City of Amsterdam

New Amsterdam Climate

Climate Report 2022

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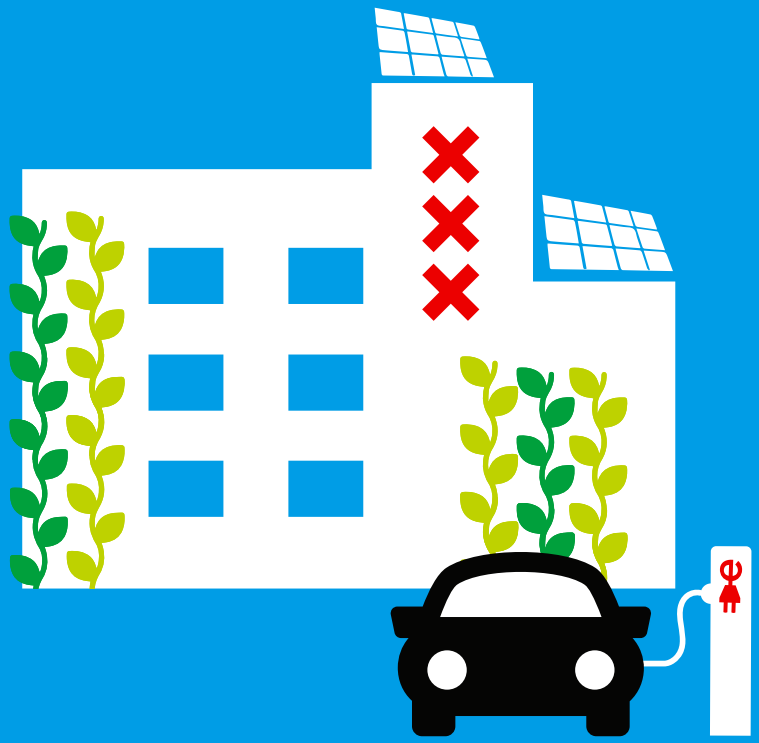
Introduction

In 2020, we set out our ambitions for the energy transition in Amsterdam in the Amsterdam Climate Neutral Roadmap. We've been collectively saving energy and generating sustainable power for years, but we need to do more – and do it faster. In its recent report in February 2022, the IPCC concluded that the global effects of climate change are already far-reaching and partly irreversible. This means that the time to take measures, so as to avoid even more serious consequences, is fast running out. The combustion of fossil fuels and greenhouse gas emissions must be reduced even more quickly than we thought. Amsterdam is therefore working with the city's residents, businesses and organisations, as well as with the region, the province, central government and Europe. In this annual Climate Report, we show what has been achieved since the Roadmap was agreed two years ago. In the infographic, the Sustainable City is represented by a building topped with solar panels, with an electric car connected to a charging station out the front.



At the time of writing this Climate Report, war was raging in Ukraine. The devastation has been enormous and the population is suffering terribly. The effects of the war have not been limited to Ukraine: European countries are taking in unprecedented numbers of refugees, and in addition to the dreadful direct outcomes of the violence, the war will also have a major impact on energy prices and the world economy. The war is also fuelling the debate about the desirability of energy independence.
At present, it is not possible to foresee the consequences of this for climate policy.

No one can achieve the energy transition alone

Looking back

In the Climate Report, we report each year on all the actions and measures that contribute to reducing the city's CO_2 emissions. Based on indicators (including CO_2 emissions) and the measures taken, we reflect on the progress made with implementing the Amsterdam Climate Neutral Roadmap 2050, so we can learn from what has worked and what could be done differently or improved. The Municipality of Weesp recently merged with the Municipality of Amsterdam, and Weesp is not yet included in the results for most indicators.

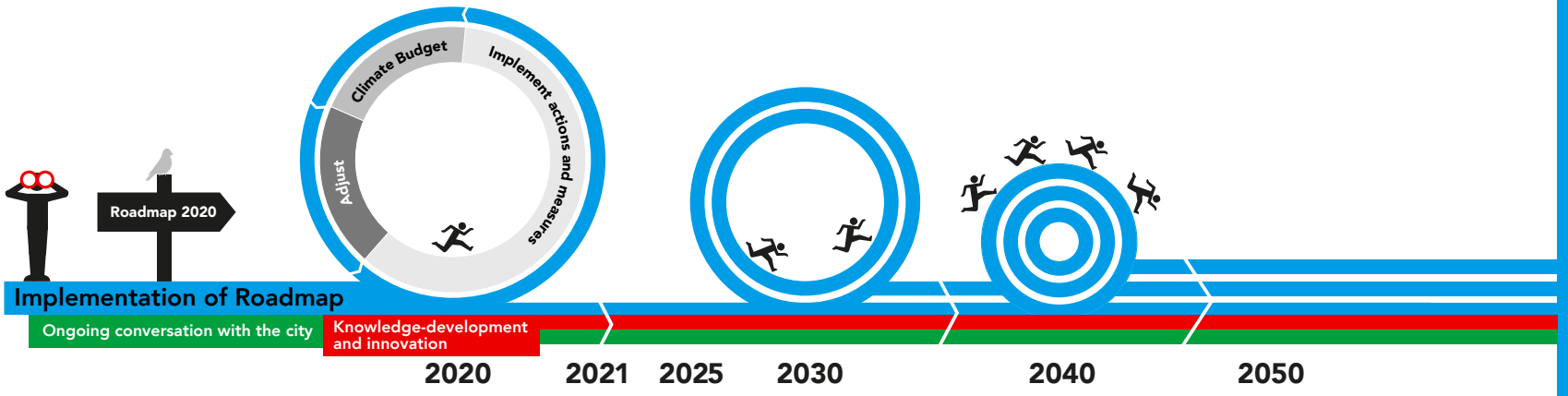
Looking ahead

We also look ahead, with updated forecasts for 2025 and 2030. These forecasts are updated each year on the basis of new information about progress with our plans and autonomous developments. This tells us whether we are on course to achieve our target of cutting CO_2 emissions by 55% by 2030, or whether additional measures are needed.

Reader's guide

This Climate Report contains several sections. In the first general section, we look back on 2021 and ahead to 2022 and beyond. In the second section, we review each transition path and pillar for 2021 (partly on the basis of indicators), and look ahead to plans for the coming period and consider points for attention. Finally, we describe our progress in relation to several key preconditions and the results of Weesp's climate policy.

The municipality also publishes separate reports on topics including: progress with greening the municipal organisation, the natural gas phase-out in the city, the Clean Air Action Plan, the Amsterdam Circulair monitor, lessons and recommendations from the 'Innovation and implementation programme for the circular economy, 2020-2021', the programme to limit car traffic, and the sustainable recovery plan.



Looking back

The city's CO_2 emissions have fallen sharply, and overall support for the transition to sustainable energy remains high among Amsterdam's citizens. We are proud of the results achieved in 2021, but at the same time we see how intractable practice can be. As the plans become more concrete, they become more of a reality for residents, provoking questions and concerns. This can create tension; something we saw in the search for suitable wind turbine locations on the city's outskirts, sparking a heated social debate that continues to this day.

Results in 2021

CO_2 emissions in 2021 were around 25% lower than the peak in 2010, and are almost back at the 1990 level. Emissions in Amsterdam are thus falling sharply, although emissions in 2021 may have been slightly higher than in 2020. Emissions in 2021 were c. 15-20% lower than in 2018. The reduction for each transition path can be found in the appendix. A large number of actions and measures were implemented in 2021, producing great results.

In 2021, the total installed solar panel capacity in Amsterdam grew by 30% in a single year. Many more owner-occupier associations were supported than envisaged. A framework agreement was also concluded with housing corporations, Vattenfall and Westport Warmte, which will ensure that 10,000 homes can be disconnected from natural gas by the end of 2026. In early 2022, the municipal assembly adopted stricter requirements for 'almost energy-neutral' (BENG) buildings. The sustainable recovery plan is being implemented. A congestion taskforce has been established, and over 38,000 residents have applied for gift vouchers for energy-saving products. The number of initiatives in the city is growing, and residents and residents' collectives are actively involved. People are asking for energy advice and companies are investing in greening their premises and business processes. In the municipal Sustainability Report 2022, we take a more detailed look at the action that the municipal organisation has taken to reduce CO_2 and save energy.

The attitude of residents

The share of Amsterdam's residents who are positive about the transition to sustainable energy has risen to 85%, according to a recent OIS survey from February 2022 (before the war in Ukraine). The majority of residents and organisations are also positive about phasing out natural gas in Amsterdam by 2040. At the same time, we see that support for policies does not automatically translate into support for specific measures. This is something we've observed in neighbourhoods where we are consulting on the natural gas phase-out, and in the search for suitable wind turbine locations. In most search areas, many residents are critical of the installation of wind turbines close to their neighbourhoods, and are concerned about the impact of the turbines on their surroundings and health.

Amsterdam's citizens care about their city, and if something is important to you, you worry about it. This can spark tension during implementation; and that is why it's important for the municipality to keep listening, take resistance seriously, and understand the views and motivations that drive it. In 2021, for example, a 'mini citizens' assembly' and wind energy reflection phase were held to find ways to address these issues.

The Amsterdam Climate Neutral Roadmap 2050 sets out the CO_2 emissions for which Amsterdam is responsible. When making the city climate-neutral, we consider emissions in Amsterdam (known as scope 1 and 2 emissions). Emissions outside Amsterdam caused by consumption in Amsterdam, the city's scope 3 emissions, are not included; the so-called 'hidden impact' of our consumer behaviour. According to the 'Monitor Amsterdam Circulair', adopted by the executive on 8 February, it seems that c. 70-90% of Amsterdam's total emissions are likely to occur outside Amsterdam, based on new preliminary estimates. It is up to the next municipal executive to decide how to address this when making the city climate-neutral.

Looking ahead

Each year we update our forecast for 2030, and we look at whether we are on course to achieve our target of reducing carbon emissions by 5% by 2025, and by 55% by 2030 (both compared to 1990). Our plans are under way, and in the coming years we will work towards translating more objectives into concrete plans, projects and instruments. We are positive about what has been achieved to date, and we will continue to save energy, phase out natural gas in neighbourhoods, and boost the generation of sustainable energy.

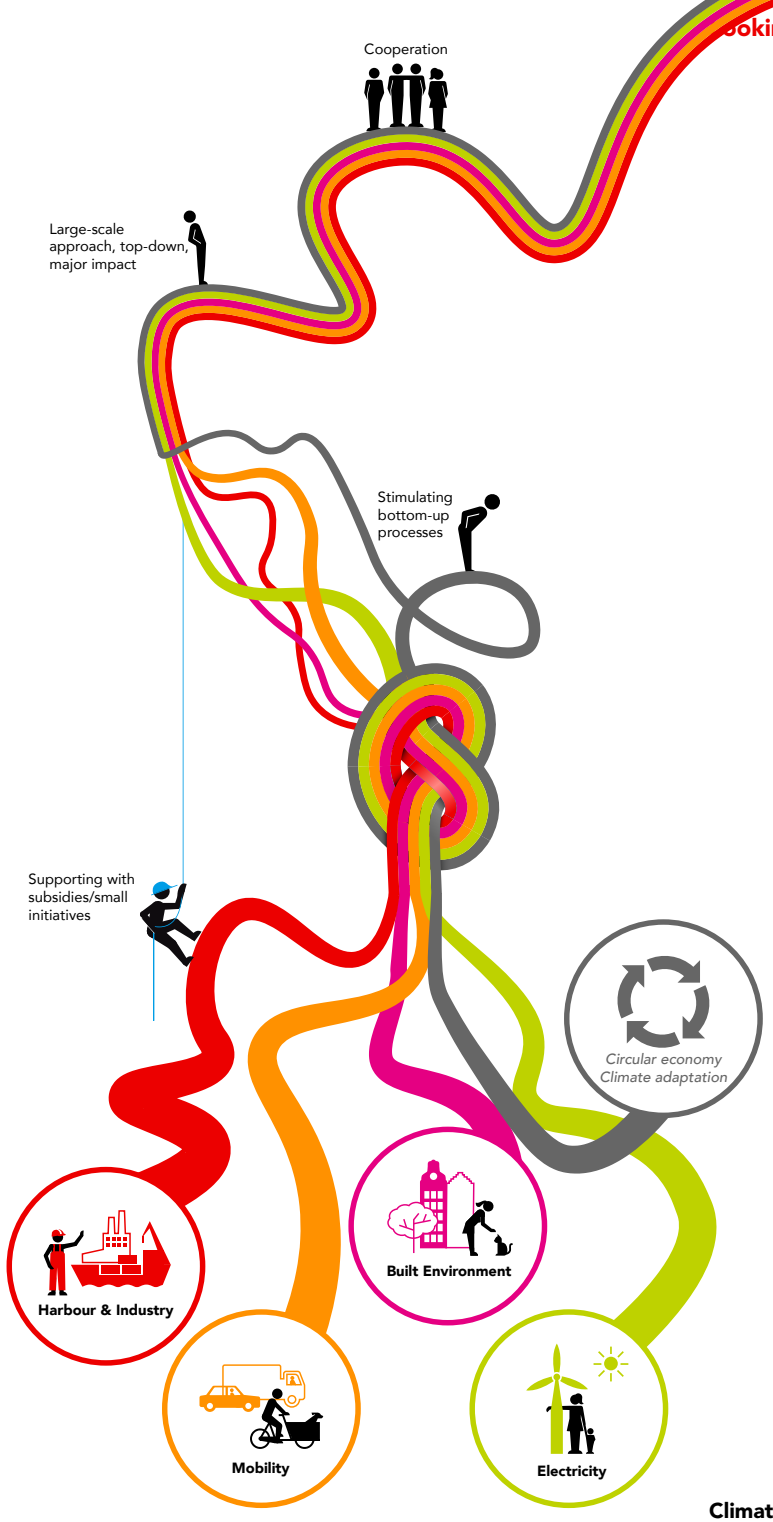
Updated forecast for 2030

The CO_2 calculation for 2030 has been updated. With the concrete plans, projects and instruments to date, we can achieve a CO_2 reduction of 2% (in 2025) and 42% (in 2030, both compared to 1990). Due to the growth of the city, emissions rose considerably between 1990 and 2010. Emissions are therefore expected to fall below the 1990 level from 2025 onwards. A range is used in the calculation, as predicting future developments always involves uncertainty. The calculation shows that the targets are still within reach. Another positive development is that the expected reduction is greater than estimated a year ago.

Risks

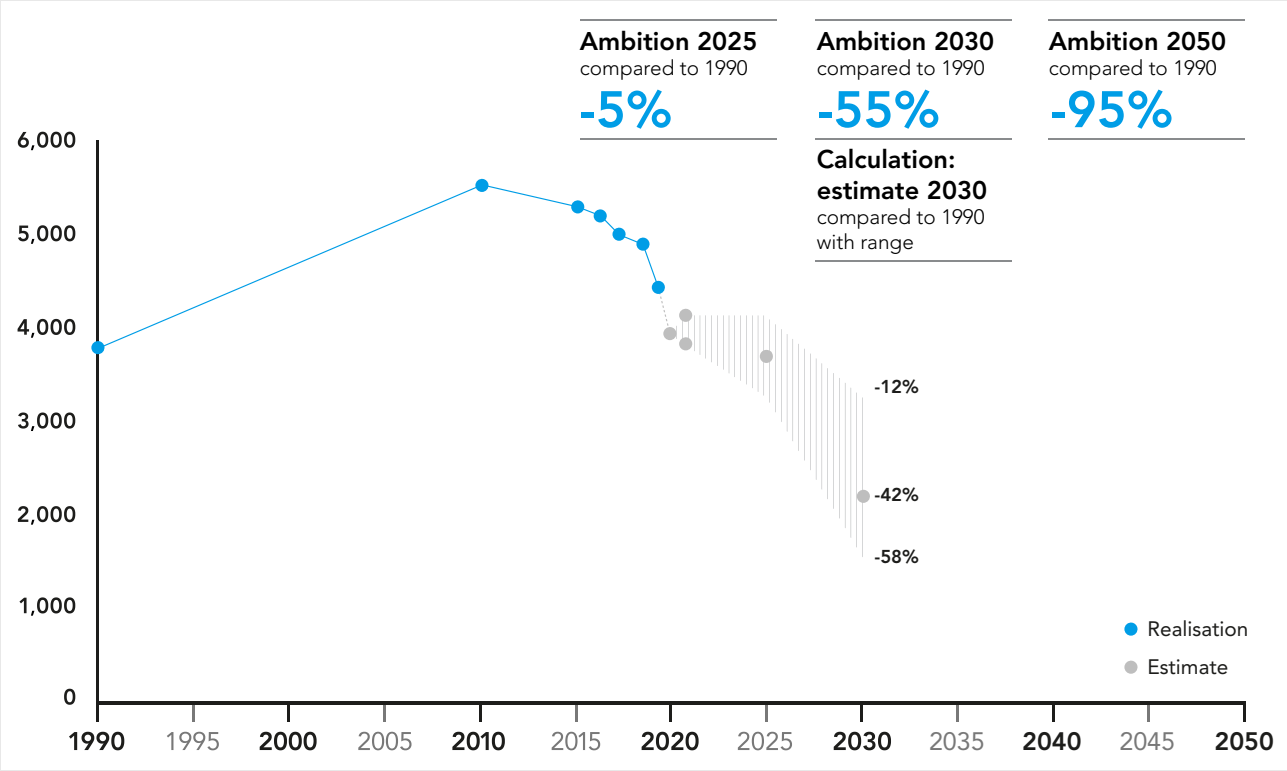
We also perceive a number of risks to the implementation of the necessary measures:

- Since late 2021, there has been a sharp rise in gas and electricity prices. This is likely to tip more of Amsterdam's households into energy poverty. In addition to the measures taken by central government, a municipal approach is needed for both the short and the longer term. Rising energy prices are also an extra incentive to take sustainability measures.
- Congestion in the power grid has a major impact on urban development, and unconventional measures are sometimes needed to solve this problem. Alliander, TenneT, the Port of Amsterdam and the municipality are working together in a taskforce to tackle congestion.
- Whether we can realise the ambitions depends on having sufficient skilled professionals available. Together with entrepreneurs and trainers, Amsterdam is working to encourage new entrants into the technical sector.
- Having insufficient resources in the municipal budget also threatens the realisation of the city's carbon-cutting ambitions.



