastructure for renewable jet fuels into operation. At present, however, this scaling-up of biofuel use is not yet viable.

The new Cabinet has indicated that the Netherlands is taking the lead in research and development of sustainable non-fossil kerosene (biokerosene) in aviation. For the time being, this is seen as the most promising way of flying more sustainably. The Cabinet wishes to promote developments in the field of sustainable alternative fuels where possible. In 2017, the Ministry of Infrastructure and the Environment commissioned research into the possibilities of stimulating the demand for biokerosene and the effects on aviation and the economy.

General
The main options concerning sustainable energy carriers for Dutch (and international) aviation in the medium term include mainly high mixes of biofuels (such as biokerosene). Electric flying is still in its infancy. Land-based activities can already be electrified now, whereas commercial electric aircraft are still far from being feasible.

Achievements in relation to the objectives (targets)
Schiphol – with 90% of the number of passengers, the most important airport in the Netherlands – is equipped with 73 aircraft stands with electricity supply (400 Hz) and preconditioned air units. As a result, stationary aircraft no longer need to connect their auxiliary engine to a kerosene or diesel-powered unit (APU), ground power unit (GPU) of preconditioned air unit (PCA).

What is happening at policy level?
Dutch aviation is largely internationally oriented. The CO_2 emission reduction targets are internationally agreed within the ICAO. The draft Agreement on Sustainable Aviation includes the following objectives for domestic aviation and land-based aviation activities:
- 2030: land-based aviation activities will be zero emission. There are currently 73 aircraft stands at Schiphol with installations for fixed electrical ground power.
- 2050: domestic aviation will be zero emission.

Emission reduction
The expectation is that CO_2 emissions from aviation will increase by about 3 million tonnes (+25%) to 15 million tonnes by 2030. That is the same order of magnitude as the expected decrease in greenhouse gas emissions in the entire Dutch mobility sector in that period [KEV, 2019]. The use of biofuels is expected to contribute a reduction in CO_2 emissions of 0.3 million tonnes by 2030.

2.6 Supply procedures

Here, the AFID requests information on: 'technical and administrative procedures and legislation with regard to the authorisation of alternative fuels supply, in order to facilitate the authorisation process'.

This concerns procedures which businesses must comply with if they wish to act as suppliers of an alternative fuel. In the Netherlands, this is regulated by the Dutch Emissions Authority by means of renewable energy units (HBEs). The process is explained below.

The total quantity of petrol and diesel (including their bio-components), which a

company has delivered to transport destinations that are subject to an obligation in the Netherlands, is referred to as delivery to final consumption. Companies register these fuel deliveries with the Energy for Transport Registry. The delivery to final consumption of petrol and diesel for use in transport applications for which there is an obligation in the Netherlands is expressed as a quantity of energy. Multiplication by the compulsory share of renewable energy for a year determines the amount of a company's annual obligation.

The annual obligation is expressed in three types of renewable energy units (HBEs): 1) the HBE Advanced (HBE-G) for the sub-target, 2) the HBE Conventional (HBE-C) for the cap and 3) the HBE Other (HBE-O) for the remainder. It should be noted that, from 2018, the amount of the annual obligation is determined including deliveries for non-road mobile machinery, farm tractors, forestry machinery and pleasure craft. Companies meet their annual obligation by surrendering sufficient HBEs of the right type on 1 April.

3 Deployment and manufacturing support

Information is provided below on the support for the deployment and manufacturing of alternative fuels. The chapter is subdivided into three sections, as requested in Annex I to the AFID.

3.1 Infrastructure deployment support

Here, the AFID requests information on the 'annual public budget allocated for alternative fuels infrastructure deployment, broken down by alternative fuel and by transport mode (road, rail, water and air)'.
The (provisional) amounts are shown below which have been allocated from the national budget for infrastructure deployment. However, this is not the full picture. In the Dutch approach consisting of Green Deals, covenants and partnerships with stakeholders and regional and local authorities, a large share of the (co-)financing comes from parties other than the Central Government. For example, regional and local authorities have funds or subsidies or they provide co-financing for infrastructure deployment. These amounts are not included in the table below.

Fuel		**Budget**	**Period**	*comments*
Electricity	Road	**8.5 m** 7.2 m 1.3 m	**2016-2018** 2016-2018 2017-2018	 *Green Deal electric charging infrastructure* *DKTI**
	Water			*Financing via EU subsidies, port authorities, grid operators, etc.*
Hydrogen	Road	**12.1 m**	**2017-2018**	*DKTI* (Co-financing)*
CNG	Road	-		-
	Water	-		-
LNG	Road	3.2 m	2017-2018	*DKTI** *Subsidy Top Sector Energy?*
	Water			*Subsidy Top Sector Energy?*

Figure 1: Financial support from the Central Government for infrastructure deployment
* Demonstration scheme for climate technologies and innovation

3.2 Manufacturing support

The AFID describes this as: 'Annual public budget allocated to support manufacturing plants for alternative fuels technologies, broken down by alternative fuel and by transport mode'.

Government support for manufacturing plants for alternative fuels is not available on a large scale. The main subsidies with respect to manufacturing of alternative fuels is distributed by the Top Sector Energy via network organisations of businesses, knowledge institutions and public authorities. In the years up to 2017, for example, innovative projects were supported in favour of the manufacturing of renewable gases and climate-neutral hydrogen.
Before 2017, however, mobility was not mentioned as an ultimate goal for energy generation. It should be noted that it is often not mentioned what the application of the (sustainably) generated energy will be. For example, electricity generated from solar or wind energy may also be used for electric vehicles. As a result, a breakdown by fuel type and by transport mode, as requested in the AFID, is difficult.

For hydrogen production, support is available via the Demonstration scheme for climate technologies and innovation in transport (DKTI) in the form of co-financing for infrastructure with local energy production. This scheme will be explained in more detail in Chapter 4. With respect to support of manufacturing plants, a relevant factor is that a project without local energy production is awarded a maximum of EUR 1 million in co-financing, whereas a project with local energy production may receive up to EUR 1.6 million (for example, local hydrogen production at hydrogen refuelling point). See: link.

3.3 Needs during deployment of infrastructure

The AFID asks for 'consideration of any particular needs during the initial phase of the deployment of alternative fuels infrastructures'.

