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Amsterdam's Pathway to Climate Neutrality: Creating an Enabling Environment

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Synonyms

Amsterdam; Buildings; Citizens; Climate change; Climate neutrality; Decarbonization; Energy transition; Governance; Mobility

Definition

A vibrant European capital and a pioneer in climate-friendly solutions related to citizens services within its urban environment, the municipality of Amsterdam has agreed on a roadmap that aims to decrease the city's CO_2 emissions by 55% in 2030 and by 95% in 2050, compared to 1990, which is used as a reference year. In 2040, Amsterdam would like to be free of the use of natural gas altogether and it aims for all traffic to be emission-free as early as 2030. A package of measures to achieve these goals has been agreed upon and adopted by the Mayor and Cabinet at the beginning of March 2020. The so-called *Amsterdam climate-neutral 2050 Roadmap* includes targets and measures for all relevant sectors: the built environment, mobility, electricity, and industry and harbor.

This chapter aims to describe the climate challenges of Amsterdam's urban environment linked to the goals and targets set in the climate-neutrality roadmap. Further, to break down the goal with a focus on the built environment and mobility sectors for the following reasons. The role the municipality can play in achieving the desired goals and the importance of citizen engagement coupled with the prospects of citizen-driven innovation and profit-sharing in the respective sectors.

Introduction

A densely populated and compact built city, Amsterdam is growing rapidly; by around 2030, the city's population is expected to reach a million residents. The further growth of the city will pose additional challenges associated with urban planning and climate risks.

In more details, the temperature has risen by 1.6 °C since 1950 while in the future, more rainfall is expected with more frequent, heavier downpours. Heatwaves will also be more frequent (indicatively, an increase to 40 summer days is expected by 2085) affecting public health by creating heat stress and sleep disruption. Biodiversity will be threatened and flooding risks will rise due to the sea level rise by 85 cm this century.

R. Brears (ed.), *The Palgrave Encyclopedia of Urban and Regional Futures*,
https://doi.org/10.1007/978-3-030-51812-7_209-1

The gradual growth of the city (including more residents, homes, jobs, and tourists) after the 1990s has resulted in the amount 5510 kt CO_2 emissions in 2010. Since then, and despite the continuous rapid urban growth, the CO_2 emissions in Amsterdam have fallen since 2010 mainly due to the increasing generation and use of renewable energy and the fall in energy consumption per resident.

As of today, the total greenhouse gas emissions in the Netherlands are already lower than in 1990, but this is not yet the case for Amsterdam. The city's emissions are still falling too slowly.

In the expected growth of the city, we should also consider the BREXIT impact in terms of the relocation of businesses in trading and finance, medicine, and agriculture, as well as logistics and distribution sectors looking to secure their European operations as the UK departed the European Union. This upward trend that started in 2019 already results in population growth and a significant rise in building construction to accommodate the business activities as well as the additional housing needs, creating additional needs for energy supplies.

The climate-neutral 2050 Roadmap is setting Amsterdam's carbon ambitions, to reverse the upwards emissions trend, and the required measures to achieve them.

Setting the Ambition

Amsterdam's emission ambition has been sketched within the interplay of the Dutch climate ambition and a meaningful contribution to meeting the Paris Climate targets.

A collective product of more than 600 agreements between businesses, civil society organizations, and governmental authorities, the Dutch Climate Agreement, enshrined in law in 2019, sets national targets for cutting greenhouse gas emissions: 49% fewer CO_2 emissions in 2030 and 95% fewer in 2050, compared to 1990. Having endorsed the national climate pledges and after having launched an open invitation to all related stakeholders within 2019 – similar to the process that took place at the national level – that led to a first outline of the path to a climate-neutral and gas-free city along with budget estimations, the city council has finalized and endorsed the climate-neutral 2050 Roadmap at the beginning of March 2020

The ambition puts high stakes. A maximum 55% cut in greenhouse emissions by 2030 and a 95% cut by 2050, both compared to 1990 levels. However, it is not certain how far the municipality will succeed in implementing the planned actions and measures as well as what the size of the effects will be. As such the 2030 goal lays in the range between −21% and −55% with the most plausible estimation to be emissions cut of 48% by 2030 which is practically in line with the national reduction target of −49%.

