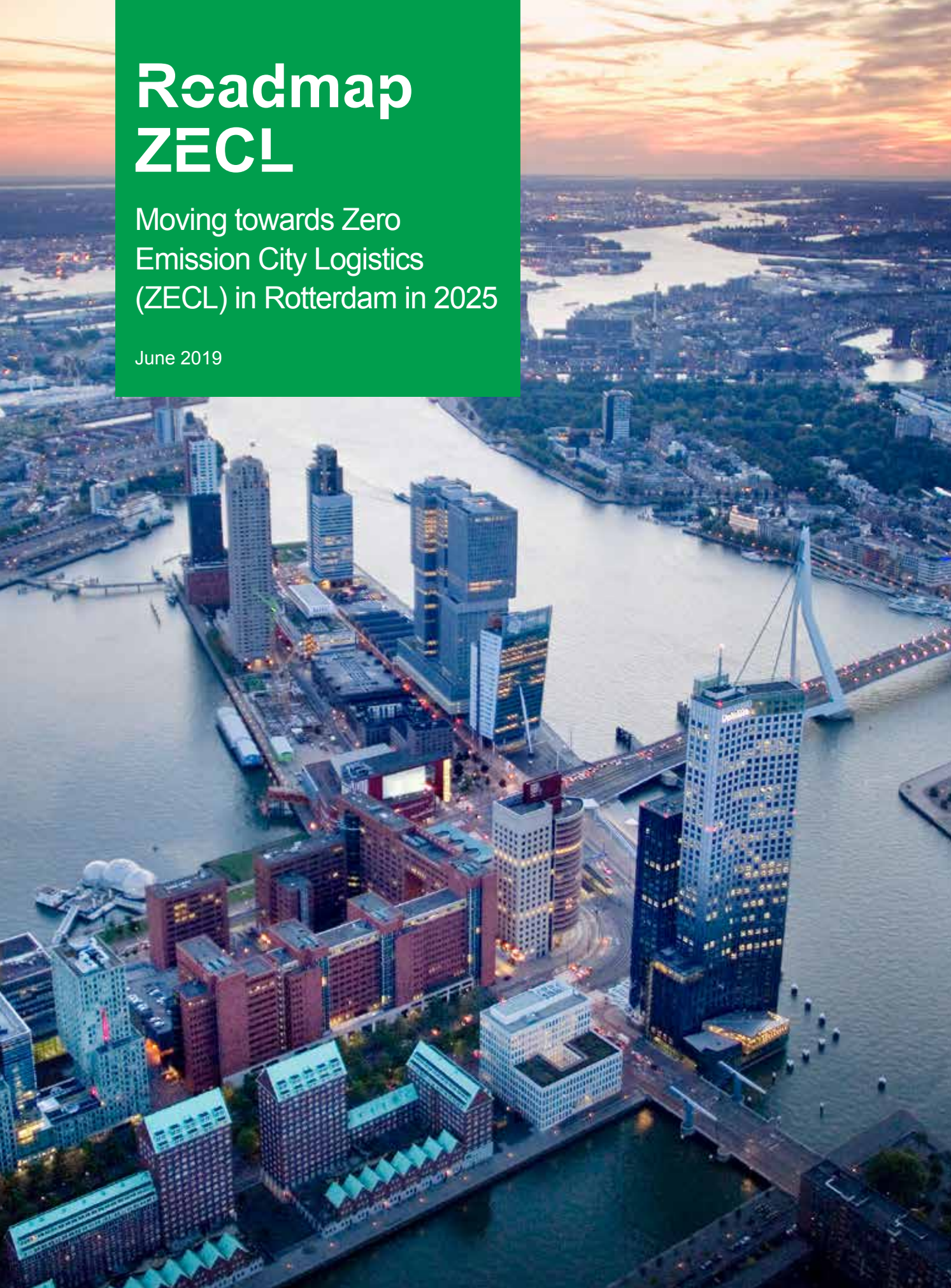


Roadmap ZECL

Moving towards Zero
Emission City Logistics
(ZECL) in Rotterdam in 2025

June 2019



City of Rotterdam

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1. Introduction

1.1 Rationale

In signing the Paris Climate Agreement in December 2015, the coalition agreement in 2017 and the documents which translated those agreements into a Climate Agreement in 2018, the Netherlands set a clear objective: to reduce greenhouse gas emissions by 49% by 2030 and by 95% by 2050, both relative to 1990 levels. With the current municipal coalition agreement, in line with the national coalition agreement, the Mayor and Executive Board of Rotterdam have committed to achieving the goal of reducing CO₂ emissions by 49% by 2030. In addition to this ambitious reduction in CO₂ emissions, the Executive is aiming for every street to meet European standards for NO_x from 2020. The Executive also intends to improve the average air quality throughout the city by 2022, relative to 2017.

One key transition path for these ambitions and challenges is that of mobility:¹ One third of CO₂ emissions and around a quarter of the air pollution in the urban area is produced by mobility and transport.² Transport movements across the city also cause noise nuisance, which has a negative impact on quality of life in the city. At the same time, of course, mobility and transport are important to the city's well-being and prosperity. Accessibility is an essential part of living and working in the city.

In the mobility subsector, city logistics is the source of more than half the exhaust in the city and it leaves a hefty CO₂ footprint – more than a third – compared to cars. We are fully aware of these big challenges, such as improving air quality and the climate, and we are tackling them at the source. For freight transport in the city, this means that we are working to achieve a transition to a system that is as efficient as possible (reducing kilometres driven to a minimum) and deploying zero emission (ZE) vehicles.

1.2 Policy context

The city council established the Rotterdam Urban Traffic Plan 2017 – 2030+ in 2017.

