



(Photo: Bas Stoffelsen)

Electric transport in the Netherlands

Highlights 2017



The Afsluitdijk is a causeway linking together two Dutch provinces (Photo: Ivo Vrandeken / Beeldmaker)

Electromobility in the Netherlands

Highlights 2017

By 2030, only zero-emission cars will be sold in the Netherlands. That is the Dutch government's ambition. With this goal in mind, businesses, social institutions, knowledge institutions and the government are all working together, both nationally and internationally, to accelerate the transition to electric vehicles. The aim is to help meet the climate targets and, in addition, to take advantage of the associated economic opportunities.

And their efforts bore fruit in 2017: last year, the number of electric cars in the Netherlands grew once again. For the first time, the growth came entirely from fully electric cars: more than 8,000 new, fully electric passenger vehicles were registered, while the number of plug-in hybrids fell slightly.

120,000 electric passenger vehicles

With just over 120,000¹ electric passenger vehicles by the end of 2017, the Netherlands is one of the European leaders in this field. As at 31 December 2017, the Netherlands had 165,884 electric vehicles with 2 or more wheels, including 119,375 electric passenger vehicles (BEVs + PHEVs).

Opportunities through innovation

It is clear, therefore, that e-mobility is an innovation that offers economic opportunities for Dutch businesses. Amongst others, Dutch companies are active in the field of charging infrastructure, charging services, consultancy, the manufacture of electric trucks and buses, the manufacture of components and the manufacture of light electric vehicles, including electric scooters.

The Netherlands Enterprise Agency, RVO.nl, promotes e-mobility on behalf of the Ministry of Infrastructure and Water Management.

In 2017, a large number of e-mobility related activities took place and significant results were achieved. This annual report contains some of the highlights from 2017. You can find the latest information on the website www.nederlandelektrisch.nl.

¹ Net registrations up to and including December 2017. This number represents the net cumulative registrations: increase due to net registrations and decrease due to export, theft, etc.



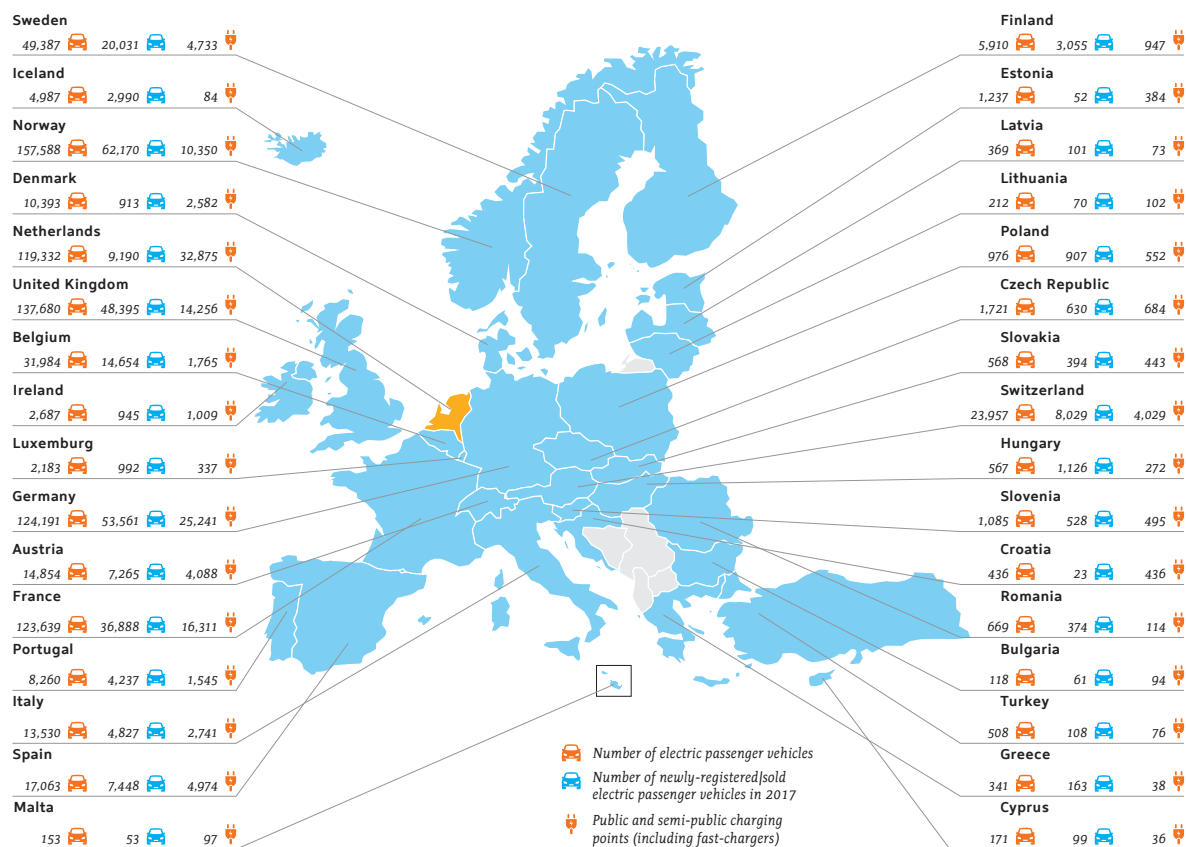
(Photo: Hans Roggen Fotografie)

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1. 2017 in a nutshell

International benchmark: the Netherlands compared to Europe



(Source: www.eafo.eu; processed by RVO.nl)

International benchmark

Country	2011	2012	2013	2014	2015	2016	2017
China	8,200	7,200	10,100	35,687	114,279	283,247	532,994
Europe	11,600	29,900	65,900	96,083	181,672	209,258	279,893
Japan	13,500	27,400	29,300	31,897	23,418	20,563	48,896
North America	18,300	57,300	100,400	120,813	122,446	169,699	212,406
South Korea							13,422
Rest of the World	100	250	750	4,024	6,528	11,944	3,535
Total	51,700	122,050	206,450	288,504	448,343	694,711	1,091,146

* New registrations passenger vehicles: plug-in hybrid electric vehicles (PHEVs) and full electric vehicles (BEVs)

(Source: Bloomberg New Energy Finance)

E-mobility in 2017 in figures²

Electric vehicles on the road³



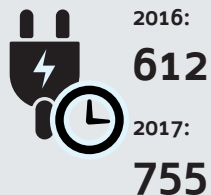
Employment

(Source: Capitalising on the Earning Potential of Electric Vehicles, November 2017)

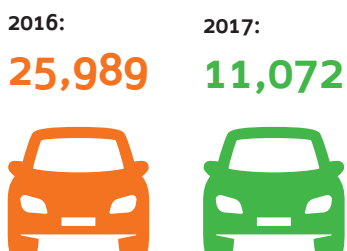


Year	Full-time jobs	Production (million Euros)
2015:	3,090	840
2016:	3,730	1,040

Fast-charging points



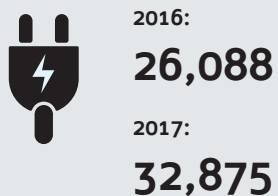
Newly registered electric cars⁴



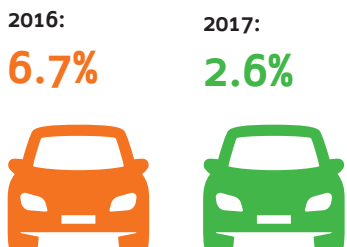
Additional tax liability for ZEV



Public and semi-public charging points



Market share of number of new registrations



Exemption of registration and road tax for zero emission vehicles



² Source: Statistics Netherlands, CBS, the Dutch Road Authority, RDW, and the charging station information provider, Oplaaadpalen.nl; edited by the Netherlands Enterprise Agency, RVO.nl

³ Cars (BEVs, PHEVs, FCEVs), commercial vehicles ≤3.5 tonnes, commercial vehicles >3.5 tonnes, quadricycles, buses, motorcycles

⁴ BEVs and PHEVs

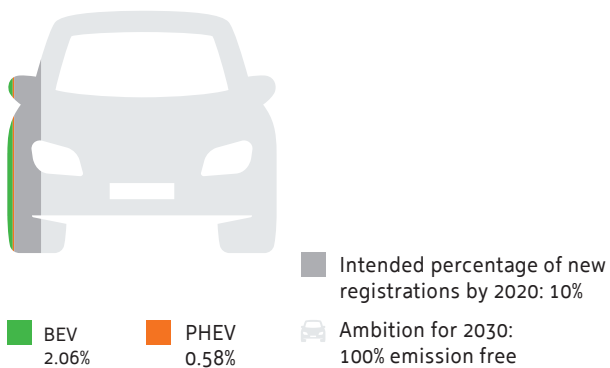
Percentage of new registrations accounted for by electric passenger vehicles

In 2016, the Dutch government and the Formula E-Team signed the Electric Transport Green Deal 2016-2020. The Green Deal's aim is that 10% of new cars will have an electric powertrain and plug by 2020. The ambition of the Coalition Agreement⁵ of 10 October 2017 is that all new cars will be emission free by 2030 at the latest.