These overarching emissions reduction goals encompass a wider city vision with various components. A climate-neutral and adaptive city able to handle effectively the inevitable consequences of climate change. A city embracing the circular economy principles, where energy is used efficiently and generated sustainably, and where raw and other materials are reused in a never-ending cycle. A municipality that will achieve becoming a climate-neutral organization by 2030.

The emissions reduction ambition will be executed through four transition paths targeting the built environment, mobility sector, electricity, harbor, and industry. As already mentioned, this piece will delve further into the buildings and mobility sectors

Understanding the Challenge

The municipality has put forward a management and governance instrument. The Climate Budget practically consists of the quantitative part of the Roadmap. It provides insights about the emissions targets (delimiting for instance the ranges between the targets) but, also, about the effectiveness of the measures the municipality is taking. It determines which carbon emissions Amsterdam is responsible for and it assesses the measures that do not lead directly to emissions reduction, but that are needed for the transition. More concretely, the Climate Budget helps the municipality to monitor

the various aspects of energy transition that vary from purely quantitative indicators, e.g., the number of public electric rapid charging points in Amsterdam to more complex ones such as measuring the citizens' support for the energy transition and the switch to renewable energy, which attained the 75% in 2019. (Data provided by the Research, Information and Statistics (OIS) Department, Municipality of Amsterdam.).

The Climate Budget is not seen as a static mechanism. The purely quantitative part, e.g., the development of CO_2 emissions in Amsterdam or the progress of other standard indicators, will be updated annually and a system monitoring the progress and estimating the impacts of the measures taken will provide the necessary insights to the municipality to adjust its choices and set, if necessary, new priorities.

The Climate Budget is complemented by a municipal financial instrument. The Mayor and Cabinet have deposited a total of 150 million euros in the Climate Fund to support the energy transition in Amsterdam.

Amsterdam Going (Dough)nuts?!

In its pathway towards climate neutrality, Amsterdam will be accompanied by a "fellow traveler." Inspired by the concept of the "Doughnut Economy," developed by the British economist Kate Raworth, according to which an economy can only be sustainable and prosperous if social and economic goals are achieved without exceeding the ecological ceiling, Amsterdam's new vision for urban development will be based on the principles of circular economy, reassessing the impact of the current economic system. Many voices have been risen questioning whether this new model will challenge capitalism in a city that can claim its origins.

It is estimated that 63% of Amsterdam's CO_2 emissions are caused by products and materials. Based on the *Circular Amsterdam 2020–2025* program, the city aims to adopt a smarter approach to the use of raw materials (the aim is to halve the use of new raw materials by 2030 and to achieve a fully circular city by 2050), to avoid waste or use it as fuel, to "close" the production circles for products and buildings. Circularity will target three value chains responsible for the scope-3 emissions: food and organic waste/consumer goods/built environment, and is considered to play a supportive key role in combating climate change.

The municipality has developed a model, the Monitor for Circular Economy, based on input indicators related to the three prioritized value chains (Expressed in terms of weight and will be further broken down in CO_2 emissions and environmental cost.). This model is constantly updated with more accurate data to identify areas that need further intervention, to determine the social and ecological impact of the circular transition, and to define at the end the feasibility of the circularity goals. The Monitor is not socially blind. Amsterdam's ambition is to keep its residents inside the "doughnut circle" safeguarding their "broad prosperity" but without putting more pressure on the planet than is sustainable. Broad prosperity broadens the concept of a good life beyond material wealth to include elements such as efficiency, equitable distribution, and continuity in meeting everyday life needs (housing, food, etc.) while respecting and preserving the natural environment.

