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The transition towards a zero-emission municipal fleet of the city of Amsterdam

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Executive Summary

The municipality of Amsterdam has great ambitions to have a zero-emission fleet by 2030. This is a highly complex process with a significant amount of stakeholders and many knowledge gaps. A 2023 review of the "Fleet Transition Plan 2019" identified four critical components. First, a vehicle replacement plan needed to be developed considering the age of the vehicles, the impact of the Zero-Emission (ZE) zone and the assessments of the availability and suitability. Secondly, locations/depots needed to be evaluated for suitability of parking and charging the estimated amount of electric vehicles on site. Thirdly, a detailed financial plan needed to be developed since electric vehicles have higher initial costs, requiring each department to budget accordingly. Lastly, each department needed to develop a unique detailed implementation plan. This adaptive strategy emphasizes knowledge-sharing and collaborative adjustments to fulfil Amsterdam's zero-emission targets effectively.

Keywords: electric vehicles, heavy duty electric vehicles, public policy & promotion

1 Amsterdam's sustainable background

1.1 Introduction Amsterdam as leading city towards zero emission

The municipality of Amsterdam is a leading city in The Netherlands related to zero emission initiatives. As frontrunner implementing a zero emission zone from January 1, 2025 onwards as one of the first cities in The Netherlands, the city representatives decided in 2019 to set up a strategic transition plan for the own municipal fleet with a deadline to be full zero emission by 2030. The background of this initiative was that a couple of important sustainability initiatives were launched in 2018 to develop proposals aimed at meeting carbon reduction targets by 2030. These efforts contributed to the 2019 Dutch national climate agreement, known as the 'Klimaatakkoord' which aligns with the goals outlined in the 2015 Paris Climate Agreement. This initiative marked the start of Amsterdam's ambition to fully decarbonize the city, with a specific focus on mobility.

1.2 The challenges for Amsterdam reaching the ambitions

The fact that the municipality of Amsterdam in 2019 initiated a plan for a zero-emission (ZE) fleet transition, setting key milestones along the way until the ambition towards a complete ZE fleet in 2030 did lead to several challenges. One important challenge is the fact that the municipality is transitioning the fleet to sustainable alternatives across all kinds of different departments. This is a challenges as they all have their own specific

vehicles in use with different usage from the employees and different locations from where they operate. Next to those already up front expected challenges, this ambitious approach encountered also unforeseen challenges in the last couple of years (2019 – 2023). For example, it became clear in some cases that a direct 1:1 vehicle replacement was insufficient due to limitations in deployability. Another unforeseen challenge was that for many vehicles a low market readiness level (MRL) was the fact in several possible zero emission solutions for specific vehicles. A third and more critically challenge was related to grid capacity issues. Consequently to those challenges, in 2023, the municipality implemented strategic adjustments to realign efforts and stay on track toward achieving zero-emission municipal mobility by 2030.

1.3 The research related to the challenges towards a zero emission fleet

FIER Sustainable Mobility and CENEX Netherlands were asked by the municipality of Amsterdam to develop a new fleet transition plan and to support the implementation of this plan together with the "Big 5" which are the 5 municipality departments with the largest and most complex fleets. In order to develop this new transition plan a close cooperation was being set up in the years 2023 – 2025. The process included a revamp of the fleet status including the already included low and zero emission vehicles in use. In this paper an overview of the current municipal fleet status and an overview on how the ambition for a transition to a full zero emission fleet in 2030 is defined and forecasted related to the challenges.

2 The current municipal fleet status

2.1 Overview of the municipal fleet composition

The fleet of the municipality of Amsterdam is a combination of all kinds of different vehicles (appr. 1.700 in total), including two-wheelers, passenger cars and forklifts as some of the easiest vehicles to transit towards zero emissions. However, it also includes more difficult vehicles, such as boats, streetsweepers, garbage trucks, flushing machines and tractors. Different municipal departments use the fleet in varied ways, necessitating an integrated approach that includes vehicle use, and most importantly charging infrastructure. In figure 1 an overview of the fleet of the municipality of Amsterdam with the progress towards sustainability measured at 3 different moments in time. The percentages per vehicle type relates to the zero emission part of the fleet. It is clear to see that for the easiest parts of the fleet that can be transitioned into zero emission Amsterdam is well on its way to the ambitions. However, for the challenging part of the transition (mainly heavy duty vehicles) a specific transitioning process still needs to be implemented and the percentages of zero emission vehicles within the fleet are still very low.