Electricity

For recharging points for road transport, the process from application to materialisation is on the long side. Municipalities are examining how this can be expedited, for example by means of granting a single permit authorising the installation of recharging points in specific spots in a town.

With the deployment of recharging points in ever greater numbers, with ever higher power, timely investment in the reinforcement of grid connections is important.

For shore-side electricity for vessels in maritime ports, the high costs of shore-side power supply points require attention. Good financing is essential and banks, ports and electricity companies must cooperate in this respect. Another priority area is the costs for the use of shore-side electricity. This must be more financially attractive compared to the use of other fuels, such as diesel. Currently, the fact that tax is imposed on electricity, but not on marine fuels, is a sticking point.

Hydrogen

Hydrogen refuelling infrastructure is expensive. Good financing is important here, especially at the initial stage. In addition, it is important at the initial stage to ensure a (limited) fleet which will use the infrastructure. Without users, there is no business case. This first group of buyers can be sought, for example, in public transport vehicles. In addition, it is very important for local authorities issuing permits to become more familiar with hydrogen. At present, the permit-granting process often takes an (unnecessarily) long time. An administrative guide on granting permits for hydrogen refuelling points has been written by the Institute for Physical Safety (*instituut fysieke veiligheid*).

4 Research, technological development and demonstration

The AFID asks about the 'annual public budget allocated to support alternative fuels RTD&D, broken down by fuel and by transport mode'.

It should be noted in this respect that it is difficult to give precise amounts allocated from the national public budget for RTD and demonstration. As a result, a breakdown by fuel and by transport mode is also complicated. This is because various measures cover several modes and/or fuels. In addition, some measures only partly include RTD or demonstration or only partly apply to mobility. In short, there is a wide range of policy measures in which it is not always feasible to draw a clear distinction in application to mode or fuel.

Furthermore, the overview below is not the complete overview of public money spent on demonstration or RTD in the field of alternative fuels. Other authorities, such as provinces and municipalities, have their own subsidies and innovation funds that contribute to developments. At national level, this involves significant amounts. However, it is complicated to figure out all the amounts. Moreover, the AFID asks about funds from the public budget.

4.1 RTD and Demonstration

There are various subsidies which include a RTD and demonstration component, such as the Top Sector Energy subsidy or, for inland shipping, the Sustainable Inland Shipping subsidy (EUR 1.75 million for 2017 – 2018). Before 2017 and 2018, however, they appear to have allocated subsidies to a limited extent.

DKTI Transport

The most comprehensive measure is the Demonstration scheme for climate technologies and innovation in transport (DKTI Transport). It is a subsidy for transport solutions with little to no CO_2 emissions. The scheme is designed for businesses, knowledge institutions and non-governmental organisations. The total budget for 2017/2018 was approximately EUR 31 million. Each year, the budget and the technology and innovation challenges are redefined. For instance, shipping and aviation were added to the scheme for 2019. The focus for 2017/2018 was on:

1. Acceleration of the development of low-emission means of road transport
2. Acceleration of deployment and use of alternative fuels infrastructure
3. Promotion of knowledge-sharing innovations related to hydrogen, biofuels and electricity.

Fuel		Budget	Period	*comments*
	Road	**10.2 m**	**2017- 2018**	
		9.6 m	2017-2018	*DKTI*
		0.6 m	2017	*Top Sector Energy*
	Water	-		*Sustainable inland shipping subsidy*
	Air	-		-
	Road	**8 m**	**2017-2018**	
		4.2 m	*2017-2018*	*DKTI*
		1.5 m	*2017?-2018*	*Subsidy for hydrogen pilot scheme*
		2.3 m	*2018*	*Subsidy for hydrogen tender*
	Road			
	Water			
	Road			
	Water			

Figure 2: Financial support by Central Government to RTD and Demonstration

5 Targets and objectives

This chapter sets out the expectations for the future vehicle fleet and looks back at the figures achieved in relation to the targets. Finally, the charging efficiency of high power recharging points is considered.

5.1 Estimate of expected number of vehicles and vessels

The AFID asks here for: 'estimation of the number of alternative fuel vehicles expected by 2020, 2025 and 2030'.
The forecasts below are based on the forecasts from three different 'fuel platforms' (working groups with business community, public authorities, social organisations and knowledge institutions). They have proposed target values for electric, CNG/LNG and hydrogen vehicle numbers. These aims are also included in the Climate Agreement. The figures date back to November 2019.

Electric vehicles
The number of plug-in cars (fully electric cars and plug-in hybrids) grew in 2019 to over 200 000. The number of fully electric passenger cars has almost doubled annually in recent years. On 1 January 2019, there were nearly 45 000 fully electric passenger cars in the Netherlands, twice as many as one year previously and ten times as many as in 2014. At the end of 2019, the number had risen to 107 000 vehicles. The Tesla Model 3 was the best-selling car in 2019 (about 30 000 new registrations).
The number of plug-in hybrids decreased by over 2% in the past year to approximately 96 000. At 31 December 2018, the number stood at 97 702 and at 31 December 2019 there were still 95 885 (source Netherlands Enterprise Agency (RVO)). The number of plug-in hybrids grew strongly from 2014, but stagnated in 2017. From January 2017, the tax liability for a plug-in electric hybrid vehicle (PHEV) was raised to 22%. This means that a PHEV is no longer more advantageous to lease from the tax point of view than a petrol or diesel car, although PHEVs do still benefit from a lower motor vehicle tax (50%).
Although new plug-in cars made their appearance, plug-in cars also disappeared from the roads in 2018, for reasons including export and inclusion in the stock-in-trade of dealers and leasing companies. Approximately 80% of plug-in cars are owned by businesses. This is almost the converse of conventional vehicles (88% privately owned).
The Climate Agreement has the ambition to sell only zero-emission passenger cars in the Netherlands by 2030 (100% of all new registrations).
The number of fully electric delivery vans has risen rapidly in recent years. At the end of 2019, the Netherlands had about 4 500 electric delivery vans. The Climate Agreement aims to have 115 000 electric delivery vans in the fleet by 2030, partly so that zero-emission zones are feasible.
In 2019, there were 173 electric trucks and tractive units (for semi-trailers) in the Netherlands. The majority (99%) were fully electric. In 2019, Simon Loos was the first in Europe to drive two plug-in electric DAF CF trucks.
Plug-ins could play a key role in supplying cities in cases of zero-emission zones. By switching to electric propulsion within the zero-emission zone, emissions can be avoided in the town, while maintaining the flexibility of a diesel vehicle.
• The Climate Agreement aims for 10 000 zero-emission/plug-in electric hybrid trucks and tractive units (for semi-trailers) by 2030. Achieving this number requires rapid growth in the number of new sales. At present, the focus is on experiments

(pilot phase). Schemes such as DKTI can contribute to attainment of the scaling-up phase.