From 2017 to 2030

- Percentage of new registrations in 2017: 2.65%
BEVs = 2.06% and PHEVs = 0.58%
- Intended percentage of new registrations by 2020: 10%
Ambition for 2030: 100% emission free

Percentage of electric passenger vehicles in 2017



(Source: Dutch Road Authority; processes by RVO.nl)

⁵ P. 43: <https://www.kabinetformatie2017.nl/binaries/kabinetformatie/documenten/verslagen/2017/10/10/coalition-agreement-confidence-in-the-future/coalition-agreement-2017-confidence-in-the-future.pdf>



(Photo: EVBox)

2. International dimension: exports, takeovers and partnerships



VDL's electric bus in the German city of Münster



Cloud-connected charging points (Photo: NewMotion)

The Netherlands as exporter: businesses go international

- Allego exports fast chargers and enters into partnership with Microsoft:** Allego has installed 4 fast chargers at Frankfurt International Airport, and has also supplied Belgium with the first smart charging plazas. The plazas, which have been installed in Antwerp, Mechelen and Brussels, distribute the available energy smartly between the electric vehicles that are using the plaza. Whereas individual charging points always charge vehicles to full capacity, Allego's ChargingPlaza adjusts the supply of power to the driver's actual charging requirements and the characteristics of the vehicle. As a result, multiple charging points can be charged using the same power capacity. Also, in 2017, Allego entered into a partnership with Microsoft. The two companies have jointly developed the EV Cloud Services Platform, which enables companies to offer interoperable services, enabling electric vehicles to be charged seamlessly at home, at work and on the road.
- VDL supplies buses to the German city of Münster:** the Eindhoven-based bus manufacturer VDL has supplied 5 electric buses to the city of Münster. Originally, it supplied 5 Citea SLF-120 Electric buses to the public utilities company Stadtwerke Münster. After a test phase of almost 2 years, the German city decided to place

a follow-up order for a further 5 electric buses.

- Fastned installs fast charging stations in Germany and the UK:** Fastned has received a grant of 4.1 million Euros from the German government for the installation of 25 fast charging stations. The stations will be fitted with the latest fast chargers, which, in 20 minutes, can provide vehicles with enough energy to enable them to travel over 250 km. The company has also signed an agreement with Transport for London (TfL) for the installation of fast charging stations in and around London. TfL, the government body responsible for infrastructure and public transport in and around London, aims to install at least 300 fast charging points by 2020.

Dutch companies catch the eye of international giants

In 2017, a number of Dutch companies caught the eye of major multinationals. Some companies were taken over completely, while others sold a percentage of their shares:

- NewMotion taken over by Shell:** Shell has bought NewMotion. The takeover will enable NewMotion to rapidly expand its e-mobility services. The company has a European network of more than 50,000 cloud-connected charging points, and more than 100,000 NewMotion charging cards are in circulation. With



Jedlix - the team
(Photo: Jedlix)



PitPoint's refuelling station
(Photo: PitPoint)

the products and services of NewMotion, Shell enhances its ability to offer different fuels and energy solutions for different journeys.

- Renault acquires stake in Jedlix:** Groupe Renault has acquired a 25% stake in Jedlix. The Dutch start-up is part of energy group Eneco, and specialises in smart, sustainable charging of electric vehicles. Jedlix and Groupe Renault will focus on the further development of products and services for drivers of electric vehicles. The first product is a smartphone app, which ensures that, wherever possible, electric cars are charged using sustainable energy, as cheaply as possible.
- Total takes over PitPoint:** Total has taken over PitPoint. Not only is PitPoint Europe's third largest supplier of green gas for vehicles but, in the Netherlands, it is also well known as an operator of charging points for electric vehicles. For example, PitPoint is currently installing 2,400 new charging stations on behalf of MRA-Elektrisch. In the Netherlands, PitPoint is also involved in a number of hydrogen projects, such as the construction of a hydrogen refuelling station in the province of Groningen. The takeover of the company is part of Total's strategy of expanding its low-carbon activities.

- ENGIE buys EVBox:** ENGIE has taken over the charging station manufacturer and operator, EVBox. The Amsterdam-based company has supplied more than 40,000 charging stations to 20 different countries. EVBox has been developing and selling charging solutions for electric vehicles since 2010.

PIBs: growth in international partnerships

Through its Partners for International Business (PIB) programmes, the Dutch government actively encourages Dutch businesses to enter new markets. PIBs are aimed at groups of companies that are looking to enter an international market together. Through the PIBs, the Ministry of Foreign Affairs uses economic diplomacy to remove barriers to trade and investment, allowing entrepreneurs to exploit the opportunities that are available to them. In recent years, a number of different e-mobility PIBs have been established, and the highlights for 2017 are as follows:

- Supercharging PIB, India:** In 2017, there was a government mission, which focused on exchanging practical experiences in the field of e-mobility and charging infrastructure. The main focus of the mission was electric buses, with best practices from the Netherlands being used to inform policy-making in India. The emphasis of the PIB was on exchanging

practical experiences in order to enable Dutch businesses to be first movers in a market that is predicted to have 6 million electric and hybrid vehicles by 2022. In 2017, businesses achieved sales of around 350,000 Euros as a result of this PIB.

- S4C PIB, United States:** the Coast to Coast Sustainable Impact Finance (C2C SIF) investment fund was set up as a result of the Smart Mobility Solutions for Connected, Clean and Autonomous Transportation Needs PIB (S4C PIB). This fund supports Dutch companies that set up business in California and US companies that are looking to set up business in the Netherlands. In 2017, there was a trade mission to California's Bay Area as part of the PIB. The trade delegation was led by Minister of Economic Affairs, Henk Kamp, and Prince Constantijn. In addition, Minister of Infrastructure and Environment, Sharon Dijksma, led a climate mission to California, which focused to a large extent on the promotion of cleaner vehicles. Finally, the EV Roadmap Conference was held in Oregon. This attracted more than 600 delegates, including a large delegation from the Netherlands, and featured international speakers, exhibitions and interactive sessions.
- Green & Smart Mobility PIB, France:** in June, a cluster of 17 Dutch businesses,



The Holland Lounge at EVS30 in Stuttgart (Photo: Rutger de Croon)

knowledge institutions and industry associations were given the go-ahead for a French PIB. This PIB aims to improve the position on the French market of Dutch businesses that specialise in the mobility of the future, e.g. electric cars, smart charging infrastructure, climate-neutral public transport, autonomous and communicating cars and smart and lightweight materials.

- **PIB Erfolgsformeln verbinden - nachhaltige Mobilität und Energie in Österreich und in den Niederlanden PIB (Combining our successes - sustainable mobility and energy in Austria and the Netherlands PIB):** the first year of this project focused on startup. Seven Austrian conferences and events helped expand the network. Two K2K projects around zero-emission heavy goods vehicles (HVGs) and zero-emission tourist mobility were launched. Preparations were made for a project around zero-emission refrigerated distribution, as was an application for 'Sondergenehmigung für Lang-LKW' (a special permit for Long Heavy Vehicles).

The PIB project made preparations for the rental of an electric camper van, which is also used as a sustainable, reusable mobile stand at conferences, trade fairs and events in the context of the PIB. Agreements have been made with the business development agency Standortagentur Tirol for collaboration in 2018, the main focus being on interoperability and roaming in the field of cross-border charging.

- **PIB Zuid- en West-Duitsland (Southern/Western Germany PIB):** the activities of the various participants have resulted in Dutch protocols being included in the tenders and charging infrastructure of German cities. The city of Munich, for example, is already active in this field in partnership with ElaadNL. And there is also interest in the controllers and back-offices of Dutch companies such as Chargepoint and LastMileSolutions. Other companies, such as EMOSS, with its electric trucks, and Stint, with its light electric vehicles, are also doing well. And, last but not least, APPM Management Consultants has established a branch in Germany.

- **PIB van Amsterdam naar Berlijn (Duitsland Noord) (From Amsterdam to Berlin (Northern Germany) PIB):** Here too, one of the main priorities was to raise awareness of the OCCP and OCPI protocols, the ultimate goal being to achieve interoperability between all charging infrastructures in Europe. The basis for this was close collaboration between the Consortium and the State of Lower Saxony and Germany's National Organisation for Hydrogen and Fuel Cell Technology, NOW GmbH, in the form of various workshops for public utilities and municipalities. This resulted, amongst others, in a partnership between EV Consult and the regional development agency CIMA Institut für Regionalwirtschaft GmbH Hannover, under which the two parties submit joint bids for tenders. In addition, EVBox has opened an office in Germany and LiveMobility found a partner during the Hannover Messe. Emodz's Vehicle2Grid Project 'Vehicle2HollandHouse' is regularly presented in Germany and won the ECO Internet Award 2016.



The Stint at the Holland Lounge (Photo: Rutger de Croon)

Partnership agreement with Benelux countries aims to improve charging infrastructure

Together with her colleagues from Luxembourg and Belgium, the Netherlands' State Secretary for Infrastructure and Water Management, Stientje van Veldhoven, is to put measures in place to make it easier for e-drivers to find charging stations and to make payment at these charging stations more user friendly and transparent. To this end, the 3 countries have signed a partnership agreement that aims to promote 'cross-border access to e-mobility services in the Benelux countries.' This is designed to enable drivers of electric vehicles to travel seamlessly through the Benelux countries. Under the agreement, drivers will be able to charge an electric vehicle in all three countries using a single charging card or app, and prices will be transparent. For this reason, Open Chargepoint Belgium, eViolin and Chargy – the sector organisations for providers of charging services from the Netherlands, Belgium and Luxembourg – are also party to the agreement.

