KpVV CROW

State of Zero-Emission Buses 2024

CROW-KpVV

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Working on practical solutions comes naturally to us. We do this with over 120 professionals in Ede (headquarters) and Utrecht. CROW is an independent, non-profit knowledge organization.

April 2025

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Introduction

With the State of Zero-Emission Buses 2024, CROW-KpVV shows how far we have progressed in the Netherlands with the objectives of the Administrative Agreement on Zero Emission Regional Public Transport by Bus (BAZEB). We also pay attention to knowledge development over the past year.

For the administrative agreement, the IPO, the Transport Region Amsterdam, the Metropolitan Region Rotterdam The Hague and the Ministry of Infrastructure and Water Management signed in 2016. The agreement is based on three goals:

- from 2025, all new buses are 100% zero-emission at the exhaust
- 100% of the bus fleet is replaced by zero-emission buses by 2030
- by 2025 at the latest, regionally generated energy for bus transport is renewable.

It was also agreed that the transition to zero-emission bus transport should not be at the expense of passengers and thus services in regional bus transport. In addition, public transport concessions have as favourable a score as possible on well-to-wheel CO_2 emissions per passenger kilometre, with what is considered 'as favourable as possible' still to be specified.

Reading guide

In Chapter 1, we outline where we stand in the transition to zero-emission bus transport. Chapter 2 deals with what considerations public transport authorities can make regarding the construction and management of parking facilities. And Chapter 3 discusses the costs and financing of the zero-emission bus system.

1 On the Road with Zero-Emission

This chapter begins with an analysis of the inflow of zero-emission buses in Dutch public transport. We then consider in section 1.2 what the electrification of bus transport means for the environmental impact, including CO_2 emissions, nitrogen and particulates, as shown in the environmental performance poster. In section 1.3, we discuss the origin and deployment of renewable energy, and section 1.4 concludes this chapter with the uniqueness of hydrogen.

1.1 Inflow of Buses

With the 'Monitor zero-emission buses', CROW-KpVV has been charting the progress of sustainability for several years on a quarterly basis. Until 2015, these were a few zero-emission buses, after which the number of new buses increased rapidly.
The ultimate goal is a bus fleet that is completely zero-emission by 2030. CROW publishes the quarterly monitor on zeroemissiebus.nl. The figures in figures 1 to 5 are from the last quarterly report of 2024.

