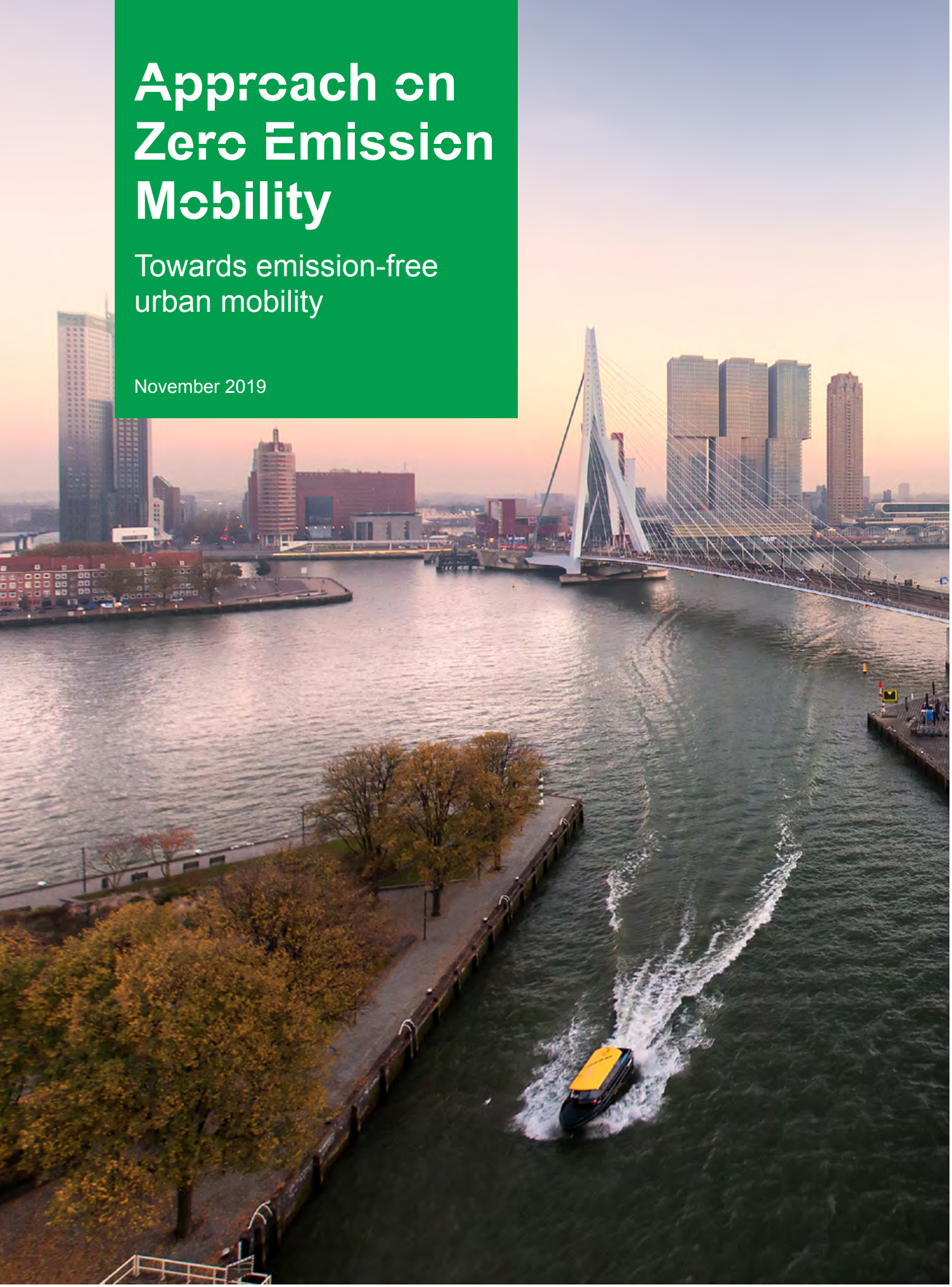
Approach on Zero Emission Mobility

Towards emission-free urban mobility

November 2019



City of Rotterdam

Table of Contents

1. The task

"A sustainable, energy-efficient Rotterdam, with better air quality. That is what we envisage. The climate challenges set out in the Paris Climate Agreement call for a major energy and economic transition of both city and port. If we and our children want to continue to live comfortably, this will require significant decisions, measures and investments (Coalition Agreement 2018-2022 'New energy for Rotterdam').