Hydrogen vehicles
The number of hydrogen passenger cars is currently still very low, but rising. The supply of hydrogen cars is still limited to the Toyota Mirai and the Hyundai Nexo (the Hyundai Nexo replaced the Hyundai ix35 fuel cell electric vehicle (FCEV) in 2018). In the municipality of The Hague alone, 35 new Toyota Mirais are registered as taxis. The Climate Agreement does not include any targets for hydrogen cars in 2030. Policy is being developed to boost zero-emission transport in general.
For the time being, there are still few hydrogen trucks on the road in the Netherlands. Experiments are currently being carried out and first experiences gained. The Climate Agreement aims for 10 000 zero-emission/plug-in hybrid electric trucks and tractive units (for semi-trailers) by 2030. Hydrogen also has a role to play in this. Assuming a share of about 10% of all zero-emission vehicles in 2030, this means approximately 1 000 fuel cell electric vehicles. To achieve this number, rapid growth in the number of new sales is necessary (currently virtually zero). In addition, hydrogen cars must become considerably cheaper. At the moment, they cost about 5 to 10 times more the price of a conventional diesel truck.

CNG vehicles
The number of CNG passenger cars, at 4 000 vehicles in 2019, is still small, but growing (in the past 3 years by about 10% per year). The number of CNG delivery vans, at 2 604 vehicles in 2019, was small, but growing (from 1 500 vehicles in 2016 to 2 600 vehicles in 2019). The number of CNG trucks and tractive units, at about 400 vehicles in 2019, is still very small.

LNG vehicles
In 2019, there were also 433 LNG trucks and/or tractive units. The target of the platform is 3 500 to 7 000 LNG trucks by 2030. So far, LNG has not yet taken off in the way hoped for a number of years ago. Each year, the fleet is growing by about 100 vehicles. This is mainly attributable to disappointing business cases.

LNG and electric vehicles
In addition to diesel, inland waterway vessels use LNG as fuel on a very limited scale (11 vessels). Sales of LNG in inland shipping are consequently limited. The future trend in the use of LNG is uncertain. LNG is considered as a transitional fuel towards zero emissions. From LNG, the switch can then be made to biogas (LBG) or synthetic gas. However, this trend is uncertain; at present little use is made of biogas.
There are still no fully electric inland waterway vessels on the market which run exclusively on electricity from batteries. On the other hand, the first applications are being developed of propulsion using mobile energy containers (MECs). Used MECs can be replaced with fully charged MECs at container terminals. There are specific plans for market launch. This technology is therefore still at the research stage, but with specific plans for introduction.
In 2019, a first vessel (SENDO shipping) was commissioned with a battery pack of 560 kWh. This vessel can run for a few hours on electricity. There are a further two such vessels under construction. The Climate Agreement aims for a minimum of 150 zero-emission inland waterway vessels by 2030. It is still unclear which proportion of these vessels will be battery-electric or fuel cell-electric.

The fleet of seagoing ships powered by LNG is growing slowly but steadily. Currently 11 LNG vessels of Dutch shipowners are operational. In the 'Green Deal Maritime and Inland Shipping and Ports', the target has been agreed to achieve a CO_2 reduction by 2030 in line with the IMO ambition (International Maritime Organisation). This is a 40% CO_2 reduction at fleet level (compared to 2008).

TRANSPORT MODE	**ALTERNATIVE FUELS VEHICLES (AFV)**	**CURRENT AND PAST NUMBER OF AFV**			**NUMBER OF AFV EXPECTED TO BE REGISTERED**		
		2016	**2017**	**2018**	**2020**	**2025**	**2030**
	ELECTRICITY						
Road	**Electric Vehicles, EV (total road)**	**149 872**	**164 027**	**195 476**	**128 936**	**991 058**	**1 953 300**
	Powered Two Wheelers (PTW)	**35 979**	**42 071**	**49 029**	**65 000**	**250 000**	**500 000**
	Electric Vehicles, EV (excl. PTW)	**113 893**	**121 956**	**146 447**	**63 936**	**741 058**	**1 453 300**
	Electric Passenger Cars (BEV+PHEV)	112 009	119 338	142 727	50 000	700 000	1 350 000
	• BEV	13 116	21 119	44 977	50 000	700 000	1 350 000
	• PHEV	98 893	98 219	97 750	NT	NT	NT
	Electric Light Commercial Vehicles	1 625	2 216	3 194	13 000	37 000	85 000
	• BEV	1 625	2 216	3 194	13 000	37 000	85 000
	• PHEV	0	0	0	NT	NT	NT
	Electric Heavy Commercial Vehicles	90	101	118	120	2 000	15 000
	• BEV	90	101	118	120	2 000	15 000
	• PHEV	0	0	0	NT	NT	NT
	Electric Buses and Coaches	169	301	408	816	2 058	3 300
	• BEV	169	301	408	816	2 058	3 300
	• PHEV	0	0	0	**NT**	NT	NT
Water	Inland Waterway Vessels	ND	ND	ND	2	30	100
	Seagoing Ships	ND	ND	ND	0	0	0
Air	Aircraft	0	0	0	ND	ND	ND
Rail	Locomotives	ND	ND	ND	0	0	0
	CNG (including Biomethane)						
Road	**CNG Vehicles (total road)**	**5 677**	**6 927**	**7 870**	**0**	**0**	**0**
	Powered Two Wheelers	**0**	**0**	**0**	**NT**	**NT**	**NT**
	CNG Vehicles (excl. PTW)	**5 677**	**6 927**	**7 870**	**0**	**0**	**0**
	CNG Passenger Cars	3 148	3 637	4 055	NT	NT	NT
	CNG Light Commercial Vehicles	1 590	2 192	2 507	NT	NT	NT