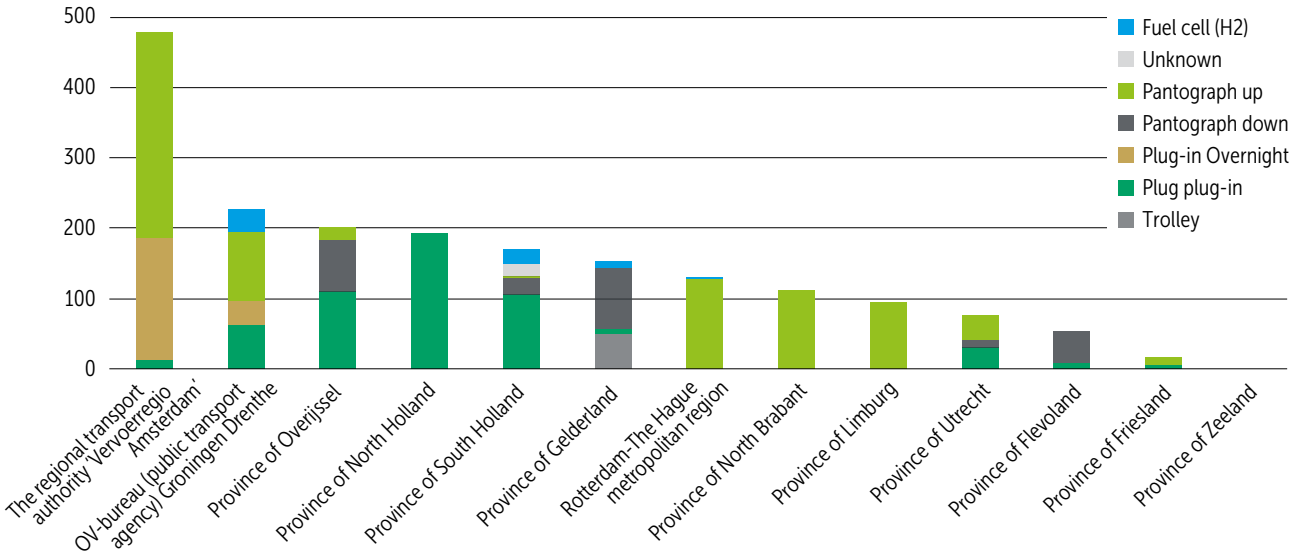

Figure 1. Number of zero-emission buses by public transport authority

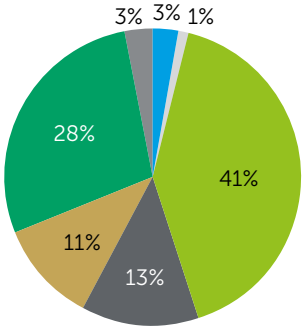

Figure 2. Share charging technology

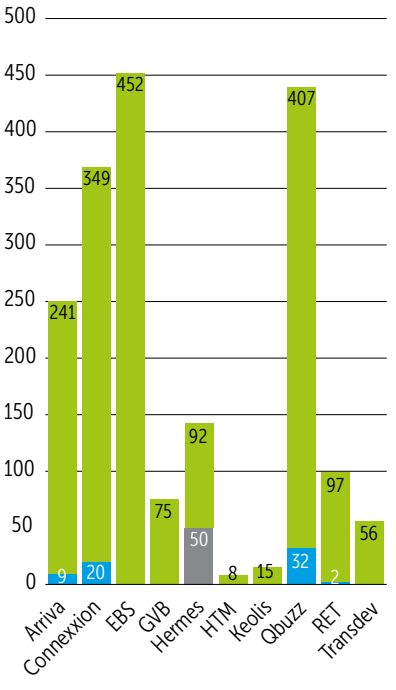

Figure 3. Zero-emission buses by carrier

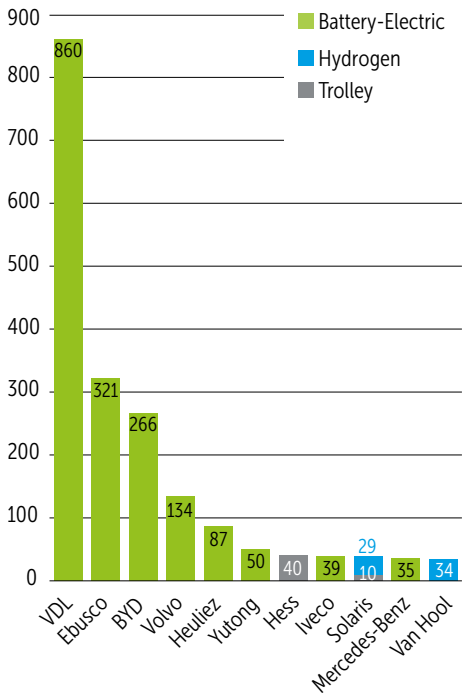

Figure 4. Zero-emission buses by manufacturer

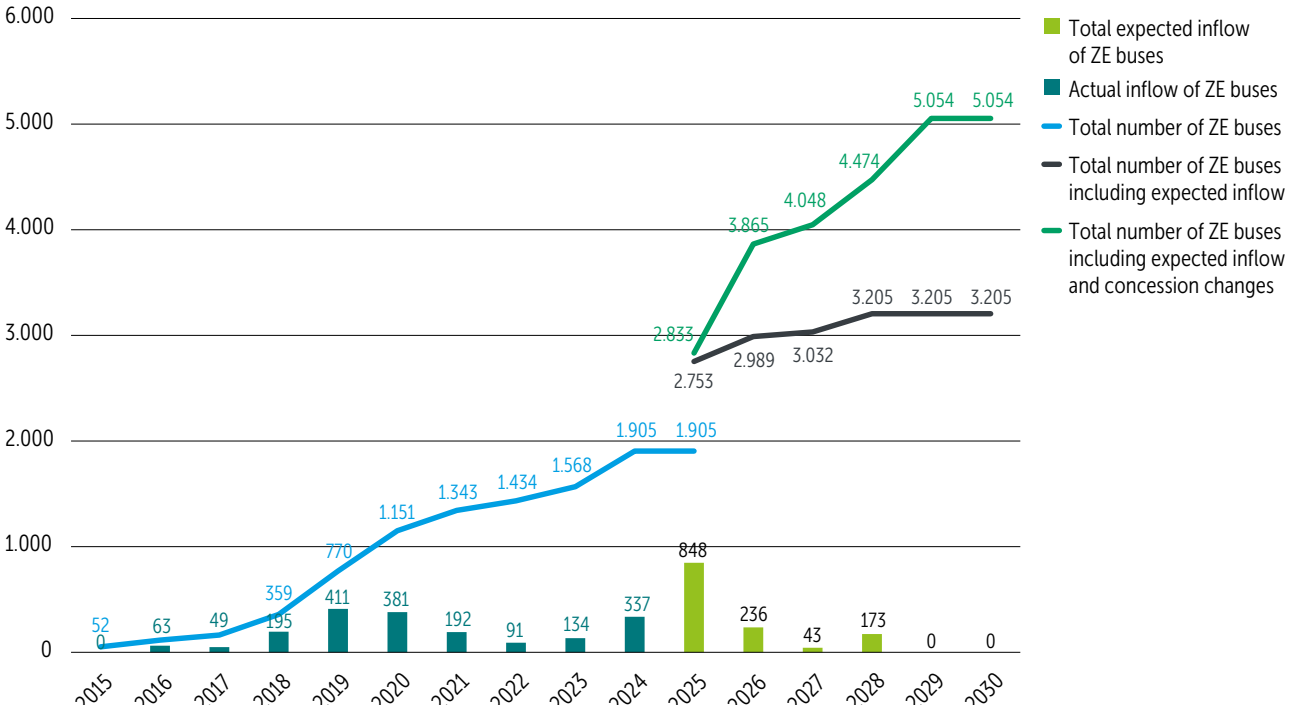

Figure 5. Inflow of zero-emission buses

In 2024, 337 zero-emission buses have entered the Netherlands. That is less than the 1,350 buses expected at the beginning of the year. Supply problems plagued bus manufacturers. In Zaanstreek-Waterland (EBS), IJssel-Vecht (EBS), Zuid-Holland Noord (Qbuzz) and Brabant-Oost (Arriva), among others, not all ordered buses are running yet.

