

Amsterdam: a different energy

2040 Energy Strategy



City of Amsterdam

Foreword

Amsterdam plans to become the beating heart of a sustainable metropolis by 2040. A creative and varied city, economically and socially strong, with a healthy living environment. Treating space, energy and power sources with care and efficiency, and equipped for the effects of climate change. In short, sustainable in every way.





Only a city that undertakes serious urban regeneration and works towards a healthy future, with clean power, clean air and clean water, will remain attractive for people to live and work in. National and international companies will be happy to set up business in such a city. An active energy policy will also help to keep the cost of living affordable. A good energy and climate policy is therefore a sensible economic and social policy.

Amsterdam has a healthy tradition of pursuing a progressive energy and climate policy. Being a leader in transitions that affect the basic facilities and infrastructure of the city, such as energy and communication, creates extra jobs, economic growth and an open playing field for innovation, thereby helping to move the city into the future. Amsterdam has secured its leading position through cooperation with partners to achieve high ambitions, for example through some major iconic projects.

The energy supply is at the start of a major transition that will involve a mix of large and small partners as well as a great deal of sustainable energy production by the people of Amsterdam themselves. This transition will also provide Amsterdam with some unique opportunities. New developments in energy efficiency, sustainable energy production, storage systems and electric cars will shape the future. However, engineering will not be sole determining factor. It will also require new forms of cooperation and commercial products.

With the Amsterdam Climate Programme, Amsterdam has been working hard for some years to become an outstandingly clean and habitable city. These activities will have to increase substantially in the coming decades to guarantee a sustainable future for Amsterdam. This transition to a sustainable energy supply requires powerful decisions, time and patience, and above all perseverance. Actions are necessary on all fronts: energy savings, the use of sustainable energy and the efficient use of fossil energy. In this 2040 Energy Strategy, we will examine the details of this challenge and outline the pathways.

No time to lose

The world is facing a huge challenge. The climate is changing and supplies of fossil fuels, such as oil, gas and coal, are running out. To an increasing extent, oil and gas are coming from politically unstable regions. And all this is taking place while there is an explosive increase in demand for cheap fuels, in particular from the developing countries and rapidly growing economies such as India and China. The demand for energy in the US and Europe is also continuing to grow. This is compounded by the fact that Europe and the US, as well as India and China, are becoming increasingly dependant on imported fuels such as oil and gas. This scarce market will lead to increasing prices.





Immediate action

In the coming years, EU dependence on imported fossil fuels will continue to increase. The Netherlands will be able to experience this for themselves when, from approximately 2025, we become net importers of natural gas instead of exporters. Simultaneously, we will be confronted with the damaging effects of fossil fuels on the environment as a result of increasing emissions of greenhouse gasses such as CO₂. The continuing ability to provide affordable, reliable and sustainable energy for a clean and habitable city requires immediate action.

Amsterdam takes the lead

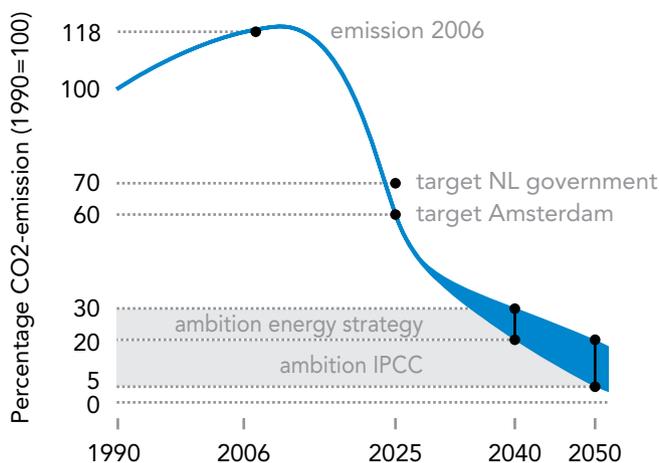
Amsterdam accepts this responsibility and has specified the following practical climate ambitions:

- A climate-neutral municipal organisation in 2015
- 40% reduction in CO₂ emissions in 2025, compared to 1990

In line with recommendations by the Intergovernmental Panel on Climate Change (IPCC), which is based on a reduction in greenhouse gasses of 80-90% by 2050 for developed countries, Amsterdam must strive to achieve a 75% reduction in CO₂ by 2040. Naturally, to ultimately become independent of fossil fuels Amsterdam will have to continue working on the Amsterdam Climate Programme after 2040.