TRANSPORT MODE	ALTERNATIVE FUELS VEHICLES (AFV)	CURRENT AND PAST NUMBER OF AFV			NUMBER OF AFV EXPECTED TO BE REGISTERED		
	CNG Heavy Commercial Vehicles	281	455	630	NT	NT	NT
	CNG Buses and Coaches	658	643	678	NT	NT	NT
Water	Inland Waterway Vessels	0	1	1	NT	NT	NT
	Seagoing Ships	0	0	0	NT	NT	NT
Air	Aircraft	0	0	0	NT	NT	NT
Rail	Locomotives	0	0	0	NT	NT	NT
	LNG (including Biomethane)						
Road	**LNG Vehicles (total road)**	**0**	**0**	**457**	**600**	**2 925**	**5 250**
	Powered Two Wheelers	**0**	**0**	**0**	**NT**	**NT**	**NT**
	LNG Passenger Cars	0	0	0	NT	NT	NT
	LNG Light Commercial Vehicles	0	0	0	NT	NT	NT
	LNG Heavy Commercial Vehicles	ND	ND	457	600	2 925	5 250
	LNG Buses and Coaches	ND	ND	ND	NT	NT	NT
Water	LNG Inland Waterway Vessels	**ND**	**ND**	**7**	**11**	**86**	**160**
	LNG Seagoing Ships	ND	ND	11	11	30	48
Air	Aircraft	0	0	0	NT	NT	NT
Rail	Locomotives	0	0	0	NT	NT	NT
	HYDROGEN						
Road	**Fuel Cell Vehicles, FCEV (total road)**	**30**	**58**	**69**	**2 203**	**33 875**	**189 400**
	Powered Two Wheelers	**0**	**0**	**0**	**NT**	**NT**	**NT**
	Hydrogen Passenger Cars	30	41	50	1 750	15 000	150 000
	Hydrogen Light Commercial Vehicles	0	10	10	400	15 000	30 000
	Hydrogen Heavy Commercial Vehicles	ND	1	3	3	3 000	7 700
	Hydrogen Buses and Coaches	ND	6	6	50	875	1 700
Water	Inland Waterway Vessels	0	0	0	NT	15	50
	Seagoing Ships	0	0	0	NT	NT	0
Air	Aircraft	0	0	0	NT	NT	NT
Rail	Locomotives	0	0	0	1	NT	NT

TRANSPORT MODE	ALTERNATIVE FUELS VEHICLES (AFV)	CURRENT AND PAST NUMBER OF AFV			NUMBER OF AFV EXPECTED TO BE REGISTERED		
	LPG						
Road	**LPG Vehicles (total road)**	**174 674**	**163 968**	**154 448**	**0**	**0**	**0**
	Powered Two Wheelers	**0**	**0**	**0**	**NT**	**NT**	**NT**
	LPG Passenger Cars	154 472	143 237	132 956	NT	NT	NT
	LPG Light Commercial Vehicles	19 479	19 997	20 753	NT	NT	NT
	LPG Heavy Commercial Vehicles	713	725	730	NT	NT	NT
	LPG Buses and Coaches	10	9	9	NT	NT	NT
Water	Inland Waterway Vessels	0	0	0	NT	NT	NT
	Seagoing Ships	0	0	0	NT	NT	NT
Air	Aircraft	0	0	0	NT	NT	NT
Rail	Locomotives	0	0	0	NT	NT	NT
	OTHER AF						
Road	**Other AF Vehicles (total road)**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
	Powered Two Wheelers	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
	Passenger Cars	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
	Light Commercial Vehicles	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
	Heavy Commercial Vehicles	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
	Buses and Coaches	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
Water	Inland Waterway Vessels	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
	Seagoing Ships	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
Air	Aircraft	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**
Rail	Locomotives	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**	**not filled in**

Key
ND = no data; NT = no target

5.2 National objectives for the deployment of alternative fuels

In 2018, conventional fuels were the main energy carriers in the mobility sector. That year, diesel, petrol and LPG accounted for approximately 97% of the energy carriers (in PJ), of which about 4.5% of the physical sales were petrol and diesel substitutes in the form of blended biofuels. In addition, 2% of the energy consumption was electric and 1% of another type. The table shows that the

absolute energy demand in mobility has increased steadily over the past three years.

Fuel		2017	2018
Electricity	**Total electricity consumption in transport - volume NL**	7PJ	8PJ
Hydrogen	**Total H_2 in Transport volume NL**	0PJ	OPJ
CNG/LNG	**Total natural gas in transport volume NL**	2PJ	2PJ

Figure 4: Alternative fuels consumption in the Netherlands

Electric car sales are growing strongly, partly due to the tax incentive. This is also reflected in the sale of electricity for road transport. Since 2013, electricity demand for road transport has risen tenfold. The share of electricity of the total quantity of renewable energy for transport is still small (0.8%). It should be noted that the Dutch Emissions Authority (NEa) provides figures only for recorded electricity. In the case of mobility, not all electricity is recorded.

Hydrogen sales in road transport are not currently centrally monitored. The share will be fairly small, given the small number of cars in circulation (see 4.4.3.4). Commercial hydrogen production in the Netherlands is currently grey, i.e. fossil. This grey hydrogen is produced from gas by means of steam reforming (SMR) or electrolysis. Hydrogen in the mobility sector is usually green, thanks to the use of green certificates at the existing H_2 refuelling stations. 'Blue hydrogen', whereby the CO_2 is captured during the SMR process and stored underground, is not available so far on the Dutch market.

Vehicles fuelled by natural gas are on the rise: sales of CNG and LNG have risen sharply since 2010. As a proportion of total sales, natural gas still amounts to less than 1%.