The province of Overijssel and the Transport Region of Amsterdam together rank first in terms of the share of zero-emission buses in the fleet at the end of 2024. More than 70% of the buses in both clients' concessions are zero-emission. The province of North Holland, the front-runner until early 2023, has 67% battery-electric buses in its three concessions. The public transport agency OV-bureau Groningen Drenthe follows in fourth place with 52% of its bus fleet zero-emission.

1.2 Vehicle Fleet Sustainability

In 2009, CROW-KpVV first published the environmental performance poster that displays the sustainability of the vehicle fleet. The key reference points here are the Euro standards established for buses. A Euro III rating or lower scores only 1 point, while Euro VI (the highest rating for internal combustion engines) scores 5 points. Depending on the fuel type and the presence of a hybrid engine, the maximum score with an internal combustion engine is 8.8 points.
A zero-emission bus scores at least 9.5 points. The block heater, whose use is generally limited, in these buses runs on diesel. A bus that is completely zero-emission, including heating, earns the full 10 points.

Public transport agency OV-bureau Groningen Drenthe achieves first place with a score of 8.66 in spring 2024. The combination of electric buses, hydrogen buses and fuel buses running on HVO (Hydrotreated Vegetable Oil, a renewable diesel variant made from vegetable oils and waste fats) makes for a high score. HVO emits significantly less CO_2 and harmful emissions than conventional diesel, making it a more sustainable alternative. A year earlier, the province of Limburg was at the top with a score of 9.0. But a temporary halt to the use of HVO, caused by high costs and limited availability, caused the environmental score to drop considerably at the time.
In the meantime, Limburg has been fuelling HVO instead of regular diesel for some time, with HVO now seen as the standard. Fuelling diesel was only a temporary measure.

The public transport concessions that score highest on environmental value are Amstelland-Meerlanden (9.3), Gooi and Vechtstreek (9.2), Haaglanden Regional Bus Transport (9.0) Haarlem-IJmond (8.8), Groningen-Drenthe (8.7), IJssel-Vecht (8.6), Voorne-Putten and Rozenburg (8.5) and Noord-Holland Noord (8.0). These concessions have many zero-emission buses or buses running on a sustainable fuel such as green gas.

Over the past 15 years, it is easy to see how the number of polluting buses declined rapidly in favour of clean Euro VI and electric (hydrogen) buses. In recent years, the number of Euro V buses did increase again. Subcontractors often deploy these buses on rush hour trips. In the past, these buses were less visible due to the lack of up-to-date data. See figure 6.

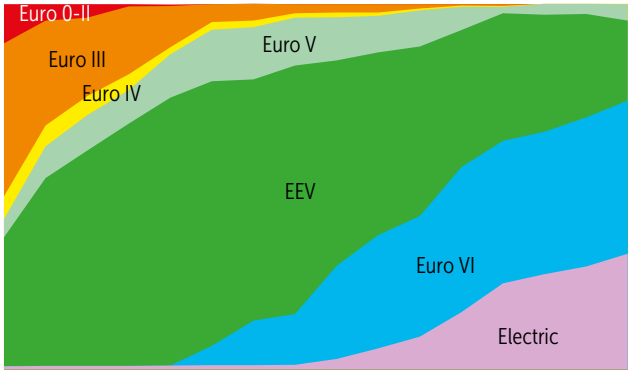

Figure 6. Development of bus fleet by Euronorm 2009-2024

Table 1. **Environmental quality of bus fleet by public transport authority**

Public transport authority	2017	2019	2021	2022	2023	2024
OV-bureau (public transport agency) Groningen Drenthe	3.16	3.55	8.90	8.85	8.89	8.66
Province of North Holland	2.55	4.65	7.21	7.15	7.99	8.56
Province of Overijssel	2.61	2.63	5.52	5.83	5.96	8.30
Rotterdam-The Hague metropolitan region	2.94	3.63	6.37	6.37	6.96	6.99
Province of Limburg	5.02	6.37	6.98	9.12	8.96	6.77
The regional transport authority 'Vervoerregio Amsterdam'	2.77	4.49	5.18	5.92	6.55	6.52
Province of Flevoland	3.10	4.78	4.71	4.89	4.92	6.48
Province of Gelderland	4.89	4.83	6.60	7.17	6.85	6.25
Province of Utrecht	4.37	4.48	5.34	5.28	5.45	5.59
Province of North Brabant	4.48	4.37	4.46	4.60	4.72	5.37
Province of Zeeland	3.84	3.90	4.11	5.16	5.11	4.75
Province of South Holland	2.92	4.14	4.44	4.57	4.66	4.61
Province of Friesland	4.33	4.41	4.64	4.74	4.68	4.34
Netherlands	3.63	4.33	5.72	6.06	6.30	6.44

This overview map clearly shows that electric (hydrogen) buses predominate in more and more concession areas. EEV buses still dominate in a few areas. In most cases, a new concession starts here in the coming years or new rolling stock has yet to come in after the start of a new concession.
In Waterland, most of the new electric buses are now in after the start of the concession at the end of 2023. A new concession with largely new diesel rolling stock began in Fryslân at the end of 2024. At the same time, the new South Holland North concession started, where Qbuzz is still waiting for new electric buses.