This traffic plan outlines how the City Council aims to shape the mobility transition – which is already under way – in both the short and the longer term. This means that mobility will contribute to:

1. Rotterdam's growth and increased urban density;
2. the energy transition;
3. a healthy living environment;
4. economic renewal;
5. climate change adaptation;

In terms of mobility, the energy transition will be implemented using the 'Trias Mobilica': **C**ut back, **C**hange and **C**lean up. The work of making mobility in Rotterdam more sustainable begins with eliminating unnecessary kilometres, for instance by bundling freight on the edge of the city: **C**utting back. This is then followed by a shift (where possible) to a non-motorised transport modality, such as cargo bikes: **C**hanging the transport modality. Finally, we aim to **C**lean up the remaining motorised transport vehicles by making them emission-free. The elements **C**ut back and **C**hange have been set out in the Rotterdam Mobility Strategy (RMS). The introductory memorandum RMA was finalised by the Mayor and Executive Board on 2 April 2019. The vision for Zero Emission Mobility focuses on **C**leaning up. The City of Rotterdam will develop this vision further in 2019. A Clean Air Memorandum is being drafted separately, addressing the acceleration in reaching the air quality policy goals.

In this policy context, the Roadmap Zero Emission City Logistics (ZECL) focuses on the freight transport aspect of mobility and involves a strategy which addresses each element of the Trias Mobilica: Cut back, Change and

¹ Mobility is one of the five transition paths. The other four are: Port & Industry; Construction & Housing; Rotterdam's Council Agreement refers to this path as 'Built Environment'; Energy Sources & Energy Saving; the Council Agreement refers to this path as 'Energy Production'; and Economy.

² 'Drift report': New energy for Rotterdam.

Clean up. This Roadmap ZECL is a strategy that looks to develop mid- to long-term solutions, and it is in line with what has been agreed in the Climate Agreement and the nationwide Green Deal Zero Emission City Logistics (GDZECL), which sets the year 2025 as its goal. The idea is for the Roadmap ZECL to mark a breakthrough in the transition to emission-free city logistics, with a special focus on the city centre; the plan does not include the end goal of emission-free city logistics within and around Rotterdam. The vision for emission-free city logistics by 2030 – and looking ahead to 2050 – is incorporated in the vision for Zero Emission Mobility.

1.3 Shared task

The Municipality of Rotterdam has been working in partnership with the business community for many years to reduce the number of logistical movements in the city, using smart logistical solutions such as combining goods flows and making the freight vehicles that need to access the city cleaner. The ultimate objective is to reduce CO₂ emissions and improve both air quality and accessibility in the city. In 2014, in cooperation with seven logistical frontrunners⁴ and the Netherlands Organisation for Applied Scientific Research (TNO), Rotterdam signed the Green Deal 010 Zero Emission City Logistics (GD010ZECL) covenant with the ambitious goal of making all logistics in the city centre emission-free by 2020. The GD010ZECL accelerated the transition to emission-free city logistics and offered insights into the opportunities and obstacles along that journey. Now the logistics sector is calling on local government to produce a concrete framework and policy to achieve emission-free city logistics, including the geographical boundary and admission requirements of a zero emission zone for city logistics (ZECL zone). The number of transport movements will be reduced within this zone, and only fully emission-free vehicles will be deployed. This is in line with the national Climate Agreement, which includes the introduction of a ZECL zone in the Municipality of Rotterdam. Recent research by TNO⁴ has also shown that a ZECL zone is one of the most effective measures the city can take to reduce CO₂ emissions in the mobility sector.

The greater engagement generated by the GD010ZECL makes this the optimum moment to forge ahead with these ambitions. The municipality is aiming to join forces with the signatories of the GD010ZECL, advocacy organisations such as TLN⁵, evofenedex⁶ and VNO-NCW⁷ to draft a supplementary covenant with the intention of introducing a ZECL zone by 2025, with a customised strategy for each subsegment (fresh produce, general freight, waste, express/parcels, facilities/service, construction). This covenant would establish joint agreements to achieve zero emission city logistics by 2025. The actors mentioned above have already been engaged from the early stages of the process of creating this Roadmap ZECL.

Rotterdam is not the only municipality working to achieve zero emission city logistics, with the introduction of a ZECL zone by 2025 as the first milestone. The Climate Agreement requires between 30 and 40 large local authorities to introduce such a zone. In 2018, the Ministry of Infrastructure and Water Management (I&W) initiated a collaboration project with a pool of experts in city logistics (the 'SPES' project) to provide structured next steps to realise the commitments on zero emission city logistics contained in the Climate Agreement. SPES focuses on developing as much generic knowledge as possible and producing a general strategy for local authorities, entrepreneurs, citizens and local politics. In April 2019, the experts from SPES published a guide called 'Roadmap for introducing a zero emission zone for city logistics, for local authorities' (Stappenplan voor invoering zero-emissiezone voor stadslogistiek, voor gemeenten). The generic steps contained in this guide have been incorporated into Rotterdam's Roadmap ZECL, and some progress has already been made in implementing these measures. This means that Rotterdam will be one of the first local authorities to put the national framework into practice. Moreover, nationwide collaboration is needed in order to stimulate lobbying efforts with vehicle manufacturers, to encourage them to improve the availability of emission-free vehicles.

³ Breytner, DHL, Getru businesses, Post-Kogeko Logistics, Renewi, Roadrunner Koeriersdiensten, Transport Service Schelluinen.

⁴ TNO study 'CO₂ reduction target for mobility in Rotterdam, 2018' ('CO₂-reductieopgave voor mobiliteit in Rotterdam, 2018').