Mayor and Executive Board targets:

1. In this Mayor's and Executive Board's term, the rise in CO_2 emissions will be converted to a downward trend leading to a 49% CO_2 reduction in 2030, relative to 1990.

2. By 2022, the average air quality in the entire city will have improved compared to the level of 2017. There will no longer be any streets where the European health standard for NO2 is exceeded from 2020.

The Council Agreement on the Energy Transition (adopted in March 2019) sets out the guiding principles for the energy transition and the reduction in CO_2 emissions. The way in which air quality will be improved during this Executive Board's term is included in the Clean Air Memorandum (Koersnota Schone Lucht, adopted by the Council in October 2019).

An important transition path for the aforementioned ambitions and tasks is mobility[1]: One third of CO_2 emissions and about one quarter of air pollution in the urban area are caused by mobility and transport[2]. The transport movements in the city also cause noise pollution, which can have a negative impact on the quality of life. At the same time, mobility and transport are essential for the well-being and the prosperity of the city.

Good accessibility in the city is essential for living, working and recreation. That is why we are working on a mobility system that will keep the city accessible, but will also reduce externalities.

Commissioned by the City of Rotterdam in 2018, the TNO calculated the reduction in CO_2 emissions from mobility in Rotterdam by 2030, based on existing policy. The report concludes that additional (policy) efforts are needed to achieve these ambitious targets.

[1] *Mobility is one of the five transition paths. The other four are: Port & Industry; Built Environment; Energy Production and Economy.*

[2] *Drift report: New energy for Rotterdam, Drift, 2018.*

The necessary energy transition for mobility has been translated into a 3-track approach: the 'Trias Mobilica':
- Cut back: managing transport demand and people's choices
- Change: managing the modal balance in the use of space
- Clean up: managing the energy consumption and emissions of the vehicles being used

Making mobility in Rotterdam more sustainable starts with preventing unnecessary kilometres: cutting back, followed by influencing the choice towards clean modes of transport such as bicycles and public transport: changing the transport modality. Lastly, cleaning up focuses on making the (remaining) motorised transport vehicles emission-free.

The way in which Rotterdam is working to clean up urban mobility, making it emission-free, is elaborated in this Approach. The other traces of the Trias Mobilica are elaborated in the Rotterdam Mobility Approach (RMA) (see image 1). The RMA and the Zero Emission Mobility Approach will be developed in conjunction with each other and are both in line with the principles of the Rotterdam Urban Traffic Plan adopted by the city council: economically strong, attractive, healthy.

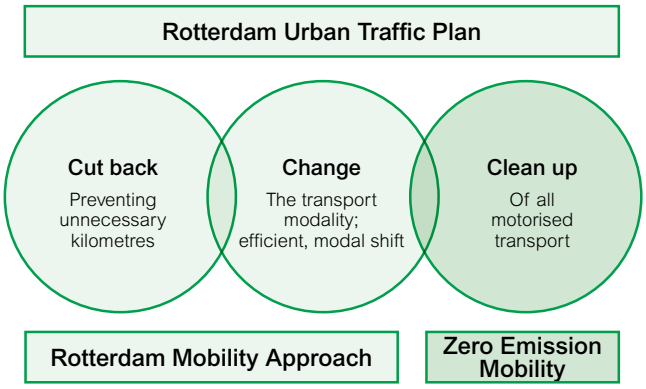


Image 1: The Rotterdam Urban Traffic Plan and the subdivision into RMA and Zero Emission Mobility

This Zero Emission Mobility Approach gives direction and focus to the activities required to make motorised road traffic in Rotterdam emission-free and thus achieve the ambitious targets. In doing so, we are building on the Rotterdam Fuel Approach[3] adopted in 2017.

The aim of the Zero Emission Mobility Approach is to clean up urban mobility in Rotterdam, by using motorised vehicles and vessels with no emissions. And in doing so, contributing to the energy transition in Rotterdam and the surrounding area.

The approach is also an elaboration of the objectives which are set out in the national coalition agreement, national Climate Agreement, Clean Air Agreement, Rotterdam Coalition Agreement, Clean Air Memorandum, Rotterdam Climate Agreement (in draft), Mobility Agenda and thus contributes to the urban objectives:
- less CO_2 emissions (translated into the energy transition);
- better air quality;
- less noise pollution;
- an economically strong, attractive and healthy city.