CO_2 emissions in Amsterdam

In kt CO_2 equivalents
Source: OIS/CE Delft



CO_2 emissions for Weesp are 101 kt (in 2019).

The independent consultancy firm CE Delft has updated the CO_2 calculation. The estimate (median value) allows for the effects of the policies planned by Amsterdam and central government (with a sufficient degree of specificity). It also allows for autonomous developments, such as the growth of the city.

Amsterdam's CO_2 emissions are expected to fall to 3,750 kt by 2025 (2% below 1990 emissions). By 2030, emissions are expected to fall further to 2,200 kt (42% lower than in 1990). Due to uncertainty about the future, the calculation uses a range. For 2025, the range is +8% to -10%. For 2030, the range of the emissions reduction is between -12% and -58% (compared to 1990). Only the effects of adopted policies are included in the lower limit of the range. The upper limit is based on proposed policies with the maximum or full intended effect.

CO_2 emissions in Amsterdam are expected to be lower than estimated a year ago in the Climate Report 2021 (37% reduction by 2030). According to PBL, the greening of electricity production at the national level is occurring faster than predicted a year ago. The baseline situation (emissions in Amsterdam in 2019) is also more favourable than previously estimated.

We need to do more

We now have a better understanding than ever of our progress towards cutting CO_2 emissions by 5% by 2025, and by 55% in 2030. We are not there yet, however, and to meet the targets we need to develop extra plans and concrete measures. After 2030, we also face the challenge of making the city climate-neutral by 2050. The municipality does not hold all the keys to this process, and we are highly dependent on our partners and other authorities. We have identified a number of opportunities in the city, and we have also asked Amsterdam's citizens for measures through the mini citizens' assembly. With sufficient support, the ten measures produced by the citizens' assembly will help to reduce CO_2 emissions in Amsterdam, and could achieve an additional reduction of 7 percentage points by 2030. There are also four measures that build more specifically on existing measures in the Roadmap. The executive supports these measures, and calls on the next administration to develop them.

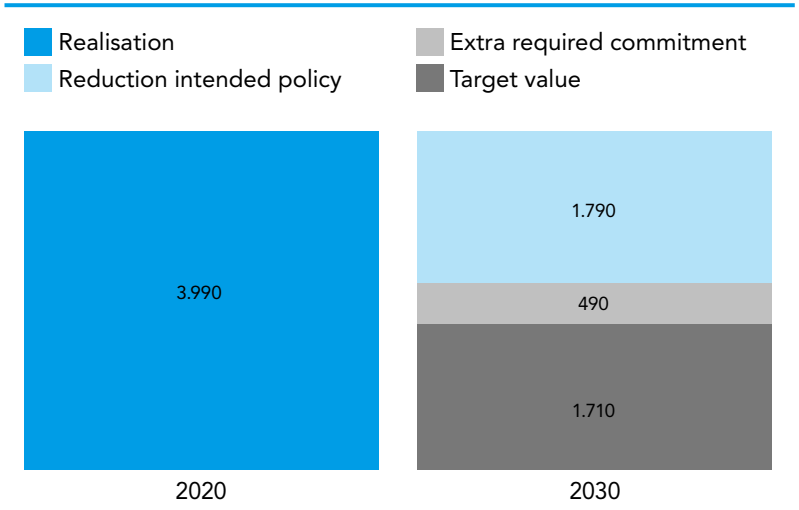
Measures, mini citizens' assembly

- Amsterdam turns dark green
- AETF Fund for rental homes
- Accelerate greening of built environment
- Sustainable business coalition
- Sustainable generation with solar panels
- Air conditioning of the city
- Make public transport more attractive than car ownership
- Carbon capture at AEB waste-to-energy plant
- Council tax (OZB) discount
- Good public transport connection Nieuw-West
- Sustainable Cooperatives
- All cruise ships to use green quayside electricity
- Maximum roof area
- Accelerating and boosting electric car use

Other potential new measures: extend CO_2 capture and storage at AEB to include biogenic emissions, a local steam network in the harbour using heat from AEB, and energy savings at data centres. These measures are from the report 'The Amsterdam climate ambition. Additional measures to achieve a 55% carbon reduction by 2030', by consulting firm Berenschot. They are currently under consideration and will be researched further in the coming municipal term. In addition, an inventory was recently made of energy-saving measures that could reduce dependence on natural gas from Russia. These measures could also lead to extra CO_2 reductions.

CO_2 emissions in Amsterdam

(kt CO_2 equivalents) Source: CE Delft



We need to do more to meet the climate targets

The EU and central government: opportunities

On 14 July 2021, the European Commission presented the Fit-for-55 package containing 13 bills to combat climate change. Decisions have yet to be taken on these bills, but the direction of the plans is clear: taxing CO_2 and fossil fuels, combating energy poverty, and an energy-efficient housing market and private sector. These plans support Amsterdam's approach.

The national coalition agreement 2021-2025 also contains ambitious climate and energy plans. They include a total climate and transition fund of 35 billion euros until 2030, in addition to the current subsidy scheme for sustainable energy production and the climate transition (SDE++). The fact that the Netherlands wants to be a leader in combatting global warming is wholly in line with the ambitions set out in the Amsterdam Climate Neutral Roadmap. On the whole, we see many points of departure in the coalition agreement, but a lot of plans still need to be developed in more detail. The realisation of these plans could lead to extra CO_2 reductions in Amsterdam, beyond the calculation made by CE Delft.

Importantly, central government should lose no time in making sufficient financial resources and appropriate regulations available, so we can design and scale up implementation at the local level. We are explicitly asking central government for:

- Sufficient resources to meet the cost of implementing the Climate Agreement.
- Sufficient financial instruments to realise the heat transition.
- More opportunities for experimentation and local initiative in the heat transition.
- Compulsory measures, such as granting the municipality statutory authority to disconnect the gas supply after completing an alternative heating system.
- Legislation for local powers for the compulsory installation of solar panels on large commercial roofs.
- Appropriate subsidy schemes (SDE) for solar panels on medium-sized roofs and housing corporation properties.
- Compulsory energy label 'A' for offices and continuation of the carbon tax for industry, providing a more powerful incentive to switch to sustainable alternatives.
- Stimulation of the capture and storage of biogenic carbon emissions.
- Alignment with the national hydrogen backbone.
- Environmental zones for extra categories and areas.

The start of a new municipal term may lead to adjustments to Amsterdam's climate policy. The need to green the city remains as great as ever. Additional measures, including those proposed by the mini citizens' assembly, can bring us closer to our targets.

Timeline

2023

- → Housing corporations' CO_2 emissions reduced from 1.5% in 2019 to 3% in 2023
- → 350 MW solar energy generated

2025

- → 5% CO_2 reduction (compared to 1990)
- → 65% non-fossil turnover in the harbour
- → Emissions-free zone within the A10 ring road for all vehicles, except passenger cars and motorbikes

2030

- → 55% CO_2 reduction (compared to 1990)
- → 127 MW wind energy generated
- → Half of all suitable roofs used for solar energy: 550 MW
- → Municipal organisation carbon-neutral
- → Emissions-free zone within the A10 ring road for all vehicles
- → Energy label 'A' for offices

2040

- → All buildings in Amsterdam natural-gas-free

2050

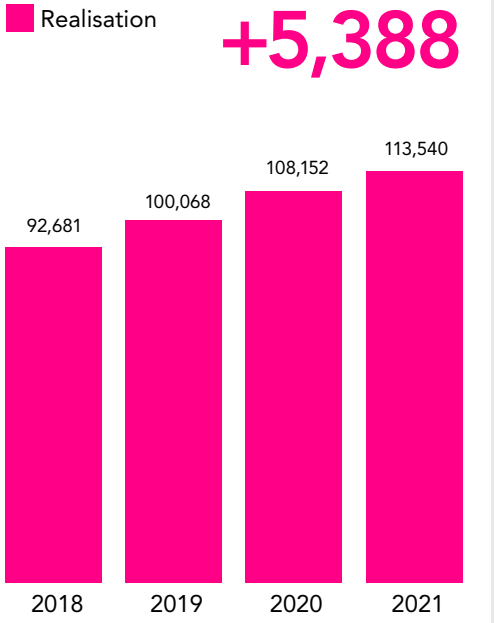
- → All buildings in the city carbon-neutral
- → Harbour and Industry carbon-neutral and circular
- → 95% CO_2 reduction (compared to 1990)

Built Environment

By 2040, every building in the city must have a sustainable form of heating. This means that we need to replace natural gas with alternative heat sources and save energy. Action is being taken behind every front door, every facade and in every street. At the same time, we must ensure that carbon emissions do not rise further due to the growth of the city.

Natural-gas-free

Total number of home equivalents connected to the heat distribution grid (at the end of the year)

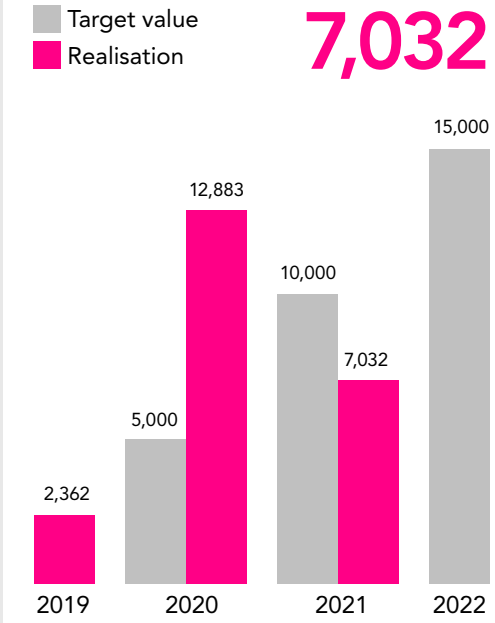


Source: Vattenfall

The number of home equivalents connected to the heat network increased by over 5,000 in 2021. Not all heat network connections are natural-gas-free. There are also buildings without a natural gas connection that use a source of heating other than a heat distribution grid (for example, a heat exchanger or heat pump). According to Liander/OIS, a total of 120,000 home equivalents (from 2019 or earlier) are currently natural-gas-free.

Natural-gas-free

Number of home equivalents where the feasibility phase of the gas-free district approach (WAM) is under way

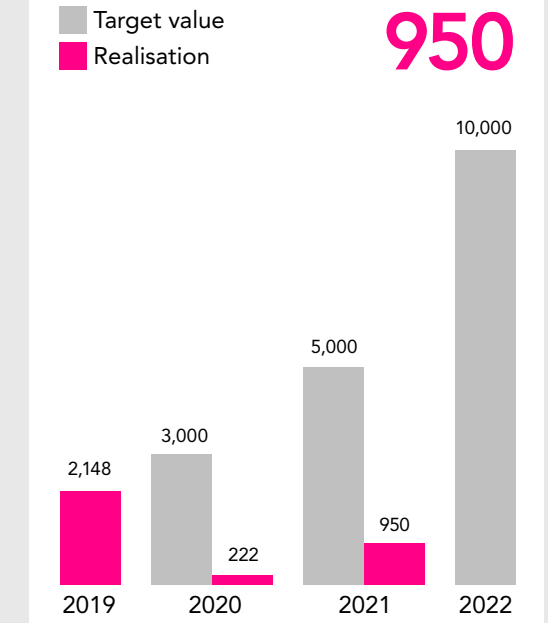


Source: R&D, gemeente Amsterdam

The feasibility phase was launched for a total of over 7,000 homes in 2021, slightly lower than expected. With the signing of the Amsterdamse Warmtemotor framework agreement in November 2021, all parties have taken a step towards acceleration and commitment. The learning phase appears to be over; we now need to move on to standardisation and scaling up. The feasibility phase is no longer necessary for Warmtemotor homes, and investment decisions will be prepared immediately

Natural-gas-free

Number of home equivalents where an investment decision has been made on phasing out natural gas (in given year)

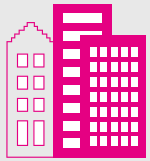


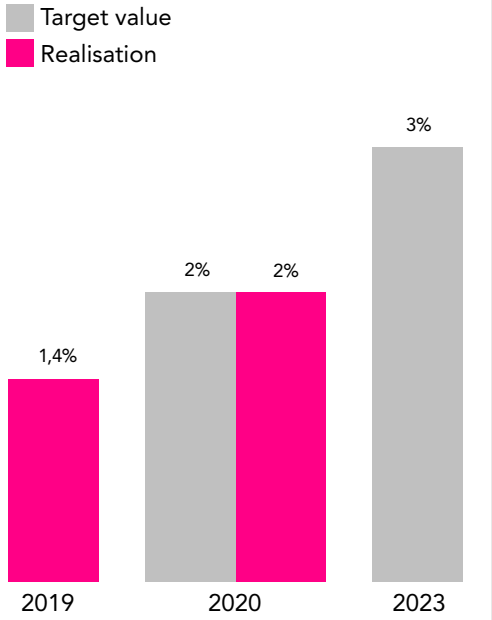
Source: R&D, gemeente Amsterdam

The number of investment decisions in 2021 was again lower than expected, because a number of initiatives took more time than estimated. The expectation for 2022 is that investment decisions will be made for 4,000-5,000 homes (via the Warmtemotor, private initiatives and the renovation of complexes). On closer inspection, the 2022 target in the Roadmap of an investment decision for 10,000 homes was on the high side, and has proved an overestimate with hindsight. Our ambition remains to phase out natural gas by 2040.

Housing corporations

Annual reduction in CO_2 emissions in corporation homes (compared to previous year)



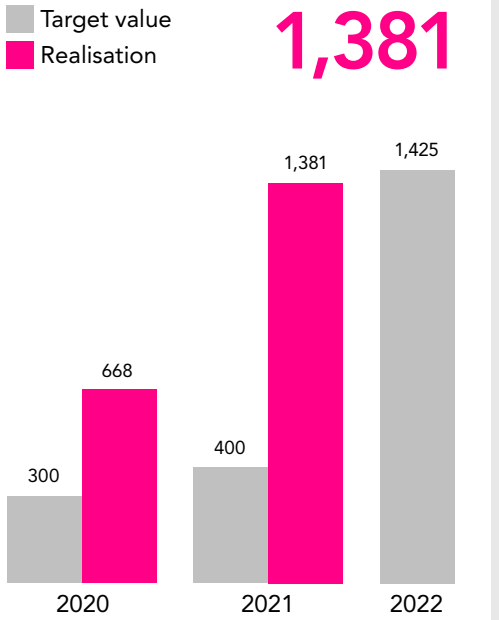


Source: AFWC

The figure for realisation in 2021 will be available from the AFWC house-building federation in May 2022 at the earliest. The AFWC monitor shows that the reduction in 2020 was 2% (compared to 2019). The housing corporations are on course to achieve the target for 2023. The actual CO_2 reduction was higher, in part because the reduction achieved via solar panels has yet to be considered.

Owner-occupier associations

Number of owner-occupier associations supported per year

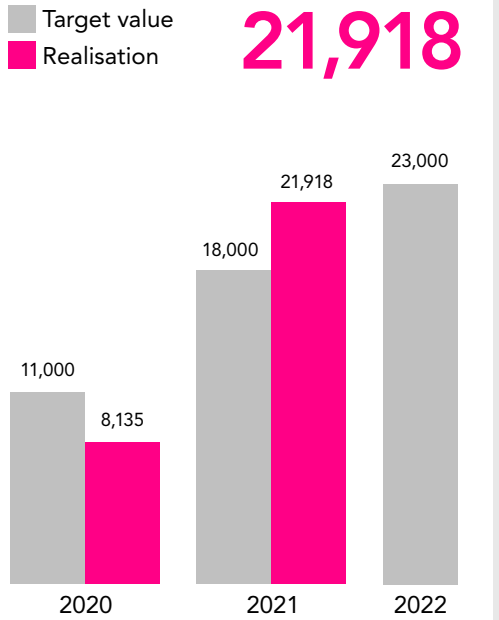


Source: R&D, gemeente Amsterdam

More owner-occupier associations were supported in 2021 than estimated. The programme of online webinars, courses and network meetings for owner-occupier associations was significantly expanded in 2021, and was well attended. More owner-occupier associations also made use of financial schemes such as the Amsterdam Energy Loans in 2021.