Spotlight on Mobility Sector

A city that is known for its biking culture and citizen-friendly transportation system, Amsterdam wants to push environmental-friendly mobility even further, initiating the transition to a system in which people and goods can be transported without emitting CO_2. It is estimated that if all mobility in Amsterdam becomes emissions-free by 2030, this will reduce carbon emissions overall by around 360 kilotons (This includes motorized traffic on Amsterdam's roads, excluding motorways and provincial roads.). Mobility is currently responsible for 18% of CO_2 emissions in Amsterdam, mainly due to fossil fuel consumption, and it is expected to be the transition path that will achieve the greatest reduction in emissions with a −76% in 2030 compared to 2017. It is also

considered the transition path that will materialize most rapidly due to the triple-helix innovation model and positive development stemming from private sector initiatives the municipality will subsidize (Set of interactions between academia, industry, and government.).

Amsterdam is already leading the way towards the electrification of urban mobility. Amsterdam offers free public electric vehicles (EV) charging stations, ranking second in Europe (in terms of the number of public chargers per million population) after Oslo and first on a global scale. This is mainly due to the national forward-looking approach to EVs with incentives policies, varying from subsidies, taxes, to charging facilitation, that has been proven so successful that electric car ownership now costs the same as diesel or gasoline car ownership.

Amsterdam itself offers additional subsidies and scrapping schemes, more precisely, since the end of 2019, as part of the Clean Air Action Plan, Amsterdam has provided financial incentives for zero-emission vehicles, offering rebates of up to EUR 3000 (USD 3684) for a taxi and EUR 40,000 (USD 49,129) for a delivery van, truck, or bus. These incentives came along with the municipality's announcement that any cars and motorbikes running on petrol or diesel would be banned from driving in the city center starting in 2030, and nonelectric buses will no longer be able to enter the city center from 2022. The municipality itself is committed to "green" the vehicles including it the municipal fleet.

A critical success factor in Amsterdam's low-carbon transport schemes will be a supportive state policy in the reevaluation of the environmental zones in 2022 mandating the municipality to introduce those zones and impose traffic restrictions.

Focus on the Built Environment

Contrary to the mobility sector, the buildings' transition path will be lengthier and less straightforward. Responsible for 25% of the carbon emissions, primarily caused by the consumption of natural gas and heat consumption by existing and new homes, commercial buildings, and social and civic buildings (such as offices, schools, and hospitals), the majority of the emissions reduction in the built environment is expected to take place after 2030. The planned switch of all existing and new homes from the natural gas grid to sustainable heating by 2040 is expected to deliver a carbon reduction that accounts for around 370 kilotons, almost 30% of current emissions in the buildings sector.

The built environment is the transition path the municipality will play the largest role and where the largest part of the Climate Fund will be allocated. This is mainly because the municipality can have considerable influence on the requirements for new buildings, defining the conditions for the granting of land and challenging the tendering parties to build as sustainably as possible.

However, the situation is different for the existing built environment, which is highly energy-consuming and with a considerable carbon footprint. There the intervention from the part of the municipality will be highly dependent on the collaboration and partnerships with property owners such as housing corporations, owner-occupants, owner associations, and commercial property investors. Additionally, significant investment will be required from property owners, energy companies, and grid operators to make the built environment more energy efficient and improve the living conditions of the resident, phase out the use of natural gas, and provide sustainable heating.

Phasing out natural gas consumption in the built environment will lead to the greatest drop in emissions. This result is highly dependent on national legislation and financial support from the central government. By law, as part of the national Climate Agreement, all seven million homes in the Netherlands should use energy and heating from renewable sources by 2050. However, so far a slow pace of progress is observed and it obvious more stimulus and stronger incentives are required. The financial supporting schemes will have a significant influence on the extent to which residents have a significant financial incentive to disconnect from the natural gas grid. The city of Amsterdam is investing heavily in this

domain; however, tougher regulations at the national level accompanied by investment funds will be the real game-changer towards the decarbonization of the built environment.