⁵ Transport en Logistiek Nederland (TLN) is an entrepreneurs' organisation for road transport companies and logistics service providers. This association has 5,500 members.

⁶ With around 15,000 members, evofenedex is one of the largest Dutch entrepreneurs' associations and represents businesses that use logistics every day in a variety of sectors.

⁷ VNO-NCW represents 185,000 companies that are connected through industry associations.

The Metropolitan Region of Rotterdam The Hague (MRDH) published its CO₂ reduction strategy in April 2019. This strategy includes the introduction of ZECL zones for freight transport in the MRDH municipalities as an effective measure. 22 of the 23 MRDH municipalities have now signed the Green Deal Zero Emission City Logistics, in which these municipalities state their intention to achieve emission-free deliveries to their city centres by 2025.

In fact, the Municipality of Rotterdam will not be the first to announce a ZECL zone: the cities of Utrecht, Amsterdam and The Hague have – to a greater or lesser extent – already announced a ZECL zone for 2025, or even earlier.

The City of Rotterdam is already working with these other G4 municipalities in the field of sustainable city logistics, and this collaboration will intensify through the Roadmap ZECL.

1.4 Reader's guide

The Roadmap ZECL offers an overview of the challenge to achieve zero emission city logistics in Rotterdam. Providing a thorough exploration of this challenge, Chapter 2 offers insight into both the intricate network of city logistics in Rotterdam and the actors involved. Chapter 3 discusses the results and insights that have arisen from GD010ZECL and underscores the urgency of the next step, with its associated challenges. The steps necessary to achieve the target of zero emission city logistics by 2025 are set out in Chapter 4.

2. City logistics in Rotterdam



Image 2.1: Cargo bike (LEV) and electric lorry DHL – leader in the GD010ZECL (source: DHL)

2.1 What do we mean by city logistics?

When we refer to city logistics, we are talking about all goods- and service-related transport movements which begin or end in the city. These movements form the first or final link in the logistics chain, also known as the 'last mile'. We also see a small number of through-flowing logistics within the ring of motorways around Rotterdam. These through-flows should actually use the ring roads, and where possible they will be discouraged from entering the city. Since almost all city logistics movements are carried out by road, road transport forms the focus of this strategy. If opportunities were to arise for sustainable city logistics by water, these could be adopted as part of the strategy.

The city logistics routes of a parcel delivery firm such as DHL (Image 2.1) begin at the sorting centre on the outskirts of the city; the 'last mile', which would be affected by the strategy, is limited to just a few kilometres. The equivalent routes for a retailer such as Kruidvat – which supplies its stores from a distribution centre in a central location in the country – come to more than 100 km.

Deliveries within the city by a local entrepreneur, such as a sole trader on Pannekoekstraat, also count as city logistics (Image 2.2). In this strategy we focus on the routes within the Rotterdam ring road, because that is where the issues with air quality are concentrated. The ring road itself is not part of this strategy, because most of the traffic on the major road network is through traffic, not city logistics. The same is true for the majority of port-related logistics, with most routes from the port following various corridors into the hinterland or towards Antwerp or Westland.



Image 2.2: Local entrepreneurs on Pannekoekstraat

The City of Rotterdam is however involved in other activities related to sustainable logistics – such as port logistics – carried out by the Port of Rotterdam, the MRDH and the central government.

2.2 What kinds of freight vehicles are there in Rotterdam?

Goods are generally delivered to destinations in the city by van, truck or tractor-trailer. These vehicles fall into the RDW categories N1, N2 and N3, respectively. These categories also include special vehicles, such as vehicles that transport fresh produce, which need a cooling engine to maintain a low temperature. Businesses such as Post-Kogeko use these vehicles to deliver to businesses such as hospitality venues and supermarkets (Image 2.3). Then there are the municipal waste collection vehicles, which have a structure that requires significant engine power (Image 2.4). Other examples include the transport of foundation piles to construction sites on extra-long lorries. Because the mobile machinery at the construction site is not covered by city logistics or construction logistics, this machinery is not included in this strategy, although the City of Rotterdam is taking action in this policy area. Rotterdam is a signatory of



Image 2.3: Refrigerated vehicle, Post-Kogeko – leader in the GD010ZECL (source: Post-Kogeko)



Image 2.4: Electric waste collection vehicle, Roteb Lease, City of Rotterdam



Image 2.5: Cargo bike (LEVV), Coolblue (source: Coolblue)



Image 2.6: Electric Goupil (LEVV), Picnic

the Green Deal Het Nieuwe Draaien ('the new way of operating'), and the city is working to achieve emission-free construction site design. Other vehicle types are becoming increasingly common in the city, such as electric light goods vehicles (LEVVs). Some examples of these are cargo bikes, as used by Coolblue (Image 2.5; these vehicles do not have an electric engine), and Goupil trucks as used by Picnic (Image 2.6; these vehicles do have an electric engine). A cargo bike is categorised as a bicycle and can be ridden on cycle paths. The electric Goupil vehicles must be driven on the road. Depending on its use, this vehicle is either a delivery van (category N1), for which the driver needs a full driving licence, or an L-category vehicle (microcar) for which the driver only needs a moped licence.

Our waterways are also attracting more and more interest as a city logistics transport route, and construction logistics providers already transport goods by water. In other cities, such as Utrecht and Amsterdam (which have an extensive network of canals), other logistics segments also make small-scale use of water transport, despite the fact that transport by water can be difficult because it is usually necessary to schedule an extra transfer; not many final destinations are situated by a waterway.