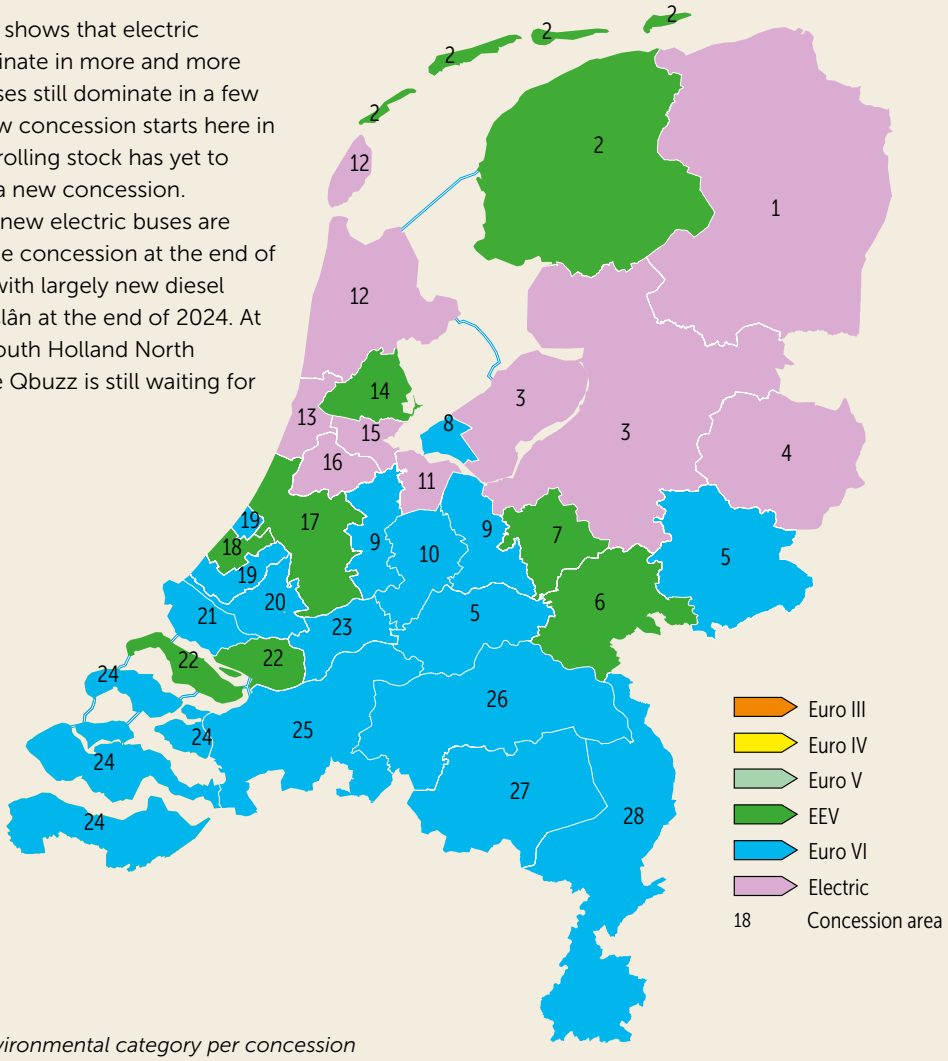

Figure 7. Most common environmental category per concession

1.3 Renewable Energy

In 2018, the European Renewable Energy Directive (REDII) came into force. This directive requires fuel suppliers to achieve at least 14% renewable energy in the transport sector by 2030.

Moreover, the Zero Emission Bus Transport Administrative Agreement states that from 2025, all new buses in the Netherlands must run entirely on 100% renewable energy or fuel. Renewable energy includes various sources, such as electricity from wind and solar, green gas, biomass and hydrogen. The use of this energy in public transport is key to achieving climate goals and reducing CO_2 emissions in the sector.

According to the most recent monitoring by Duinn, total energy consumption in urban and regional transport in 2024 was estimated at 5.8 million Gigajoules (GJ), 45% of which came from renewable sources. This means that more than 2.6 million GJ were deployed from renewable energy sources, with an increasing share of locally generated energy. In 2023, only 9% of renewable energy was produced locally, but this will increase to 38% by 2024. This is a positive development, as locally generated energy strengthens the regional economy and contributes to a more sustainable energy system.

Within the renewable energy mix, clear shifts are visible. The share of green electricity has increased significantly. Of the renewable electricity used in urban and regional transport, 60% came from Dutch wind power and 40% from European wind sources. This shows that public transport is becoming increasingly dependent on sustainable, renewable electricity. In addition, green gas is playing an increasing role in the energy mix. This is partly due to the Arnhem-Nijmegen concession, where green gas is an important source of energy. Green gas is increasingly being used as an alternative to natural gas, especially in regions where renewable gas production is possible.

As for renewable fuels, the use of HVO (Hydrotreated Vegetable Oil) has declined in certain concession areas, partly due to the rising price. Nevertheless, fuel suppliers remain obliged to meet the renewable energy obligation by submitting sufficient Renewable Fuel Units (RFUs) to the Dutch Emissions Authority (Dea). This system ensures that a minimum percentage of renewable fuels are deployed annually.

For energy consumers, such as public transport companies and concessionaires, the system of Guarantees of Origin (GOs) applies. With GOs, they can prove that the electricity purchased actually comes from renewable sources. This system provides transparency and certainty about the origin of energy.