Enterprise Europe Network supports companies

In May 2017 about 10 companies from the Basque region of Spain visited several organisations in electric mobility in different cities in the Netherlands, including TU Delft and TU Eindhoven. This was organised within the framework of Enterprise Europe Network (EEN) (<https://een.ec.europa.eu/>), the network that helps companies innovate and grow internationally. It was a unique opportunity, not only to learn more about the latest developments in electric vehicles and smart charging in the Netherlands, but also provided the beginnings of possible new partnerships. In addition many Dutch companies took part in the Enterprise Europe Networking matchmaking at the International Electric Vehicle Symposium & Exhibition (EVS30) in October in Stuttgart and at the Smart Electric Mobility – creating green jobs in February in Norway, both of which offered Dutch companies the chance to meet with potential new partners.

Holland Lounge EVS30

Using the Holland Lounge as a base, in October 2017, the Dutch government, businesses and the PIBs presented themselves at the Electric Vehicle Symposium & Exhibition (EVS30) in Stuttgart. The pay-off 'Open minds. Smart solutions' and the showcases on display in the lounge raised the profile of the Dutch e-mobility sector internationally.



(Photo: EVBox)

3. Regional investment



The first charging point from the joint tender issued by the provinces of Brabant and Limburg (Photo: Province of Brabant)

Brabant and Limburg to install 1,250 charging stations

In July 2017, Nuon/Heijmans installed the first of the 1,250 additional charging stations in the provinces of Brabant and Limburg under a tender organised by both provinces in conjunction with more than 60 municipalities. Residents and businesses in participating municipalities can now request a charging point when purchasing an electric vehicle, so a government grant per charging point is no longer required under this tender.

MRA-Elektrisch awards contract for 360 charging stations

On behalf of 60 municipalities, the project office MRA-Elektrisch (MRA-E) has organised a successful tender for the operation of 360 existing charging stations in the provinces of Noord-Holland, Flevoland and Utrecht. The contract was awarded to Pitpoint. The tender is unique in that it is the first time that a commercial player will pay for operation of the charging stations. Previously, the government provided co-finance.

Drenthe and Groningen to have 1,000 additional public charging stations

The provinces of Drenthe and Groningen are to install 1,000 additional public charging

stations for electric vehicles, giving users the opportunity to charge their vehicles using the energy provider of their choice. The provinces are currently preparing a tender for this, and both are using the Green Deal Openbaar Toegankelijke Laadinfrastructuur (Green Deal for Publicly Accessible Charging Infrastructure). The province of Drenthe is to install an additional 270 charging stations, which is double the current number. The remainder of the charging stations will be in the province of Groningen, the majority of them in the city of Groningen.

Gelderland and Overijssel to award contract for 4,500 smart charging points

The provinces of Gelderland and Overijssel have issued a tender for 2,250 charging stations with 4,500 smart charging points on behalf of 43 municipalities. The tender was published in October 2017. Operators had until January 2018 to submit a bid. This is the largest ever tender for public charging stations. In addition, the charging stations will experiment on a large scale with smart charging profiles that take into account the load on the grid. Drivers will decide, on this basis, at what speed they wish to charge their vehicles.



Amsterdam's environmental zone significantly reduces polluting journeys

The Hague expands e-mobility grants

The municipality of The Hague has further expanded the scope of its e-mobility grants. For example, in 2017, once again, it offered a grant to individuals who purchased an electric car. In addition, lease vehicles were also eligible for the electric taxi and van scheme. And freelancers, partnerships and the self-employed were able to take advantage of the existing scheme for heavy road users, which previously applied only to electric scooters and high-speed electric bikes/cargo bikes.

The municipality of Utrecht: 1,000 smart solar charging points by 2020

The municipality of Utrecht's ambition is to have 1,000 charging points that obtain their power from solar panels and that can supply power to a battery in the home in operation by 2020. This type of charging requires the charging point to be versatile. In addition, obstacles imposed by legislation and regulations, such as double VAT on releasing power back to the grid and flexible connection charges for network operators,

must be resolved. A number of authorities and commercial players are currently in discussion with the government over this.

Smart and green mobility partnership between Noord-Brabant and Ohio

The province of Noord-Brabant and Ohio State University have signed a declaration of intent to work more closely together and to share knowledge with each other in the field of smart and green mobility. More specifically, the agreement involves the partners sharing experiences and information from R&D projects, test projects and implementation projects etc. with each other. In addition, student exchanges involving students from Ohio State University and Eindhoven University of Technology will be encouraged and facilitated.

Amsterdam Environmental Zone: polluting journeys cut by two thirds

A study by the municipality of Amsterdam has found that, between December 2016 and February 2017, the city's environmental

zone reduced the number of polluting journeys by delivery vehicles by two thirds. An environmental zone for delivery vehicles, under which pre-2000 delivery vehicles are no longer permitted to enter the city, has been in place since 1 January 2017. Since 1 May 2017, anyone who fails to comply with this ban will be fined €90. In order to promote zero-emission transport, the municipality of Amsterdam offers grants for electric cars, vans, taxis and trucks, which travel many kilometres across the city on a daily basis.

More than half of EVnetNL's charging stations transferred to municipalities

141 municipalities have taken up EVnetNL's offer to take over the ownership of public charging stations. These charging stations were installed by EVnetNL between 2009 and 2014. EVnetNL offered all municipalities the opportunity to take over the stations. As a result, in 2017, almost 1,000 charging stations changed ownership. In turn, the municipalities outsourced management of the charging stations to commercial players.



Region	Charging points ⁶ at end of 2017
Amsterdam	3,834
Brabant	3,795
The Hague	1,994
Drenthe	342
Gelderland	3,001
Groningen	490
Limburg	1,025
MRA-E	7,121
Overijssel	1,171
Rotterdam	2,399
Utrecht	1,405

⁶ Includes both public and semi-public standard and fast chargers

Utrecht plans to install smart, sustainable charging points (Photo: Renault)



(Photo: Lightyear)

4. Made in Holland

More and more Dutch companies have started manufacturing electric vehicles in the Netherlands, ranging from solar-powered cars to trucks, buses and special vehicles.



VDL's electric minibus for small-scale passenger transport (Photo: VDL)



Breda's electric garbage truck (Photo: E-Trucks Europe)



The semi-electric crane from Spierings Kranen (Photo: Spierings Kranen)

- VDL launches the MidCity Electric minibus:** VDL has launched an electric minibus called the MidCity Electric. This is the next step in the expansion of the zero-emission electric bus range of VDL Bus & Coach, all of whose vehicles are manufactured in the Netherlands. The new electric vehicle is suitable for small-scale passenger transport. The fully electric minibus is 8 m long and has a low floor, which facilitates boarding for passengers and wheelchair users. In addition, the longer wheelbase provides a high level of flexibility in terms of the type and number of seats. The MidCity Electric has a maximum range of 220 km. VDL has manufactured hundreds of small and large electric buses in the Netherlands, which are currently being used both in the Netherlands and abroad. In 2017, for example, it received orders from Münster, Groningen and Noord-Holland, amongst others. In addition, VDL has announced that it plans to start producing electric trucks in 2018.
- E-Trucks Europe manufactures fully electric garbage truck:** E-Trucks Europe has manufactured a fully electric garbage truck for the municipality of Breda at its factory in Westerhoven. The electric garbage truck produces no emissions and is equipped to run on hydrogen in the future. This will only be possible, however, if there is a service

station that sells hydrogen in Breda or the surrounding area. The vehicle is currently capable of fast charging, i.e. its battery can be re-charged from empty within 2 hours. Within the next 5 years, E-Trucks Europe plans to turn out 1 electric truck a week (ranging from electric refuse trucks to electric HGVs), i.e. to produce 50 vehicles a year.

- World's first hybrid mobile crane comes from Oss:** The Dutch crane manufacturer Spierings has built the world's first hybrid mobile crane. The undercarriage of the SK487-AT3 City Boy is fully electric. This allows the crane to move effortlessly to the place where it is required without the use of a combustion engine. Once it has arrived at the work site, the crane can be connected to mains electricity quickly and easily. As a result, the crane is emissions free. If no power is available, the City Boy can run on its own battery for several hours.
- Lightyear presents 4-wheel drive solar car:** Lightyear has unveiled the pre-design for its commercial solar car, the Lightyear One. The vehicle is fully electric, is powered exclusively by solar energy and will be launched in 2019. With a full battery, the vehicle can travel up to 800 km. The integrated solar panels on the roof of the new car generate enough energy to charge the battery during the

day and plugging in to charge is rarely necessary. For very long journeys, the car can be charged using a normal socket, so a separate charging infrastructure is not required. In the meantime, more than 10 of the vehicles have already been sold at the pre-sale stage, even before the first prototype is ready.