Well-to-wheel emissions
Well-to-Wheel (WTW) emissions are all emissions over the entire chain. To obtain a basic insight into the trend in WTW emissions, the degree of renewability is shown for the various energy carriers over the entire chain. The following observations are made:

- Conventional fuels petrol and diesel are subject to blending obligations for biofuels. As a result, the proportion of renewable has increased in recent years to 4% (petrol) and 11% (diesel). This includes the double-counting;
- Gaseous fuels may be renewable or fossil-based. The share of renewable in LPG, CNG and LNG is currently about 30%;
- Hydrogen-electric:
    - Industrial production of hydrogen is mainly based on fossil fuels. However, the present refuelling stations supply predominantly green hydrogen by means of green certificates;
    - Social discussion is under way on the desirability of the greening of energy carriers by means of green certificates;
    - In addition, it will have to be investigated how the use of 'green hydrogen' influences the total cost of ownership (TCO) for users. Naturally, the same applies for green electricity and renewable gas;
    - There is no 'blue hydrogen' on the market in the Netherlands;
- The greening of the electricity mix in the Netherlands has risen from 14% in 2017 to 15% in 2018;
- High mixes of biofuels by definition have a high renewable content. In the total fuel mix, these fuels are used only on a small scale [NEa, 2019].

5.3 National targets for the deployment of infrastructure

The AFID asks here for the 'level of achievement of the national targets, year by year, for the deployment of alternative fuels infrastructure in the different transport modes (road, water, rail and air)'.

Electric transport

The number of recharging points for road transport is rising rapidly. Over a four-year period (2016-2019), the number has nearly doubled (from about 27 000 to 50 000). The majority of recharging points, i.e. over 90%, provide a low-voltage connection (22kW). Only about 1 000 recharging points have high-voltage connections (above 100kW). As a result, the target under the National Policy Plan of 25 000 recharging points has already been achieved ahead of schedule. There are no hard targets for the number of recharging points in 2030. In the National Agenda of Charging Infrastructure, a figure of 1.7 million is mentioned. This is based on the assumption that 15% of the energy demand is for charging using fast chargers.

Shore-side electricity

Maritime shipping

The number of shore-side connections and locations in the Netherlands is relatively limited (see table below). Charging of (partly) electrically powered vessels usually requires a much heavier duty electric connection than is customary for shore-side electricity (electricity for the hotel trade). Cruise ships are an exception, as they require comparable power for the hotel trade as for propulsion. There are currently shore-side installations in four ports:

Den Helder (defence) Ijmuiden (fishing trawlers), Hook of Holland (ferries) and Scheveningen (trawlers and government shipping).

In Amsterdam, cruise ships will be connected to shore-side electricity in the near future. In Rotterdam too, plans are well advanced to establish shore-side electricity at a large wharf on the Calandkanaal. In 2019, a mobile shore-side electricity installation was opened on the Parkkade. Due to the very high energy consumption of cruise ships for the hotel trade, this requires very heavy-duty connections (in the order of 5 MW).

Inland shipping

Electrical infrastructure mainly refers to the shore-side electricity supply used as a substitute for a conventional auxiliary engine while the vessel is moored. Shore-side electricity connections are available in (almost) all major inland waterway ports in the Netherlands.

Aviation

Normally speaking, stationary aircraft use their kerosene-powered auxiliary engines or a diesel generator for power and air conditioning. In order to reduce this, there are 73 aircraft stands at Schiphol Airport which are equipped with installations for fixed electrical ground power (400 Hz) and pre-conditioned air units. As a result, stationary aircraft no longer need to run their auxiliary engines. The Climate Agreement provides that all land-related activities at the Dutch airports will be zero-emission from 2030.

Hydrogen road transport

The Netherlands currently has four public hydrogen refuelling stations (April 2020). In addition, there are a number of semi-public and private installations. The aim is to increase to 20 in 2020. Under the Climate Agreement, the aim is to achieve 50 hydrogen refuelling stations by the end of 2025. The four public refuelling stations

are located in Rhoon, Helmond, Arnhem and Delfzijl. The majority of hydrogen refuelling stations in the Netherlands supply hydrogen at both 350 and 700 bar. New refuelling stations under construction include those located in The Hague, Schiphol, Groningen, Pesse, Emmen and Roosendaal. In addition, there are a further 12 other refuelling stations at the planning stage in the Netherlands. Special 'hydrogen tankers' ensure the supply. These trailers are equipped with high-pressure hydrogen tanks. In some cases, hydrogen is also produced locally from natural gas (Arnhem), or transported by pipeline (Rhoon).

CNG and LNG road transport
At present, there are 170 CNG refuelling stations and 26 LNG refuelling stations in the Netherlands. CNG is relatively easily available throughout the country, except perhaps in Zeeland. Zeeland has only two CNG refuelling stations. Refuelling with LNG is not yet possible nationwide, but the fuel is still relatively new on the market. However, the present network is adequate. It matches the current demand for LNG. Both the CNG and the LNG refuelling stations are largely realised by the market itself. The expectation is that the number of LNG refuelling stations will increase considerably in the coming years.

LNG shipping
In 2018, the LNG bunkering vessel Cardissa was commissioned by Shell for the bunkering of (larger) seagoing ships. Cardissa can be deployed flexibly for the major ports of Amsterdam and Rotterdam. The bunkering pontoon 'Flexfueler 001' can be deployed flexibly for seagoing ships and inland waterway vessels in Amsterdam and Rotterdam. A second bunkering pontoon 'Flexfueler 002' has already been ordered. As far as is known, there are no plans to purchase more LNG bunkering vessels.
For inland shipping, there are now 7 locations where LNG can be bunkered: Eemshaven, Amsterdam, Rotterdam (tanker and ship-to-ship), Moerdijk, Vlissingen and a fixed bunkering point at Doesburg.

The table below presents the figures for the infrastructure created. The figures date back to November 2019. This tab also includes the updated targets for the deployment of alternative fuels infrastructure. These have been adapted in response to the Dutch Climate Agreement.