The growth in the number of certificates issued for Dutch wind and solar power reflects the increase in renewable electricity in public transport. With the use of renewable energy sources and the possibility of verifying this through GOs and RFUs, the sustainability of public transport is becoming increasingly demonstrable.

1.4 Hydrogen

In 2024, hydrogen became increasingly important for making public transport sustainable. One of the key steps in this transition was the expansion of hydrogen infrastructure in the Netherlands and other European countries. Governments and companies took an active approach to hydrogen buses, with the Netherlands leading the way in regions such as Groningen-Drenthe.

Take the province of Utrecht, for example, which has invested heavily in hydrogen infrastructure. From March 2024, companies can apply for subsidies to purchase hydrogen trucks and delivery vans, and to build hydrogen refuelling stations. This is an important step towards a nationwide network of filling stations. The aim is to have around 40 hydrogen refuelling stations in operation across the country by 2024. This development allows companies to switch to sustainable mobility without worrying about the availability of hydrogen vehicle refuelling stations.

At European level, the project *Joint Initiative for Hydrogen Vehicles across Europe (JIVE)* has been further expanded in 2024. Thanks to this initiative, 300 hydrogen buses have been deployed in 22 European cities, promoting the commercialisation of hydrogen buses. Joint procurement and large-scale implementation have reduced the cost of these vehicles, encouraging more cities to embrace hydrogen as a clean fuel.

A telling example of the use of hydrogen in public transport can be found in the Groningen-Drenthe region, where hydrogen plays a key role in making bus transport more sustainable. In this region, hydrogen is produced not only via electrolysis, but also from residual hydrogen from the chemical industry in Delfzijl. The production of chlorine releases hydrogen, which is then used as fuel for the region's buses. This is an innovative example of how industrial residues can be effectively reused for sustainable mobility. This reduces CO_2 emissions from public transport while making logistics in the region more sustainable.

Hydrogen can be produced in three ways. The most widely used technology is Steam Methane Reforming (SMR), which produces hydrogen from natural gas. This is also known as grey hydrogen, because the process releases CO_2 that is not captured. When CO_2 emissions are captured and stored via Carbon Capture and Storage (CCS), we speak of blue hydrogen. One example is the Porthos project in Rotterdam, where CO_2 is stored under the North Sea. The third form is green hydrogen, which is produced via electrolysis with renewable electricity, e.g. from wind or solar power.

Case study hydrogen OV-bureau Groningen Drenthe

The hydrogen bus is still seen as the alternative to compete against battery-electric buses. In a comparison made on Total Cost of Ownership (TCO), i.e. purely on the basis of (local) costs, this is understandable. Based on technology, hydrogen buses are not inferior to battery-electric buses, but the choice of technology is almost always a financial trade-off in practice. What is not considered in the TCO calculation is the social importance and the extent to which the technology choice is desirable or timely implementable.

OV-bureau Groningen Drenthe sees a mixed fleet of battery-electric buses for the short and medium detours and hydrogen-electric buses for the long detours as the most suitable solution. Electric buses on the longer distances have several drawbacks. For example, charging stations in rural areas take flexibility out of transport plans. Needlessly lugging around huge battery packs is not the preferred option. Furthermore, the space requirements of charging plazas in city centres are not always desirable. Above all, a large grid connection must be available. However, these drawbacks are pushed aside as long as the TCO of battery-electric buses is lower.

Unfortunately, the alternative also has drawbacks. The price of hydrogen is currently still so high that external financing is needed to break even. Only large-scale production of hydrogen at lower cost, or infrastructure to import hydrogen at low cost, can solve this problem. Another major area for improvement is the availability and reliability of hydrogen refuelling stations. More backup capabilities are needed and, again, scaling up is the solution. Furthermore, while the whole of the Netherlands contributes to the cost of reinforcing and expanding the electricity grid, the cost of scaling up hydrogen lands with local carriers or governments, which usually do not have the money to do so.

Currently, in Groningen and Drenthe, the choice for zero-emission Qliner buses falls in favour of battery-electric. The choice could also have fallen in hydrogen's favour if major grid connections, a new stabling facility and a loading bay for buses at the Main Station had not been available. It is therefore not a done deal. In 5 to 10 years, the market may be different again. In fact, most bus manufacturers are betting on hydrogen for long-distance buses.

The conclusion is that public transport buses can run reliably on hydrogen, even with very intensive use. If the use of hydrogen buses is preferable to battery-electric buses, the challenge is to make that happen financially.

2 Parking Facilities Zero-Emission Equipment

In 2024, CROW looked into the development of parking facilities for zero-emission buses. A key question that concerned public transport authorities was how to make informed decisions about the ownership of these parking facilities and associated charging facilities. This led to a follow-up study, in which CROW-KpVV developed the Roadmap on Parking Facilities for Zero-Emission Buses. In sections 2.1 and 2.2, we explain this roadmap in more detail, focusing on grid congestion, site selection and different ownership models. In section 2.3, we discuss what steps public transport authorities need to go through and what options they have in order to have zero-emission buses available on time, based on the different phases of the concession period. Finally, the last section focuses on the safety of zero-emission buses at public transport junctions, with a fact sheet as a source of information.

2.1 Roadmap on Parking Facilities

The State of Zero-Emission Buses 2023 provides an overview of the pros and cons of self-managing parking facilities. In 2024, we continued working on this 'roadmap' to meet the challenges of grid congestion in the Netherlands and finding suitable locations for parking and charging infrastructure for zero-emission buses. Reducing the risks of delays and safeguarding public transport services requires a strategic approach.
The focus here is on the steps that public transport authorities can take to establish parking facilities in strategic locations. This involves ensuring sufficient electric transmission capacity and choosing the right organisational form, whether ownership lies with the carrier, the public transport authority or a third party.