Owner-occupier association homes

Number of homes supported per year (belonging to owner-occupier association)

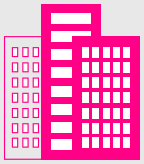


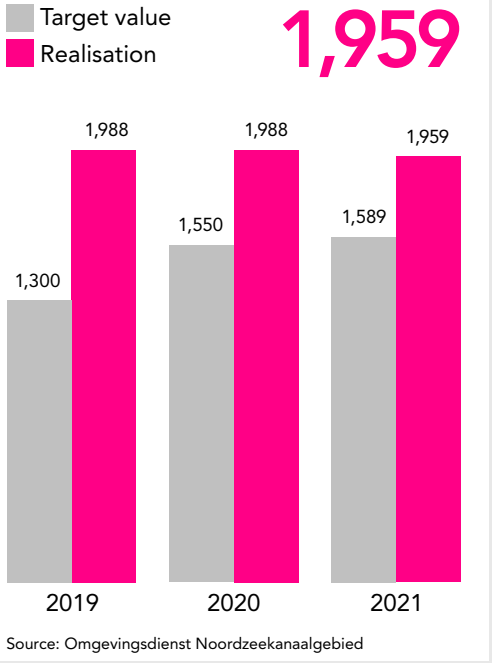
Source: R&D, gemeente Amsterdam

The number of supported homes belonging to an owner-occupier association was also higher than estimated. In the Climate Report 2021, the target value for 2021 was erroneously reported as 38,000, not 18,000.

Business market

Number of checks



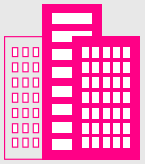


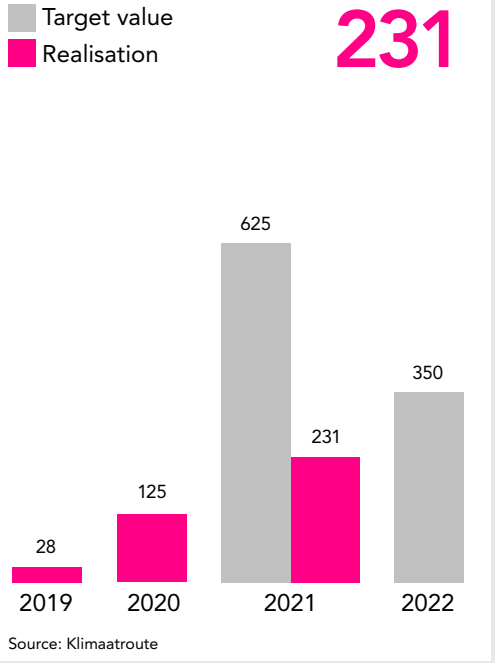
Source: Omgevingsdienst Noordzeekanaalgebied

Due to COVID-19, slightly fewer checks were carried out in 2021 than in 2020 (1,959 in total). Fewer integral checks and more thematic checks were carried out than in 2020. As thematic checks take less time, the total number of checks in 2021 exceeded the target value. No target value is yet available for 2022. We are working on a new design for the performance indicator and reporting for checks relating to sustainability and the energy transition. In 2022, in addition to integral controls, at least 1,000 energy-specific checks will be carried out.

Business market

Number of energy scans carried out (business market)



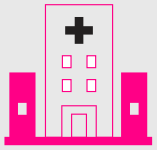


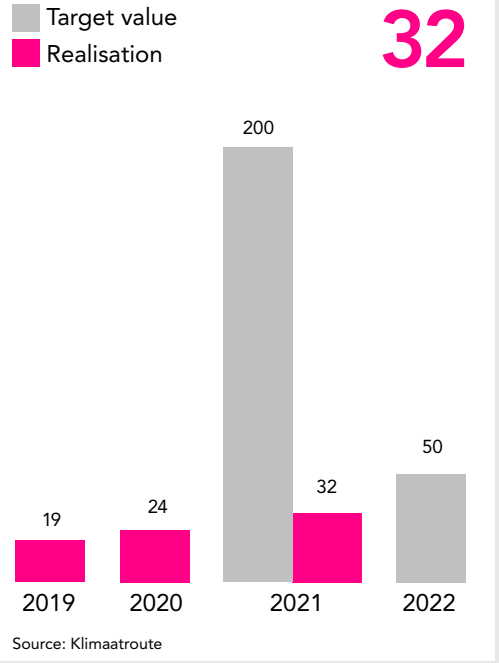
Source: Klimaatroute

Fewer energy consultation and guidance projects were carried out than planned in 2021, due to the COVID-19 crisis. Of the companies that receive energy advice, an average of 38% invest in the first year in sustainable measures such as LED lighting, insulation and solar panels. In 2022, we will also offer energy advice specific to the label 'C' obligation for offices.

Social and civic buildings

Number of energy scans carried out (social and civic buildings)



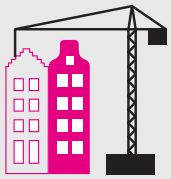


Source: Klimaatroute

In retrospect, the target for the number of energy scans carried out on social and civic buildings was too high, and it was not achieved for organisational reasons. The number of scans implemented in 2021 was higher than in 2020, however. The target for 2022 has been revised downwards.

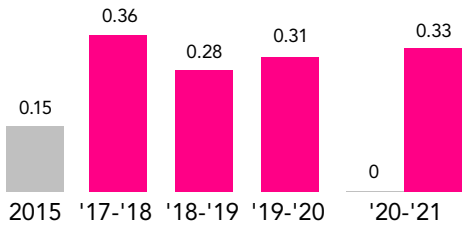
New-builds

Average energy performance coefficient (EPC) of new-build homes



Target value
Realisation

0.33

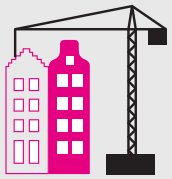


Source: Projectenboek gemeente Amsterdam

The EPC value represents the building's energy performance. AN EPC of < 0.4 is legally required for new-build homes. In recent years, Amsterdam has out-performed the national requirement, but we are not yet in line with our own target. From 1 January 2021, the 'nearly energy neutral' (BENG) requirements apply. In 2021, the average BENG 3 value (the share of renewable energy to be generated) for all submitted permit applications was 68% (source: Regional Agency for the Environment). The national requirement is 40%, and the new norm in Amsterdam (with an expected starting date of 1 January 2023) is 70%.

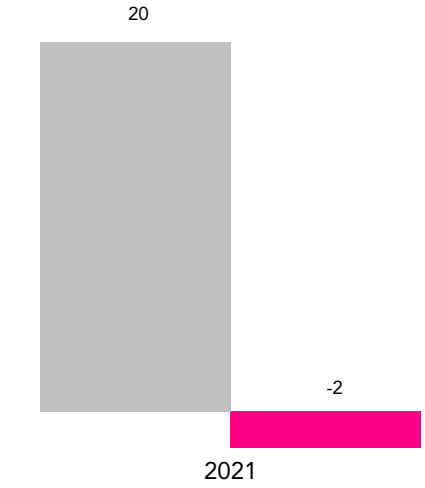
New-builds

Average BENG 2 value (share of fossil energy in energy consumption in kWh/m²/year) for new-build tenders



Target value
Realisation

-2



Source: G&O, gemeente Amsterdam

In 2021, the average BENG 2 value of seven tenders (for 825 homes) was -2 kWh/m²/year. That is lower than the new Amsterdam requirements in this area. A total of six tenders were zero-energy or energy-producing..

Pillar 1

Scaling up the natural gas phase-out, district by district

What and how

Natural gas is being phased out in the built environment. By 2040, all homes and buildings (commercial or social/civic) that are currently dependent on natural gas must have a different form of heating. This will be achieved by creating alternatives to natural gas in each district. The current district-based approach by the Amsterdam City Deal partners (housing corporations, private landlords, tenants' associations, energy companies and the municipality) is active in 28 neighbourhoods, and will be expanded into a citywide, systematic approach with an accelerated process. The basis for this large-scale operation is the vision document on the heating transition (Transitievisie Warmte), which sets out when natural gas will be phased out in which district, and which alternative heating technology is preferred. By 2040, all existing 650,000 homes or other buildings in the city will be natural-gas-free.

Looking back

- A five-year work plan has been drawn up, including neighbourhoods that fall within the Amsterdamse Warmtemotor (AWM) and neighbourhoods with private/local initiatives.
- The AWM framework agreement with housing corporations and Vattenfall/ Westpoort Warmte has been signed. This means that a total of 10,000 homes in 10-15 neighbourhoods are expected to be disconnected from natural gas by the end of 2026. The municipality is providing a subsidy of 5,000 euros per home.
- Neighbourhood implementation plans have been drawn up for the Gentiaanbuurt, Molenwijk and Banne Noord, meaning that the first stage of phasing out natural gas in the neighbourhood can go ahead, or implementation can enter the second stage.
- Private initiatives have progressed from exploration to the feasibility phase (e.g., Kantershof, Universiteitskwartier), and from the feasibility phase to the design phase (Reigersbos, Plantagebuurt/Artis and co., WG-terrein/Ketelhuis and Middenmeer).
- Despite the COVID-19 limitations, the participatory neighbourhood approach continued using online residents' meetings, allowing us to reach new target groups.
- Establishment of a subsidy scheme for social and civic real estate and entrepreneurs.

Looking ahead

- Further development of the selection process to promote neighbourhoods in the five-year work plan from potential AWM neighbourhood to definite AWN neighbourhood.
- Cooperation in the Wildemanbuurt, Bloemenbuurt and Waterlandpleinbuurt between utility companies, the municipality and heat suppliers (a single common design, tender and management structure).
- Broaden the neighbourhood implementation plan (paying attention to insulation and other measures), service provision to owner-occupier associations, private individuals in neighbourhood approach (financial support, information and collective actions) and develop new construction with (external) funders in heat distribution grids.

The agreement with housing corporations, Vattenfall and Westpoort Warmte will ensure that 10,000 homes are disconnected from natural gas by the end of 2026.

Pillar 1

Points for attention

- Support and affordability for private individuals (in the case of private housing and limited resources).
- The opportunity to connect to a collective heat supply within a period of a few years.
- Vulnerable and less digitally savvy residents are more difficult to reach.
- Continuation of Climate Fund and financial support. Without this incentive, there will be no progress. Seek to coordinate on this with the state-backed WAM approach.
- Crucial factors for scaling up/accelerating: a more standardised approach, collective heating solutions, designation of neighbourhoods and targeted participation (certainly if national policies facilitate this).
- Continue to experiment with technologies other than district heating (aquifer thermal energy, waste heat recovery, etc).

Pillar 2

Developing sustainable sources for the heat distribution grid

What and how

Scaling up the district-by-district approach to phasing out natural gas will increase demand for sustainable heating, and this demand will need to be met. Attention must be paid to diverse sources to create a robust system. The current heat distribution grid is powered by AEB's waste incineration plant and Vattenfall's Diemercentrale plant. These sources provide enough heat, but they will not be able to meet growing demand in the long term, and they need to become more sustainable. Potential new sources include geothermal heating, aquifer thermal energy systems, and waste heat from industry and datacentres.

Looking back

- Together with the Amsterdam partners in the natural-gas-free city deal (citydeal aardgasvrij), we have identified the demand for heat and anticipated sustainable sources to meet it.
- Together with the province, Vattenfall and Eneco, we have applied for an exploration licence for geothermal energy. The national SCAN survey on the quality of the subsoil has been facilitated.
- The municipality has initiated an area-specific collective low-temperature heat distribution grid for several areas (e.g., Centrumeiland, Overamstel, Strandeiland and Hamerkwartier).
- Research has started with Westpoort Warmte on introducing waste heat from data centres into the existing heat distribution grid.
- The municipality has joined Westpoort Warmte as a shareholder. Agreements have been made on greening the existing heat distribution grid by 2040.
- Together with Westpoort Warmte, the municipality has launched an evaluation of concessions, with the aim of reaching agreements on sustainable solutions for new-builds in concession areas.

Looking ahead

- An action plan for sustainable heat sources will be drawn up in 2022. Agreements will be made with Westpoort Warmte and Vattenfall about the path towards 100% sustainable heating in existing heat distribution grids.
- In the summer of 2022, there will be more clarity on the suitability of Amsterdam's ground for the extraction of geothermal energy.
- Decision-making on the use of heat from data centres on the western and eastern sides of the city.
- Development of the most suitable (collective) heat supply for Havenstad and decision-making on the heat supply in several area developments.
- The evaluation of the Westpoort Warmte concessions will be completed. Agreements will be made about heating systems for new-builds in concession areas.
- In 2022, Vattenfall will decide whether to go ahead with the construction of the temporary biomass power plant in Diemen.
- Vattenfall will start construction on a 150 MW e-boiler on sustainable electricity.

A low-temperature heat network will be realised in various areas of Amsterdam.

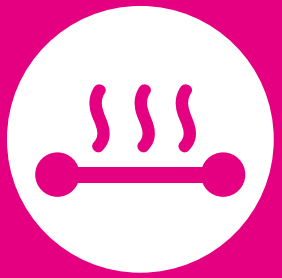
Pillar 2

Points for attention

- The decisions about heat source use are made by power companies; the municipality can only play a facilitating role.
- The rate at which homes and businesses are connected to a heat distribution grid determines how many new heat sources can be fed into collective networks. The supply of heat from the waste incineration plant is now greater than the demand for heat in the Westpoort Warmte grid.
- The construction of heat distribution grids requires long-term investments with uncertain payback periods. This is slowing down the introduction of new sources.
- According to the national calculation rules, waste heat from power stations results in fewer CO_2 emissions than waste heat from data centres. As a result, it is less attractive for power companies to feed in waste heat from data centres.

Pillar 3

Building a city-wide heating infrastructure



The tender for the Middenmeer Noord heat distribution grid has been completed.

What and how

In order to phase out natural gas in Amsterdam by 2040, the heat infrastructure will develop into a citywide infrastructure that delivers the right heat to the right place. In addition, more local grids will be developed, fuelled by decentralised sources. One point for attention is that infrastructure should not be developed only in boroughs with the lowest costs; it must be possible to disconnect every home and building in Amsterdam from natural gas. Building this new infrastructure will have a major impact on public space in the city. In the run-up to 2040, we will move from a high- and medium-temperature district heating system to an infrastructure with local heat distribution grids and electricity infrastructure to facilitate smart energy exchange (heat, gas and electricity).

Looking back

- On 1 March 2021, the municipality acquired a 50% share in the Westpoort Warmte power company.
- In late 2021, house-building corporations, heat suppliers and the municipality signed a framework agreement with the aim of connecting 110,000 homes to the city's district heating system (Amsterdamse Warmtemotor) by 2040.
- The integral tender for Middenmeer Noord has been completed successfully. The selected contractor will also build a heat distribution network in the neighbourhood.

Looking ahead

- Warmtemotor roll-out: establish neighbourhood agreements for the first c. ten neighbourhoods, after which the works can begin.
- Start implementation of the natural gas phase-out in at least two neighbourhoods in the Amsterdamse Warmtemotor (Molenwijk and Gentiaanbuurt).

Points for attention

- The lack of clarity on recently announced relevant legislation and the voluntary nature of existing legislation is impeding the establishment of agreements with private owners and commercial landlords.
- Becoming gas-free is not cost-neutral. State subsidies are far from adequate to compensate building owners, and the municipality has insufficient means to bear this burden for the entire city.
- In particular, citizens on low or middle incomes should not face financial difficulties as a result of rising energy prices. According to the legal 'gas reference framework' (the 'niet-meer-dan-anders' principle), the end user in a natural-gas-free building should not pay more than they otherwise would for gas. To boost acceptance of district heating, it would help if this were cheaper than natural gas.

Pillar 4

Making housing energy-efficient

What and how

The heating of homes accounts for 14% of CO_2 emissions in Amsterdam. We need to reduce our electricity and heat consumption. There are currently c. 450,000 homes in Amsterdam, 30% of which are owner-occupied, 42% owned by housing corporations, and 28% owned by private landlords. It is important that every homeowner takes energy-saving measures when major maintenance is carried out, but preferably sooner rather than later, because the pace must be accelerated. We are working towards a situation in which all homeowners, including all owner-occupier associations, have received advice and taken action. The ultimate aim is for all homeowners to make their homes energy-efficient and natural-gas-free.