ALTERNATIVE FUELS INFRASTRUCTURE (AFI)	**CURRENT AND PAST NUMBER OF RECHARGING/REFUELLING POINTS**			**TARGET NUMBER OF RECHARGING/REFUELLING POINTS**		
	2016	**2017**	**2018**	**2020**	**2025**	**2030**
ELECTRICITY						
Total recharging points (public* + private)	**26 693**	**33 623**	**38 977**	**25 000**	**925 500**	**1 826 000**
Recharging points (publicly accessible)	**26 693**	**33 623**	**38 977**	**0**	**0**	**0**
Normal power recharging points, P ≤ 22kW (public)	26 079	32 867	35 502	NT	NT	NT
High power recharging points, P > 22kW (public)	614	756	3 475	0	0	0
• AC fast charging, 22kW < P ≤ 43 kW (public)	202	217	2 658			

ALTERNATIVE FUELS INFRASTRUCTURE (AFI)	**CURRENT AND PAST NUMBER OF RECHARGING/REFUELLING POINTS**			**TARGET NUMBER OF RECHARGING/REFUELLING POINTS**		
• DC fast charging, P < 100 kW (public)	412	539	552			
• DC ultrafast charging, P ≥ 100 kW (public)	0	0	265			
Recharging points (private)	**0**	**0**	**0**	**0**	**0**	**0**
Normal power recharging points, P ≤ 22kW (private)						
High power recharging points, P > 22kW (private)	0	0	0	0	0	0
• AC fast charging, 22kW < P ≤ 43 kW (private)						
• DC fast charging, P < 100 kW (private)						
• DC ultrafast charging, P ≥ 100 kW (private)						
Shore-side electricity supply for seagoing ships in maritime ports	0	0	4	NT	10	NT
Shore-side electricity supply for inland waterway vessels in inland ports	ND	ND	280+	NT		75
Electricity supply for stationary airplanes	ND	ND	73+	NT	NT	100% ZE
NATURAL GAS (including Biomethane)						
CNG refuelling points (total)	**0**	**0**	**150**	**170**	**170**	**170**
CNG refuelling points (public)	ND	ND	150	170	170	170
CNG refuelling points (private fleet operators)	ND	ND	ND	NT	NT	NT
LNG refuelling points (total)	**0**	**18**	**27**	**NT**	**30**	**NT**
LNG refuelling points (public)	ND	18	27	NT	30	**NT**
LNG refuelling points (private fleet operators)	ND	ND	ND	NT	NT	**NT**
Maritime Ports - LNG refuelling points	**ND**	**1**	**1**	**NT**	**4**	**NT**
Inland Ports - LNG refuelling points	**ND**	**5**	**5**	**NT**	**NT**	**7**
HYDROGEN						
H2 refuelling points (total)	**0**	**1**	**15**	**20**	**50**	**NT**
H2 refuelling points – 350 bar (total)	0	0	8	0	0	0
H2 refuelling points – 350 bar (public)			4			
H2 refuelling points – 350 bar (private fleet operators)			4			
H2 refuelling points – 700 bar	0	1	7	20	50	0

ALTERNATIVE FUELS INFRASTRUCTURE (AFI)	CURRENT AND PAST NUMBER OF RECHARGING/REFUELLING POINTS			TARGET NUMBER OF RECHARGING/REFUELLING POINTS		
(total)						
H2 refuelling points – 700 bar (public)			3			
H2 refuelling points – 700 bar (private fleet operators)			4			
LPG						
LPG refuelling points (total)	**0**	**0**	**1 351**	**NT**	**NT**	NT
LPG refuelling points (public)			1 351			
LPG refuelling points (private fleet operators)						
OTHER AF						
AF refuelling points (total)	**0**	**0**	**0**	**0**	**0**	**0**
AF refuelling points (public)						
AF refuelling points (private fleet operators)						

Key
ND = no data; NT = no target; ZE = zero emission

5.4 Charging efficiency

The AFID asks here for: 'information on the methodology applied to take account of the charging efficiency of high power recharging points'.
Charging efficiency is defined by the Commission as follows: 'the concept of efficiency is linked to the number of electric vehicles that can be charged per day in a recharging point. This number will depend on the power of the charger and to a lesser extent on its location.'

There is no fixed methodology used by the public authorities to determine the charging efficiency of recharging points. Furthermore, the public authorities do not possess the data to be able to determine how many charging sessions there are per charging point. These data are held by the private parties that install and operate the fast recharging points.

Network of fast recharging points
Important developments are in progress which influence the charging efficiency of the fast recharging points. The number of vehicles that can be charged per point depends primarily on the charging capacity of the fast recharging point and the charging speed of the vehicle. The Netherlands now has a network of fast recharging points comprising 1 256 public recharging points, which are largely implemented alongside motorways and major trunk roads and to an increasing extent in the urban environment. The majority of fast recharging points have a standard charging capacity of 50 kW. One development, however, is the increase in the charging capacity.
The number of 175 kW public recharging points is increasing and there are a few 350 kW recharging points. The number of such high power recharging points will increase further. In addition, there are the Tesla superchargers with limited

accessibility, which can charge at up to 120 kW. And although most of the present car models cannot (yet) charge more quickly at high power, this will change in the future, as a result of which considerably more cars can be charged per day.
In addition, the location also appears to have an impact on the number of cars that can be charged. Some locations are more popular and have more charging sessions per day. As a result, there is also a location (near Schiphol) where the fast recharging points are at nearly maximum capacity during the day.

Conclusion
In the light of what is asked in the AFID, it can be stated that the public authorities use no fixed methodology to determine the charging efficiency of recharging points. However, the developments surrounding (the network of) fast recharging points will be monitored closely. Discussion is also taking place on this subject with the market, including with a view to the number of necessary future locations. The preparation of a National Charging Infrastructure Action Plan in 2018 will be important in this respect as it maps the present situation and future actions.