We are aiming to reduce the number of large and heavy goods vehicles in the city centre as much as possible because these vehicles emit exhaust, have a negative effect on road safety and cause road surfaces to deteriorate. That said, the alternative is not an unalloyed boost for the city. Roughly seven vans would be needed to transport all the goods that fit in a truck, and if we want to transport the contents of the vans by LEVV we would need something like four LEVVs per van. This shows that the alternative to large goods vehicles does not always represent an improvement, because many more movements are necessary in order to deliver the cargo. Lorries – especially when they are fully loaded and make only a few stops in the city – are still one of the most efficient ways to transport goods in the city. One example of this is the logistics of supplying large supermarket chains. These chains have many different locations, and because they transport large volumes they promote efficiency. In this case, replacing a lorry with smaller vehicles would not be an efficient solution and would lead to more transport movements – not to mention more emissions if the alternative vehicles were not emission-free. With a more intricate network of delivery addresses, and with smaller volumes of goods to be delivered, a LEVV can be the most efficient and sustainable solution.

In practice, passenger cars are also sometimes used for logistical purposes. These vehicles are not a formal part of logistics and are not included in this strategy, although there is a risk that, if emissions policy for goods transport is tightened, entrepreneurs who now use a van could switch to using a large car as a way to get around legislation on emission-free city logistics. However, we expect that this effect will only be a factor in the early stages (after a stricter emissions policy is introduced) and will only be used by a few small business owners. The ZECL policy monitoring will pay special attention to this.

2.3 Road traffic emissions

City logistics is one of the biggest producers of exhaust in the city and leaves a greater CO₂ footprint than do cars (Image 2.7). It is important to mention here that Image 2.7 is based on traffic measurements from 2015. The rise of Euro VI lorries has significantly improved NO_x emissions.

Because this group of vehicles (and actors) are responsible for a significant proportion of emissions from the mobility sector, focusing on this relatively small group will actually have a big effect.

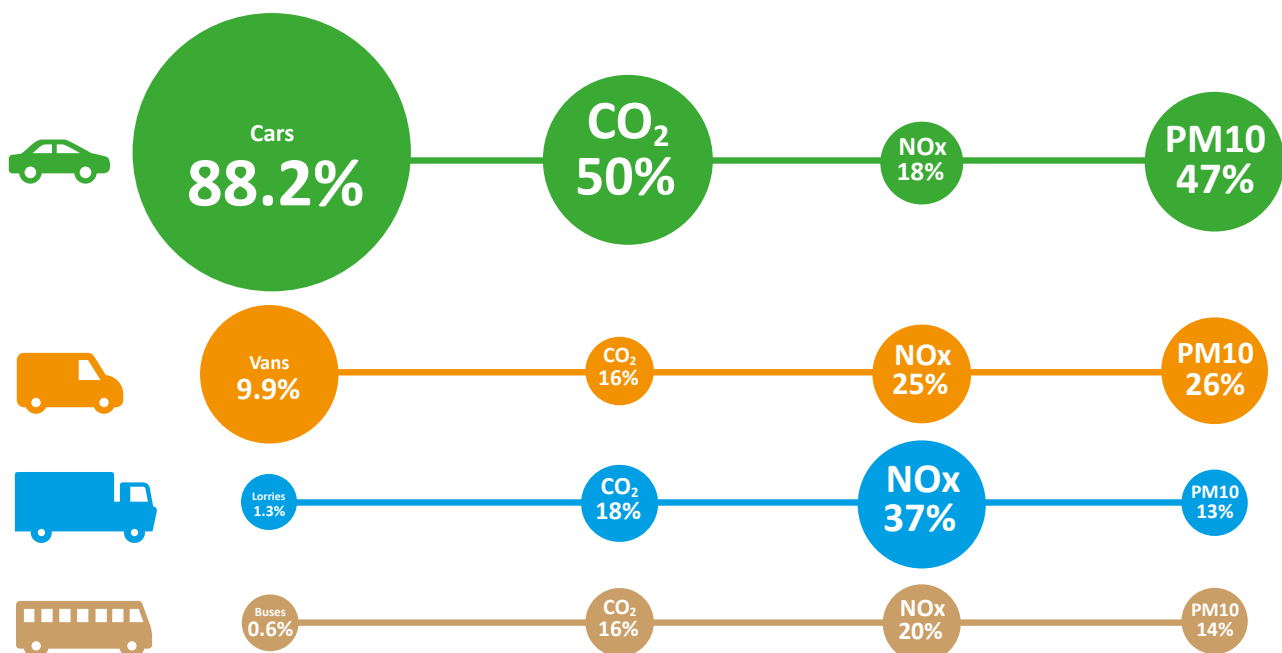


Image 2.7: Proportion of vehicles in traffic and emissions (Rotterdam city centre, 2015)⁸

⁸ Please note: this image is based on measurements from 2015. Since that time, the fleet of lorries has been updated and many more Euro VI lorries are active in the city. Up-to-date data is currently lacking, but Euro VI lorries emit almost no NO_x. In the current situation, this suggests that the proportion of NO_x emissions from lorries will be substantially lower than in 2015. Professional road transport actors (including the market leaders in Logistics 010) have already been using Euro VI lorries to supply the city centre for some years.

3. Time to take the next step

3.1 Results from GD010ZECL

The GD010ZECL accelerated the transition to emission-free city logistics. The City of Rotterdam created the Logistics 010 community, which now numbers 1,300 associated organisations (Image 3.1). The Logistics 010 event has been organised twice a year since 2015 by De Verkeersonderneming, evofenedex, TLN, MRDH and the City of Rotterdam (Image 3.2). Attendees include transporters, logistical service providers, carriers, shop owners and regional authorities. The objective of the community and the events is to pool knowledge and to join forces to achieve cleaner, more efficient logistics in Rotterdam. Another way to achieve this is through the website: www.logistiek010.nl.