2.2 Purpose Roadmap

CROW then asked MuConsult to draw up a 'Roadmap on Parking Facilities for zero-emission buses' to support public transport authorities in the transition to zero-emission buses within their concessions. The State of the Zero-Emission Buses 2023 already includes a 'Consideration framework for parking facilities'. This consideration framework from CROW-KpVV provides an overview of the advantages and disadvantages of owning parking facilities for zero-emission buses. The Roadmap on Parking Facilities builds on this and provides more insight into steps that public transport authorities need to go through and the options they have when it comes to having parking facilities for zero-emission buses available on time.

The Roadmap on Parking Facilities for zero-emission buses is structured as follows:

- an overview of the different types of parking facility ownership
- a schematic overview of the steps public transport authorities can take
- a more detailed description of these steps, described in chronological order and type of ownership model
- some practical examples for inspiration.

2.3 Phases of Concession Period

In this section, we briefly go through the different phases of a concession period and explain the areas of focus for each phase.

Initiative phase
In this phase, we concretise the outline frameworks for the succeeding concession. It is important to formulate clear ambitions within the framework of the Administrative Agreement on Zero Emission Bus Transport (BAZEB), to think about the choice of technology (such as hydrogen- or battery-electric buses) and to set a realistic timeframe for implementation. The initiative phase further involves a thorough analysis of the market situation. Consider the specifications for vehicles and charging infrastructure, as well as the situation of the medium-voltage grid. Technical elements, such as the reference line network and energy requirements, should then be considered in relation to the existing stalls and other assets.

Preparation phase
In this phase, the public transport authority holds market consultations and translates this input, together with the ambitions and outlines, into a Programme of Requirements (PoR) and other tender documents. The commissioner of the public transport is also making legal and financial preparations. These are important in determining the strategy for ownership of the parking facilities. Furthermore, the public transport authority should take into account market conditions and examine which areas offer sufficient space for parking facilities with the required capacity and convenient location in relation to future bus routes.

If it is not desirable or possible to take over existing sites, for example because the public transport authority does not want to take responsibility as the management organisation for the parking facility (facilities), the next step is to find, develop or purchase a new depot location. To find a suitable location, the public transport authority can prepare a mini-PoR to approach plot owners and ask if they are interested in making their land available for a new parking facility. This can be done both for sites acquired by public transport authorities or other parties and for sites where private individuals retain ownership of the parking facility.

The public transport authority can decide to stop the process at any time if the location does not meet the requirements. When looking for suitable sites, good cooperation with municipalities and grid operators is essential. Municipalities have insight into land availability, permits and zoning plans, while grid operators know more

about the status of the electricity grid and waiting times for new connections.

The chosen location should be easily accessible, comply with zoning laws and provide sufficient space for bus parking and maintenance. In addition, the location should be suitable for maintenance work, such as washing buses and carrying out minor repairs. The site should provide sufficient manoeuvring space and meet the requirements of safety regions and insurers, especially when many electric or hydrogen buses are parked.

Tender phase
In the tender phase, the public transport authority publishes the concession, and operators can ask questions and submit bids. Once awarded, the layout of the parking facilities will follow in consultation with the new concessionaire. Site inspections are essential to get a realistic picture of conditions; they help carriers prepare accurate quotes. In addition, agreements are needed on the takeover of parking facilities and current leases at the end of a concession.

Implementation phase
In the implementation phase, the official transfer of the parking facility to the (new) concessionaire takes place. In this process, the transport company checks that the parking facility meets all contractual conditions and technical requirements. The responsibility for commissioning lies with the concessionaire, who also takes care of the planning and management of the parking facility.

If the parking facility is owned by the public transport authority, or conditions apply from an acquisition scheme for the zero-emission bus system, periodic quality checks are necessary. If there are defects, steps will be taken to improve the quality and make the parking facility function optimally.

Implementation phase
When a public transport authority takes the parking facility into its own management, good asset management comes with it. This involves optimal management of all resources, such as buildings, infrastructure and maintenance facilities. The public transport authority can completely outsource management to external parties, or it can keep it in-house. Efficient asset management requires the following two steps:

1. **Asset inventory –** create a detailed list of all managed assets, such as maintenance facilities and charging infrastructure, and their condition. A life cycle analysis is useful to determine when maintenance or replacement is needed.
2. **Management and maintenance –** prepare a plan for preventive maintenance to avoid unexpected failures and extend the life of assets. In addition, procedures should be in place for corrective maintenance in case of unexpected defects.