Due to the rapid technical and social developments in the world of emission-free driving, an adaptive approach is needed that can continually respond to new opportunities and initiatives. Rotterdam's approach allows for this, as not every step in the transition is prescribed. All projects and measures in this approach must contribute to the ultimate goal: making mobility emission-free. This has been translated into a number of strategic principles. These principles can be found in chapter 2, while the way in which the approach is designed is described in chapter 3.

The principles and approach are aimed at urban mobility: traffic movements which begin and/or end in the city. A separate approach is needed to clean up through traffic, the port and industry, inland shipping, maritime shipping and aviation. After all, this is mainly an assignment for the supralocal level. Moreover, other technical solutions are required to a certain extent.

[3] *Adopted by the Mayor and Executive Board in June 2017*

2. Principles for zero emissions

Rotterdam has chosen to - eventually - make urban mobility in Rotterdam completely emission-free. This will contribute to meeting climate targets (-49% CO_2 in 2030 and climate-neutral in 2050) and improving the air quality in the city.

Wherever possible, emission-free vehicles will already be employed. And where possible, Rotterdam is ahead of national policy, which aims to ensure that all new cars being sold are emission-free by 2030. This will contribute to the target of reversing the trend of rising CO_2 emissions towards lower CO_2 emissions within this Mayor's and Executive Board's term and of realising the ambitions in the field of air quality. This can be done relatively easily and quickly for many types of transport, but for others (such as heavy works traffic) the challenge is greater.

For the transition to fully emission-free urban mobility, Rotterdam applies the following principles:

1. The mobility clean up is based on The Rotterdam Urban Traffic Plan 2017-2030, with which it contributes to an economically strong, attractive and healthy city. Rotterdam is cleaning up mobility by taking measures in the areas of Behaviour, Infrastructure (Space) and Vehicles (Technology).
2. At this moment, Rotterdam sees all-electric propulsion as the only alternative to achieving a zero-emission mobility system. By this, we mean electric vehicles (with a battery), supplemented by hydrogen vehicles for the heavy-duty vehicles segment. Both technologies are necessary for the transition to emission-free mobility and complement each other well. The financing requirements for the two technologies are also complementary to each other. Due to their energy efficiency, Rotterdam chooses, where possible, to use electric vehicles, with due consideration for the current technology and the level of performance that the vehicle has to deliver.
3. We use energy that is generated as cleanly as possible, because mobility emissions will only be completely emission-free if the energy generation is also emission-free. The emission-free generation of energy will be formulated within the Regional Energy Strategy (RES) and the starting memoranda on the Acceleration of Solar Energy and the Acceleration of Wind Energy, as included in the Sustainability Compass. When considering the options, we take into account the current and expected method of energy generation. Where Rotterdam itself purchases energy for mobility, it purchases, as much as possible, sustainably (green electricity and blue/green hydrogen).

[4] Wherever a vehicle is mentioned, this may also refer to a vessel, as long as the means of transport fits within the scope of 'urban mobility'

4. The available charging infrastructure must continue to keep pace with the growth in electric vehicles[5]. The charging infrastructure must not be an obstacle to the transition to electric vehicles. The municipality is developing policy to this end and will ensure an adequate charging infrastructure.

5. The available hydrogen filling stations for heavy-duty vehicles should also keep pace with the increase in hydrogen vehicles. Here, too, the availability of hydrogen filling stations should not be an obstacle. The municipality is developing a policy to this end. The provision of hydrogen filling stations for vehicles where electricity is an alternative will be entirely left to other parties (than the municipality).

6. The City of Rotterdam is not giving any new active support to the development of non-emission-free alternatives, such as biofuel or LNG, for urban mobility.

7. Rotterdam considers the combination of stimulatory measures and regulatory measures to be the most effective. Rotterdam is therefore investigating the possibilities of introducing zero emission zones for (parts of) the traffic.

8. With regards to zero emissions, the municipality is committed to increasing the number of fast chargers and hydrogen filling stations. The auction policy for service station locations within the municipality offers opportunities to shape the transition to zero emissions together with the market. The municipality will explore the possibilities, also in the light of future zero emission zones, for such things as city logistics.

9. The municipal HR policy on commuting and work-related journeys for its employees will, as far as possible, be brought into line with the vision of making the mobility of municipal employees more sustainable and more flexible.