Amsterdam is working on the Amsterdam Climate Programme in accordance with the principle of Trias Energetica, an approach that results in an optimum reduction of CO₂. Three pathways will be pursued simultaneously to create a sustainable future:

1. Energy savings
2. Maximum use of sustainable energy
3. Increase the sustainability and efficient use of fossil energy.



The image shows two modern, colorful chairs (one yellow and one orange) with solar panels mounted on their backrests. The chairs are placed on a green lawn. The solar panels are framed in red and have a grid pattern. The background is a dark, out-of-focus green area, possibly trees or a hedge.

The transition pathways

If Amsterdam is to become a clean and habitable city, work will have to be carried out over a long period to achieve the transition to a sustainable energy supply. This transition can only succeed if all the partners in Amsterdam – the citizens, companies and organisations – work together. The council will take the lead in establishing this cooperation. To this end, a large number of companies, organisations and private initiatives have been approached since mid 2007. Joint efforts are being made to achieve a sustainable future via the following important transition paths.



1. Buildings

- Far-reaching energy efficiency (minimum of Energy Certificate B) through insulation, district heating, heat and cold storage and the use of solar energy
- Climate-neutral new-build development
- Generate awareness and behaviour changes among the general public and companies

2. Clean transport

- Limited traffic, paid parking, encourage cycling, green public transport and clean conventional vehicles
- Large-scale conversion to electric cars and increasing sustainability of the electricity chain
- Different method of paying for mobility (government policy)
- Hydrogen for heavy transport outside the city (evaluation of hydrogen roadmap in 2015)

3. Port and Industry

- Transform port to sustainable 'energy port'
- Make optimum use of sun and wind (install more wind turbines and replace old turbines with large, new ones)
- Sustainable business activities (recycling systems, biofuels, transshipment wind turbines)
- Increase the energy efficiency of industry and make the ICT sector greener

4. Sustainable energy

- Increase the speed of introduction of wind power, in particular in the port and Amsterdam-Noord
- Installation of solar panels
- Optimise the use of sustainable energy through smart grids
- Application and combination of heat and cold storage and green district heating

1. Buildings

As much as 70% of the energy consumed in Amsterdam is used by buildings for heating and electricity. Making savings here and increasing its sustainability will be an especially large challenge for Amsterdam. Activities along all three pathways of the Trias Energetica will be necessary to achieve the appropriate reduction.



Current status

Making buildings more sustainable is already an important focus in the activities of the city as part of the Amsterdam Climate Programme. Plans are being made with housing corporations to make 50% of all rental accommodation more energy efficient and sustainable. The local authority is setting the example for offices, business premises and schools. A city-wide improvement programme has been set up for all existing schools. An energy helpdesk has been set up to help SME realise energy savings.

Follow-up plans

Up to 2015

In the period leading up to 2015, all municipal buildings, both existing buildings and new-build, will be made climate neutral. The existing schools in Amsterdam will be considerably improved in respect of energy and interior climate. Pilot projects will be set up related to building new climate-neutral, houses, schools and offices. Considerable energy savings have been realised by the business community in cooperation with MKB-Amsterdam (Amsterdam SME), Kamer van Koophandel (Chamber of Commerce), ORAM (Amsterdam Region Business

Association) and the city districts. A strong appeal will also be made to the general public and the business community to contribute towards the reduction of their own CO2 emissions.