Installing solar panels on the building roofs, heat pumps, and collective management of heat distribution grids (possibly fueled by hydrogen) are then prioritized and promoted technological alternatives for the gradual replacement of the natural gas grid. The municipality is planning to take a systematic district-by-district approach, outlined in detail in a vision document the "Heat Transition Vision" adopted in September 2020, attempting to identify and implementing the preferred alternative sustainable heating source in each case acknowledging that a one-size-fits-all solution is neither feasible not viable.

The success of this complicated process is highly dependent on the citizens' input and support. The municipality and the private partners proposed a pathway that was open to public consultation until May 2020. After lengthy discussions among residents, companies, and institutions, an agreement at the administrative level has been reached. Citizen-driven and citizen-focused initiatives that support the different groups of residents (tenants, owners, etc.) in implementing the heat transition are supported financially by the municipality, considered an instrumental partner of the process. Those initiatives facilitate two-way communication between the residents and the municipality while providing useful insight to the policy-makers on the barriers the citizens are facing (02025 targeting homeowners, Woon-Thuis in de stad targeting residents in building corporations, Regionaal Energieloket targeting individuals that want to implement retrofitting and energy efficiency solutions by themselves.). However, it is usually observed that the citizens participating actively in those processes have a high educational background and a considerable income. The participation is lower among low-income citizens, usually with an immigrant background. Another crucial element is the rather high percentage of energy poverty (31% in the year 2017) affecting the low-income households not allowing them to invest money in energy efficiency or retrofitting measures.

All in all, despite the municipality's good intentions towards the creation of an inclusive process in the heating transition, obstacles remain and are expected to delay the whole process.

The Many Roles of a (the) Municipality

The scale of ambition described in the Roadmap will challenge the municipality in many different ways. On its part has defined the preconditions needed to meet the intended targets. Those preconditions include activities that may not reduce the CO_2 emissions directly but will play a crucial role in the transition from fossil to renewable energy and achieving a fully circular economy.

The municipality sets "climate justice" as the guiding principle. Acknowledging climate change as a justice problem and the fact that the energy transition will not be equal for everyone, it aims for a fair distribution of the costs and benefits, open access to the decision-making process, and equal opportunities in a changing job market. Seen as a broader social transformation, energy transition and circular economy need to embrace the will of the citizens. Strengthening the positive movement in the city, stimulating knowledge transfer and innovation, managing the urban space and providing the necessary infrastructure are the pillars upon the climate neutrality will be achieved.

As such, the municipality is called upon to undertake different roles in the process. These roles will change over time, depended on the various transition paths progress.

A municipality that performs taking the lead and setting the example. The municipality will work on becoming a sustainable organization. This means making the internal operational management climate-neutral, including the transport fleet and building stock. It also concerns everything the municipality purchases, including the materials, used to organize public space but, also, the behavior of the staff.

A municipality that regulates along with the central government, setting indicators and

standards whenever possible and advocating the necessary reforms.

A municipality that cooperates with residents, businesses, and institutions to gradually design shared ambitions and achieve common goals through cooperative platforms and agreements, capacity building, and sharing of resources.

A municipality that supports the assumed self-regulation and self-organization of the different stakeholders, e.g., homeowners associations with instruments including subsidies, advice and information, facilitation of knowledge sharing, the establishment of help desks to support the initiatives, simplifying guidance on procedures and rules, lobbying, and communication.

Quo Vadis Amsterdam? (Conclusions)

With an adopted roadmap, specific emission reduction targets per transition path, and a new economic model underway, one could argue that the city of Amsterdam has already taken important steps towards the right path. Assuming the responsibility as the capital city of the Netherlands, Amsterdam is an urban climate advocate, pioneering especially in the mobility sector. Nevertheless, the local ambition without a robust national regulatory and investment framework is bound to narrower effects.