Image 3.1



Image 3.2: Impression of the Logistics 010 event, 11 April 2019

Gerke Haisma, Managing Director of ERA Contour:

“Logistics 010 brought us into contact with transporter Breytner. This resulted in a collaboration in which Breytner provides our ‘last-mile transport’ of scaffolding materials to the construction site in Nieuw-Crooswijk (using electric lorries).”

Businesses are quicker to take action. In Rotterdam, the conversation is no longer about ‘Why’, but rather about ‘How’ we will get it done. The GD010ZECL has provided the logistics sector and the city council with insights into the numerous obstacles, such as the lack of rapid development of emission-free vehicles, especially in the heavy goods segment. Availability of the necessary (fast) loading infrastructure is also limited or hard to achieve, and emission-free vehicles cannot be deployed in the same way as diesel vehicles because they have a lower pulling capacity and a smaller range. Moreover, the purchase price of emission-free vehicles is still unaffordable for most entrepreneurs, even if the Total Cost of Ownership (TCO) is comparable to the diesel alternative. The current policy, which arose from the GD010ZECL, focuses primarily on incentives, a few of which are summarised below. Despite the efforts and the results that have been achieved in sustainable mobility, the GD010ZECL has also revealed that we need more than just non-binding stimulus policies if we want to remove the obstacles.

Some examples of current incentives offered by the City of Rotterdam:

- ECOSTARS: Through the ECOSTARS programme, carriers can earn stars for sustainable operations. Logistics brokers visit transporters on behalf of the City of Rotterdam to give them non-binding advice about how they can save (even more) fuel and make the switch to emission-free transport in Rotterdam.

To date, over 400 ECOSTARS certificates have been issued, and roughly another 100 certificates are added every year.

- Privileges for emission-free freight transport:
 - Waiver for shared use of bus lanes. This waiver can be requested for emission-free lorries (though not for vans). The waiver offers access to 19 selected bus lanes in Rotterdam, to be used by various different vehicles including the all-electric trucks deployed by Breytner and Technische Unie (Image 3.3).
 - Evening window for emission-free goods transport. This waiver can be requested for emission-free lorries and vans. This waiver allows the vehicle to enter pedestrian areas (which generally have a window from 5:00 to 10:30) from Monday to Thursday between 18:00 and 20:00 for transportation purposes.
- ZE van subsidy scheme: Until December 2019, entrepreneurs can receive a purchase subsidy from the City of Rotterdam to buy an electric van. This subsidy scheme was initiated by the central government and is facilitated by the municipality.
- Buy Zero Emission Transport (BuyZET): The municipality has a direct influence on the transport services it purchases, whether or not this is done through a tender procedure. One example of this is the municipal contract for relocation services and transport related to setting up polling stations. By the end of the contract period (2024) – if not before – this transport will be completely emission-free. For the past two years the programme has also focused on emission-free construction contracts. More examples (in Dutch) can be found at www.010duurzamestad.nl/thema/lucht/?filter=1502449868-4
- Construction logistics: The City of Rotterdam is working closely with several large construction companies and TNO to agree arrangements for the optimum use of construction hubs, transport by water and zero emission last-mile deliveries. Funds from the central government are currently being used to prepare a subsidy scheme that will reduce construction-related freight movements in the city and reduce the related emissions.
- Subsidy helpdesk: The City of Rotterdam is making capacity available to support businesses in applying for national and/or European subsidies. One example of this is the central government’s demonstration scheme for climate-related technologies and innovations in transport (DKTI), which is intended to finance innovative projects for sustainable transportation. Rotterdam has already helped draft several applications.



Image 3.3: Breytner electric lorry in a bus lane – leader in the GD010ZECL (source: Breytner)

Marie-José Baartmans, Owner of Breytner:

“Zero emission city logistics is already a possibility. Our entire fleet is 100% electric. Don’t focus on what can’t be done, but rather on what can be done now.”

3.2 Next step: GD010ZECL 2.0

Recent research (TNO, 2018; DRIFT, 2018) has shown that – despite the efforts made and the results of the GD010ZECL – the City of Rotterdam faces a big challenge in terms of the energy transition, necessary CO₂ reduction and improvements to air quality related to mobility. An analysis of the effectiveness of the City of Rotterdam’s current policy to reduce CO₂ confirmed that this policy alone will not be sufficient to achieve the target for the mobility subsector. This means that, if the current mobility policy remains unchanged, Rotterdam is not on course to achieve the Paris climate targets.

The logistics sector is also aware that an incentive policy on its own will not be enough to create a completely emission-free city centre. In addition to continuing and expanding the incentive campaigns, regulation must also be introduced to ensure that the entire logistics sector makes the transition to zero emissions. The introduction of a zero emission zone for city logistics (ZECL zone) is the

clearest and most effective measure the local authority can take. A ZECL zone is an area within the city which only emission-free delivery and freight transport vehicles are allowed to enter.

The logistics sector has called on the local authority to communicate a concrete framework for such a zone as soon as possible, to give the sector enough time to incorporate an emission-free fleet into their business activities. Moreover, Rotterdam must not fall behind other municipalities such as the cities of Utrecht, Amsterdam and The Hague, which have – to a greater or lesser extent – already announced a ZECL zone for 2025, or even earlier. This is also in line with the nationwide Climate Agreement, which includes the introduction of a ZECL zone for city logistics in between 30 and 40 large municipalities by 2025.