From 2015 to 2025

Only climate-neutral buildings will be constructed in Amsterdam from 2015. Existing buildings will be made more sustainable by fundamentally improving their energy efficiency through insulation, double glazing and the use of solar energy. The district heating network will be expanded a step at a time, not just for new-build construction but in particular for existing houses. In addition, heat and cold storage will be introduced in an increasing number of locations. Solar energy will become increasingly visible in the city.

From 2025 to 2040

To achieve the ambition of a 75% reduction in CO2 by 2040, the existing buildings must attain a minimum energy efficiency of certificate B. Additional innovative measures will be necessary to achieve this. Smart networks and control engineering will ensure the optimum use of energy. The use of solar energy will have become particularly beneficial for both houses and businesses. In addition, approximately 200,000 houses will be supplied with heat from the district heating network.

Smart construction of IJburg

In 2025, in the new district of IJburg, four new islands will have been constructed with over 9000 sustainable houses. These houses will be constructed using sustainable materials and supplied with electricity from their own solar panels. A smart electricity network will ensure optimum use is made of the solar power generated on the islands. The houses will be heated using district heating that will be made greener through the use of solar heat and geothermal energy.

Solar panels will also be installed in public areas to generate additional sustainable energy. Windmills will be placed around the islands' edges. Ultimately, the new islands will be net energy producers.





100% elect

2. Clean transport

Despite pursuing a traffic-limiting policy, paid parking, encouraging the use of bicycles, public transport and clean conventional vehicles, the traffic and transport sector is still responsible for a considerable part of the CO₂ emissions in and around Amsterdam. In 2006, this amounted to 20% of the total emissions in the city. Cars, lorries and boats not only generate CO₂ emissions but also produce fine dust particles and nitrogen dioxide emissions. These substances have a negative effect on the quality of the air and therefore on the health of the population of Amsterdam. Consequently Amsterdam is working hard within the Amsterdam Climate Programme to create a better climate with clean air.

Electric drive in the city

Electric transport considerably improves the air quality, it is better for the climate and it stimulates the local economy. Amsterdam will therefore facilitate the conversion to electric transport. It is expected that between 60% and 90% of all the kilometres travelled by car in Amsterdam in 2040 will be powered by green electricity generated by windmills, solar panels and biomass power stations. Only quiet, electric boats will be allowed to travel along the canals. Goods will also be transported electrically, in bulk, by road and water. People that live beside a busy through road will be able to open their windows without being exposed to exhaust gasses. All this will be thanks to electric traffic and transport.

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Current status

A large number of measures have been taken to ensure the people of Amsterdam enjoy cleaner air when they travel through the city: the exclusion of polluting lorries from the city inside the A10 ring (with the exception of Noord); trams and the metro on green electricity; reduced number of trips using vehicles that run on fossil fuels; more frequent travel using public transport, bicycles and electric vehicles, which are quiet, clean and energy efficient. Electric vehicles provide an immediate and important contribution towards improving the air quality and residential environment. There are also plenty of opportunities for local entrepreneurs to become involved in the rapid development of electric transport. Amsterdam is therefore investing heavily in electric.

Follow-up plans

Up to 2015

Amsterdam is investing in clean, quiet and efficient electric transport to help reduce the CO₂ emissions of the traffic and transport sector. Hundreds of charging stations for 10,000 electric cars (including 5000 plug-in hybrids) and scooters will be installed in the city. The local authority will ensure that part of their fleet is powered by electricity. Green public transport will be encouraged. The use of electric bicycles will increase because they can cover larger distances. Polluting cars will be discouraged from parking through differential parking charges. Pilot projects will be set up to investigate the feasibility of using hydrogen for heavy traffic outside of the city (hydrogen roadmap). The hydrogen pathways will be evaluated in 2015.