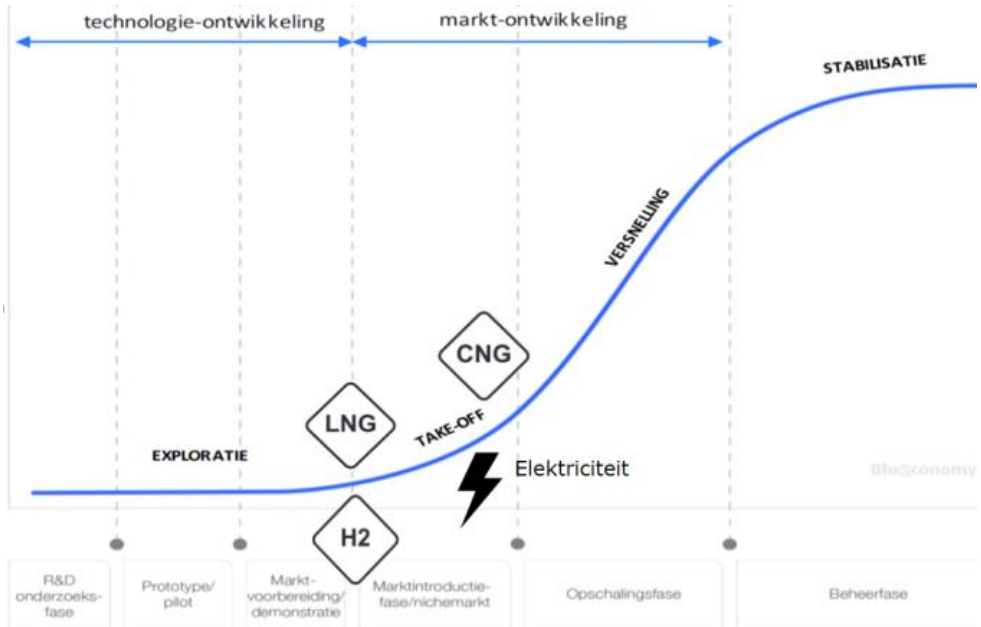
6 Alternative fuels infrastructure developments

In this chapter, the AFID asks about: 'changes in supply (additional infrastructure capacity) and demand (capacity actually used)'. After looking at the shifts in supply in Chapter 5, the developments between supply and demand are now examined.

The Commission's approach is to arrive at a ratio which reflects the capacity used per unit of infrastructure. However, it proves difficult to put a figure on this because demand can be measured in a number of different ways. With regard to hydrogen and CNG/LNG, the infrastructure capacity actually used is not specifically monitored. For electricity too, there is no national monitoring of the capacity actually used. However, some municipalities map this locally, at municipal level.

Demand and supply developments
Looking back in the broader sense to the developments between supply and demand for alternative fuels, a number of interesting developments emerge. Demand is seen here as consumption and/or the number of vehicles for a fuel.

- For electricity, looking back, there was a significant increase in the public charging infrastructure in 2017 (+30%), with demand still lagging behind. Although the vehicle fleet and consumption are growing, supply is ahead of demand here. However, the expectation is that demand will grow strongly in view of the emission targets and the ambition of the Dutch Government to sell only electric vehicles from 2030. The question is therefore whether supply will match demand with the current targets or whether it will have to grow.
- For hydrogen, growth in supply was in line with demand, with not a great deal of growth in either. However, as indicated above, the supply of infrastructure will grow significantly in the coming years, certainly if the target is to be met. The supply will outstrip demand. After this, it is consequently important for demand to keep pace.
- Looking back for CNG and LNG, there was an increase in supply and demand. In the case of LNG, following an increase in the infrastructure, there is now also rising demand in the form of a growing vehicle fleet of trucks. For CNG, the nationwide network has grown slightly and demand has also risen in the form of more CNG passenger vehicles. Consumption rose from 2015 and in 2017 remained more or less stable.



Key
technolgie-ontwikkeling = technology development
markt-ontwikkeling = market development
EXPLORATIE = EXPLORATION
LNG
H2
Elektriciteit = Electricity
TAKE-OFF
VERSNELLING = ACCELERATION
STABILISATIE = STABILISATION
R&D onderzoeksfase = R&D research phase
Prototype/pilot
Markt-voorbereiding/demonstratie = Market preparation/demonstration
Marktintroductiefase/nichemarkt = Market introduction phase/niche market
Opschalingsfase = Scaling-up phase
Beheerfase = Management phase

Conclusion
In conclusion, fuels can be seen to be in a different market phase and that the changes in supply and demand are in line with this. The main changes are the significant growth in the supply of electric charging infrastructure and the fact that growth in hydrogen is partly lagging behind. With the growth of the electric charging infrastructure, the development that this will possibly have to grow faster due to future demand also plays a role. In contrast, for hydrogen, the supply will grow in the coming years and it is the demand which must grow with it. CNG and LNG are developing favourably and there is therefore no obvious need for greater efforts on the demand or the supply side. On the other hand, developments in these areas must be closely monitored.

Annex 1: Overview of support measures

The table below provides an overview of the main measures contributing to the AFID. A measure here is 'allocated' to a fuel or mode of transport only if it was actually deployed for that purpose in 2017/2018. Some measures, such as subsidies, were in fact intended for several fuels but in practice were implemented for only one fuel.
Zero Emission measures are the measures which explicitly mention that the focus as far as possible is on zero emissions by means of electric transport and/or hydrogen. Only if a measure is fuel-specific is this stated next to the fuel in question.

Fuel		Measure	Road	Water	Air	Rail
Zero Emission	*tax*	Tax incentive ultra-fuel-efficient cars 2016-2020 (Financing Plan 2015 and *Autobrief II*): *- 0 gr/km CO_2: exemption from purchase tax (BPM) and motor vehicle tax (MRB), additional income tax liability 4%.* *- 1-50 gr/km CO_2: reduction BPM and MRB, additional income tax liability 22%* Environmental investment deduction (MIA) and Arbitrary depreciation of environmental investments (VAMIL) schemes (MIA/VAMIL schemes)	■	■		
Electric & hydrogen	*non-tax*	Green Deal Zero Emission Urban Logistics Green Deal Electric Transport 2016-2020 Administrative Agreement Zero-Emission Regional Public Transport – Transport by Bus Administrative agreement on Zero-Emission Transport for Target Groups Covenant City Deal Electric Mobility-sharing in urban area development Green Deal Car-sharing Central Government as launching customer Lean & Green Personal Mobility	■			■
Electric						
	tax	MIA/VAMIL schemes Halving of tax rate for public recharging points Local subsidy schemes: subsidy for purchase of passenger (new/second-hand) and company vehicles**	■	■		
	non-tax	Green Deal Publicly Accessible Electric Charging Infrastructure (Green Deal Mopeds and Auto-cycles & Green Deal Textile Industry) Local measures: demand-driven recharging point installation, priority parking permit, renewal of own car fleet Support from EU subsidies (including BENEFIC) Schiphol agreements concerning electrified spaces for groundhandling services Programme for better use: e-recharging points Haaglanden region Increasing sustainability of Central Government vehicle fleet Demonstration scheme for climate technologies and innovation in transport (DKTI)	■	■	■	
Hydrogen						
	tax	Exemption from excise duty on hydrogen MIA/VAMIL schemes	■			
	non-tax	Hydrogen Safety Innovation programme: Uniform permit-granting, tunnel safety Support from EU subsidies (including BENEFIC, INTERREG NWE, TEN-T CEF, FCHJU) Regional projects: e.g. Covenant on green hydrogen economy South Holland Subsidy for Hydrogen Pilot scheme (vehicles & infrastructure) Demonstration scheme for climate technologies and innovation in transport (DKTI)	■	■		
CNG						
		Bio-CNG: Credit generated by means of renewable energy units (HBEs)	■			