- Dutch production of light electric vehicles:** In 2017, a number of Dutch companies launched new models on the light electric vehicle market. Urban mobility firm Stint and the municipality of Zaanstad, for example, have developed a vehicle that the municipality will use for landscaping and street cleaning. Previously, municipality employees had to walk 6 km a day with a wheelie bin to empty the bins; now they use an electric vehicle developed by Stint, which can transport a load of up to 400 kg over a range of 90 km. Frysian Motors has launched a fully electric ride-on mower, the Rimmert FM-170. Before this, with its FM-30, the company was the first in Europe to launch a fully electric garden tractor. The company's electric vehicles and tools are assembled in the Frisian village of Bakkeveen. Components, both well-known and lesser-known brands, are shipped there from all over the world for incorporation into the company's vehicles.



(Photo: Jumbo Supermarkets)

5. E-mobility for the masses, on land and at sea



One of PostNL's electric delivery vans
(Photo: Voltia)



Stedin goes electric
(Photo: Stedin)

More and more businesses, authorities and non-profit organisations are electrifying their fleet. Here are some of the e-mobility highlights and innovations by sector.

Cars and vans

- **Royal HaskoningDHV replaces entire fleet:** after the successful completion of a pilot involving 26 fully electric BMW i3s, consultants Royal HaskoningDHV chose to make all of the company's 625 lease vehicles 100% electric. Within 5 years, all its conventional vehicles will be replaced.
- **PostNL goes fully electric on the Frisian Islands:** From now on, PostNL will deliver all mail on the Frisian Islands using electric vehicles only. Having started with the island of Ameland, PostNL is now also delivering mail in electric vans on the islands of Texel, Vlieland, Terschelling and Schiermonnikoog.
- **Nuon and Vattenfall to electrify 3,500 vehicles:** over the next 5 years, Nuon's parent company Vattenfall plans to replace more than 3,500 cars and

vans in the Netherlands, Germany and Sweden with electric alternatives. In the Netherlands, 750 vehicles, ranging from cars to service vehicles and maintenance vans, are to be replaced.

- **Stedin to go fully electric:** Network operator Stedin has started electrifying its entire fleet. The process is due to be completed by 2020. With around 2,100 commercial vehicles, apart from the emergency services, Stedin has the largest fleet in the Randstad conurbation.
- **Jumbo delivers shopping in electric delivery vans:** The supermarket chain Jumbo Supermarkets has started delivering customers' shopping in electric delivery vans. The first Street-Scooter electric delivery vans, which are also being used by DHL, are already in use in Groningen and Utrecht.

Other passenger vehicle highlights in 2017:

From now on, thanks to a partnership with Taxi Electric, guests staying in Hampshire Hotels in and around Amsterdam **will be collected from and taken to Schiphol airport in fully electric taxis.** | The municipality of Groningen has taken the next step in making its operations more sustainable by **bringing 2 fuel cell electric cars into service.**



The electric scanning vehicle in Bergen op Zoom
(Photo: Renault)



VDL's electric bus on its way to Schiphol
(Photo: VDL)

- **Essent employees go electric:** Energy company Essent has started converting its entire lease fleet to electric and hybrid models. Since September 2017, employees choosing a new lease vehicle, have a choice between fully electric or plug-in hybrid only.
- **World's first electric scanning vehicle in operation in Bergen op Zoom:** Bergen op Zoom has brought the world's first fully electric scanning vehicle into service. The vehicle, which will be used for enforcement and monitoring purposes, is a new Renault ZOE, which is combined with ARVOO Imaging Products' ScanGenius scanning system. And Amsterdam is now also using a number of fully electric scanning vehicles based on Opel Amperas. The city hopes to have 11 electric scanning vehicles in operation in 2018.
- **DHL to deploy 100 electric delivery vans in the Netherlands:** DHL is to use 100 fully electric vans for its deliveries in more than 50 Dutch cities. For this purpose, 100 StreetScooters - manufactured by DHL in collaboration with Ford - will be procured. The vehicles have a maximum speed of 80 km an hour and a range of 80 km. The

target is for 70% of DHL's deliveries to be emission free by 2025 at the latest.

Buses

- **VDL wins orders for hundreds of electric buses:** The Dutch public transport operator Connexxion has placed an order for 100 Citea SLFA Electrics with VDL Bus & Coach. This is the largest order for electric buses in VDL's history. Connexxion and its parent company Transdev operate the largest electric bus fleet in Europe. Connexxion has also placed an order for 62 VDL MidCity Electrics. This is the first large order for the VDL MidCity Electric in 2017. The fully electric minibus is 8 m long and has a maximum range of 220 km. Qbuzz also brought 10 VDL Citeas into service in the province of Groningen in 2017.

- **BYD supplies dozens of electric buses:** BYD has supplied 8 electric city buses to Connexxion. The buses have been running in Haarlem since September 2017, as part of the new Haarlem-IJmond concession. Connexxion has also placed an order for a new BYD vehicle: a fully electric midibus. Twenty-one of these electric buses will be in service in the region of Noord-Holland Noord from summer 2018. In 2017, BYD also delivered 9 fully electric buses to Syntus. The public transport operator is using 2 of the buses in Amersfoort as part of its existing bus concession for the province of Utrecht. The other 7 buses are being used on the new concession in Almere.

Other electric bus highlights in 2017:

The buses currently operating on the city of Utrecht's U-OV route 1 are to be **replaced by 10 electric buses**. This is part of the province's ambition of making all urban and regional public transport emission free by 2028. | The cities of Dordrecht and Gorinchem have presented the electric buses **that are to run on 5 bus routes**. Dordrecht will have 3 Iveco Rosero buses and in Gorinchem Arriva will run 2 VDL Citea LLE 99-Es. | Qbuzz **has launched the first fuel cell electric bus in Groningen and Drenthe**. After a test period, 2 fuel cell electric buses are now operating on the new regional routes in Groningen and Drenthe. | Hermes has reached a milestone: it has covered **1 million kilometres in its 43 electric buses**, which have been in operation since December 2016.



Technische Unie's electric trucks
(Photo: Breytner)



The electric truck used by Simon Loos to deliver to Albert Heijn
(Photo: Simon Loos)

HGVs

- **3 electric trucks for Technische Unie:** From now on, transport firm BREYTNER and wholesaler Technische Unie will transport their goods within Rotterdam using 3 fully electric trucks from EMOSS. The 2 companies have received support for this venture from the municipality of Rotterdam and the European Freight Electric Vehicles in Urban Europe (FREVUE) project.
- **Albert Heijn to use 2 electric trucks for deliveries:** From now on, Albert Heijn supermarkets in Amsterdam city centre will receive their deliveries in 2 fully electric trucks. The trucks will be operated by transport firm Simon Loos and supplied by Ginaf Trucks.

Light electric vehicles

- **Maastricht and Amsterdam welcome LEVs:** as part of the LEVV-LOGIC Lab initiative, the cities of Maastricht and Amsterdam have initiated 2 new trials involving light electric vehicles (LEVs), in this case e-cargo bikes. The project will investigate the possibility of using LEVs to deliver goods in cities.

Charging infrastructure

- **Fastned enters into partnership with Van der Valk Hotels:** Fastned has signed a framework agreement with Van der Valk Hotels & Restaurants for the

construction of fast charging stations in the Netherlands and Belgium. The partners are planning dozens of locations at hotels and restaurants.

- **Shell enters into fast charging partnership with Allego:** Shell and Allego have entered into a partnership for the installation and management of fast charging points for electric vehicles at Shell service stations in the Netherlands and the UK. Shell installed the first 2 fast charging points for electric vehicles on the A12 motorway near Gouda at the end of 2017.

Other electric truck highlights in 2017:

Haulier Transport en Logistiek Nederland (TLN) has announced that it plans to make all its deliveries in Dutch city centres fully electric by 2025. The company says that, if this ambition is to be achieved, an adequate supply of rolling stock as soon as possible is crucial for hauliers.



A Shell fast charging point (Photo: Shell)



Charging points in the Home Center car park
(Photo: GroenLeven)



Rotterdam's first electric water taxi
(Photo: Watertaxi Rotterdam)

- **Tesla opens 12th supercharger location:** Tesla has brought its 12th supercharger location into service in the Netherlands. The station has 10 charging points and is located at the Van Der Valk Hotel in Emmeloord.
- **72 charging points for Home Center in Wolvega:** Laadpaal24 has installed 72 charging points for electric vehicles at Home Center in Wolvega, which visitors can use free of charge. The charging stations are powered by the 15,000 solar panels on the roof of the building.

Electric boats

- **New semi-electric boat in operation in the Port of Rotterdam:** Bek en Verburg, a firm that collects shipping waste from the Port of Rotterdam, has brought the Invotix IX into service. The hybrid vessel has an electrically powered bow thruster motor. It can run for 1 hour and then needs 1 hour to recharge.
- **First fully electric water taxi for Rotterdam:** Watertaxi Rotterdam has brought Rotterdam's first fully electric water taxi into service. The water taxi has a converted Tesla battery under its bonnet. It has enough power to run for a day at an average speed of 12 km an hour.
- **First electric long-distance boat sets sail:** the first electrically powered long-distance boat, the CO2-ZERO, which is almost 10 m long and can accommodate 6 people, has set sail from Amsterdam. The boat can sail for 14 hours on electricity and has a cruising speed of 9 km an hour.