Looking back

- 54 owner-occupier associations have received free energy advice. Seven webinars were held for owner-occupier association members, and 780 owner-occupier associations took part in these.
- 60 owner-occupier associations took part in a three-evening course on sustainability. More than 60 owner-occupier associations attended a webinar on the importance and preparation of a long-term green maintenance plan (Groen Meerjaren Onderhoudsplan).
- The !WOON foundation supported 83 residents' groups with home improvements and energy-savings in rental complexes and mixed owner-occupier associations (5,500 homes).
- C. 4.8 million euros of energy loans were awarded to make homes more sustainable. This included fitting insulating glass in 252 homes and installing solar panels on 168 homes. In total, measures were taken at 536 homes, around two-thirds of which belong to owner-occupier associations.
- With the aid of the home energy-use reduction scheme (Regeling Reductie Energiegebruik Woningen, RREW), more than 38,000 residents (mainly tenants) applied for gift vouchers worth 70 euros to spend on energy-saving products.
- The results of the sustainability partnership agreements with housing corporations are largely in line with the agreements made. In 2020, a 2% reduction in carbon emissions was achieved as a result of limiting gas consumption. The carbon reduction target for the period 2020-2023 has been raised from 8% to 9%.

C. 4.8 million euros of energy loans were granted for sustainability measures in 536 homes.

Pillar 4

Looking ahead

- Energy-saving measures will be taken in the first homes (as part of the Isolatietrein scheme) in the second half of 2022.
- At least 35,000 homeowners will be approached in 2022 by collective purchasing schemes for sustainability measures; at least 50,000 a year in 2023-2025.
- 12,000 households will be approached door-to-door, with residents being given direct energy advice and energy-saving products.
- Plan for the extensive renovation of poor housing to be further developed.
- Continuation and expansion of the owner-occupier association approach.
- Lowering the landlord levy from 2022 and abolishing it in 2023 will create more investment room for corporations to green their housing stock.
- We will use 8 million euros (state funds) to support the households hit hardest by higher energy bills in the short term with energy-saving measures.
- The national insulation programme announced in the coalition agreement may offer opportunities to insulate homes more quickly and efficiently.

Points for attention

- The sharp rise in the gas price is affecting many households. This makes it even more important to reduce heat demand through renovations and insulation.
- Structural funding is needed to meet the insulation/renovation challenge in the long term.
- Making homes energy-efficient should ideally be tackled in conjunction with housing quality and other (sustainability) challenges.
- Shortage of labour and raw materials.

Pillar 5

Making the business market energy-efficient

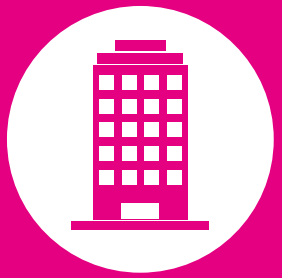
What and how

All commercial buildings must be made natural-gas-free and carbon-neutral. The business market has various sectors and a wide range of building types: offices, catering, shops, shared office buildings and industrial buildings. Each sector faces unique opportunities and challenges. Greening the business market will require energy-saving measures in buildings and their connection to the sustainable heat distribution infrastructure. Business processes will also need to be made more energy-efficient. The enforcement of the Environmental Management Act (Wet milieubeheer) and the Energy Efficiency Directive (EED) is being intensified, and the assistance offered to businesses has been expanded and become more structural in nature. By 2023, a mandatory energy label 'C' for offices will be introduced and enforced. See also pillar 10 on solar energy.

Looking back

The focus in 2021 was on expanding the range of businesses, establishing partnerships, and stepping up enforcement. The following has been achieved:

- The number of energy consultations was scaled up: 231 businesses received free advice and guidance on taking measures. These businesses have already saved 280 tons of CO_2.
- Expansion of the offering with free label-C energy advice for offices, energy advice for gas-free entrepreneurship, and a free online energy consultation (www.deb.nl/amsterdam).
- A stimulating city-wide and area-focused subsidy for phasing out natural gas in commercial premises and processes was made available, following on from a subsidy for residents.
- A collective insulation action was set up in partnership with MKB-Amsterdam and the regional energy helpdesk (Regionaal Energieloket).
- Collective partnerships were established in business parks, including Sloterdijken 3 and De Heining. At De Heining, in phase 1, 481 solar panels were installed on six commercial roofs.
- A new frontrunner group of sustainable entrepreneurs' collectives was launched. In this second round, seven entrepreneurs' collectives are working on a sustainable ambition in their area.
- Intensification of checks and enforcement by environmental services: 2,077 checks carried out at businesses, and 5,000 office owners and office users were informed by letter about the minimum requirement of at least energy level 'C' for offices in 2023.
- Partnership with data centres: a structural consultation was launched with the data centre sector to make agreements on developments relating to sustainability. At the metropolitan regional (MRA) level, LEAP partnership to accelerate the transition to a sustainable digital infrastructure.



In 2021, 231 free energy advisory and guidance projects were implemented to make business premises more energy-efficient.

Pillar 5

Looking ahead

The focus in 2022 is on scaling up current initiatives and encouraging businesses to implement energy advice and invest in sustainable measures:

- Scale up targeted energy advice and guidance for entrepreneurs.
- Scale up collective partnerships and collective (purchasing) actions in business parks.
- Continue the information campaign on compulsory energy level 'C' for owners of office buildings from 2023. The Regional Agency for the Environment will start actively enforcing this in 2023.
- Supervise the second round of the front-runner group of sustainable entrepreneurs' collectives (Koplopersgroep Duurzame Ondernemerscollectieven) and two networking sessions with sustainable entrepreneurs' collectives (share sustainability ideas and experiences).
- Further intensification of checks and enforcement by the Regional Agency for the Environment. The provisional Energy Conservation Agreement (Energiebesparingsakkoord), which was signed in January 2022, will provide funds for this.
- Data centres: reassess the location policy and sustainability agreements (January 2022), partly on the basis of the Sustainability Monitor.

Points for attention

Lobby central government for stricter legal obligations, including expanding the target group obliged to take energy-savings measures under the Environmental Management Act.

Pillar 6

Making social and civic buildings energy-efficient

What and how

Energy consumption must be reduced in community centres, schools, sports facilities, hospitals and arts and cultural venues. These c. 3,000 buildings also play an exemplary role in the energy transition, by inspiring visitors to make their own homes more sustainable. There is a wide range of social and civic buildings in terms of building type, use and ownership. Building owners (including the municipality) and users are responsible for greening buildings. Increasing use is being made of the support on offer, including energy scans, subsidies and low-interest loans. By 2021, many plans had been set in motion and positive results achieved.

Looking back

- With the adoption of a new subsidy scheme, from 2022 businesses and social and civic institutions can also apply for a subsidy to cover the additional costs of disconnecting buildings from natural gas and replacing production equipment.
- 32 social and civic institutions received energy scans and took sustainability measures. Half of these were religious institutions.
- KIT-Royal Tropical Institute presented an ambitious plan to make its real estate (hotel and museum) sustainable and natural-gas-free. This involves an investment of 3 million euros.
- In primary and secondary education, sustainability plans have been developed for ten school buildings.
- Sustainability steps have been taken at various municipal buildings and sports facilities, such as phasing out natural gas, generating sustainable electricity with solar panels, saving energy by installing LED lighting, the construction of a smart blue-green roof, and the re-use of an old sports floor. This concerns a total of 54 buildings and 21 sports facilities.
- Together with Eigen Haard and Waternet, a Proeftuin Aardgasvrij application was submitted for the Mirandabad pool and surrounding residential complexes. The application was rejected.

Looking ahead

- The incentive package for greening primary and secondary school buildings is being discussed by the municipal assembly. With the reserved amount, 20 schools can submit applications to make their school buildings much more sustainable.
- The GGD and the Municipality of Amsterdam are exploring the possibility of joining the Green Deal Duurzame Zorg 3.0, which focuses on carbon savings, reducing waste flows and reducing medicine residues in waste water.
- 50 new social institutions are receiving energy scans and developing plans for energy-savings and sustainability measures.
- Sustainability plans have been developed for 20 sports facilities and municipal buildings.

Points for attention

- Due to the ongoing COVID-19 crisis, the pressure on cultural and healthcare institutions remains high. This may have an impact on the realisation of sustainability ambitions.
- Many social and civic institutions have sustainability ambitions. The investments linked to this require new financial arrangements, but these are being impeded by existing sectoral regulations.

In 2022, at least 90 social and civic institutions and municipal buildings will work on sustainability.

Pillar 7

Energy-neutral construction

With sustainable tenders, we are putting Amsterdam on the national and international map with attractive, sustainable buildings.

What and how

There is just one moment to ensure that the city's new-builds meet the required standards, and that is when they are built. The buildings that are built in the coming years must not add to the challenge of cutting CO_2. In future, only energy-neutral and energy-producing construction methods will be used (good insulation, solar panels and connected to sustainable heating). A contribution will also be made during the construction phase, by using emissions-free materials and logistics. We are working towards ambitious standards for new-build energy performance that apply universally at the environmental permit stage. This has long been our aim and practice in Amsterdam. Unfortunately, central government is denying us an opportunity to continue with our policy before 2022. When the Environment and Planning Act comes into force, we will continue on our path. We will also continue to challenge the market with tenders for new-build plots

Looking back

- Preparation of decision-making on tightening BENG house-building requirements (Besluitvorming Amsterdamse Bijna Energieneutrale Gebouwen), including an exemption scheme, transitional scheme, and subsidy scheme for social house-building.
- Promising results have been achieved with lot tenders for new-build homes. The proposals that have been submitted are architecturally attractive, and are zero-energy or even energy-producing in 80% of cases.

Looking ahead

- Prepare introduction of stricter BENG requirements for house-building in Amsterdam's Environmental Plan (Omgevingsplan).
- Continue to focus on sustainable construction and absorption of greenhouse gases in biogenic materials, such as wood construction.

Points for attention

- The legal basis for local measures and date of entry into force of the Environment and Planning Act.
- Accumulation of sustainability ambitions and requirements for new-builds.

Jerrexl Oron

Community worker specialising in sustainability in the Weesp area

"As a community worker, I help people in my neighbourhood to prepare for the energy transition. My first contact with residents is through door-to-door conversations. I pop a flyer through the letterbox, saying that I'm a community worker and will be stopping by for a chat. At that point, I don't say anything about sustainability. I think it's important to understand a resident's situation before starting to talk about how to save energy, for example.

To do this work, I need to be in direct contact with residents. To make that happen, I mainly work in the neighbourhood. That allows me to pick up on what's happening. In Weesp, I have spoken personally to around a third of the residents in a particular neighbourhood.

The energy transition is both a technological and a social transition. Without the technological developments we've seen recent years, we wouldn't be able to implement the transition successfully. But I believe that the social part is more than 50% of the transition.

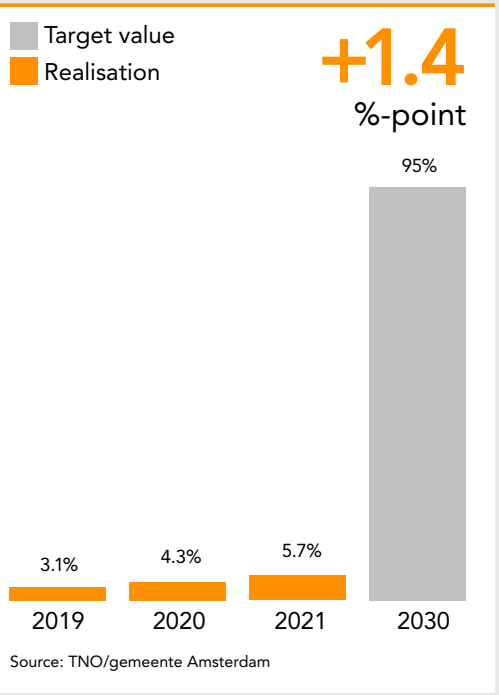
My advice to everyone is to insulate your home as soon as you can. That's difficult for some people, as they are dependent on a housing corporation. In that case, see whether you can close up cracks and holes yourself, with the help of draught strips. Also take a look at your own energy behaviour. Turn off the radiator when you're not in a room or when you go to bed. You can also save a lot of money on your energy bill by taking shorter showers. Saving energy is good for your finances and also helps the energy transition."

Mobility

Amsterdam is attracting increasing numbers of residents, visitors and jobs – but more people means more journeys. If we don't act, this will lead to more carbon emissions. That's why we are asking every vehicle-owner or driver to choose a sustainable alternative form of transport. The municipality will promote, facilitate and, if necessary, regulate this switch.

Electric driving

% of kilometres of motorised traffic on Amsterdam's roads

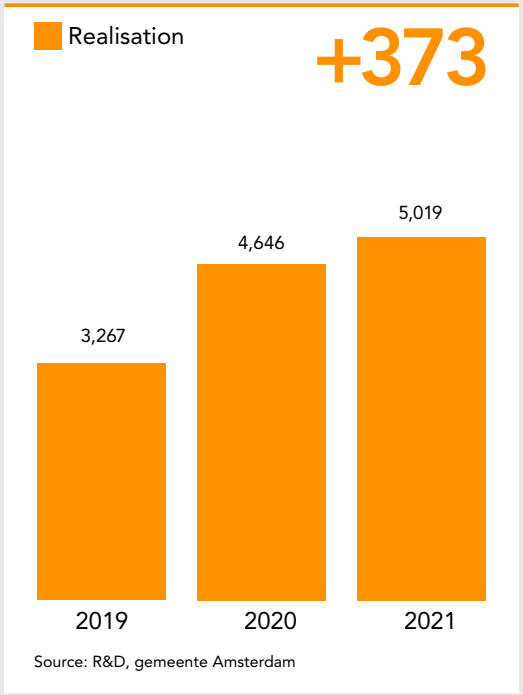


Source: TNO/gemeente Amsterdam

The share of kilometres driven by electric motorised traffic increased to almost 6% in the first half of 2021. The share is highest for kilometres driven by public transport buses (19%) and mopeds and motorcycles (18%). The Clean Air Action Plan (Actieplan Schone Lucht) will allow us to achieve our target by 2030.

Charging points

Total number of public electric (fast-) charging points in Amsterdam



Source: R&D, gemeente Amsterdam

By the end of the third quarter of 2021, the total number of public charging points had increased by 373.

Pillar 8

Limiting polluting traffic

What and how

The main goal is to minimise the number of polluting kilometres in order to cut CO_2 emissions from vehicles in Amsterdam. We are taking a three-track approach:

- Promoting the switch to sustainable means of transport.
- Facilitating sufficient sustainable alternatives.
- Regulating by removing parking places or closing streets to motorised vehicles.

We are working on sustainable forms of transport, such as more and faster public transport, and more space in the city thanks to fewer car-parking spaces and smart mobility.

Looking back

- More than 1,500 car-parking spaces were removed in 2021.
- 1,300 shared bikes and 100 shared cargo bikes were installed in 2021.
- Paid parking was extended to Geuzenveld and the De Pijp and Museumkwartier areas on Sundays.
- The permit ceiling was lowered in areas with limited car traffic.
- A policy was introduced to encourage cycling in Zuidoost, Noord and Nieuw-West.
- The ferries policy was adopted with a sustainable target.
- Amsterdam now has a total of ten different neighbourhood hubs where residents can rent various forms of shared electric transport.
- The Hub Vision has been adopted by the municipal assembly.

Looking ahead

- As working from home will remain the norm for many people this year, there is likely to be a temporary reduction in passenger transport movements. It is not known how this situation will develop in the future.
- Work continues on the implementation of the limited car traffic agenda (Agenda Autoluw).
- Preparations are under way for a traffic reduction pilot in Weesperstraat in 2023.

Points for attention

- Due to the effects of the COVID-19 crisis, public transport operators are still under pressure.
- There is a high level of pressure on public space. Due to bridge and quay wall maintenance, for example, the space freed up by removing parking spaces is less available for bicycle infrastructure or green space.

A total of ten different neighbourhood hubs have opened in Amsterdam.

Pillar 9

Cleaning of all polluting vehicles and vessels

What and how

For many citizens, companies and visitors, the car remains an important means of transport. The switch to 100% emissions-free transport will require all parties in the city to contribute. We are aiming for less, smarter, and above all green traffic. We are doing this in three ways:

- Boosting emissions-free transport with subsidies and privileges for green vehicles.
- Facilitating emissions-free transport with special parking places and charging infrastructure.
- Regulating fossil-fuel-powered vehicles by establishing environmental zones.

Our objective is for all traffic within the A10 ring road to be emissions-free by 2025, with the exception of passenger cars and motorbikes. Mopeds and motor-assisted bicycles must be emissions-free throughout the built-up area. We want all traffic on Amsterdam's roads to be emissions-free by 2030.

Looking back

- Partly thanks to the measures in the Clean Air Action Plan, the number of (polluting) traffic movements has been further reduced, meaning that everywhere in Amsterdam now meets the legal norms for air quality for the first time.
- The national Urban Logistics Implementation Agenda (Uitvoeringsagenda Stadslogistiek) has been signed. It sets out the route to emissions-free urban logistics by 2030, and records agreements on the introduction of emission-free zones by 2025.
- The Zero-emission Taxi Roadmap has been signed nationwide, a major step in the direction of an emission-free zone for taxis by 2025. The Municipality of Amsterdam is lobbying for the introduction of emission-free zones.
- Total Energies is the new contracting party that will realise the necessary growth of the public charging network until 2023. The first charging stations have been installed within the concession.
- Under the subsidy scheme for clean alternative transport for Amsterdam, 1,385 polluting diesel vehicles have been scrapped.
- The subsidy scheme for sustainable transport in Amsterdam (Subsidieregeling Duurzame Amsterdamse Vervoermiddelen) has been extended. Until 2023, entrepreneurs can apply for a subsidy to purchase an emission-free commercial vehicle.
- The GVB is introducing clean public transport buses in batches. Two of the six batches in Amsterdam are now emission-free.
- One new hybrid ferry has been put into service on the IJ, and two zero-emission ferries on the North Sea Canal.
- All new orders and lease contracts for passenger cars for the municipal fleet will be exclusively electric as of 2021.