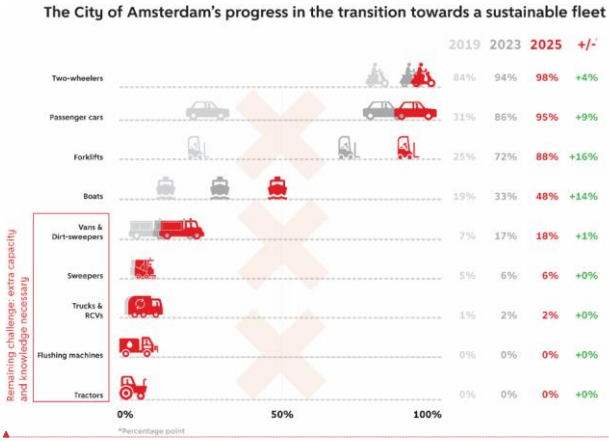

Figure 1: Amsterdam's municipal fleet composition in 2019, 2023 and 2025

a mis en forme : Police :Times New Roman, 10,5 pt, Non Italique, Couleur de police : Automatique

2.2 Short description of the usage of the fleet

Transitioning the fleet is closely tied to the tasks and services that each department provides for Amsterdam's services for their citizens. A short overview of these services related to the vehicle types:

- **The two-wheelers** are motorbikes, mopeds and electric bicycles, which are used to quickly move throughout the city. They are used by all departments, with the largest group being cleaning crews
- **Passenger cars** are used to transport people and smaller equipment throughout the city, a large part are shared cars used by municipal workers. Passenger cars are also used in law enforcement, passenger transport and garbage collection.
- **Forklifts** are mainly used on depots to move materials over shorter distances. Occasionally they are used on location to move equipment for events.
- **Boats** are mainly used by city law enforcement to patrol the canals, another part is used to check the state of quay walls and bridges in the city.
- **Vans and dirt sweepers** are vehicles up to 3.5 t GVW used to transport people and goods (vans), with some being specialized kippers which are used by manual sweepers which clean the streets from garbage, dirt, leaves etc.
- **Sweepers** are specialized vehicles with motorized brushes that clean the streets by brushing it and storing the swept up dirt in their backs. These are vehicles drive with a limited speed.
- **Trucks and RCVs** are heavy goods vehicles with half of this fleet being used as refuse collection vehicles that collect garbage at households and central refuse collection points. Some have back loaders while other include cranes to hoist containers.
- **Flushing machines** are specialized vehicles which can equip different attachments like flushing equipment, where they also transport water, or gritter equipment to combat the snow and ice in winter conditions. These are therefore used throughout the year in different roles.
- **Tractors** are used for the maintenance of the forests, parks and sports fields within the City of Amsterdam.

Each department has started its own sustainability efforts and faces unique challenges. The goal of the transition process is to support these departments in taking ownership of the transition, fostering collaboration on knowledge exchange, market engagement, and piloting new vehicle types. Coordinated planning is essential to address shared challenges, such as charging capacity.

3 The transition process

3.1 Process based on four interdependent components

A reassessment of the 2019 initiatives toward a sustainable fleet transition revealed that the process is more intricate than initially anticipated. After the research related to the challenges towards a zero emission fleet, the definition of the transition process took place. This resulted in a process of Amsterdam’s transition to a sustainable municipal fleet which is structured around four key, interdependent components. In figure 2 an overview of these four components and how they are interdependent.