We are keen to formulate both agreements for the ZECL zone and a concrete action plan in a new supplementary covenant, GD010ZECL 2.0. This covenant will set out the geographic boundaries of the ZECL zone for 2025, with separate strategies for different subsectors (construction, retail, fresh produce, waste, facilities and parcels).

The municipality intends to finalise this covenant together with the signatories of the GD010ZECL, advocacy organisations such as TLN, evofenedex, VNO-NCW, suppliers, carriers, transporters, recipients and residents. The covenant is also in line with the logistical aims set out in the Rotterdam Climate Agreement.

Jan Boeve, Director of TLN:

“As soon as possible, the City of Rotterdam must communicate where the zero emission zone for city logistics will be from 2025, so that transport business owners know where they stand and can prepare their business model accordingly.”

An important basic principle for the introduction of the ZECL zone is that it must not have any negative impact on the economic climate in Rotterdam. Deliveries in the city must continue unimpeded in the future; we must adapt to the reality that there is always construction work taking place in Rotterdam and that residents are opting to have more parcels delivered to their homes. This is why it is so

important to implement separate strategies for different subsectors. A customised emission-free alternative will be sought for each subsector, with an achievable percentage to become emission-free by 2025. If it turns out that a target of 100% emission-free by 2025 is not achievable for a specific subsegment, a roadmap will be developed for the remaining percentage, including concrete steps to ensure that these vehicles can ultimately also become emission-free.

Achieving an emission-free city centre may demand a certain level of effort, but at the same time it boosts the economic climate by improving a range of aspects of liveability (cleaner, quieter, more efficient city logistics).

3.3 Zero Emission City Logistics: more than just zero emission vehicles

Whether the last mile is short or long, whether the vehicle is a delivery scooter or a tractor-trailer, every situation will need an emission-free alternative when a ZECL zone is introduced in 2025. Only consider: in a single week, more than 28,000 unique vans and almost 4,700 unique lorries drive into the centre of Rotterdam.

Various researchers have indicated that, by 2025, there will not be enough vehicles available to carry out every single one of these trips with emission-free vehicles. A certain number of brands are currently making electric vans available, and the market introduction of more new models is expected in the next few years. Some examples of available brands and models are the Nissan eNV, currently deployed by Roadrunner Koeriersdiensten for routes in Rotterdam, and the electric Renault Kangoo, in use by Oosterbouw BV for their jobs in Rotterdam (Image 3.4). The purchase price of an electric van must also be made affordable for small local entrepreneurs before emission-



Image 3.4: Electric van, Oosterbouw B.V.

free city logistics can be made compulsory through the introduction of a ZECL zone.

Hans Quak, Senior Researcher for Sustainable Transport and Logistics at TNO:

“In city logistics, a large number of small transporters with low volume are responsible for the largest share of transport movements, whilst a small proportion of the (professional) goods transporters transport the largest share of the volume. Zero Emission City Logistics can only work in practice if a ZE solution can also be found for that large group of small transporters, because not everyone can buy a ZE van right now.”

The heavy goods segment is still lagging behind in terms of technological developments. Most of the electric lorries that are currently on the roads are actually converted diesel vehicles. An example of this is the Technische Unie's Emiss truck (Image 3.5), which combines the chassis of a diesel lorry with an electric driveline. Partly for this reason, the costs of a lorry like this are still very high. It also has a relatively limited range compared to a diesel vehicle. That said, progress is also being made in this segment;



Image 3.5: Electric lorry, Technische Unie

Europe recently imposed a regulation requiring a minimum share of lorry manufacturers' total production to be emission-free. Emission-free vehicles are expected to be available in most segments by 2025. However, there will still not be enough vehicles available in the heavy goods segment to replace all current vehicles – quite apart from the fact that the increasing number of residents and increased activity in the centre will require more goods transport movements. Moreover, due to their limited range, electric lorries cannot be deployed in the same way as diesel vehicles. For the replacement of this heaviest category of diesel trucks with emission-free alternatives after 2025, the roadmap has been incorporated into the vision for Zero Emission Mobility.

An emission-free city centre needs more than just emission-free vehicles. It needs an efficiency boost from actions such as the consolidation of goods and the most efficient deployment of the available emission-free vehicles for the last mile. The solution and the municipality's efforts will differ for each subsector (fresh produce, general freight, waste, express/parcels, facilities/service, construction).

Large parcel delivery providers such as PostNL and DHL have already optimised their logistical processes within their own operations. They also make use of their own hubs on the outskirts of the city, making it more straightforward to deliver the last mile emission-free. Both companies have also already announced that they are planning to make their deliveries in the centre of Rotterdam completely emission-free even before the target year of 2025.

Kruidvat – with its distribution centre in the middle of the country and its chain of retail stores across the country – is another matter. Multiple fully-loaded lorries travel from this centrally-located distribution hub to Rotterdam every day. Transferring a full load from a distribution truck to an emission-free vehicle on the outskirts of the city is an expensive extra step in the supply chain. Emission-free alternatives include using a hydrogen-powered vehicle with a bigger range, or recharging the battery at an intermediate point; the latter solution would require high-capacity public charging infrastructure that can be booked in advance. Another option under consideration is the use of hybrid vehicles in combination with geofencing.⁹ When they enter the ZECL zone, hybrids can automatically switch to all-electric propulsion.

⁹ Geofencing is the virtual delimitation of a geographical area using GPS. A new system has been introduced in Rotterdam for this solution: SIC!. An initial pilot with cars was conducted in 2018 in cooperation with BMW.

Another possible option is to use a system of exchangeable transport units. Kruidvat is currently running a pilot along these lines in cooperation with Breytner: Kruidvat places four units a day, six days a week, on the outskirts of the city. Breytner then transports these four units into the city each day on a single electric truck.