In doing so, the guiding principles of the Council Agreement on Energy Transition will be followed.

[5] *Or sailing, as long as the means of transport fits within the scope of 'urban mobility'*

3. Our approach

Various projects and activities are being carried out by the municipality and by many other parties in Rotterdam, which aim to clean up mobility in Rotterdam. The Zero Emission Mobility programme ensures coherence in both municipal and non-municipal projects, initiates new activities and monitors progress. The principles of this approach will guide all activities.

Programme design

The programme focuses on road transport in Rotterdam, such as passenger cars, lorries and public transport and on waterborne passenger transport. The activities are divided into the four pillars, each with its own approach:

1. Mobility of persons
2. Logistics
3. Municipal fleet
4. Charging and filling infrastructure

Each pillar has its own specific dynamics and task, has a different array of stakeholders and field of influence and requires a different role for the government. That is why each pillar has its own strategy and approach. Each strategy focuses on the task, trends and developments in the market and the most appropriate role for the government, the municipality. The strategies build on the National Climate Agreement and make use of the results of the mobility table of the Rotterdam Climate Agreement.

The City of Rotterdam is monitoring the effects of the approach as part of the effect monitoring of the energy transition.

Pillar 1: Mobility of persons

Electric cars are becoming increasingly competitive with fossil-powered cars, not only in financial terms but also in terms of performance (range). As a result, the number of electric cars in Rotterdam is expected to grow strongly in the period 2020-2025.

Under the Climate Agreement, national efforts are being made to ensure that 100% of new car sales will be zero-emission by 2030.

The success of this ambition is largely determined by national fiscal regulations, with a focus on accelerating the use of electric mobility. The Rotterdam approach builds on this and organises the local acceleration of the number of emission-free kilometres driven. This will be done by increasing the use of electric vehicles by specific target groups, by 'getting more out of' transition technologies such as plug-in hybrid and by stimulating electric shared mobility. Shared electric cars, shared electric scooters and shared Light Electric Vehicles such as the Biro are an alternative to traditionally fuelled cars for urban trips. An electric shared scooter such as the felyx or a light electric vehicle such as the LEV can also be considered to be a clean alternative to mopeds or motor-assisted bicycles.

Rotterdam is committed to accelerating the change in the mobility of the following groups of users:

1. Specific target groups, including taxis, contract transport, shared cars, waterborne passenger transport, light electric vehicles;
2. Business (lease) market, companies;
3. Buses.

Emission-free RET buses

The City of Rotterdam and the metropolitan region of Rotterdam - The Hague have ensured that the requirement for electric buses is included in the RET concession. By the end of 2019, the first 55 electric buses will be in operation. A further 50 emission-free buses will be added in 2021, another 50 in 2024 and in 2029 the last 110 buses will be replaced. To realise the necessary charging infrastructure in public areas, Rotterdam has identified the possible locations (Zuidplein, Conradstraat and Van Noordwijkstraat).

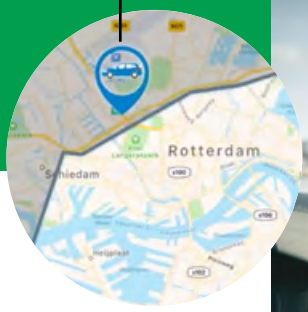
Tendering for social transport

The social transport concession includes the requirement that a number of vehicles must become electrically operated within the concession period. This is important because it means that a larger number of electric vehicles will be used for target group transport in Rotterdam. By doing so, the municipality is contributing to a larger number of electric vehicles in the city. The next step is to facilitate the demand for charging infrastructure for electric taxis.

Electric City Drive

Electric City Drive is the first project in a three-year collaboration between the City of Rotterdam and BMW Group NL. This pilot project investigated how drivers of hybrid BMW cars could best be encouraged to make the most of their car's electric drivetrain.

Using the Electric City Drive app, drivers were given a signal on the screen of their car to switch to electric mode at the right time (when entering the area within the Ring). As a result of the project, the drivers of plug-in hybrid cars covered no less than 93% of their kilometres in the Electric City Drive area using electrical power during the project. In addition, the number of electric kilometres driven outside the defined area also increased. The results of this pilot will be used to further illustrate the potential of this technology and to further develop the collaboration with car manufacturers.