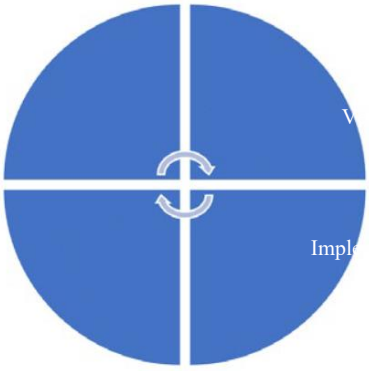

Figure 2: Four key components of fleet transition

3.2 The interdependence between the components explained

The first component (1. Vehicles) centers on determining the timing, quantity, and specific types of vehicles slated for replacement. A detailed vehicle replacement plan needed to be developed considering. It had to consider the age of the vehicles and the expected total usage period. This needed to be compared with the impact of the ZE zone, and the assessments of the availability and suitability of the vehicles based on the Market Readiness Level. Key fields of interest are the special vehicles like tractors, street sweepers, and refuse trucks, where the MRL currently is relatively low.

The second component, locations (2. Locations), addresses the challenges posed by the increasing adoption of electric vehicles (EVs) on the electrical grid capacity at their respective parking locations. Each location must assess whether its grid infrastructure can accommodate the anticipated surge in energy demands required for vehicle charging. A forecast model has been developed to project the energy requirements for each site based on full fleet electrification by 2030, providing departments with a clear understanding of necessary actions regarding charging infrastructure and grid connections.

The third component considers the financial implications (3. Finance) of transitioning to an zero emission fleet. Zero emissions vehicles currently entail higher upfront costs, typically ranging from 1.5 to 3 times the cost of conventional vehicles, varying by vehicle type. However, advancements in battery technology and increased production scales are anticipated to reduce these price gaps over time. Another issue related to finance is the fact that in some use cases it is not possible to replace 1 vehicle for a zero emission vehicle, as they are heavier and have less load capacity, this also must be calculated in the investment plans. Each municipal department must assess these financial impacts and develop comprehensive transition budgets and plans accordingly.

Finally, each municipal department is tasked with formulating its own implementation plan (4. Implementation Plans) to achieve a zero emissions fleet by 2030. While the end ambition is clearly defined, the pathway toward it will likely be nonlinear, requiring ongoing adjustments and refinements based on evolving insights and technological advancements. This adaptive process is expected to entail iterative planning and alignment with broader sustainability goals.

3.3 The organisation structure of the transitioning process

In order to make the right decisions related to these four interdependent components including the fact that there are 5 departments responsible for the services related to the vehicles a decision making process is defined for leading the transition to a zero emissions fleet. In this process all four components have a responsible manager included which operate under a strategic Director of Municipal Fleet Transition. The four managers are the Process manager Fleet, Operational manager real estate, Finance & Control manager and the Procurement team

manager which lead the category managers for fleet, charging infrastructure and energy. The five usage departments all have their own fleet managers and decision makers, which contribute by assessing operational requirements and identify the specific needs of each department.

4 Conclusions

The ambition of Amsterdam to a zero emission own fleet by 2030 turned out to be a highly complex process with a significant amount of stakeholders and many knowledge gaps. The total fleet is a mix of several kinds of vehicles with their own market readiness levels for zero emissions solutions. In the first part of the transition process (2019 – 2024) Amsterdam already replaced a lot of vehicles of the fleet to zero emission. However, for the more difficult to replace vehicles a clear transition process related to vehicles, locations / infrastructure, finance and specific implementation plans needed to be set up in order to realise the ambitions in the next couple of years. This was necessary because of the many internal and external stakeholders were involved in parts of the whole process and because there is a lot of interdependence in the decision making process and the possible available solutions. For example market readiness levels of zero emission vehicles differ, the possibilities for getting the right grid connection at the locations in time and the high up front investments needed are challenges which resulted in a specific organisation structure of this transitioning process under the responsibility of a Director of municipal fleet transition.

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Presenter Biography

Edwin Bestebreurtje MSc is partner and senior consultant of FIER Sustainable Mobility. Edwin has been specialized in business development projects in the automotive and mobility sector. He was responsible as project manager for developing the Automotive Campus in Helmond and project manager in European projects on (e-) mobility, such as SOLUTIONSplus, SCALE and GEMINI. Edwin is responsible for the European Alternative Fuels Observatory (EAFO) which is THE knowledge platform for alternative fueled transport in Europe owned by EC DG Move.