For recipients with a large number of suppliers (such as the City of Rotterdam itself), a lot can still be achieved by combining goods at a hub on the outskirts of the city. One promising aspect of this option is that suppliers can deliver their products to a single location on the outskirts of the city, where the goods are then combined in an all-electric lorry and transported to their final destination in the city. Combining goods at a hub would also help the construction and retail sectors to achieve a significant reduction in the number of movements in the city. Unfortunately, hubs for different segments cannot simply be combined, however desirable that might be from the point of view of the efficient use of space. We are seeing more and more service providers introducing a completely new logistical concept that is both efficient and emission-free. Picnic is a good example of this trend.

Image 3.6 (see next page) shows the proposed transition to emission-free city logistics in the city centre for each subsegment and is intended to start conversations. The image shows variation in the shift in the type of vehicles for each subsegment (not all emission-free vehicles are either suitable or available), as well in terms of propulsion. The image also shows how efficiency gains are achievable in each subsegment, to a greater or lesser extent.

3.4 Extent of the ZECL zone 2025

The transition in the city logistics system, and the question of whether there are enough emission-free vehicles available, will depend on the extent of the ZECL zone.

The bigger the zone, the greater will be both the positive effect within the zone and the knock-on effects outside it. A bigger zone also means there will be more actors for whom an emission-free alternative will have to be found.

The obstacles surrounding air quality are concentrated in and around the city centre: a very relevant basic principle when setting the boundaries of the ZECL zone. Another prerequisite for success will be the harmonisation of the boundaries and the timing of ZECL zones with other cities. It is clear that a range of conceivable scenarios will need to be investigated. The precise scenarios will be defined in the next stage of this plan. Scenarios that are clearly worth investigating include:

- Current environmental zone: Within the Rotterdam ring road north of the Maas river. This scenario makes optimum use of existing systems, although this is a large zone and a significant challenge.
- Medium-sized zone: Rotterdam city centre plus the surrounding city districts. This zone is in line with the Climate Agreement.
- Small zone: Rotterdam city centre. Manageable, but with limited effect.

It is very important that the area and entry requirements of the ZECL zone be established as soon as possible (early 2020). Once it is clear which vehicles will no longer be permitted to enter which areas of the city from 2025, the logistics sector will be given a maximum of five years to adapt their operations to that situation.

Expected transition to zero emission city logistics by 2025 Rotterdam city centre

Segments	Subsegments	Most common type vehicles and propulsion 2019			Most common type vehicles and propulsion 2025		
Fresh	Retail (fresh)						
	Hospitality and specialists						
	Fresh home deliveries (groceries and prepared meals)						
General freight	Retail chains (non-fresh)						
	Specialists (including fashion, hanging garments)						
	Two-person home deliveries (furniture, white goods)						
Waste	Waste collection: households						
	Waste collection: businesses						
Express and parcels	Express and parcels						
Facilities/ service	Maintenance and service						
	Office supplies, hospitals and municipal services						
Construction	Public space/ infrastructure/making land construction-ready						
	Building shell						
	Completion/interiors						
	Personnel						

Image 3.6: Expected transition to zero emission city logistics by 2025 in Rotterdam city centre.

Information on the shift vehicles 2019 → 2025

- Shift to smaller vehicles.
 - Slight consolidation potential with hubs on the outskirts of the city.
-
- Shift to smaller vehicles.
 - Slight consolidation potential with hubs on the outskirts of the city.
 - Use of LEVVs.
-
- Increase in logistical movements.
 - Increased use of LEVVs.

- Shift to smaller vehicles.
 - Slight consolidation potential with hubs on the outskirts of the city.
-
- Shift to smaller vehicles.
 - Slight consolidation potential with hubs on the outskirts of the city.
 - Limited use of LEVVs.
-
- Slight consolidation potential with hubs on the outskirts of the city.







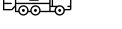
- More efficient deployment of vehicles through the use of sensors on underground containers. (Only collect full containers).
-
- More close-knit network of pick-up services through the use of LEVV, combining goods delivery and waste collection.
 - Joint collection for each street/area (combining waste).
 - Arranging pick-ups with recipients (more efficient route).

- Increase in logistical movements.
- Increased use of LEVVs.
- Significant consolidation potential with hubs on the outskirts of the city.

- Shift to smaller vehicles.
 - Limited use of LEVVs.
-
- Shift to smaller vehicles.
 - Consolidation potential with hubs on the outskirts of the city.
 - Limited use of LEVVs.
 - Push for route reduction/consolidation through municipal procurement and joint procurement (with e.g. Erasmus MC, University of Applied Sciences).

- Shift to smaller vehicles.
 - Slight consolidation potential with hubs on the outskirts of the city.
 - Push for route reduction/consolidation through municipal procurement.
-
- Significant consolidation potential thanks to hubs on the outskirts of the city.
-
- Significant consolidation potential through carpooling or use of public transport/P+R facilities.






Vehicle type

-  LEVV
-  Moped
-  Van
-  Truck/lorry
-  Tractor-trailer/heavy lorry
-  Waste collection vehicle
-  Special construction vehicles

Proportion of vehicles per subsegment



Driveline type

-  Fuel
-  Electric
-  Hydrogen electric
-  Hybrid (electric within the zone – regular fuel outside the zone)
-  Biofuel

What does this table show?

Rotterdam is focusing on 'zero emissions' by promoting electric vehicles (powered by electric batteries and hydrogen). This infographic visualises the expected transition to zero urban logistics emissions by 2025 in Rotterdam's city centre.