The renewable energy transition has the support of the majority of the citizens (According to a public survey, 75% of Amsterdamers expressed their support to the renewable energy transition in 2019.). However, some residents or neighborhoods are more vulnerable or will benefit less from the opportunities brought by the energy transition, and this is primarily translated in the slow transition pace we observe in the built environment. Amsterdam's housing rates are already extremely high and the thorny question to answer is how to avoid a rise in the living expenses for households with low or middle incomes due to the costs of the energy transition. Additionally, while the residents may be willing to boost the energy efficiency of their households high costs, uncertainty about how long they will live in the property, and expectations that it will be cheaper to do so in the future, are stopping them from taking action. The rules are still complex, the technological solutions seem promising but not implemented and evaluated to a satisfactory level. Phasing out natural gas in heating will be the biggest challenge to face, but, if accomplished, a one-of-a-kind urban transition and transformation paradigm.

Cross-References

- ▶ Adapting Cities to Climate Change
- ▶ Amsterdam's Pathway to Climate Neutrality. Creating an Enabling Environment
- ▶ Circular Cities
- ▶ Circular Economy Cities
- ▶ Cities, Nature and the Green Recovery
- ▶ City Visions: Toward Smart and Sustainable Urban Futures
- ▶ Climate Change and Urbanization
- ▶ Climate Resilience in Informal Settlements: The Role of Natural Infrastructure
- ▶ Coastal Zones: How Can Coastal Communities Protect their Groundwater Resources from Saltwater Intrusion
- ▶ Collaborative Climate Action
- ▶ Community Engagement for Urban and Regional Futures
- ▶ Electric Vehicle Energy Storage and Materials
- ▶ Future of Urban Governance and Citizen Participation
- ▶ Governance of Smart Cities
- ▶ Green Belts
- ▶ Green Cities
- ▶ Green Infrastructure
- ▶ Green Infrastructure in Metropolis Dimension
- ▶ Greening Cities
- ▶ Housing Affordability
- ▶ How Cities can be Resilient
- ▶ Local Climate Action
- ▶ Localizing Climate Change Adaptation
- ▶ Low-Carbon Transport
- ▶ Making of Smart and Intelligent Cities
- ▶ Overcoming Barriers in Urban Green Infrastructure Implementation

- ▶ Participatory Engagement Approaches for Resilient Communities
- ▶ Participatory Governance for Adaptable Communities
- ▶ Planning for Technological Failures in Organisations and Urban Areas
- ▶ Policies for a Just Transition
- ▶ Powering the Resilient City
- ▶ Public Procurement for Regional and Local Development
- ▶ Public Space
- ▶ Regulation of Urban and Regional Futures
- ▶ Resilient Urban Climates
- ▶ Shaping Transport Demand and Delivering Transport Supply
- ▶ Smart Cities
- ▶ Smart Cities for the Arctic
- ▶ Smart City
- ▶ Sustainable Urban Mobility
- ▶ Systemic Innovation for Thrivable Cities
- ▶ Technological Change and Urbanisation
- ▶ The Sustainable and the Smart City: Distinguishing Two Contemporary Urban Visions
- ▶ Theme Cities Networks
- ▶ Towards a Sustainable City
- ▶ Tragedies (and Successes) of the Commons
- ▶ Trans-Disciplinary Knowledge Exchange to Cope with Climate Change in Cities
- ▶ Transformation Towards Smart and Carbon Neutral Urban Development
- ▶ Transition to a Low Carbon Transport Sector
- ▶ Transport Resilience in Urban Regions
- ▶ Transportation and Mobility
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- ▶ Unpacking Cities as Complex Adaptive Systems
- ▶ Urban and Regional Leadership
- ▶ Urban Anthropocene Futures in Late 20th Early 21st Century Speculative Fiction
- ▶ Urban Climate Responsibility
- ▶ Urban Commons as a Bridge between the Spatial and the Social
- ▶ Urban Electric Mobility
- ▶ Urban Planning-Real Estate Development Nexus
- ▶ Urban Policy and the Future of Urban and Regional Planning in Africa
- ▶ Urban Resilience
- ▶ Urban Resilience: Moving from Idealism to Systems Thinking
- ▶ Urban Structure and its Impact on Mobility Patterns: Reducing Automobile Dependence through Polycentrism

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Further Reading

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