Other charging infrastructure highlights in 2017:

Total has signed a contract with NewMotion to give its business customers access to a network of 50,000 charging points in 25 European countries. | OrangeGas has opened the first fast charging point for electric vehicles in the Port of Amsterdam. The fast charging station installed by the green gas specialist is the result of a partnership with Nissan and Bluecorner. | EVBox has installed its 50,000th charging point. It was placed in Los Angeles in the US. It took 7 years for EVBox to install the first 50,000 charging points. But it expects to install the next 50,000 within 2 years. | A public hydrogen refuelling station has opened in the city of Arnhem. The HyGear refuelling station on Industriepark Kleefsewaard supplies hydrogen for both fuel cell electric cars and buses.



The first electric long-distance boat
(Photo: CO2-ZERO)



A car2go car in Amsterdam
(Photo: car2go)

Other electric boat highlights in 2017:

The second electric-only boating route has opened in the province of Friesland.

The new boating route starts at the Grutte Wielen nature reserve near Leeuwarden, goes past the village of Ryptsjerk, Bûtenfjild nature reserve and the village of De Falom, and ends at De Swemmer marina in De Westereen. | The province of Groningen is to purchase a sustainable inspection vessel for monitoring, policing and escorting boats and policing events in Groningen. The first battery-powered inspection vessel in the Netherlands will be brought into service in 2018.

project involves 100 fully electric Hyundai IONIQ cars. The company has launched a similar project on the island of Ameland, with 2 fully electric and 2 hybrid variants of the vehicle.

- **Uden brings 14 car-share vehicles into service:** The municipality of Uden has brought 14 electric car-share vehicles into service. The municipality shares the cars with the housing corporation Area and the social enterprise company IBN. The municipality was awarded the National Car Share Award 2017 for the project by the ngo Natuur & Milieu and the Ministry of Infrastructure & Water Management.

Electric car-sharing

- **BMW Nederland and BPD launch car-share project in Amsterdam:** BMW Nederland and property developer BPD have launched a project in Amsterdam that allows people living in the Blok 26 apartment complex to share 4 fully electric BMW i3s. They use a cloud solution that allows them to see which cars are being used when and to book a slot to use them.
- **car2go reaches milestone:** car2go has welcomed its 50,000th member in Amsterdam. car2go has been in operation in the capital since 2011. Use of the electric car-sharing concept car2go has doubled: the vehicles are now used almost 2,000 times a day in Amsterdam. The municipality of Amsterdam supported the project up to

the end of 2017 by providing a parking permit that was valid throughout the city.

- **Hyundai starts car-sharing in Amsterdam and on Ameland:** car manufacturer Hyundai has launched IONIQ Car Sharing in Amsterdam. The



The electric car-share vehicles on the island of Ameland (Photo: Hyundai)



6. Home-grown Dutch innovation

In 2017, Dutch businesses, knowledge institutions and authorities launched a wide range of home-grown innovations.



An electric vehicle being charged with power from Arnhem's trolley network
(Photo: the municipality of Arnhem)



The transparent charging station from Alliander
(Photo: Alliander)

Charging infrastructure pilots

- **Flexible charging in Amsterdam:** In partnership with Nuon, Liander and ElaadNL, the municipality of Amsterdam has introduced flexible charging of electric vehicles. In this pilot, electric vehicles are charged up using more power when there is less demand for electricity from other energy users and the demand for power is therefore low. And they are charged up using less power when less energy is available. 200 charging points in Amsterdam Centre, West, New West and South are taking part in this pilot.
- **Power from braking trolley buses:** the city of Arnhem has introduced a charging point for electric vehicles that derives its energy from batteries that are housed in the pylon of a trolley bus wire. This is the first time in Europe that power from braking trolleybuses has been harnessed to power electric vehicles. The city plans to introduce more of these charging points over the next few years.
- **Launch of Open Fast Charging Alliance:** 5 European fast charging companies, including Fastned, have joined forces to form the Open Fast Charging

Alliance. The parties will connect their networks through roaming to provide a high-quality network of fast charging stations throughout Europe. This network will be open to all fully electric vehicles, thereby facilitating long-distance travel.

- **Launch of vehicle-to-grid pilot:** In conjunction with car manufacturer Mitsubishi and network operator TenneT, NewMotion has launched a pilot that involves bidirectional charging of a number of electric vehicles in an effort to balance peak demand on the grid more effectively. A first charging station has now been brought into service.
- **Flexpower shows benefits of slower charging:** ElaadNL, Liander, GreenFlux, NewMotion and EVnetNL have demonstrated in a pilot that charging electric vehicles more slowly during the evening peak does not adversely affect drivers of electric vehicles. During the project, the electric vehicles of 71 participants were charged at half the normal speed during the evening peak for 1 year in order to reduce the burden on the grid. This was offset by charging the fully electric vehicles 25% more quickly outside peak hours.

- **First peer-to-peer connection via OCPI:** Allego and Plugsurfing have launched the first peer-to-peer connection via Open Charge Point Interface (OCPI). This gives Plugsurfing's customers more detailed information on their charging sessions at Allego's charging stations in the Netherlands, Germany and Belgium. The direct connection between Plug-Surfing's payment system and Allego's charging infrastructure avoids roaming charges.
- **Launch of transparent charging station:** Alliander has developed a transparent charging station that shows users on a display how the available power is being distributed between all the electric vehicles charging at the station. If there is not enough power to charge all the electric vehicles at the station in full at the same time, the transparent charging station will indicate how much power there is and how it will be distributed.
- **Smart Solar Charging scaled up:** after a successful pilot in Lombok, the sustainable energy system Smart Solar Charging is to be expanded to 5 districts in the Utrecht region and will include 70 electric We Drive Solar cars.



Successful pilot in the Dutch city Utrecht
(Photo: LomboXnet)



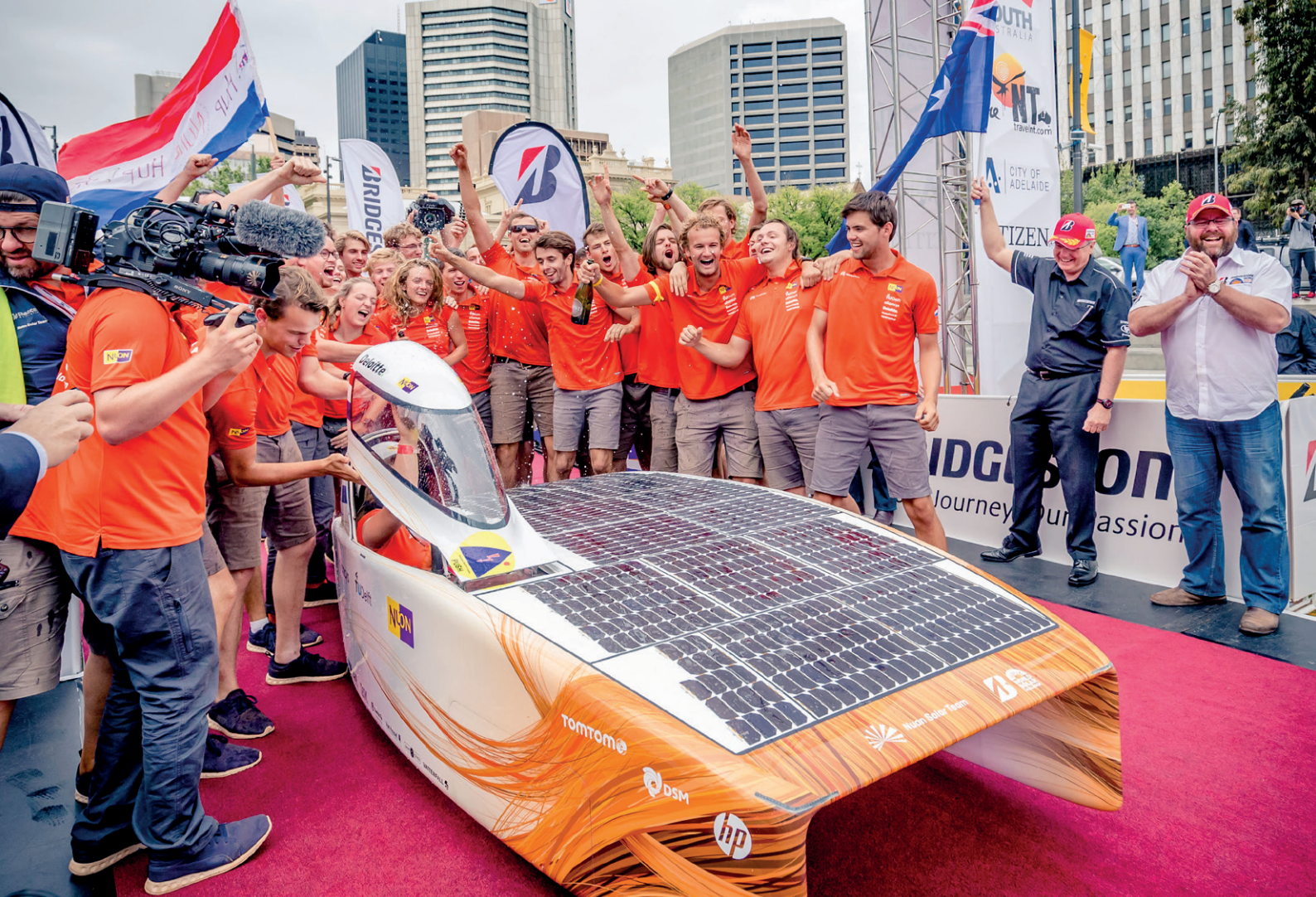
The electric bus that runs on formic acid, developed by Team FAST from Eindhoven University of Technology (Photo: Eindhoven University of Technology)

During the day, a smart charging station stores local solar power in electric car-share cars, while at other times the excess energy is used locally thanks to vehicle2grid (V2G) technology.