On 1 January 2022, Amsterdam will introduce a stricter (diesel) environmental zone for trucks, buses and coaches.

Pillar 9

Looking ahead

- As of 1 January 2022, Amsterdam's (diesel) environmental zone for trucks, buses and coaches has been tightened to emission class 6.
- The zero-emission zone for urban logistics from 2025 will be prepared from 2022.
- The national evaluation of the harmonisation scheme for environmental zones will be held in 2022. Amsterdam is dependent on the outcomes of the evaluation for the introduction of emission-free zones for buses, touring cars and passenger cars. The municipality is lobbying for the introduction of emission-free zones.

Points for attention

- Facilitating the transition to emission-free transport with a comprehensive public charging network is being hampered by congestion in the energy grid. The municipality is searching for solutions with grid operator Liander, among others.
- Weight restrictions for urban logistics may hinder the transition to electric vehicles. The batteries that are required make the vehicles much heavier. With the communication platform Logistiek 020, the municipality has taken an important step towards sharing recent urban logistics developments clearly with stakeholders.
- The continuation of the COVID-19 crisis is putting pressure on the operation of public transport, and thus on the greening of public buses.

Nora Stoppelenburg

Founder of Rijschool Zero, Amsterdam's first sustainable driving school

"In late 2019, my work as a DJ disappeared due to the COVID-19 measures, but I was still working as a driving instructor in Amstelveen. During the first lockdown, I had more space to think. I'd noticed for some time that there's growing interest in electric transport.

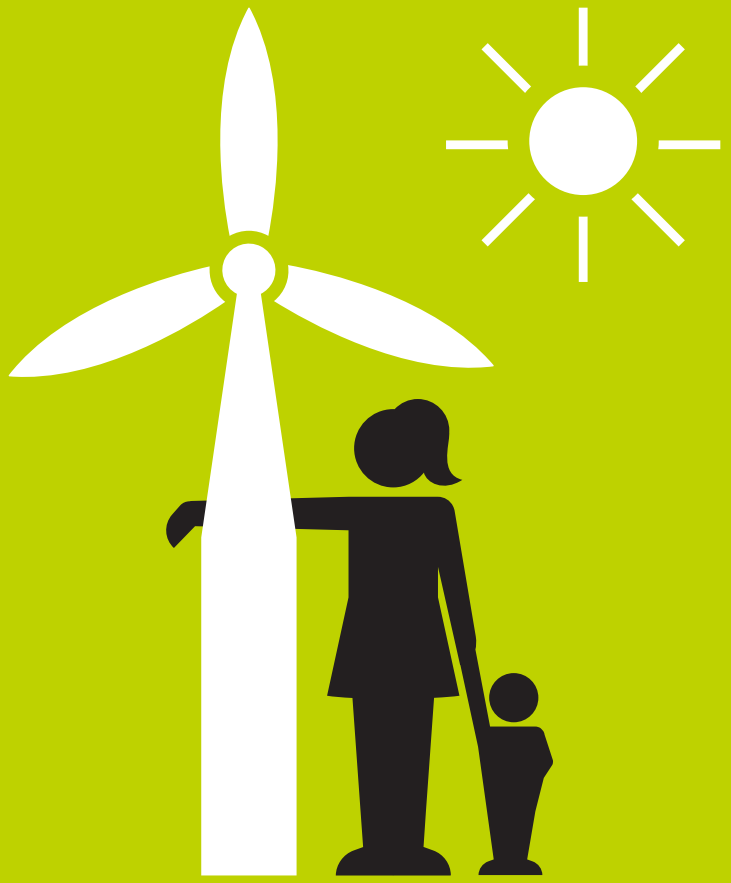
The electric motor scooter is becoming increasingly popular in and around the city, for example. That's not surprising, because you can park for free, you don't have to deal with traffic jams, and an automatic is speedy and manoeuvrable on the ring road and in the city centre. People want to learn that, too. At the time, I asked people I knew whether they were interested, and soon I had ten people wanting to learn how to drive an electric motor scooter.

I wrote a business plan for Amsterdam's first sustainable driving school, got financing, and ordered an electric car, a motor scooter and a scooter. Unfortunately, there are no subsidies for sustainable driving schools, like there are for electric taxis and vans. Nevertheless, it worked out and I started Rijschool Zero. My driving school is all about zero emissions. In practice, most people driving an automatic need half as many lessons as in a manual car. And with electric driving, we will all switch to automatics in the end.

I've noticed that sustainability is becoming a serious consideration for more and more people. It also has financial benefits. Something really has to be done to make the world a cleaner place, and I'm happy to play my part."

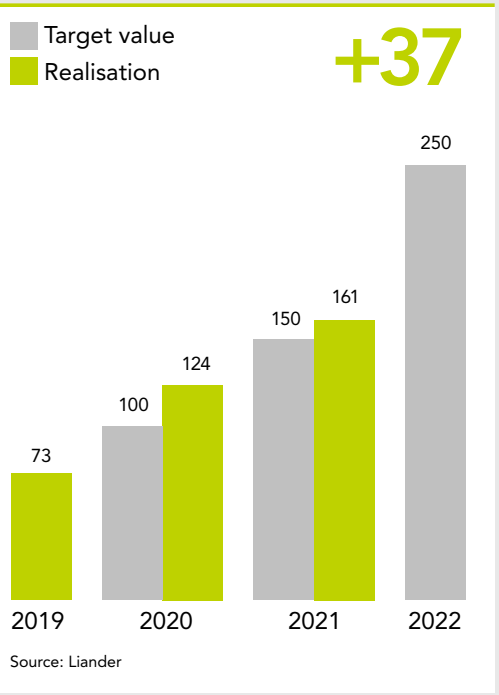
Electricity

Electricity plays a key role in the energy transition. There is greater demand for electricity due to the transition to a gas-free city, the growth in the number of electric vehicles, and the growth of the city with additional houses and businesses. This electricity must be generated sustainably. Many roofs in Amsterdam are suitable for generating solar energy, and there are also opportunities for generating sustainable power using wind turbines.



Generating solar energy

Total installed capacity
solar energy in Amsterdam
(MW, at end of the year)

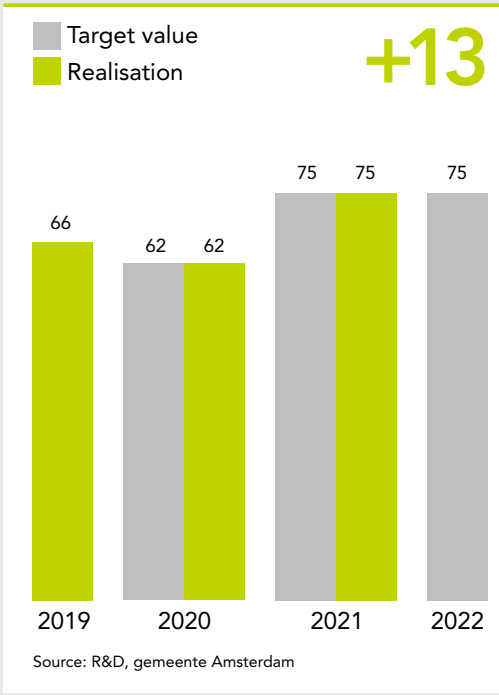


Source: Liander

In 2021, the power that solar panels could generate in Amsterdam rose by 30% in a single year.

Generating wind energy

Total installed capacity
wind energy in Amsterdam
(MW, at end of the year)



Source: R&D, gemeente Amsterdam

Due to the replacement of some wind turbines in 2021, the total installed capacity of wind energy in Amsterdam reached 75 MW.

The installed capacity of solar energy in Weesp is 7 MW (in 2020).

Pillar 10

Maximising solar energy generation on roofs

What and how

There is a lot of roof space in Amsterdam that we want to use optimally to generate sustainable power. The advantage of solar panels is they are technically relatively simple to install and often profitable, although yields are under pressure from falling SDE++ tariffs, higher costs due to additional requirements (building insurance), and the fact that the remaining roofs are more complex (many straightforward locations are already in use). The key parties for the generation of solar energy are the owners and users of buildings in the city. We have opted for an approach in which we inspire citizens and remove obstacles and enter partnerships, allowing for more effective use of the opportunities created by solar power. In the framework of the Environment and Planning Act, Amsterdam is exploring the options for managing solar energy on large roofs. By 2050, all suitable roofs will be used for generating sustainable power.

Looking back

- An online step-by-step plan on the Zon Zonder Zorgen website with opportunities for everyone in Amsterdam.
- Menu of options for solar panels on listed buildings and in conservation areas. A guide has been written for the sustainable heritage helpdesk (loket Duurzaam Erfgoed).
- Collective purchase schemes in Noord, Zuid and West. In 2021, all owners of homes with ground-level access in Amsterdam (excluding conservation areas and monuments) will have received an offer. More than 1,000 households in the city have signed up, and citizens have invested more than 5 million euros in solar panels.
- 38 owner-occupier associations received advice on solar energy. Webinars on solar roof panels were held for owner-occupier associations.
- New subsidy scheme launched for accelerating solar projects by housing corporations (Zonmotor). In the first round, 2.3 million euros of subsidies were granted to five housing corporations for 20,000 extra solar panels on roofs in Amsterdam.
- The Zoncoalitie helped property owners to generate more solar energy on large roofs.
- Introduction of 'roof of the month' to showcase exemplary projects.
- Realisation of solar panels on 20 schools, bringing the number of schools in Amsterdam with solar panels to c. 150.
- Support for companies and organisations through a business park approach with tailormade advice, project preparation, and research on the suitability of roof structures. Companies with large roofs have been approached to get started with solar energy. In the first round, applications were submitted for more than 60 MW of SDE++ subsidies.
- Central government has been called upon to include state land, for example along motorways, in the OER programme (Opwek van Energie op Rijksvastgoed).
- 24 municipal premises have been examined for their suitability for installation of solar panels.
- Inclusion of a temporary solar farm in the Strandeiland zoning plan and Buiteneiland project decision.
- Development of a dashboard for monitoring solar potential and realisation based on aerial photo analysis.

In 2022, housing corporations will install 20,000 extra solar panels through the Zonmotor subsidy.

Pillar 10

Looking ahead

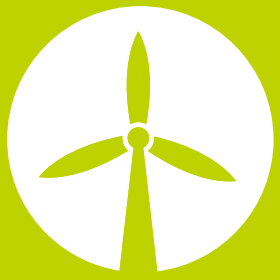
- Simplify solar panel installation in conservation areas, including through a pilot collective purchase scheme in Amsterdam Noord, a guideline for solar panels in conservation areas, and 'Project Zon op Centrum', in which residents of the Unesco World Heritage site in pilot postcode 1012 receive advice in partnership with experts and the Green Light District.
- Launch solar energy decision tree for owner-occupier associations.
- Realisation of phase 1 of the Zonmotor with 20,000 extra solar panels on housing corporation roofs and a second subsidy round.
- Research potential municipal management of the use of large commercial roofs for solar energy.
- In partnership with the Port of Amsterdam, research solar potential in the harbour area and make agreements on possible acceleration.
- Further analyse use of space along state infrastructure, together with the Directorate-General for Public Works and the Ministry of Economic Affairs and Climate Policy (EZK), including along the A9/A5 and A10 Noord.
- Tender for solar panels on 22 municipal buildings.
- Investigate possibilities for solar carports, charging infrastructure and energy storage at 20 municipal car parks, and realise solar carport at the municipal Sport en Bos car park.
- Develop tool to accelerate the issuing of permits for solar panel installation.
- Participate in ZonNext platform for the reuse of solar panels and join initiatives for further sustainability (PIANOo Buyer Group).
- Monitor development of solar panels by target group.

Points for attention

- As a result of the COVID-19 crisis, companies have postponed investments in solar panels.
- The lower SDE++ tariffs are proving increasingly inadequate. We therefore need to keep lobbying central government for a more appropriate scheme in which roofs can continue to be used.
- Difficult business cases and/or complex decision-making (e.g. in case of owner-occupier associations), especially medium-sized roofs and multi-storey buildings.
- The business case can be complicated by the insufficiently solid construction of many large roofs.
- It is becoming increasingly difficult to insure solar panels, and this requires more work and extra inspection costs. A guarantee fund could be set up for this.
- It takes significant time for network operators to reinforce electricity connections.
- Spatial integration of ground-based systems.

Pillar 11

Optimising the use of potential wind energy



The search areas for wind energy are set out in the Regional Energy Strategy for Noord-Holland Zuid (RES 1.0).

What and how

By generating more wind energy, we want to make an appropriate contribution to greening electricity production. The ambition is to install at least 50 MW of extra capacity in Amsterdam by 2030 (on top of an additional 11 MW due to replacement with larger wind turbines), and to grant the licences for this before 2025. This will result in a total of at least 127 MW of installed capacity. In the wind energy search areas, we are looking for locations for new wind turbines. In consultation with spatial planning experts, neighbouring residents and other stakeholders, we are preparing the decision-making process for installing wind turbines with at least 50% of production in local hands.

Looking back

- We have started to replace existing wind turbines with larger ones.
- The ambition (to realise at least 127 MW of wind energy by 2030 and issue permits for this by 2025) and search areas for wind energy are set out in the Noord-Holland Zuid Regional Energy Strategy (RES 1.0) and the Spatial Vision.
- The municipality has included a reflection phase as an extra step in decision-making on the RES 1.0, recognising the widespread desire to participate in the process of introducing wind turbines in Amsterdam. The aim of the reflection phase is to inventory and listen to the various concerns and needs of a wide range of stakeholders.
- In the reflection phase, we are working with various thematic and area-specific sounding board groups on a number of products to provide more guidance for initiators, residents and councillors in the development of wind turbines (e.g., the 'Signals from the city' document, which provides insight into citizens' views on the arrival of wind turbines).
- In addition, the expert group on nature and the expert group on health, led by an independent chair, are working on recommendations for standards to protect nature and health when realising wind energy.

Pillar 11

Looking ahead

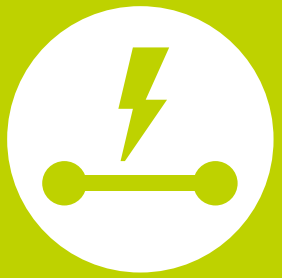
- The reflection phase will be completed.
- A city-wide Plan-MER (environmental impact report) will be carried out for the (new) search areas in the RES 1.0, clarifying the environmental impact (including for health and nature) and accounting for the choice of search areas.
- The MER project for the Noorder IJplas/ Cornelis Douwesterrein area will be carried out in consultation with the surrounding area.
- Discussions will start with initiators for the next areas.
- The municipality is only supporting initiatives and cooperatives where wind turbines are developed with at least 50% local ownership.
- Future initiative-takers to produce a participation plan in consultation with the surroundings. This plan must be approved by the Mayor and Cabinet.
- Parallel to the implementation steps for solar and wind in the municipality, the energy region will start preparing the RES 2.0, which will be adopted in the spring of 2023.

Points for attention

Communication about the next steps in realising wind energy and residents' options to participate in the decision-making process. Residents have concerns about their health and nature, among other things.

Pillar 12

Developing a future-proof electricity infrastructure



A taskforce has been launched to tackle congestion in the electricity grid.

What and how

Electricity plays a key role in the energy transition. More and more electricity is being used to heat buildings and power electric vehicles, but electric cooking in catering also requires a lot of power. Having sufficient capacity in the electricity grid is an important precondition for meeting the climate targets, as well as economic growth and building extra homes. In 2021, Liander had to announce congestion in several parts of the city due to insufficient capacity in the electricity grid. This threatens developments relating to climate targets and urban growth.

The Municipality of Amsterdam is working with Liander, TenneT and the Port of Amsterdam (PoA) to resolve this problem as soon as possible. Liander has indicated that congestion cannot be ruled out in other parts of the city in the meantime. The parties in the Congestion Taskforce are working to find solutions to allow the electricity grid to be expanded more quickly and used more efficiently. Unconventional measures will sometimes be needed to allow developments in the city to go ahead. We also need central government to remove obstacles to legislation and regulation.

The electricity grid will ultimately make an optimal contribution to a larger sustainable electricity system, in which electricity generation and consumption are coordinated at the local level.

Looking back

- Congestion in the electricity grid: grid operator Liander announced congestion in several places in the city. A taskforce was established in response, consisting of the municipality, Alliander, TenneT and the PoA, and a pressing letter was written to central government calling for adequate instruments.
- The development framework for the electricity supply 2035 has been sent to the city districts for consultation. The framework sets out where electricity infrastructure needs to be installed in the city.
- The thematic study on electricity 2.0 provides an improved and more refined picture of the challenges for the electricity grid, which will help when taking the necessary next steps.