Pillar 2: Logistics

In the national Green Deal for Zero Emission City Logistics, governments, carriers, shippers, vehicle manufacturers, knowledge institutes and industry- and interest groups endorsed the ambition to achieve zero-emission urban logistics by 2025. Rotterdam has signed up to this Green Deal. For logistics, there is an additional need to go to zero emissions, because freight transport causes half of the air pollution through mobility.

As of 2014, Rotterdam has been developing the Logistics 010 community, in which Rotterdam is working together with more than 1300 regional companies on sustainable urban logistics. The Logistiek 010 community is committed to sustainable solutions that improve the air quality in Rotterdam's city centre and reduce greenhouse gas (CO_2) emissions.

Together with transport companies from the region, industry associations, knowledge institutes and other authorities, a Rotterdam roadmap has also been developed with concrete steps towards zero emission urban logistics in 2025: the Roadmap Zero Emission City Logistics (ZECL) (Stappenplan ZES), was adopted by the Mayor and Executive Board on 16 July 2019. This Roadmap describes the strategy and approach to be followed to achieve emission-free distribution in all segments of the logistics sector.

Part of this roadmap is to prepare and take a Mayor and Executive Board decision in 2020 on a zero emission zone for city logistics in 2025. It's an approach that is in line with the National Climate Agreement, which states that medium-sized zero emission zones will be introduced in the thirty to forty larger municipalities by 2025.

Delivery windows and use of bus lanes for electric vehicles

In Rotterdam, emission-free goods vehicles (categories N1, N2 or N3) may be granted an exemption to enter pedestrian areas outside the regular loading and unloading time(s). This offers companies the opportunity to set up the logistics process more efficiently.

Emission-free taxis, private bus transport and goods transport (freight vehicles categories N2 or N3) are eligible for an exemption to drive on nineteen selected bus lanes. These exemptions offer an advantage and encourage transport operators to switch to emission-free vehicles.

Buy Zero Emissions Transport (BuyZET)

As part of a European project, Rotterdam has started to encourage zero emission transport by including it in the requirements and award criteria for the purchase of goods and services (e.g. transport services purchased by the municipality itself). The result is greater use of emission-free vehicles for deliveries in Rotterdam. For example, we include emission-free transport requirements in our purchases. An example of this is the municipal contract for house moving services and transport of furniture for polling stations. By the end of the contract period (2024 at the latest), this transport will be carried out completely free of emissions. In addition, it stimulates large inner-city buyers (both public and private parties) to work togetherin so-called buyer's groups. By harmonising the purchasing policy, suppliers can be given a greater incentive to deliver more efficiently and more quickly.

Pillar 3: Own Municipal Vehicle Fleet

A portion of the traffic movements in Rotterdam can be attributed to the City of Rotterdam. The municipality uses waste collection vehicles to collect waste in the city, employees of the municipality travel to meetings and the municipality carries out maintenance work. By cleaning up the municipal vehicle fleet, Rotterdam contributes to improving air quality and reducing CO_2 emissions. In this way, the municipality leads by example, helps to increase the demand for clean transport and is contributing to the development of new vehicles. Together with suppliers, we are carrying out pilots with vehicles that are not yet 'standardly available on the market'.

Through cooperation with former municipal (implementation) bodies and other municipalities via the Transport & Materials Urban Management department (formerly Roteb Lease), we have been able to combine our forces. Collaboration with other organisations is an important theme in terms of sharing knowledge and creating the leverage to accelerate innovation. We have drawn up a Multiannual Programme for the replacement of our own fleet with zero emission vehicles. The aim is to achieve a sustainable and well-functioning municipal vehicle fleet, with the end goal of an entirely emission free municipal vehicle fleet by 2030.

The municipal vehicle fleet is subdivided into categories, with separate target years for zero emissions:
- 2023 emission-free passenger vehicles
- 2025 emission-free light commercial vehicles
- 2030 emission-free heavy-duty vehicles
- 2030 emission-free other (specific work) vehicles

Although technical developments in the field of electric and hydrogen vehicles are progressing rapidly, there are still relatively few suitable zero emission vehicles in the heavy-duty segment.
In order to be able to make the correct decisions regarding a particular energy carrier when replacing a vehicle in our own fleet, an assessment framework has been developed.

Electric forklift truck

The municipality has a completely emission-free forklift truck. It has a load capacity of 5000 kg, is fully electric and can be converted to hydrogen if necessary. This forklift truck has replaced an old forklift truck that was running on diesel. In the coming years, moremunicipal machinery will be replaced by emission-free alternatives.