Vehicle-related innovations

- **Launch of smart mobility testing area in Noord-Brabant:** the province of Noord-Brabant has given the go-ahead for the MobilitymoveZ.NL, Urban Mobility Testing Area. The initiative, which was set up by the province of Noord-Brabant, the Ministry of Infrastructure and Water Management, Rijkswaterstaat (the agency responsible for water and road management), and the municipalities of Eindhoven, Helmond and Tilburg, comprises of a stretch of national, provincial and local roads that runs from Helmond to Tilburg via Eindhoven. MobilitymoveZ.NL provides national and international players with a controlled, manageable section of public highway to develop and test new technologies and services in the field of smart mobility and innovative mobility services in practical situations.

- **Launch of SparkCity model:** Eindhoven University of Technology, ElaadNL and the Netherlands Knowledge Platform for Charging Infrastructure, NKL, have launched the SparkCity model. This model can be used to calculate scenarios around the growth of e-mobility and enables users to zoom in on specific districts and roads. Using the model, the researchers have calculated that, if government policy continues as it is, there will be 3 million electric cars in the Netherlands by 2030. And, by 2030, 88 per cent of all new cars will be electric. The SparkCity model is what is known as an agent-based model. In other words, the computer simulates how people live and how they use their vehicles during the day on the basis of real maps of real areas.



The Nuon Solar Team after their win at the World Solar Challenge
(Photo: Nuon Solar Team)

Student teams are highly successful

Just as in previous years, the Dutch student teams had an excellent year in 2017, with the unveiling and development of new vehicles and technology and participation in international competitions.

- **World's first bio-based electric car:** TU/eomotive, a team of students from Eindhoven University of technology, has presented the design of Lina, its fourth concept car. This is the first car in the world to be made of a biocomposite. The electric city car, which can accommodate 4 people, weighs just 225 kg. Moreover, use of the latest near field communication (NFC) technology allows users to gain access to the vehicle using their phone or an NFC chip card. When a user opens the

door, Lina recognises from the unique NFC code who is entering the vehicle. The user's personal settings are then activated. MobilitymoveZ.NL provides national and international players with a controlled, manageable section of public highway to develop and test new technologies and services in the field of smart mobility and innovative mobility services in practical situations.

- **Electric bus runs on formic acid:** Team FAST, a team of students from Eindhoven University of Technology, has unveiled an electric bus that runs on formic acid. The self-built system is housed in a small trailer that is connected to an electric bus, which converts the formic acid into electricity by splitting it into hydrogen and CO₂.

The hydrogen is then used to generate electricity, which is used to power the bus, which is a city bus manufactured by Eindhoven-based company VDL.

- **2 Dutch teams win World Solar Challenge:** the Nuon Solar Team and the Solar Team Eindhoven have won the World Solar Challenge. Delft University of Technology's Nuna9 took first prize in the Challenger Class of the World Solar Challenge in Australia. Solar Team Eindhoven's Stella Vie won the Cruiser Class for 'practical' solar cars. The car, which can accommodate 5 people but can still cover some 1,000 km a day on solar power only, was a first for the Eindhoven-based team.



7. Financial incentives

The government offered a number of tax incentives in 2017.
This led to an increase of more than 8,600 zero-emission cars.



(Photo: NKL - The Netherlands Knowledge Platform for Public Charging Infrastructure - www.nklnederland.nl)

Tax incentives package 2017

The 2017 tax incentives package was as follows:

- exemption from the payment of car and motorcycle purchase tax (BPM) for zero-emission vehicles (BEVs and FCEVs) with CO₂ emissions of 0 g/km. The following tax brackets applied to semi-electric (plug-in hybrid) cars:
 - tax bracket 1 (1 - 30 g/km): €19 per g of CO₂
 - tax bracket 2 (31 - 50 g/km): €85 per g of CO₂
 - tax bracket 3 (> 50 g/km): €282 per g of CO₂
- exemption from the payment of motor-vehicle circulation tax (MRB) for zero-emission vehicles (BEVs and FCEVs) with CO₂ emissions of 0 g/km; 50% exemption for plug-in hybrid electric vehicles (PHEVs) with CO₂ emissions of between 1 and 50 g/km;
- 4% private use charge for drivers of leased zero-emission vehicles (BEVs and FCEVs). The private use charge for drivers of leased plug-in hybrid electric vehicles (PHEVs) is the same as for all other vehicles, i.e. 22%;

- environmental investment allowance (MIA), whereby businesses can offset up to 36% (subject to a maximum of €50,000) of the cost of zero-emission cars (BEVs and FCEVs). Zero-emission vans are eligible for the same percentage, but in this case the maximum is € 75,000. Plug-in hybrid electric vehicles (PHEVs) with CO₂ emissions of up to 30 g of CO₂/km are eligible for an environmental investment allowance (MIA) of up to 27%, subject to a maximum of €35,000.

Local grants for electric vehicles

In 2017, the municipalities of Amsterdam, Rotterdam and The Hague offered a number of different grants and schemes for electric vehicles.

Amsterdam

In 2017, Amsterdam offered a number of different grants for the purchase of electric cars, vans and trucks. The grants for 2017 were €5,000 for an electric company car, €5,000 for an electric van, €5,000 for an electric taxi and 20 per cent of the purchase value (up to a maximum of €40,000) for an electric truck.

The Hague

The Hague offered a number of different grants in 2017. There were grants of €5,000 and €3,000 respectively for residents buying a new or second-hand fully electric car. A similar grant was available for businesses that purchased or leased an electric van or an electric taxi.

Rotterdam

In 2017, Rotterdam ran a scrappage scheme for old, polluting cars or vans, subject to a maximum of €2,500 per vehicle. If the old vehicle was replaced by an electric model, drivers could apply for an additional grant.



(Photo: Autodelen.info)

8. Green Deals

Through the Green Deal approach, the government promotes innovative initiatives from society with a view to accelerating the transition to a sustainable economy. When implementing sustainable initiatives, businesses, local, provincial and regional authorities and groups of citizens sometimes encounter obstacles. The Green Deal approach is there to remove these obstacles. The government's role varies according to the initiative. In recent years, a number of Green Deals have been established in the field of electric transport. The highlights from 2017 are set out below.

Green Deal - Electric Transport 2016-2020

The aim of the Green Deal - Electric Transport is to accelerate the transition to electric transport by combining all activities in the field of electric transport. Under the Green Deal, the 18 partners in the Formula E-Team strive to promote e-mobility and green growth. A wide range of activities took place as part of the Green Deal in 2017.

For example, efforts were made to remove legislation and regulations that hinder the transition to electric transport. In December 2017, a list of barriers was submitted to the House of Representatives. These barriers are being tackled in the context of the 'Versnelling Energietransitie' (Act on Acceleration of the energy transition). By removing barriers and collaborating in working groups, the Formula E-Team will provide market players with opportunities for growth. This is also evident from the *Verzilvering verdienpotentieel elektrisch vervoer* (Capitalising on the Earning Potential of Electric Vehicles) report: in the past 2 years, the e-mobility sector has shown renewed growth. Both production and added value have grown by some 40%.

The Internationalisation steering committee, which forms part of the Formula E-Team, has developed an assessment framework which will make it possible to provide Dutch businesses with more targeted support and to help them with their international activities. Also in 2017, a number of activities were organised with a view to raising the profile of the Netherlands internationally in the field of e-mobility. For example, Formula E-Team chair Bert Klerk travelled to California as part of a trade mission, where he established new contacts. In addition, members of the Formula E-Team attended an e-mobility conference in Norway, which included matchmaking sessions. During the European Battery, Hybrid and Fuel Cell Electric Vehicle Congress (EEVC) in Geneva, the Netherlands was in the spotlight, whose theme was 'the success of the Netherlands'. A number of speakers from the Netherlands spoke about Dutch government policy, the Green Deal - Electric Transport 2016 -2020, the Formula E-Team and Dutch activities in the field of smart charging and in the automotive sector. The marketing strategy developed in conjunction with the Internationalisation working group was put into practice for the first time through the Holland E-mobility House at Electric Vehicle Summit 30 (EVS30) in Stuttgart.



Green Deal - Charging Infrastructure leads to thousands of additional charging stations (Photo: EVBox)



The number of electric car-share cars in the Netherlands is growing (Photo: Autodelen.info)

In 2017, business innovation was also supported through working groups that focused on market segments such as light electric vehicles (LEVs), which can be used as an alternative for shorter journeys and heavier electric trucks.