Pillar 12

Looking ahead

- Congestion Taskforce: Alliander, TenneT, the PoA and the municipality are working together to solve the congestion by (1) accelerating grid expansion, (2) taking measures to temporarily increase the electricity supply, (3) talking to large energy consumers about their demand for electricity, and (4) talking to central government about removing legislative and regulatory obstacles.
- The electricity grid development framework 2035 will be adopted by the Mayor and Cabinet. It includes an implementation agenda for the short and medium term. Based on this, planning for a number of substation locations will be completed in 2022.
- Work is underway on more active management of the supply and purchase of electricity. This may result in a 10-20% reduction in peak demand.
- The medium-voltage infrastructure forms part of the overall electricity grid. A medium-voltage strategy will be developed in 2022, in which Liander and the municipality will agree on how to expand this network in the coming years.

Points for attention

- Congestion in the power grid has a major impact on urban development. Unconventional solutions may sometimes be needed, such using gas turbines or asking large energy consumers to change their business practices.
- Current legislation and regulations are inadequate for some solutions, for example in relation to managing supply and demand or prioritising (large) consumers.
- The spatial impact is considerable: substations and transformer boxes need to be installed and cables laid in many locations in the city.
- Central government is developing a new precautionary policy on electricity and health (electromagnetic fields). The municipality will take this into account.

Yola Geradts

Proud owner of twelve new solar panels

"I'd tried to buy solar panels in the past, but I was always told that it didn't make any sense in my case; that the investment wouldn't be worth it. When I received a letter from the municipality about the collective solar panel purchasing scheme, I thought: let's give it one more try. You never know.

Soon after I'd signed up for the scheme, I received a call from the installers. They came by and immediately said that my roof was suitable. The panels are fitted on top of the dormers. I'm really pleased about that, because they're less conspicuous that way and it looks quite nice. They were installed on 31 August 2021: four panels on each side of the roof and four on the extension. It was done really quickly and I'm very satisfied.

From day one, I could see from the app on my phone how much they were producing. I've noticed that the panels also produce energy when it's cloudy, but they produce much more when it's really sunny. Especially on sunny days, I look at how much electricity we've generated. It's great to see.

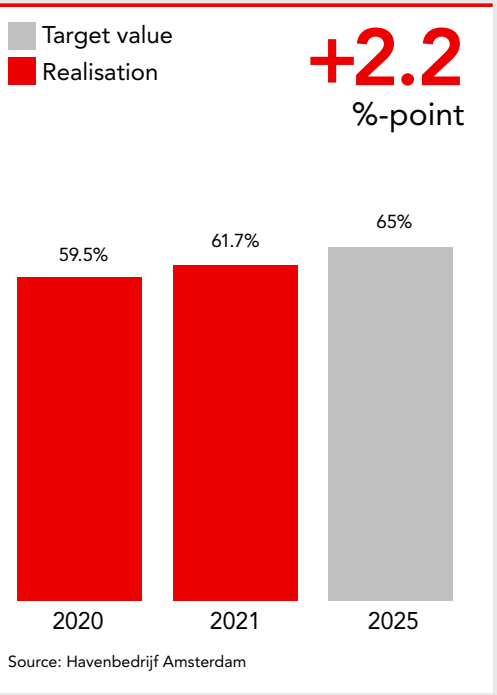
I really like the idea of generating my own energy, so I can be more self-sufficient. Solar panels are useful, they're a good investment, and they also help to reduce carbon emissions."

Harbour and Industry

Energy plays a central role in Amsterdam's harbour. Energy is produced and fuel is stored and shipped on a large scale. The opportunity and challenge for the harbour and industry is to change from being a fossil energy cluster to being a leader in sustainable energy, heat and alternative fuels for the city, the region, shipping and aviation.

Turnover

Share of the Port of Amsterdam's total turnover not related to fossil fuels

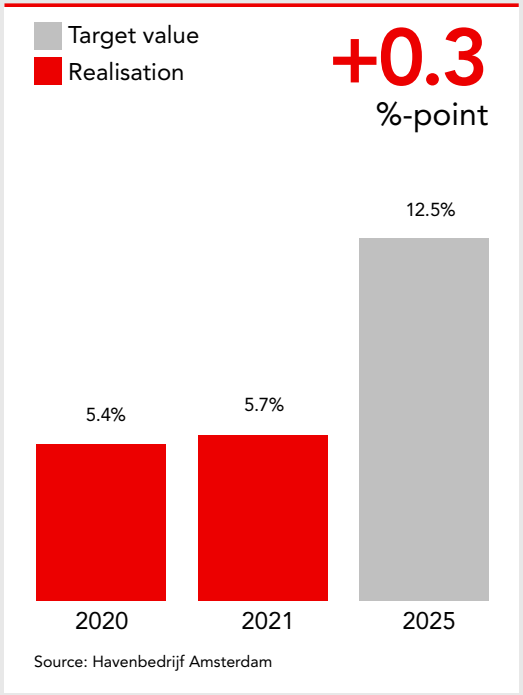


Source: Havenbedrijf Amsterdam

The ambition of the Port of Amsterdam is for 65% of its turnover by 2025 to consist of activities that are not related to fossil fuels. In 2021, this share rose to 62%.

Storage capacity

Share of storage capacity in harbour area used for sustainable fuels



Source: Havenbedrijf Amsterdam

The share of storage capacity in the harbour area used for sustainable fuels in 2021 was 5.7%. The target for 2025 will remain challenging in the years to come. That is because long-term investments are needed, on which the Port of Amsterdam has an indirect influence.

Pillar 13

Transforming the harbour into a sustainable battery

What and how

'The harbour as a sustainable battery for the city, region and Europe' is the shared future vision of the harbour as a place where sustainable energy is generated, produced, converted, stored and distributed to end-users on an industrial scale. We support this vision, and we will ensure that the Port of Amsterdam and the companies based in the harbour are able to implement it successfully. The harbour will also contribute to the energy transition beyond Amsterdam and in sectors such as industry, mobility, electricity and the built environment. The harbour economy in Amsterdam is being transformed from one based on the storage and transshipment of fossil fuels, such as coal and oil products, to one of the most sustainable harbours in Europe, with a 100% sustainable energy and fuel cluster with green hydrogen, biofuels and synthetic fuels. We aim to phase out coal by 2030 and all other fossil fuels by 2050.

Looking back

- Together with partners in the North Sea Canal Area, the Cluster Energy Strategy (CES 1.0) was drawn up and adopted by the municipal executive. The strategy sets out how supply and demand for fuels will develop in light of carbon reduction targets. Based on this, we have mapped out the new infrastructure that is needed.
- The multiannual infrastructure energy and climate programme (Meerjarenprogramma Infrastructuur Energie en Klimaat, MIEK) covers infrastructure projects of national significance, such as the regional hydrogen backbone and the various new electricity substations being developed in Amsterdam.
- From the recovery and investment plan 2021-2024, the municipal executive has granted a subsidy of 250,000 euros to Synkero for various feasibility studies on the realisation of a plan for green synthetic kerosene for aviation in Amsterdam's harbour. As well as the Municipality of Amsterdam, the Port of Amsterdam, SkyNRG, Schiphol and KLM have provided funding.
- The search locations for wind turbines have been specified in more detail.
- A study has been carried out on the maximum potential of rooftop solar panel generation in the harbour area, and presented to the municipal assembly. In the meantime, many new rooftop solar panels were installed in 2021.

Through the Cluster Energy Strategy and the MIEK programme, there has been a marked acceleration in the greening of industry in the harbour.

Pillar 13

Looking ahead

- The Cluster Energy Strategy 1.0 will be updated, and must clarify the consequences for electricity demand and supply (including offshore wind) and hydrogen production, distribution and importation.
- As a result of research on the maximum potential of rooftop solar panel generation in the harbour, an effort to accelerate this will be launched in 2022, in partnership with the Port of Amsterdam.

Points for attention

- The new coalition agreement aims to intensify the sustainability of the energy and industrial sector. The government will invest large sums in this in the coming years, creating good opportunities for the transition of Amsterdam's harbour and the North Sea Canal Area.
- At the same time, the impact on available space and the environmental contours of Amsterdam's harbour and the North Sea Canal Area are becoming increasingly visible.

Pillar 14

Developing the green hydrogen economy

What and how

Green hydrogen is an important potential fuel for the future energy system and for 'the harbour as a battery for the city, region and Europe.' Although green hydrogen cannot replace sustainably-generated electricity, it is an essential raw material and fuel for industry, heavy goods traffic and shipping and aviation. Hydrogen may play an important role in temporary storage and switching capacity in the electricity grid. With the coalition agreement and the EU's 'Fit for 55' plan, the hydrogen transition is now fully under way. As well as opportunities for reducing carbon emissions, hydrogen creates major economic opportunities. That is why it is extremely important that the region responds in a timely manner to the current hydrogen developments and plays the leading role to which it aspires. We need to promote cooperation in the region to take concrete steps to develop the regional hydrogen economy, in relation to infrastructure, hydrogen production, legislation and regulations and financing.

Looking back

- A subsidy of 250,000 euros has been awarded to Synkero, a start-up that wants to produce synthetic kerosene from hydrogen and CO_2.
- A regional partnership on accelerating the hydrogen transition (Waterstof versnellingstafel NZKG/MRA) has been launched between industry, governments and expert institutes. The following organisations are involved: the Port of Amsterdam, Projectbureau NZKG, the Province of Noord-Holland, Tata Steel, Nobian (HyCC), Vattenfall, Gasunie, Alliander, the Municipality of Amsterdam, Schiphol, the Municipality of Zaanstad and ORAM. Among other things, a joint proposition has been developed on the region's aim to become an international Hydrogen Valley.
- Official launch of the Hydrogen Hub Amsterdam NZKG by Alderman Everhardt at the World Hydrogen Congress in Amsterdam (thanks to sponsorship from the Municipality of Amsterdam).
- In November 2021, the report on regional hydrogen opportunities (Waterstofversnelling – Mogelijkheden in het NZKG) was published by consultant Roland Berger. The report and a lobbying letter were presented to the Ministry of Economic Affairs and Climate Policy and politicians Remkes and Koolmees, on behalf of the regional partnership.
- The Regional Integrated Backbone NZKG is one of the first projects to be included (as part of the national hydrogen infrastructure) in the multiannual infrastructure, energy and climate programme (MIEK).
- In Q4 2021, the MRA/NZKG hydrogen proposition and the H2Gate report on hydrogen imports were presented to the head of the Cabinet of the European Commission, Diederik Samsom.

Amsterdam can become an international Hydrogen Hub.

Pillar 14

Looking ahead

- The regional partnership will develop the recommendations in Roland Berger's report. The Municipality of Amsterdam will focus specifically on recommendations relating to public authorities.
- Strengthening the partnership, commitment and details of the following steps for the development of a regional hydrogen economy, including infrastructure, hydrogen production, legislation and regulations, financing, research, innovation and training.
- Research opportunities to boost the region's hydrogen production to the set maximum capacity of 1 Gw by 2030.
- Regional partnership to lobby the new Dutch Cabinet and the European Commission to communicate hydrogen-related developments and the necessary resources.

Points for attention

- Tata Steel can serve as a flywheel and ensure that the key preconditions for the future hydrogen economy are created more quickly.
- Vulnerabilities have been identified that require further investigation, such as incorporation and technical and economic feasibility.

Pillar 15

Carbon capture, storage and utilisation

What and how

CCUS stands for Carbon Capture, Utilisation and Storage, or CO_2 capture, storage (CCS) and reuse (CCU). More and more parties, including central government and the municipality, agree that CCS is needed to meet our CO_2 reduction targets. Carbon capture is a cost-efficient way to achieve considerable carbon reductions in a short period, and a building block for the 'harbour as a battery for the city, region and Europe.' The municipality supports carbon capture for production processes for which there are currently no alternative fossil-free production methods. In the future, the captured CO_2 may be used for the production of synthetic kerosene, for example, which is essential for greening aviation.

Looking back

In the Amsterdam Climate Neutral Roadmap 2050, the target was set to support the ambition of the Amsterdam AEB waste-to-energy plant to reduce 530 kt of CO_2. This is equivalent to 11% of Amsterdam's total CO_2 reduction target for 2050. We worked intensively with AEB to submit an SDE++ subsidy application for CO_2 capture. The administrative side of the process was covered so that AEB could apply for a state subsidy to capture 440 kt of CO_2. The application was eventually rejected. By submitting this subsidy application, AEB has shown the government that it is ready to take the next step in the area of carbon capture and storage.

Looking ahead

- The Municipality of Amsterdam will again play a role in preparing CO_2 capture at AEB by applying for subsidies, making agreements with chain partners and realising the necessary infrastructure. In doing so, the municipality will lobby the government to increase the likelihood of AEB being awarded a subsidy.
- The use of Carbon Dioxide Removal (CDR, or negative CO_2 emissions) is key to achieving the European climate targets. That is why we are joining forces with other organisations and cities to promote CDR, introduce it to a wider audience, and get it on the political agenda. The potential for negative emissions in the harbour of Amsterdam is also being investigated.

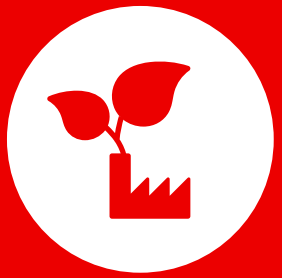
Points for attention

Lobby for carbon storage (including CO_2 of biogenic origin) at waste incinerators, such as AEB. Without state support for this, it will be virtually impossible to achieve the city's CO_2 reduction targets.

In 2021, AEB submitted a subsidy application for the realisation of 440 kt of carbon storage per year in 2027.

Pillar 16

Saving energy in industry



In 2021, steps were taken to facilitate the operation of a steam network in the harbour within several years.

What and how

Industry uses natural gas, electricity and heat. This produces CO_2 emissions, which need to be cut in order to achieve the climate targets. Amsterdam has a relatively small industrial sector. Most industry is located in the harbour. In addition to the European emissions trading scheme (ETS), there will be a national carbon tax for industrial companies from 2021. As a local authority, we have a limited range of instruments to steer the reduction of energy use and CO_2 emissions in industry. Although central government is the key actor, our tools include discussions, cooperation and, in some cases, enforcement.

Looking back

- Together with the Regional Agency for the Environment, our discussions with the largest industrial emitters have continued. These roundtable discussions with companies explore issues such as the realisation of the supply of steam from AEB to various industrial customers.
- In collaboration with stakeholders, an industrial energy scan was carried out at Cargill Multiseed to map energy consumption and make recommendations for reducing CO_2 emissions.

Looking ahead

- Together with the Port of Amsterdam and the largest energy-intensive industries, we will develop a roadmap for energy-intensive industry in the harbour of Amsterdam (REHA). This builds on the Cluster Energy Strategy (CES), which provides insight into each company's transition path.
- Cargill's exploration of ways to achieve negative CO_2 emissions will be supported.
- In 2022, we expect investment decisions to be taken for the realisation of the steam network in the harbour. Companies will be able to buy steam from AEB, to replace natural gas.

Points for attention

Availability of the sustainable energy and infrastructure (H2, steam, electricity) needed to reduce industrial carbon emissions.

Joop Suurmeijer

Project developer, first bio-LNG plant in the Netherlands

"Renewi has been collecting organic waste and residual waste for more than ten years. It's collected from supermarkets and restaurants in Amsterdam. We ensure that it's sorted properly and processed efficiently. With the aid of our fermenter in the Western Harbour Area, where the material is biodegraded by billions of bacteria, it is converted into energy, clean water, and fertiliser for arable farming.

In order to bring a new product to the market and end our dependence on state subsidies, Renewi has started to look further. Biogas from the fermenter can be separated into pure methane and CO_2 molecules. By using a new technology to liquify the methane molecules, the volume becomes 600 times smaller than in gas form, and you concentrate the energy it contains. That's how you make bio-LNG (bio-Liquified Natural Gas), a liquid, clean and sustainable fuel for heavy vehicles such as trucks and ships.

The technology to do this on a 'small scale' hadn't been developed anywhere, so we worked in partnership to make this possible. We contacted the founder of Nordsol, which had the technology, and we were able to build the plant together. And then there's Shell, which has filling stations for this fuel. The three of us joined forces to meet the challenge, and now we're global leaders with this new product. There's currently a lot of market demand for bio-LNG!

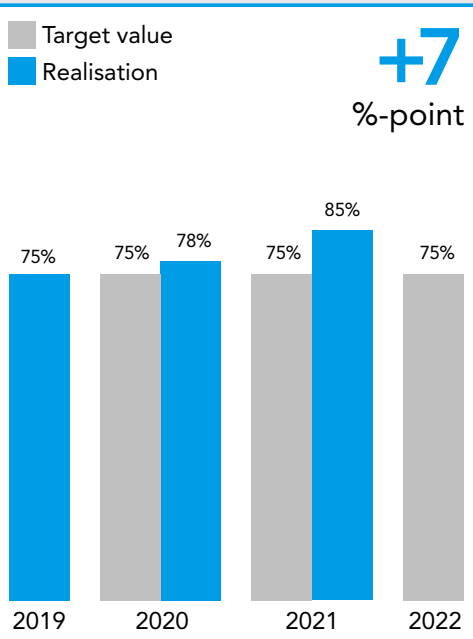
We're very proud of our project and the collaboration. Everything worked. To bring a new, sustainable product to the market that also works well commercially, you need to find the right partners – strong partners who share your vision and are prepared to go for it!"