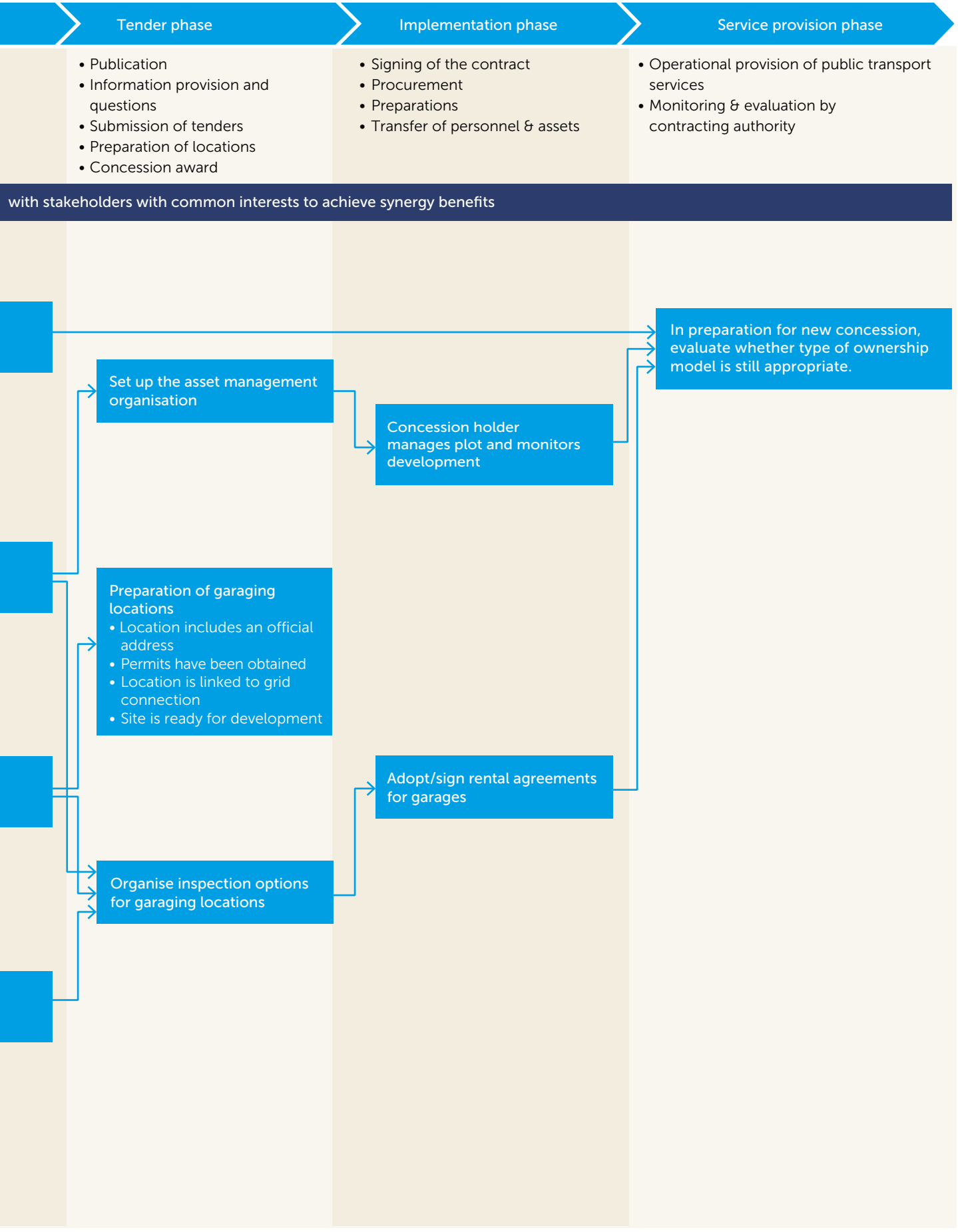

Figure 8. Phases of concession period. From: Roadmap on Parking Facilities for Zero-Emission Buses

2.4 Design Guidelines Fire Safety at Parking Facilities for Zero-Emission Buses

In late 2024, on behalf of the BAZEB programme group, CROW commissioned a summary of the publication DesignGuidelines Fire Safety at Parking Facilities for Zero-Emission Buses. Like the main report, this summary was written by the Netherlands Institute for Public Safety (NIPV).

In 2021, CE-Delft was commissioned by the BAZEB programme group to study the safety aspects associated with the deployment and operation of zero-emission buses. Like the main report, this summary was written by the Netherlands Institute for Public Safety (NIPV). In 2021, CE-Delft was commissioned by the BAZEB programme group to study the safety aspects associated with the deployment and operation of zero-emission buses. At the time of the study, knowledge around safety and zero-emission buses still had some gaps. One of the gaps was fire safety at parking facilities. By the end of 2022, the Netherlands Institute for Public Safety (NIPV) has worked out knowledge gap 7: Design guidelines for parking zero-emission buses in shelters and bus depots.

The aim of this study was to identify possible measures and make proposals that can be incorporated into design guidelines for parking facilities, bus depots and bus stations so that battery-electric buses and hydrogen buses can be safely parked and/or charged/fuelled in these spaces.

The study identifies possible measures such as sprinkler systems, detection, ventilation and compartmentalisation. The study does not provide a ready-made fire safety concept for depots with zero-emission buses. However, the report does suggest fire safety measures from which the designer of a bus depot can choose in consultation with the public transport company and the client.

The main report is a detailed document for transport operators, public transport authorities, parking facility construction companies, municipalities and other parties to work with. The summary produced from the report is intended to show at a glance the risks and possible measures for zero-emission buses compared to diesel buses.

3 Costs and Financing Zero-Emission

The transition to zero-emission bus transport involves changes, especially when it comes to costs and ownership of infrastructure. The revamped takeover regulation, which we discussed in section 3.1, is now much more in line with what the industry needs and practical experience. In section 3.2, we take a closer look at the financing and subsidies that support public transport companies to purchase electric buses and the associated charging infrastructure. All this accelerates the transition to a more sustainable transport system. Finally, section 3.3 focuses on asset management. In this, data-driven work plays an important role, along with charging infrastructure, contributing to more efficient and sustainable resource management.