Green Deal - Publicly Accessible Charging Infrastructure

The aim of the Green Deal - Publicly Accessible Charging Infrastructure is to reduce the total cost of installing and operating public charging infrastructure for electric vehicles. The annual benchmark of the Netherlands Knowledge Platform for Charging Infrastructure, NKL, which estimates the cost components of charging stations, indicates that there was a reduction of 35% in 2017 compared with 2013, and it is anticipated that this downward trend will continue up to 2020. In addition, in 2017, the Green Deal made a substantial contribution to the growth in the number of public and semi-public charging stations. More than 6,000 charging stations were installed in 2017. This was made possible, amongst others, by a government grant of €5.7 million through the Green Deal, and the availability of an additional €1.5 million for the co-financing of public charging stations in public spaces. In 2017, the provinces of Gelderland and Overijssel were promised a grant of more than €1 million. MRA-Elektrisch

(MRA-E) also applied for funding under the scheme and was also promised a grant. In all, 216 municipalities will install 7,800 charging stations.

Green Deal - Car-sharing

The Green Deal - Car-sharing is a three-year collaboration between 42 organisations which aims to accelerate car-sharing. Partners in the initiative include, amongst others, insurers, government authorities, sharing concept providers, environmental organisations and interest groups. The ambitious and bold objective of the Green Deal is that the Netherlands will have 100,000 car-share cars by 2018. The Green Deal has given rise to countless activities designed to raise awareness of car-sharing, amongst others through the informative website autodelen.info. In addition, knowledge and data have been accumulated and shared and pilots have been set up in order to expand car-sharing further. According to a study by CROW-KpVV, in the spring of 2017, the Netherlands had 30,697 car-share cars, 4% of which were electric. Compared with 2016, the number of car-share cars has grown by 23%, i.e. an increase of more than 5,700 cars. The strongest growth in car-share cars can be seen in the Netherlands' 4 major cities. Amsterdam has the most car-share cars, followed by Utrecht.



9. Formula E-Team

The Formula E-Team (FET) is a public-private partnership between the business community, knowledge institutions and the government. The Formula E-Team strives to promote e-mobility in the Netherlands, to respond to international developments and to exploit opportunities for green growth.

Formula E-Team calls for faster energy transition

A rapid transition to electric transport is crucial if the Paris climate targets are to be achieved. Further electric transport helps make the Netherlands a cleaner place and offers opportunities for business and industry. 'It is essential and we can achieve it,' said the Formula E-team when the new government was formed.

The FET's Consumer Market working group actively contributed to the 2017 E-mobility Monitor of the ANWB (Dutch automobile association) through the provision of statistics. This first monitor outlined developments in e-mobility in the Netherlands, consumer response to electric vehicles and any obstacles that were encountered.

The Charging Infrastructure working group organised a meeting for municipalities and provinces in conjunction with the Association of Netherlands Municipalities (VNG). There were presentations on expected trends, best practices amongst municipalities and the needs of e-drivers. According to participants, the conclusion was clear: electric transport has reached the point of no return. In 2017,

the Charging Infrastructure working group also contributed ideas towards the charging infrastructure scenario study that was carried out by Ecofys on behalf of the Ministry of Economic Affairs and Climate Policy.

The Communications working group started with storytelling in conjunction with the Charging Infrastructure working group.

Finally, the E-mobility Innovation and Acceleration Programme (IAP) was established. This programme operates at the interface between the High-tech Systems and Materials, Logistics and Energy top sectors. The aim of the E-mobility IAP is to tackle social problems in urban areas of the Netherlands. Priorities are quieter, cleaner transport and keeping tomorrow's cities accessible. The programme focuses, amongst others, on the behaviour of e-mobility users; opportunities for light electric vehicles and heavy transport; and the impact of the electrification of transport on the energy infrastructure.

See Chapter 8, Green Deal - Electric Transport 2016-2020, for more details on the Formula E-Team's results.

Robert Dencher is new chair of H2Platform

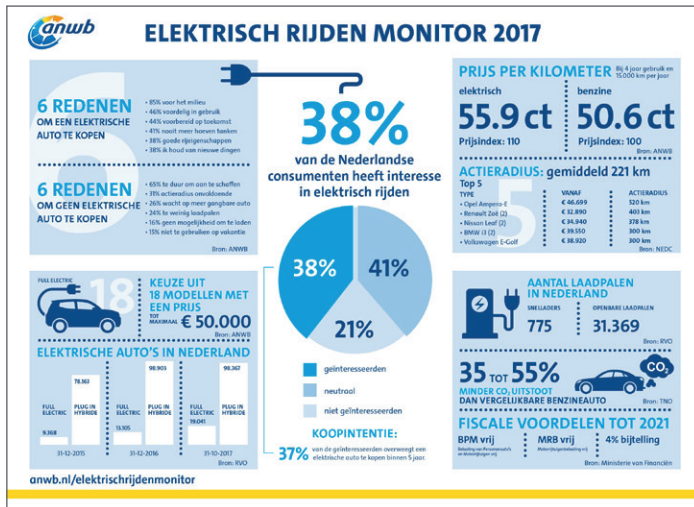
The H2Platform, formerly the National Hydrogen Platform, has appointed Robert Dencher as its chair. Dencher has worked for Shell for 35 years in various international commercial roles. He was head of Government Relations, for example, where he was responsible for building and maintaining contacts with civil servants, politicians and other stakeholders. The H2Platform aims to enable the sharing of knowledge and the finding of solutions to problems encountered by anyone who works with hydrogen. The H2Platform includes all stakeholders that work with hydrogen, including the bicycle and automotive industry association, RAI Vereniging, the Dutch Hydrogen & Fuel Cell Association, NWBA, the association of motor car, garage and allied trades, BOVAG, and more than 40 large and small businesses.



Photo: Bas Stoffelsen

10. Research and publications

Research and publications



The E-mobility Monitor

The E-mobility Monitor is an initiative of the Dutch automobile association, ANWB, which outlines developments in e-mobility in the Netherlands, consumer response to electric vehicles and any obstacles that have been encountered. The first edition of the Monitor indicates, amongst others, that 38% of consumers are interested in e-mobility.



Economic impact assessment of e-mobility

This report by HEV TCP Task 24, which is part of the International Energy Agency, IEA, suggests that further growth of electric transport would have an impact on the economy and employment. The report was compiled jointly by 8 countries, all of which concluded that the impact on jobs would be evident, amongst others, in the energy sector.



Charging infrastructure on private built environment

This report, which was produced by Ecorys and EVConsult, highlights 3 obstacles to the installation of charging points for electric vehicles on private built environment, such as shared car parks in apartment complexes and offices. According to the writers of the report, there are a number of different policy measures that could be implemented by the government to speed up an increase in the number of charging points on private built environment.



Low-emission vehicles: consumer demand and fiscal policy

This study suggests that technological improvements in electric vehicles and an increase in the number of charging points would encourage more consumers to go electric. A smart fiscal policy and capitalising on consumers' environmental awareness are other factors that could help persuade certain groups of users to make the change. The study was produced by VU University Amsterdam.



NKL Benchmark for Charging Infrastructure 2017

In 2017, the Netherlands Knowledge Platform for Charging Infrastructure (NKL) once again published a benchmark of the costs associated with public charging infrastructure. This report indicates that the costs of public charging infrastructure continued to fall in 2017 to 35% of the costs in the reference year (2013). Another of the report's findings is that, from 2017 onwards, the focus moves from cost reduction to professionalisation of the market.



Smart charging of electric vehicles, institutional barriers and potential solutions

This report by PwC reviews current obstacles to optimum use of electric vehicles in the Netherlands and suggests potential solutions. The report’s recommendations include the following: optimisation of the incentive to store energy in an electric vehicle for own use, avoidance of a double tax on energy and reduction of the transmission charge.



Capitalising on the Earning Potential of Electric Vehicles

The growth in electric transport is continuing and is expanding to other modes of transport, such as Light Electric Vehicles (LEVs) and bus and truck transport. This is the main conclusion of the latest edition of the Verzilving verdienpotentieel Elektrisch Vervoer (Capitalising on the Earning Potential of Electric Vehicles) report,

which was produced on behalf of the Ministry of Infrastructure & Water Management. According to the report, over the past 2 years, production and added value have seen growth of around 40%, and the number of full-time jobs has increased by a similar percentage to 3,730.

11. Trends in electric transport in figures

Trend in the number of electric vehicles registered 2013-2017

The table below shows the cumulative number of registrations (net⁷) to the end of the calendar year for the period 2013-2017.