		MIA/VAMIL schemes Low energy tax				
LNG						
	tax	Temporary favourable excise duty rate MIA/VAMIL schemes (including LNG Infrastructure & vehicles) Refund scheme LNG 2014-2018				
	non-tax	Green Deal: 'LNG: Rhine and Wadden' Innovation programme small-scale LNG (2012-2017) Knowledge-sharing via National LNG Platform Support from EU subsidies (including BENEFIC, CEF *(connect 2LNG)*) Subsidy programme for innovations in sustainable inland shipping Demonstration scheme for climate technologies and innovation in transport (DKTI)				

Annex 2: Other alternative fuels: biofuels & LPG

As indicated, the monitoring focuses on the measures taken in a Member State to support the build-up of alternative fuels infrastructure. The National Policy Framework lists measures for fuels for which the AFID lays down obligations (electricity, hydrogen, CNG and LNG). The AFID contains no obligations with regard to biofuels because the existing fuel infrastructure is used for them. Likewise there are no obligations for LPG because this infrastructure no longer requires any additional incentives. Consequently, there are no supporting measures or targets mentioned in the National Policy Framework. On the other hand, the Commission asked for developments concerning these fuels to be mentioned.

- Biofuels

The Dutch commitment to the use of biofuels is governed by two European Directives, the European Fuel Quality Directive (FQD) and the European Renewable Energy Directive (RED). Provision has been made in Dutch legislation for the 'blending obligation' since 2007. Businesses also have the possibility to place additional renewable energy on the market one year and to carry it forward administratively to a subsequent year. In addition, biofuels may count towards the obligation at a time when it is not yet certain that they will in fact be placed on the market. This can be recorded in a registry via 'renewable energy units (HBEs)'.

Compared to 2017, the consumption of liquid biofuels for road transport has increased by 26%, whereas in 2016 it fell by over 20%.

This monitoring report will not deal further with the developments concerning biofuels. These developments are in fact already reported to the Commission every two years. In addition, the Dutch Emissions Authority (NEa) issues an annual report containing the results achieved for the energy for transport laws and regulations. In addition, the CBS reports annually on the progress towards achieving the European target for renewable energy for transport.

- LPG

The public authorities do not provide any incentive measures or policy instruments focusing on the use of LPG or the build-up of infrastructure. The number of points of sale in the Netherlands is about 1300, making it a broad nationwide network. The popularity of LPG has been declining in recent years. The number of points of sale is falling, as well as the number of vehicles running on LPG. As a result, the total consumption of LPG is also declining in road transport. The CBS mentions disadvantages of LPG installation, such as the loss of luggage space and the lapsing of the manufacturer's warranty when driving on LPG. Moreover, diesel has become more economical for business drivers.

A development in the field of greening of fuel is the possible use of bio-LPG. In the production of HVO, bio-LPG becomes available as a by-product which could lead to extra use of biofuels in light road transport.[iv]

Annex 3: Requirements for AFID report

The AFID Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 states the following in ANNEX I: REPORT:

The report shall contain a description of the measures taken in a Member State in support of alternative fuels infrastructure build-up. The report shall include at least the following elements:

1. Legal measures
Information on legal measures, which may consist of legislative, regulatory or administrative measures to support the build-up of alternative fuels infrastructure, such as building permits, parking lot permits, certification of the environmental performance of businesses and fuel stations concessions.

2. Policy measures supporting the implementation of the national policy framework
Information on those measures shall include the following elements:
— direct incentives for the purchase of means of transport using alternative fuels or for building the infrastructure,
— availability of tax incentives to promote means of transport using alternative fuels and the relevant infrastructure,
— use of public procurement in support of alternative fuels, including joint procurement,
— demand-side non-financial incentives, for example preferential access to restricted areas, parking policy and dedicated lanes,
— consideration of the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network,
— technical and administrative procedures and legislation with regard to the authorisation of alternative fuels supply, in order to facilitate the authorisation process.

3. Deployment and manufacturing support
- Annual public budget allocated for alternative fuels infrastructure deployment, broken down by alternative fuel and by transport mode (road, rail, water and air).
- Annual public budget allocated to support manufacturing plants for alternative fuels technologies, broken down by alternative fuel and by transport mode.
- Consideration of any particular needs during the initial phase of the deployment of alternative fuels infrastructures.

4. Research, technological development and demonstration (RTD&D)
Annual public budget allocated to support alternative fuels RTD&D, broken down by fuel and by transport mode.

5. Targets and objectives
— estimation of the number of alternative fuel vehicles expected by 2020, 2025 and 2030,
— level of achievement of the national objectives for the deployment of alternative fuels in the different transport modes (road, rail, water and air),
— level of achievement of the national targets, year by year, for the deployment of alternative fuels infrastructure in the different transport modes,
— information on the methodology applied to take account of the charging efficiency of high power recharging points.

6. Alternative fuels infrastructure developments
Changes in supply (additional infrastructure capacity) and demand (capacity actually used).

Annex 4: List of sources

References: (to be supplemented)

[i] Application of policy with regard to services alongside motorways and major trunk roads: https://zoek.officielebekendmakingen.nl/stcrt-2017-11880.html
[ii] Netherlands Enterprise Agency (RVO), https://www.rvo.nl/sites/default/files/2016/07/Duurzaam%20laden%20op%20de%20zon.pdf
[iii] MRDH, https://mrdh.nl/nieuws/ret-gunt-levering-55-e-bussen-en-laadpalen-vdl-bus-coach
[iv] TNO Status check of the targets of the mobility table
[v] Routeradar 2019 Straatbeeldmonitor, Rijkswaterstaat commissioned by the Ministry of Infrastructure and Water Management.