Preconditions

To achieve a successful transition from fossil fuels to sustainable energy, we must not focus on CO_2 alone. Preconditions such as social support and cooperation, sharing knowledge, space, capacity, regulations and financing are just as important. And, last but not least, striving for a fair transition in which all citizens can participate.

Attitude of Amsterdam's citizens

Percentage of citizens who support the transition to sustainable energy

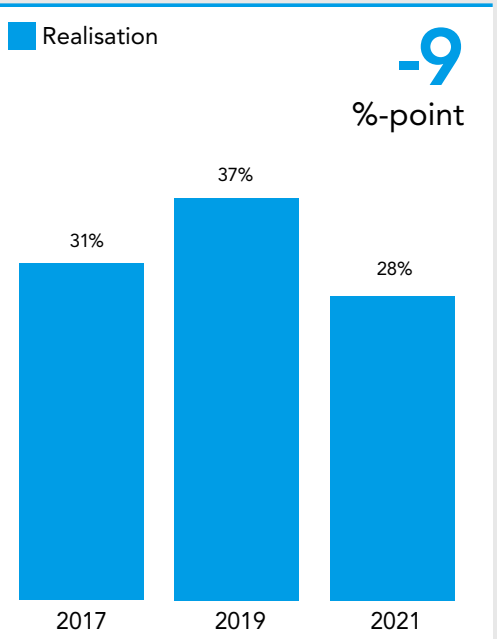


Source: OIS

The share of citizens who are positive about the transition to sustainable energy increased over the past year, and is now 85% (survey in February 2022).

Energy poverty

Percentage of low-income households in Amsterdam that are in energy poverty

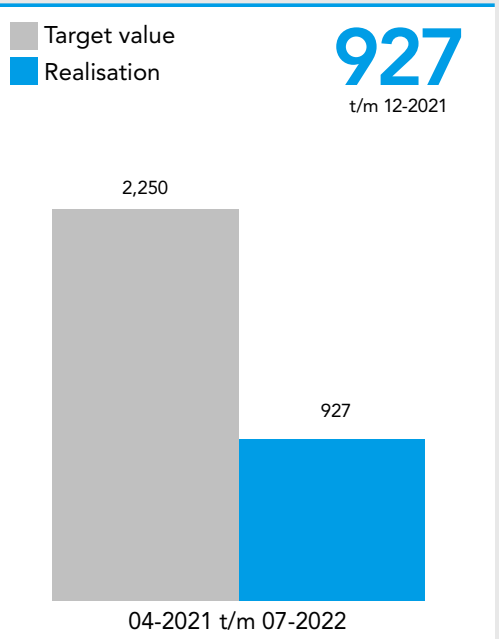


Source: OIS, Enquête Wonen in Amsterdam

The number of low-income households affected by energy poverty fell in 2021 compared to 2019. This was partly because monthly energy costs were lower on average. Energy poverty is expected to rise again in 2022, due to the higher energy prices.

Energy consultations

Total number of energy consultations by energy coaches

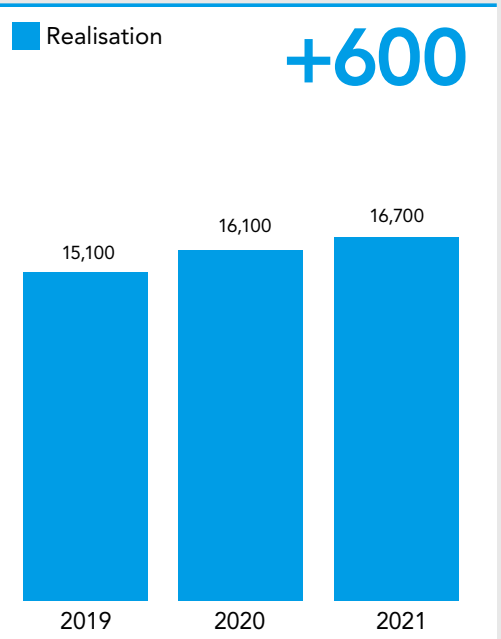


Source: WPI, gemeente Amsterdam

Between April 2021 and 31 July 2022, the aim is to provide 2,250 energy consultations through the !WOON foundation. Between April and December 2021, 927 consultations were carried out. Since September 2021, !WOON energy consultations have been promoted via the Stadspas. Due to the COVID-19 measures in the winter, fewer energy consultations could be held. By April 2022, !WOON had held a total of 1,600 energy consultations.

Jobs

Total number of jobs in Amsterdam in sustainable energy sectors (as of 1 January)

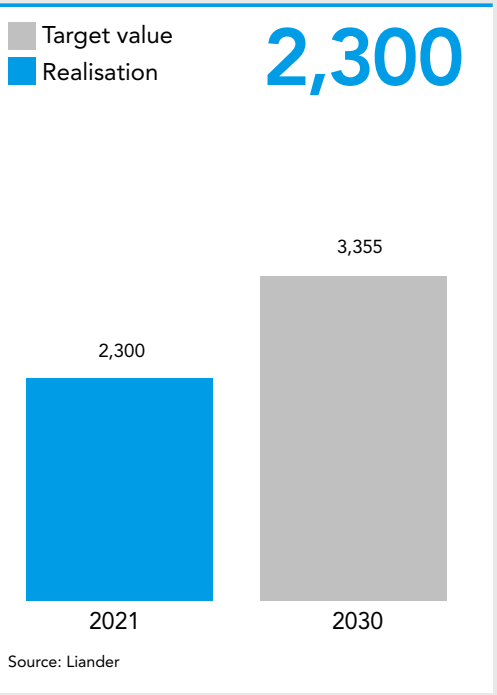


Source: OIS, rapport werkgelegenheid energietransitie juli 2021

The number of jobs in Amsterdam relating to the energy transition rose by 600 in the year starting 1 January 2020.

MV/LV substations

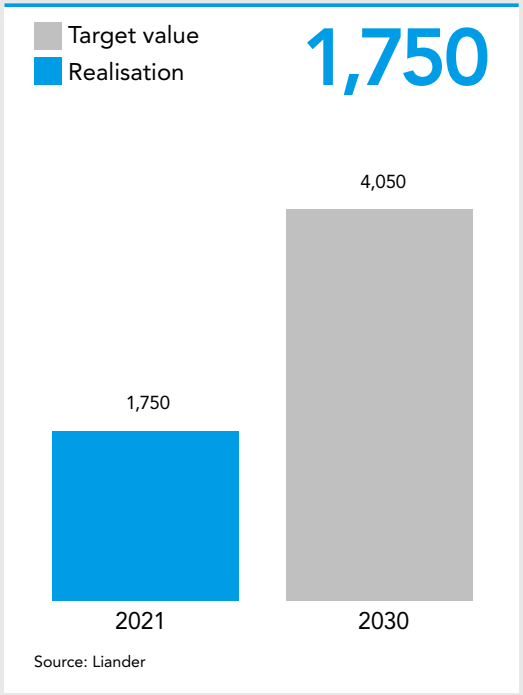
Total number of MV/LV substations in Amsterdam



According to Liander's high scenario, a total of 1,055 extra MV/LV substations are needed in Amsterdam by 2030. Although there are presently enough MV/LV substations to meet the demand for power, the growth in the number of MV/LV substations may eventually be unable to keep pace with the rapid growth of the city.

Electricity grid

Total installed capacity substations Amsterdam (MW)



According to the electricity supply development framework Amsterdam 2035 (Ontwikkelingskader Elektriciteitsvoorziening), 2,300 MW of extra installed capacity is needed by 2030, compared to the current situation (by expanding existing substations and constructing new substations). Maximum capacity has been reached at several substations in Amsterdam. This means that demand for power is growing more rapidly than the expansion in the number of substations.

Pillar 17

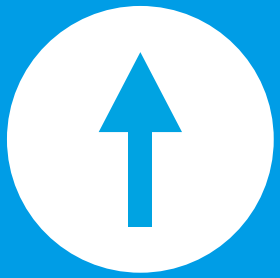
Building the movement in the city

What and how

The citizens who want to contribute to greening Amsterdam are looking for help: in the form of subsidies, advice, and inspiring examples. People also want to get involved in activities in their neighbourhoods. We listen to what they need so that we can offer support in the energy transition, and we keep learning. Based on all our experiences, we draw up new policies, we improve existing measures, and we devise new instruments. We adapt our offering when necessary, and possible, to the target group and area. Through various channels, including our website www.amsterdam.nl/duurzaam, the online New Amsterdam Climate platform, and Duurzaam020 on Facebook and other social media channels, we provide as much knowledge and information as we can to residents and companies that want to get started on the transition.

Looking back

- Through collective purchasing schemes with the regional energy helpdesk, 'Winst uit je woning' and neighbourhood networks, more than 1,000 homeowners installed more than 10,000 solar panels on roofs, together generating c. 3.5 MW of clean energy.
- A mini citizens' assembly, with 100 participants selected by lot, recommended 21 extra proposals for additional CO_2 reduction by 2030.
- Various webinars have been organised for owner-occupier associations on the energy transition, sustainability, rooftop solar panels and charging stations.
- Five youth sessions were held to involve people aged 17-26 in sustainability issues.
- With the support and efforts of sustainability coordinators in the city districts, the regional energy helpdesk, 02025 and the !WOON foundation, many residents were reached with advice and initiatives.
- In Oost, a FIX brigade helped people to carry out small energy-saving measures.
- Vouchers have been distributed as part of the RREW scheme for small energy-saving measures in homes.
- Ten energy breakfast sessions were held by 02025 to connect frontrunners in the city districts.
- The 'space for sustainable initiative' (Subsidieregeling Ruimte voor duurzaam initiatief) is being used for area-based initiatives.
- A special multicultural cookbook on gas-free cooking was produced with residents and professionals from the H-buurt.
- Citizens who want to take sustainable measures at home are supported with a direct phone number for questions and practical assistance from partner organisations such as De Groene Grachten, !WOON and the regional energy helpdesk.
- Eight residents' initiatives received exclusive support from gas-free coordinators from the Municipality of Amsterdam, including MeerEnergie, Ketelhuis-WG, the Universiteitskwartier, Groen Gaasperdam and Collectief Duurzame Plantage Amsterdam.
- Platform 02025 supported start-up residents' initiatives, including Green Falcon in Noord, W.E.N.S. and Oostoever in Nieuw-West, Oostpoort in Oost and Schinkelkade in Zuid.



A mini citizens' assembly, with 100 participants selected by lot, recommended 21 extra proposals for additional CO_2 reduction by 2030.

Pillar 17

Looking ahead

- We will continue to provide financial schemes such as the natural gas-free subsidy, the 'space for sustainable initiative' and the Energy Loans.
- In 2022, at least 35,000 home owners will be approached by collective purchasing schemes for sustainability measures; in 2023-2025, at least 50,000 a year.
- 12,000 households will be approached door-to-door, with residents being provided with direct energy advice and energy-saving products.
- The participation process in the current WAM neighbourhoods will continue.
- An even more intensive participation plan will be rolled out in the WAM neighbourhoods that fall under the Amsterdamse Warmtemotor, for tenants and owner-occupiers.
- We will continue to provide a city-wide 'heat helpdesk' (warm loket) in neighbourhoods where there is much enthusiasm about the energy transition, but no works are envisaged in the next ten years, according to the Transitievisie Warmte.
- We will continue the e-tool postcode finder, which shows residents when their homes will be disconnected from natural gas.
- Development of an e-tool that gives residents insight into the cost of various alternatives to natural gas at home.
- Launch guidance for various owner-occupier associations to provide more knowledge about and insight into (the affordability of) multi-year green maintenance plans.
- The housing corporations and the !WOON foundation will install 2,000 (number to be determined) energy displays in minimum-wage households, to give insight into energy consumption and energy costs.
- Continuation of the partnership with the regional energy helpdesk, !WOON and 02025 to involve residents in the energy transition and provide advice.
- Further development of the mini citizens' assembly's proposals on involving residents in climate issues.
- Follow up on the 'Kinderdonut' motion: involve children more in sustainability.
- Launch a city-wide campaign about the energy transition in the city, the neighbourhoods and at home, and how we can best tackle it together.
- Further integration of New Amsterdam Climate, Duurzaam020 and amsterdam.nl, with information and inspiration about sustainability.
- Further development of local facilities and activities to inform residents about sustainability, such as climate hubs.

Points for attention

- Participation can be achieved in many different ways, and effective participation always takes a lot of time and effort. The available capacity can limit participation.
- Only a small percentage of citizens understand that they have to take part in the energy transition and take action. The largest group – the silent majority – always waits to see which way politics and society are moving. More than 75% of Dutch people see the government as the 'implementer' of the energy transition. We need to accelerate awareness among citizens that this needs to be tackled collectively. Effective communication and participation can help with this.
- In the future, live, digital and hybrid events will be held. This will build on the experience gained during the COVID-19 pandemic.

Pillar 18

Working towards a fair energy transition

What and how

Greenhouse gas emissions are causing a decline in the quality of life around the world. People in the poorest countries contribute the least to global warming, but they are hit hardest. Amsterdam also has vulnerable citizens who benefit less from the opportunities created by the energy transition. By focusing on the vulnerable, we can reduce the differences between communities and ensure that everyone has equal opportunities. Due to the complexity of the interaction between people, their surroundings and policy, we need fair and integrated approaches so that solutions in the energy transition ultimately contribute to a fair and healthy living environment.

Our policy is built on the principle of climate justice and follows three tracks:

- Fair distribution of the costs and benefits: countering energy poverty.
- Open access to the decision-making process.
- Fair opportunities in a changing labour market; focus on employment.

Looking back

- The current 'energy coach' approach has been intensified. We are focusing on districts with high levels of energy poverty, and relieving households by directly installing energy-saving measures where possible. In 2021, !WOON held 927 energy consultations. The neighbourhood teams also provide energy advice. In 2021, they provided at least 63 consultations. The neighbourhood teams are still in development, and may grow even further. Online webinars on how to save energy are also being held.
- !WOON provides support to tenants who want to propose energy-saving measures to their landlords.
- New framework agreements have been made between corporations, tenants and the municipality about (everyone's role in) renovation and sustainability.
- When the municipality became a shareholder in Westpoort Warmte in March 2021, it agreed with co-shareholder Vattenfall that the Westpoort Warmte tariffs would be among the lowest 25% in the country.
- The 'sustainable city, sustainable jobs' (Duurzame Stad, Duurzame Banen) programme links investment in sustainability measures to the realisation of jobs for job-seekers. Networks of internal and external partners in education and the labour market have been expanded and career paths have been developed.
- Sustainability is a focus of the intermediate vocational education (MBO) agenda. We are highlighting the importance of this theme and calling on MBO institutions to cooperate on project plans in this area.

Training pathways have been developed for job-seekers, career entrants and people seeking to retrain.

Pillar 18

Looking ahead

- In 2022, Amsterdam will receive 8 million euros of state funding to combat energy poverty by taking energy-saving measures.
- We will continue to actively develop career paths, training and retraining focused on technology and the workforce for the energy transition.
- Project for circular employment through the re-use of solar panels in Amsterdam Zuidoost.
- Development of the Social Energy Project.

Points for attention

- The shortage of personnel to meet the sustainability challenge.
- There are still relatively few secondary-school pupils and MBO students opting for technical training.
- Space is needed to innovate in financing and organisation and to develop the public-private partnerships needed to meet the climate challenge.
- Participation in times of COVID-19 led to larger numbers attending online meetings, but it remains difficult to reach vulnerable and less digitally savvy residents.

Pillar 19

Boosting knowledge development and sustainable innovation

What and how

Together with residents, companies and knowledge institutions, we will get working to boost and accelerate innovations to meet our sustainability targets. This is all about innovation in the broadest sense of the word: technologically, socially and economically. We attach great value to international cooperation and knowledge exchange. We participate in European and global networks and carry out projects with other cities. Together we are learning what works and what doesn't, which helps us to accelerate the transition. We need to develop more plans and solutions to achieve the necessary reduction. Partnerships and innovation play an essential role in this.

Looking back

- New subsidy scheme (SESA-HIP) to boost innovation projects in sustainable growth sectors (circular economy, energy transition, mobility, health). Five subsidies awarded as of January 2022, with a total value of 1,459,384 euros.
- Innovation opportunities identified for reducing peak load in the power grid. This has resulted in project proposals. A start has already been made on several of these, such as smart-charging for electric cars.
- Exploration carried out for an agenda and approach for innovation in the heat transition.
- The LEAP coalition of 40 parties for sustainable digitisation has worked on a white paper, infographic and five projects focused on reducing energy and material use throughout the digital chain.
- Three years of participation in the EIT Climate KIC programme Green Light District were successfully concluded in late 2021.
- Construction activities for sustainable innovation projects have started within the EU ATELIER project. Innovation Ateliers have also been developed.