Distribution of the number of electric vehicles by different types of vehicle

Total number of registrations by vehicle type ⁸	31/12/2013	31/12/2014	31/12/2015	31/12/2016	31/12/2017
BEVs	4,161	6,825	9,368	13,105	21,115
PHEVs*	24,512	36,937	78,163	98,903	98,217
FCEVs	0	0	21	30	43
Commercial vehicles ≤ 3.5 tonnes	669	1,258	1,460	1,628	2,208
Commercial vehicles > 3.5 tonnes	39	46	50	66	81
Buses**	73	80	94	168	296
Quadricycles	632	769	872	1,007	1,134
Motorcycles	125	196	268	316	446
Total***	30,211	46,111	90,296	115,223	123,540

* Including E-REVs, excluding fully hybrid vehicles

** Including trolleybuses

*** This total includes motorcycles

(Source: Dutch Road Authority; processed by RVO.nl)

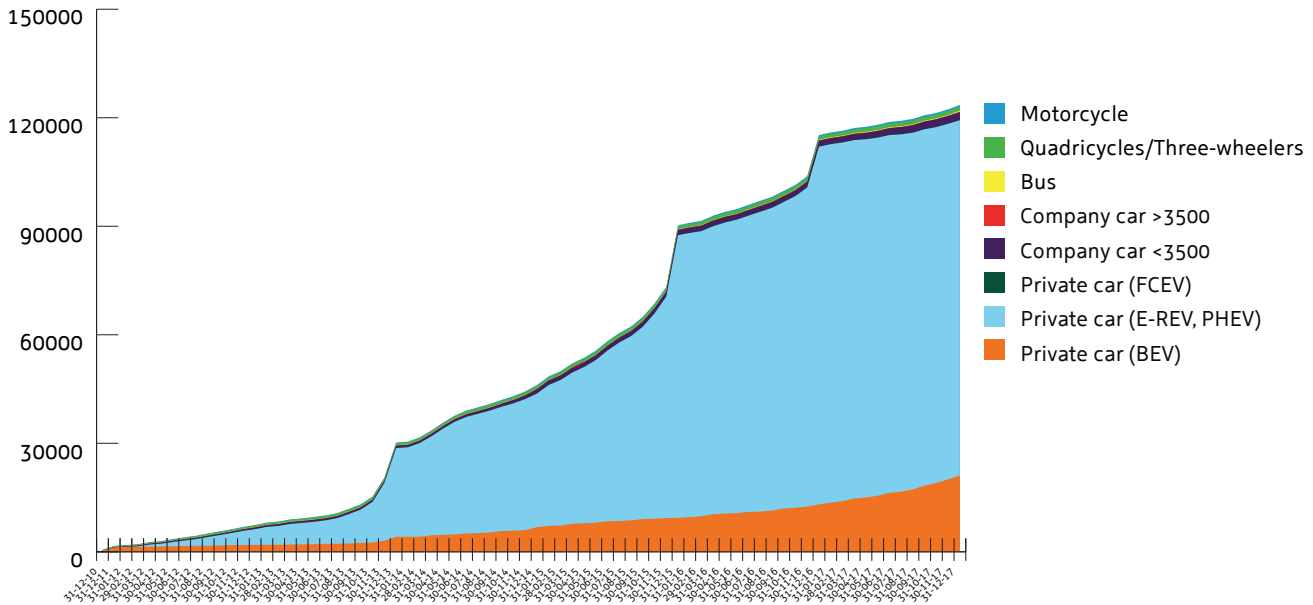
Number of electric vehicles

On 1 January 2017, there were 115,939 electric vehicles registered in the Netherlands. By 31 December 2017, that number had increased to 123,540 electric vehicles.

⁷ Net: this is the balance of the increase in new registrations, less the decrease resulting from exports, theft etc.

⁸ Source: the Dutch Road Authority, RDW, edited by RVO.nl

Growth curve for electric vehicles 31 December 2010 - 31 December 2017

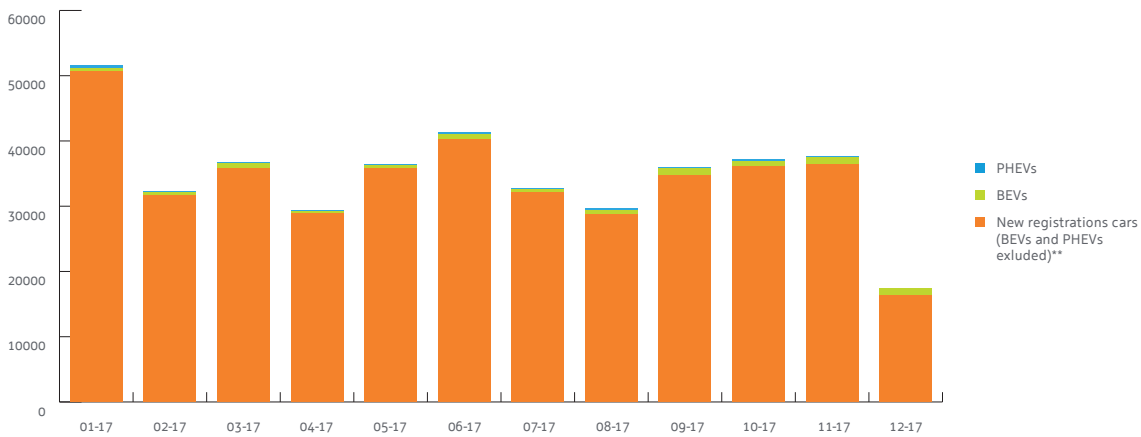


(Source: Dutch Road Authority; edited by RVO.nl)

Apart from PHEVs, in 2017, all types of electric vehicle saw growth compared with the previous calendar year. This growth was particularly strong in the case of BEVs. At 31 December 2017, net registrations of PHEVs compared with 31 December 2016 were down 1%.

New registrations of electric cars

The graph below shows the trend in the number of new registrations by month for BEVs (yellow) and PHEVs (blue). It also shows the total number of cars registered by month (NB: apart from BEVs and PHEVs) (orange).



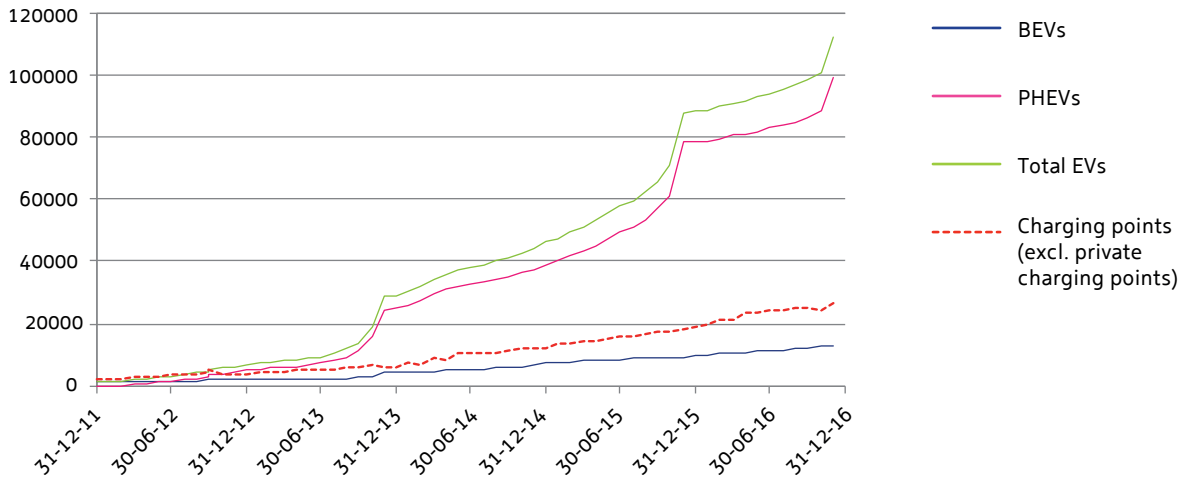
(* Source: Dutch Association of Car Dealers (RAI) and Garage Owners (BOVAG)

(** Source: Dutch Road Authority; edited by RVO.nl)

Cumulative registrations of electric cars and charging points

The graph below shows the trend in cumulative registrations of BEVs compared with PHEVs. It also shows the trend in the number of charging stations (public, semi-public, private and fast charging stations)⁹.

Development electric passenger cars and charging points



(Source: Dutch Road Authority, Oplaadpalen.nl; edited by RVO.nl)

Number of charging stations⁹

Numbers installed as at	31/12/2013	31/12/2014	31/12/2015	31/12/2016	31/12/2017
Standard charging stations					
Public (publicly accessible 24/7)	4,089	5,421	7,395	11,768	15,288
Semi-public ¹⁰ (restricted public access)	2,735	6,439	10,391	14,320	17,587
Fast charging					
Public and semi-public fast charging stations	61	254	465	612	755
Fast charging locations	44	90	130	173	178
Private charging stations					
Estimate based on research carried out in 2012 and extrapolated based on registered EVs	18,000	28,000	55,000	72,000	80,000

⁹ Source (vehicles): RDW, edited by RVO.nl; Source (charging stations): Based on figures from the charging foundation, stichting e-laad, EV-Box B.V, NUON and Essent, The New Motion (figures up to 31/10/2012) and Oplaadpalen.nl (from figures up to 30/11/2012). For figures up to 28/02/2014, it has been assumed that the charging stations of e-laad, Nuon and Essent are public and that all other charging stations are semi-public. From 31/03/2014, the Oplaadpalen.nl data states whether the charging stations are public or semi-public. Private charging stations: estimate based on research carried out in 2012 and extrapolated based on registered EVs.

¹⁰ Semi-public charging stations are interoperable and have been registered by their owners as accessible. These charging stations can be found, for example, at shopping centres and by office buildings, in car parks and on the premises of individuals who have made their charging station available to third parties.

¹¹ Fast charging location = geographical location with one or more fast chargers with a capacity of >22kW.



(Photo: Paul Tolenaar)

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