3.1 Takeover Scheme

In December 2024, CROW-KpVV released a new version of the Guide on Takeover Scheme Zero-Emission Bus System. For this third update, practical experiences with takeover schemes in the public transport concessions Achterhoek-Rivierenland, Hoeksche Waard/Goeree-Overflakkee and East Brabant were investigated. This research has led to a series of improvements and modifications that reflect the latest developments and needs in public transport with zero-emission buses.

Indeed, practice shows that such a scheme is always necessary for proper funding and is also valuable for public transport authorities. Also new is an article describing how a takeover obligation can be included in concession decisions. In addition, the names of paragraphs and topics have been changed to better reflect the usual terminology in takeover schemes.

The term *Workplace* has been replaced by *Charging Location* to indicate more clearly where the charging infrastructure is located. The commentary now puts more emphasis on keeping grid connections available and sufficient contracted power at charging locations. Provisions on maintenance, replacement and takeover values of battery packs have also been updated based on recent experience.

Finally, the sample texts have been legally reviewed and rewritten, and the appendix with information requirements has been adapted based on insights from the East Brabant concession. These improvements make the guide more up to date, practical and valuable for everyone involved in the transition to a zero-emission bus system.

3.2 Funding and Grants

The switch to zero-emission bus transport is crucial for making public transport in the Netherlands more sustainable. To facilitate this transition, the national government, the Ministry of Infrastructure and Water Management (IenW) and the European Union have set up several funding and subsidy programmes. These initiatives are vital to support public transport companies in purchasing electric buses and setting up the necessary infrastructure. Financing zero-emission bus transport is a complex issue. Public transport authorities have several options for purchasing vehicles, such as leasing, loans or direct purchase. The choice of option depends heavily on the asset management of the authority concerned.

Besides traditional financing models, there are several grant schemes available that can help public transport companies in their transition to zero-emission bus transport. These subsidies make it financially viable for public transport companies to invest in both the vehicles and the associated infrastructure, such as charging infrastructure and hydrogen refuelling stations.

Electric bus subsidy scheme

Under the Specific Allowance Zero-Emissionbuses (SPUK ZE buses), public transport authorities received a total of 40 million euros in 2024 as a contribution to the purchase of electric buses. The scheme was set up that year to accelerate the transition to zero-emission bus transport and lower the financial threshold for public transport companies wishing to invest in sustainable buses. The scheme was set up that year to accelerate the transition to zero-emission bus transport and lower the financial threshold for public transport companies wishing to invest in sustainable buses. This allowed public transport companies to make necessary investments to make their bus fleets more sustainable and contribute to the Netherlands' climate goals.

Grant scheme for emission-free coaches

The Grant Zero-Emission Coaches (STour) supports public transport companies investing in zero-emission coaches, such as electric buses that can reach speeds of up to 100 km/h. This is important for making long-distance transport more sustainable, where zero-emission vehicles help improve air quality and reduce CO_2 emissions. This scheme specifically encourages the purchase of electric public transport coaches, contributing to broader goals of emission reduction and sustainable mobility. More information on the grant can be found on the RFO website.

Charging infrastructure grant scheme

The Private Charging Infrastructure Subsidy Scheme (SPRILA) offers subsidies for the purchase of charging infrastructure and stationary batteries. A well-functioning charging network is essential for the daily use of electric vehicles. The scheme supports companies and public transport authorities to install charging stations and develop solutions that reduce grid congestion, for example by using stationary batteries. This promotes the implementation of electric buses.

Subsidy scheme for hydrogen buses

The Subsidy Scheme Hydrogen in Mobility (SWiM) targets public transport companies that want to invest in hydrogen buses. Hydrogen is a promising solution for making public transport more sustainable, especially for vehicles that need to travel longer distances, for which battery-electric buses may be less suitable. This scheme encourages the purchase of hydrogen buses and supports the necessary infrastructure for hydrogen refuelling. The technology helps achieve emission-free mobility and contributes to the Netherlands' broader climate goals.

3.3 Asset management in Public Transport

2024 marks a significant change in the approach to asset management within public transport. The focus will be on data-driven operations and the integration of charging infrastructure, facilitating a successful transition to zero-emission bus transport.
A striking practical example illustrates this development.

Largest zero-emission bus shelter in Groningen

In November 2024, the expansion of the zero-emission bus parking facility on the Peizerweg in Groningen was successfully completed. With almost a doubling of the site, the parking facility accommodates an additional 160 buses, making it the largest in the Netherlands. The new parking facility is equipped with all necessary facilities for charging zero-emission buses. This will allow the public transport company to accommodate and charge more electric buses, accelerating the transition to a sustainable, carbon-neutral bus fleet.
The bus shelter on Peizerweg plays a major role in the region's ambition to reduce fossil fuels in public transport and replace them with electric alternatives. This is not only good for the environment but also good for the health of Groningen residents, as the use of zero-emission buses improves air quality in the city. The increase in the number of buses in the depot will allow transport operators to further expand their fleets and improve the quality of public transport in the region. This benefits both travellers and the environment.

Colophon

State of Zero-Emission Buses 2024

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