The shift in the type of vehicle and the driveline is indicated for each (sub)segment.

4. Roadmap ZECL

Zero Emission City Logistics is essential if we want to achieve our ambition to reduce CO₂ emissions and improve air quality. In concrete terms, this means establishing a zero emission zone for city logistics in Rotterdam and promoting zero emission logistical and vehicle-specific solutions. This is Rotterdam's answer to the logistics sector's call for clarity, and it reaffirms the city's determination to honour the commitments made in the national Climate Agreement.

This chapter sets out the steps the City of Rotterdam needs to take to achieve zero emission city logistics in Rotterdam city centre. Wherever possible, these steps are in line with the 'Roadmap for introducing a zero emission zone for city logistics, for local authorities' guide provided by the Ministry of Infrastructure and Water Management.

Step 1: Mayor and Executive Board officially establish the Roadmap ZECL strategy

June 2019

This Roadmap ZECL gives an overview of the challenge, the vision and the strategy to achieve zero emission city logistics in Rotterdam. The roadmap was drafted in collaboration with the signatories of the GD010ZECL and the advocacy organisations TLN, evofenedex and VNO-NCW. The Roadmap ZECL shows how major measures – such as a zero emission zone for city logistics – are necessary in order to achieve our objectives. These measures will not only influence mobility – other policy areas will also feel their effect. In Step 1 the Mayor and Executive Board finalise the strategy in the Roadmap ZECL.

Step 2: Develop and sign the covenant Green Deal 010 Zero Emission City Logistics 2.0, together with the logistics sector¹⁰, including an action programme and a concrete ZECL zone

June 2019 – March 2020

Zero emission city logistics is a joint task for both the government and the logistics sector. We aim to join forces with the signatories of the GD010ZECL and advocacy organisations such as TLN, evofenedex and VNO-NCW to draft a supplementary covenant with the intention of introducing a ZECL zone by 2025, with a transitional model for each subsegment (fresh produce, general freight, waste, express/parcels, facilities/service, construction). That covenant – Green Deal 010 Zero Emission City Logistics 2.0 – will establish joint agreements to achieve zero emission city logistics by 2025.

¹⁰ The logistics sector reflects the logistical actors who are active in and around Rotterdam. The signatories to the GD010ZECL (Breytner, DHL, Getru business- es, Post-Kogeko Logistics, Renewi, Roadrunner Koeriersdiensten, Transport Service Schelluinen, TNO and the City of Rotterdam) and the industry associations TLN, evofenedex and VNO-NCW are involved in creating the Roadmap ZECL and have indicated a desire to remain involved in the follow-up steps. In order to draw up an achievable, effective covenant that enjoys broad support, three groups will be put together.

Working group GD010ZECL 2.0: A working group will be set up, in coordination with the prospective signatories to the GD010ZECL 2.0, to shape the covenant and the action programme.

Focus group: To ensure that the activities are in line with practical experience, a focus group will be set up within the Logistics 010 community. The composition of the focus group will reflect the city logistics chain partners in the city.

Expert group: By developing their knowledge in recent years, certain actors have become experts in the area of ZECL in Rotterdam. For this reason, in addition to the focus group (which is intended to present a broader reflection), an expert group will also be set up to allow the leaders in their field to come together with the municipality and TNO to tackle future challenges. This expert group will include Breytner, DHL, Roadrunner Koeriersdiensten, TNO and the City of Rotterdam, as well as new, pioneering (logistics) enterprises based in Rotterdam.



The municipality and the signatories will draw up an action programme under the leadership of the City of Rotterdam. Agreements about who will carry out which action from the programme will be set out in the covenant. One important action involves defining the geographical boundaries and entry requirements for the zero emission zone for city logistics that is to be introduced in 2025.

The covenant, including the action programme, will be finalised by the Mayor and Executive Board and signed together with the partners.

Step 3: Implement action programme and monitor developments

March 2020 – December 2025

The agreed action programme will be implemented by the signatories to the covenant and monitored by means of a steering group chaired by the City of Rotterdam. Progress made on the programme will be frequently discussed with the signatories to the covenant.

Important first steps include:

- developing a plan for enforcement.
The City of Rotterdam is very experienced in enforcing the access system of the current environmental zone. It should be straightforward to implement either the same or a similar system.
- developing a plan for a policy on exemptions.
Another important part of introducing a ZECL zone is the exemption policy. A policy on exemptions forms the basis for granting both structural exemptions and occasional daily exemptions. This depends very much on the ultimate extent of the ZECL zone, the availability of emission-free vehicles and national policy on harmonising ZECL zones.



Step 4: Traffic order

January 2022

Once the boundaries of the ZECL zone have been established and the plans for enforcement and exemption policies have been finalised, the ZECL zone traffic order¹¹ will be introduced.

Step 5: Preparation and introduction of the ZECL zone

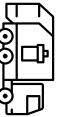
January 2023 – January 2025

This step encompasses all the preparations in terms of the organisation, signage and IT systems that are needed to make the ZECL zone a reality. Communication will be intensified at this point. The pre-announced ZECL zone will be introduced on 1 January 2025.

Step 6: Monitoring and evaluation from January 2025

The effectiveness and economic impact of the ZECL zone will be monitored and evaluated. Any necessary adjustments will be made.

A structured communication strategy will be needed throughout the entire process, from finalising the roadmap to introducing and monitoring the ZECL zone.



¹¹ On 12 April 2019 the cabinet voted to confirm the amended Road Traffic and Traffic Signals Regulations, to harmonise the current environmental zone and new ZECL zones. This makes it possible for local authorities to introduce ZECL zones in a uniform way.



City of Rotterdam