Electric waste collection vehicles

Rotterdam has one of the first fully-electric waste collection vehicles in the Netherlands. With a fully charged battery, it has a range of 150 kilometres. After that, the vehicle has to be connected to the charger at Kleinpolderplein. A waste collection vehicle drives an average of 80 kilometres a day in Rotterdam. Two more electric waste collection vehicles will soon be added to the fleet.

Pillar 4: Charging infrastructure and filling stations

The charging infrastructure is an important prerequisite for the transition to zero emission mobility. The basic principle is that the charging infrastructure should not be an obstacle to the roll-out of electric mobility. The availability of a sufficient and suitable charging infrastructure at the right locations for each target group is important in this respect. Each target group has its own needs in terms of spatial planning, charging speed and the availability of charging infrastructure. This network consists of a combination of normal chargers, fast chargers and super-fast chargers - and hydrogen filling stations for heavy-duty vehicles.

In recent years, Rotterdam has built a charging network for passenger vehicles. This charging network now comprises more than two thousand public charging points. The use of the network is continuously monitored and is being expanded based on the demand. We will continue to do so.

In the coming years, Rotterdam will take the next step, in order to be ready for the ever-increasing demand for charging facilities. The expectation is that the coming years will see greater growth than in recent years. In addition, charging facilities will become ever more important for other users. These include taxis, the logistics sector, but also the emergence of a second-hand market for private individuals. Rotterdam will also focus more on supporting charging facilities on private property, such as in parking garages of Owners' Associations.

In order to be able to take this next step and to meet the growing demand for charging, a new strategy will be drawn up as an update of the existing policy for the installation of the charging infrastructure (the Rotterdam Framework for Charging Infrastructure). This charging strategy also takes into consideration the National Strategy on Charging Infrastructure, which is part of the national climate agreement.

Auctioning policy for service station locations

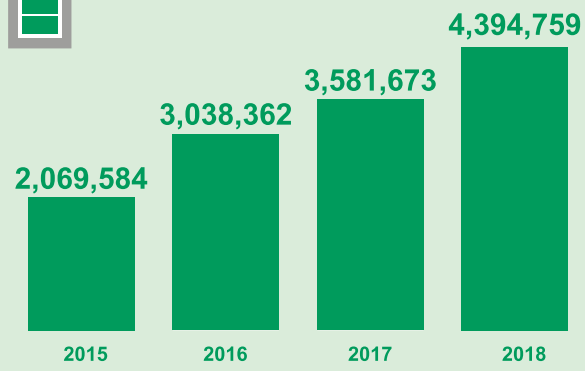
The municipality will map out how the auction policy for municipal locations can be used to meet the expected demand for zero emission alternatives. In addition, Rotterdam is assessing the consequences and opportunities that the introduction of zero emission zones for (parts of) the traffic will have for the municipal locations. The municipality will make an inventory of the service station locations within the future ZECL zone, the duration of the contracts, the consequences and opportunities that the zone will create for these contracts and new leases. This will be done together with our civic partners.