Looking ahead

- Integral innovation agenda on sustainability (energy, circular, green and health) to focus and use our innovative power more effectively.
- A new competition-based approach – 'Innovatielab' – with the aim of helping young entrepreneurs to develop solutions to meet our climate goals. In 2022, 150,000 euros for this project will be made available to 2-6 entrepreneurs.
- Within the Startup in Residence 'Sustainability & Circularity' programme, we work with startups on seven specific municipal challenges.
- The pilot on quay wall heat extraction and the Living Lab 'Quay wall as energy factory' will investigate a new heat supply for the city centre.
- Implement the recommendations on innovation in the 'Heat for the city' and 'Electricity supply Amsterdam' programmes.
- Relaunch the Green Light District, independently of the EIT Climate KIC. The Municipality of Amsterdam will continue to be involved.
- The municipality has submitted a European application for the New European Bauhaus. This subsidy aims to bring the Green Deal closer to citizens, with a focus on sustainability, aesthetics and inclusion.
- There will be increasing cooperation with development regions through the EU ATELIER project.

Continuing to support the Green Light District projects is key to securing the network and the expertise gained.

Pillar 19

Points for attention

- Make the most of innovative power in the region to achieve our sustainability goals. It is important to have a long-term integral knowledge and innovation agenda, including multi-year mission-driven innovation programmes.
- Innovation requires creativity and open-mindedness throughout the municipal organisation, with the time and space to take risks and experiment.

Pillar 20

Space for the energy transition and infrastructure

The Spatial Vision for Amsterdam 2050 was adopted in 2021.

What and how

An energy structure is needed to generate, transport and deliver electricity, heat, (green) gas, CO_2 and hydrogen. This includes underground pipes and above-ground installations. Making changes to the energy infrastructure is a major task, one that requires a lot of space – yet there is little space above and below ground in a compact and growing city. We are searching for smart combinations and opportunities that are both efficient and appropriate, and this means we will have to make choices.

While we work on new visions and implementation strategies for spatial adjustment, we have simultaneously launched projects on phasing out natural gas, solar panels, wind turbines and reinforcing the electricity infrastructure.

We play a major role in spatial planning, the design and operation of public space, and the management of underground space.

Looking back

- The Spatial Vision for Amsterdam 2050 has been adopted, focusing on the spatial integration of the energy transition, the necessary adaptation and expansion of the energy infrastructure, and the generation of renewable energy.
- RES 1.0 sets out opportunities for the generation of sustainable energy in the city and region in Noord-Holland Zuid.
- The RIB (Regional Integrated Backbone) for the North Sea Canal Area is the first MIEK infrastructure project to be included in the national hydrogen infrastructure.
- The electricity supply development framework 2035 shows where electricity infrastructure needs to be installed in the city.

Looking ahead

- Draw up environmental programme for sustainable energy (Omgevingsprogramma Duurzame Energie). Translate ambitions in Spatial Plan into plannable measures and agreements.
- Award contract for the heat structure plan (Warmtestructuurplan). Scenario modelling total heat infrastructure Amsterdam and strategic implementation agenda.
- Develop strategic medium-voltage structure with Liander.
- Update the Cluster Energy Strategy 1.0. Clarify electricity demand and supply (including offshore wind) and the production, distribution and import of hydrogen.
- Research municipal management of the use of large company roofs for solar energy.
- Set aside space for geothermal energy, exploration permit and look ahead.

Points for attention

- The Environment and Planning Act has been postponed.
- Better insight into and management of the underground infrastructure.
- The pressure on underground and public space requires decisions and prioritisation in relation to the spatial demands of the energy transition.
- This requires looking ahead (to 2050) and greater specificity (to plan at the city and area level).

Weesp

The energy transition in Weesp

What and how

Weesp is aiming to become climate-neutral in the foreseeable future. Weesp has CO_2 emissions of c. 100 kt per year, a relatively high share of which come from industry. On 24 March 2022, the Municipality of Weesp merged with the Municipality of Amsterdam. Amsterdam's policy will also apply to the Weesp urban area from that date.

Looking back

Duurzame energieopwekking:

- The Regional Energy Strategy (RES) was adopted in 2021.
- Under the leadership of the Participation Coalition (consisting of various civil society organisations, including the Natuur en Milieufederaties and Energie van Noord-Holland) and in collaboration with the Weesp Duurzaam residents' association, ten possible locations were investigated for potential solar projects, some in combination with nature development and strengthening biodiversity.
- The solar map for Weesp was drawn up in 2021. This shows roof areas in conservation areas in Weesp that could potentially be used for solar panels.
- In the project WeesperZon2021, by the energy cooperative Weesp Eco Energie, three postcoderoos projects have been combined into one project. This involves three roofs where Weesp residents, as members of the cooperative, will jointly realise solar systems.
- As part of the RES, municipalities from the Gooi en Vechtstreek region are working on a two-year Zonwinst project to stimulate and accelerate solar panels on the roofs of (larger) commercial buildings.
- The search areas for wind energy were removed by the then municipal assembly in early 2021. There are no search areas in Weesp at present.

Energiebewustwording en -besparing:

- The energy cooperative Weesp Eco Energie (WEE), founded in 2019 with municipal support, made an important contribution to the energy transition in 2021. Results for 2021:
  - Six energy coaches trained.
  - 209 energy coach sessions held, 111 of which with tenants.
  - 32 citizens applied for the collective solar panel purchasing scheme, and 16 for the collective insulation purchasing scheme.
  - 43 heat scans were carried out.
- In October, the municipality launched a voucher campaign for energy-saving products worth 70 euros. 1,250 vouchers have been made available to minimum-wage earners.
- The community worker on the energy transition/sustainability has carried out 81 house-to-house discussions with residents and organised various neighbourhood meetings. The discussions and meetings aim to inform tenants, support them in the energy transition, and help them get organised.

A relatively high share of Weesp's CO_2 emissions come from industry.

- The energy transition awareness campaign was launched in October 2021, to strengthen and broaden awareness of the (necessity of the) energy transition. The aim is to encourage Weesp's citizens to take energy-saving and energy-generating measures. The campaign will run until the merger date.
- The Stimulerend Toezicht project provides clear information about the obligation to save energy and helps businesses to meet this obligation. Eighteen companies have applied and will receive support over the coming three years.
- The Sustainable Energy Projects Weesp subsidy scheme, which focuses on greening civil society organisations and launching collective energy projects, ran until the merger date.

The heat transition:

- On 16 December 2021, Weesp's municipal assembly adopted the vision document on the heating transition (Transitievisie Warmte).

Looking ahead

- The WAM process will be launched in the area where a starting opportunity for a heat distribution grid has been identified in the Transitievisie Warmte. The WAM process will further investigate the feasibility of a heat distribution grid in this neighbourhood.
- Extra sustainability measures for house-building corporations' social housing stock.
- Financing will be made available in 2022 to establish the FIX Brigade in Weesp. Fixers from the FIX Brigade make home visits to people on low incomes to provide information about saving energy and carry out small energy-saving measures, such as installing draught strips and radiator foil.

In addition, the following projects ongoing in 2021 will be followed up in 2022:

- The Zonwinst project will be coordinated from the Gooi en Vechtstreek region until 31 December 2022.
- Voucher campaign on energy-saving products (until merger date).
- Stimulerend Toezicht (this project will be taken over by NZKG environmental services).
- Weesp Eco Energie's implementation projects (including energy coaches, collective purchasing actions, collective solar power project).
- Community worker energy transition/ sustainability.

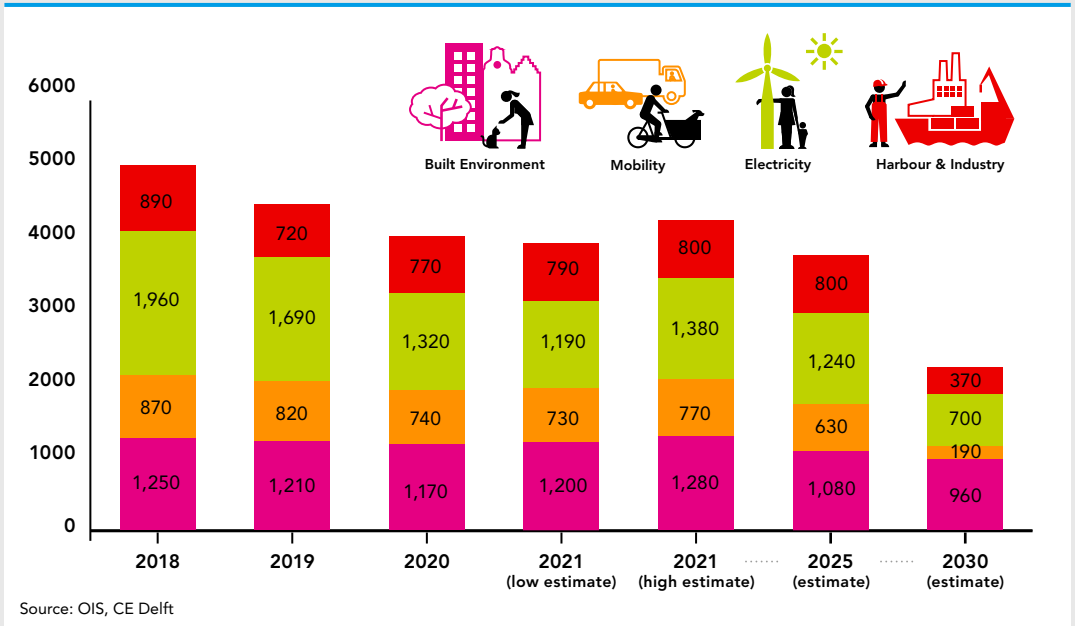
Points for attention

- Integration of Weesp's projects into Amsterdam's official system.
- Clear communication to Weesp's citizens about sustainability opportunities after the merger date, both about ongoing projects that are exclusively for Weesp and projects that will also apply to Weesp after the merger.

Appendices

CO_2 emissions in Amsterdam by transition path

in kt CO_2 equivalents

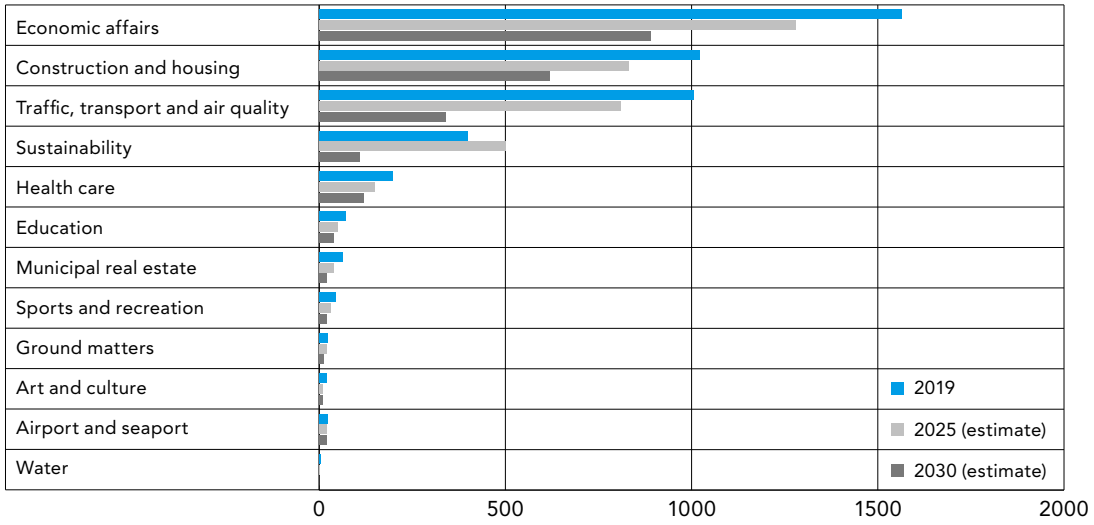


Source: OIS, CE Delft

It is expected that until 2030, the largest relative fall in CO_2 emissions will take place in the Harbour and Industry and Mobility transition paths. The largest absolute fall will occur in the Electricity transition path.

CO_2 emissions in Amsterdam, by portfolio

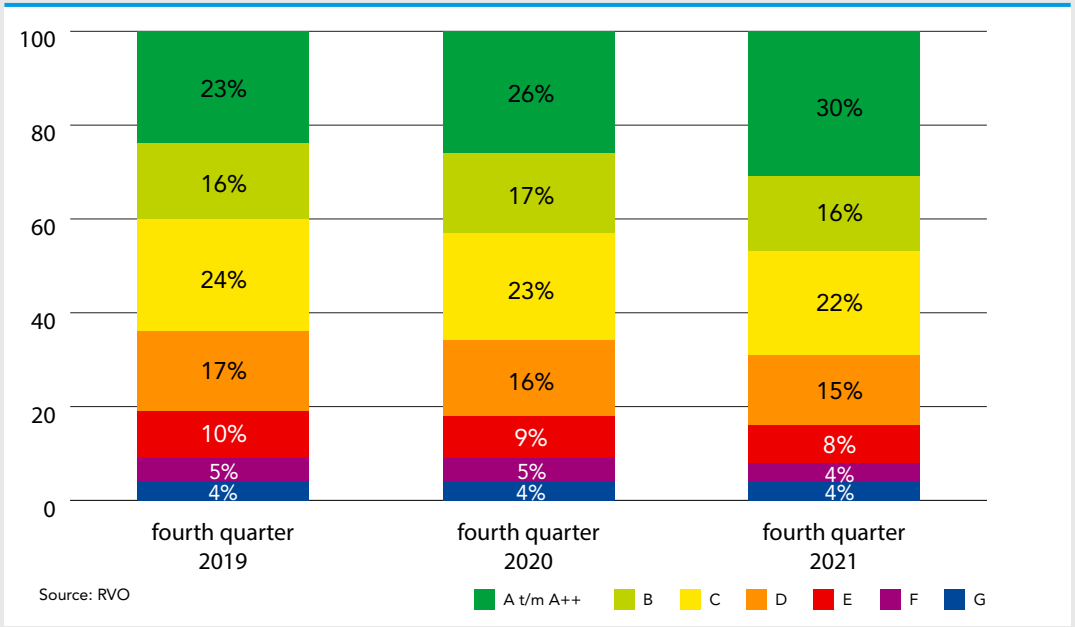
in kt CO_2 equivalents



Source: OIS, CE Delft

Most CO_2 emissions take place in the Economic affairs, Construction and housing, Traffic, transport and air quality, and Sustainability portfolios.

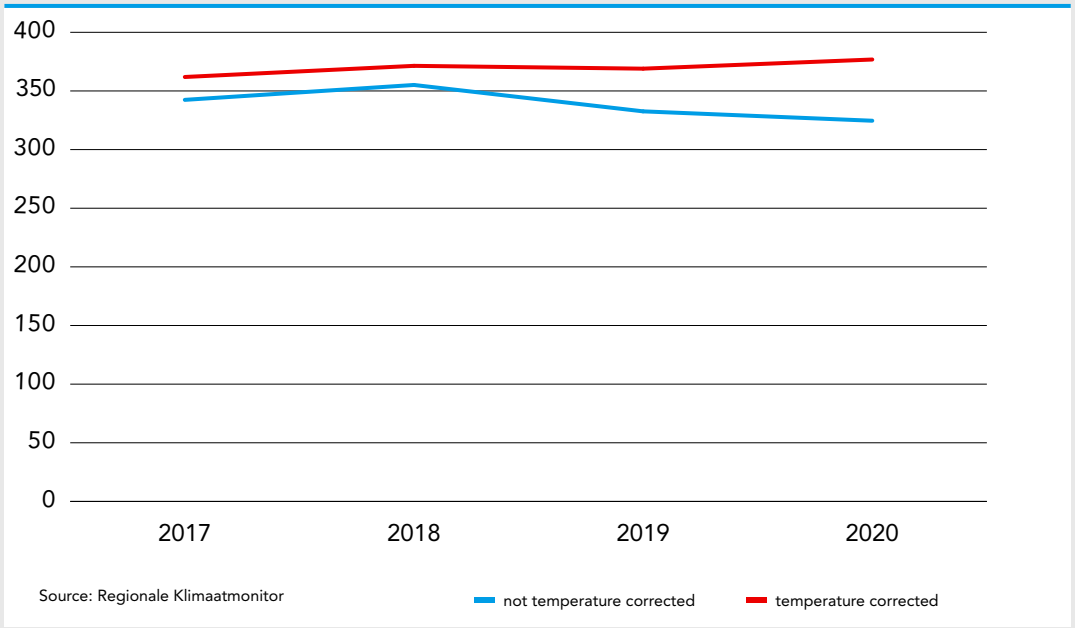
Distribution of energy labels in Amsterdam's homes



At the end of 2021, c. two-thirds (68%) of homes in Amsterdam had a registered energy label of 'C' or higher. Two years previously, this share was 63%.

Total natural gas consumption of Amsterdam's homes

in million m^3



The total annual natural gas consumption of homes in Amsterdam in 2020 was c. 5% lower than in 2017. The CBS corrects consumption for temperature changes. In principle, less natural gas is consumed in warmer years. If this is taken into account, natural gas consumption increased by 4% between 2017 and 2020.

Colophon

Climate Report 2022

Council commissioner
Alderperson Mrs M. van Doorninck
(Sustainability)

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