Facts and figures

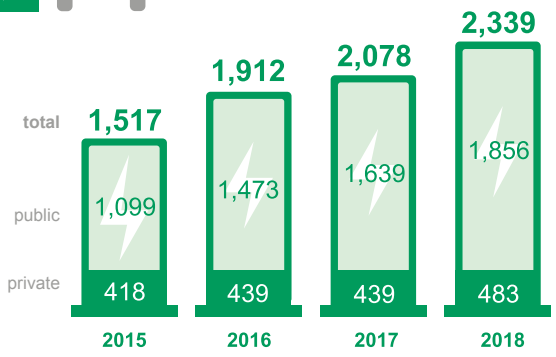
Electric mobility in Rotterdam

Rotterdam elektrisch

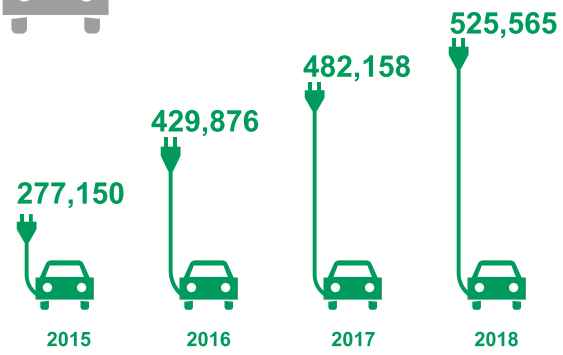
Quantity of loaded kWh



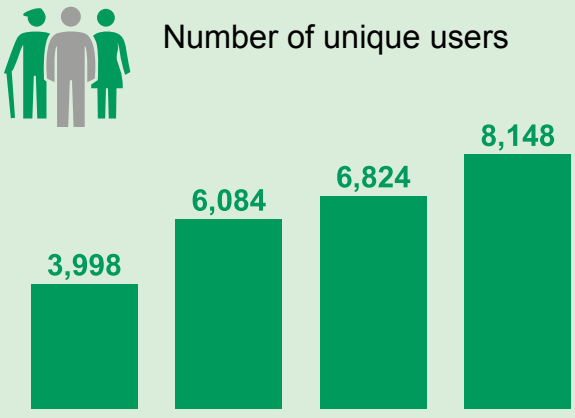
Number of charging points



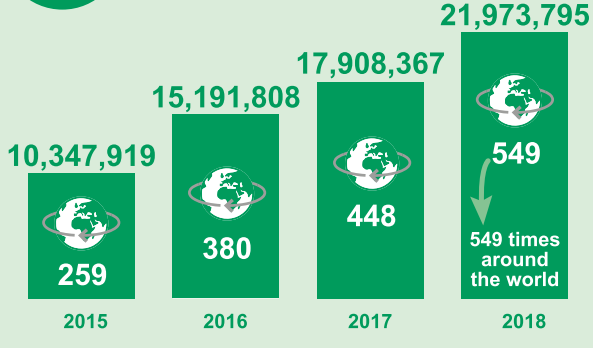
Number of charging sessions



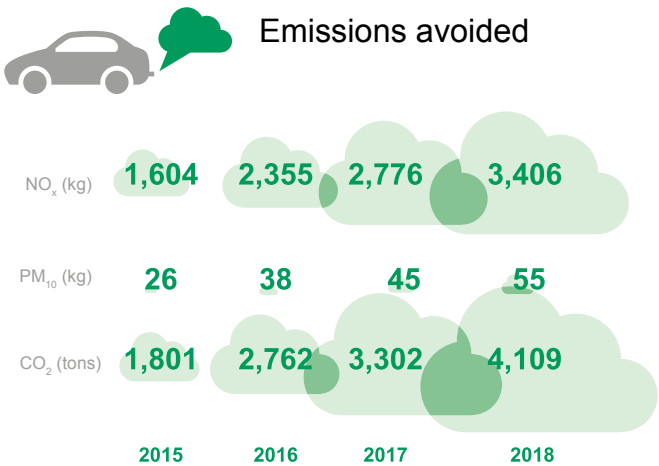
Number of unique users



Number of zero emission kilometres



Emissions avoided



Charging plaza for electric cars

In Rotterdam, the first charging plaza for electric cars has been opened at the Veerhaven. Together with ENGIE, the municipality created this smart charging plaza for the general public. The plaza, which is called Veerkracht (means resilience), allows ten cars to be charged simultaneously. Smart software distributes the available green electricityto the connected cars. Combining the charging facility in one place is easy for the user and is more efficient to install. The charging plaza on the Veerhaven allows the municipality to gain valuable experience for future charging schemes. This is important because charging plazas could be a solution to meet the ever-increasing demand for chargin points. It offers advantages in terms of space, cost and user-friendliness: charging points are to be found in one place, can be installed in one go and offer opportunities for the smart distribution of available power. With this, Rotterdam wants to increase the findability and charging security and reduce the amount of cars driving around looking for charging points.

Electric charging brochure for Owner's Associations

The brochure 'Charging solutions for electric cars within an Owner's Association' (Dutch) has been prepared by the municipality, in collaboration with G4 and EV Consult, and offers a step-by-step plan for Owner's Associations and residents of Owner's Associations to create charging points in communal parking garages and in car parks. This brochure is supplied with a toolkit containing standard documents for making and recording agreements. By doing so, the municipality wants to help out drivers of electric vehicles and to further stimulate their uptake. In the case of Owner's Associations, there are often questions about the distribution of the investment costs and the decision-making process with Owner's Association meetings. The brochure makes this clear and manageable. The next step is to investigate how EV drivers in Owner's Associations can be better helped to install a charging facility.

City of Rotterdam