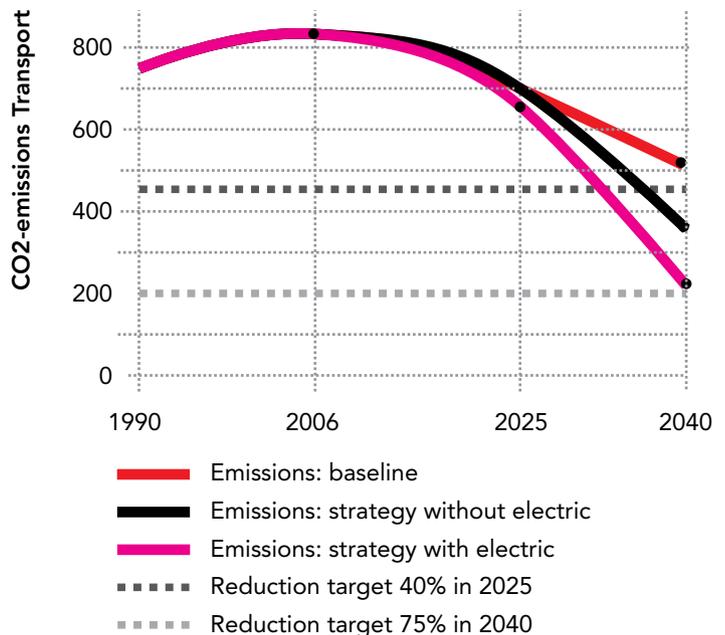
From 2015 to 2025

Electric transport will be further increased to 40,000 electric vehicles, including 10,000 plug-in hybrids. Car sharing will be increased through more Park and Ride locations.

The government will initiate projects within the scope of a 'Different method of paying for mobility'. The local authorities will continue to invest in developing hybrid busses for public transport, optimising the energy efficiency of trams and transporting freight by water. In addition, the EU will tighten up standards for the CO₂ emissions of vehicles.

From 2025 to 2040

There must be 200,000 electric cars (including 100,000 plug-in hybrids) and scooters in the city before 2040. Only electric boats will be allowed to travel along the canals. Innovative concepts on the outskirts of Amsterdam for the distribution of goods to the city will provide additional benefits. International legislation will specify emission standards for all land vehicles and watercraft.



3. Port and Industry

Amsterdam only has a limited amount of process industry. In contrast, energy consumption by data centres has increased significantly, in part because of the large services sector in the city. Approximately 6% of all the CO₂ emissions of Amsterdam is estimated to be caused by data centres. And the number of ICT businesses in the city is increasing annually, as does the worldwide use of the internet and the transmission and storage of data. This is why the local authorities and large companies in Amsterdam are working together in the Amsterdam Climate Programme. The Port of Amsterdam is also working on the Programme to ensure it remains an attractive location for companies.

Sustainable energy port

Over the next 30 years, the Port of Amsterdam, which is currently one of the largest coal and petrol transshipment ports in Europe, will undergo a major transition to a sustainable port.

A great deal is transported to and from the port by water and rail. Ships docked in the port will no longer have to provide their own power supply because of the availability of shore power supplies. This prevents the emission of hazardous substances and reduces noise pollution.

New wind turbines in the port will substantially increase the production of wind energy. The huge roof area in the port will be covered by solar panels, which will generate much of Amsterdam's energy requirements.

The strong position of the port in the energy sector will be further developed to tranship biofuels that do not endanger food production.

Current status

The local authority and the Amsterdam ICT sector have jointly set up the 'Green IT initiative'. In addition to making the ICT sector more efficient, ICT plays an important role in changing our mobility patterns, integrating sustainable energy sources and making houses and offices more efficient. This 'enabling technology' can result in net savings greater than the energy consumption of their own sector. The port authority has committed to the target of -40% CO2 by 2025, and this includes the inland and ocean shipping. A number of large wind turbines have already been installed in the western area of the port. The port area also contains the Waste and Energy Company, which produces both electricity and heat from waste. Forty seven percent of the electricity and power it produces is sustainable.

Follow-up plans

Up to 2015

In cooperation with the ICT sector, existing data centres will be made more energy efficient and new sustainable centres will be designed. The Port of Amsterdam is continuing to work on their transition to a 'Green Energy Port'. In addition to cleaning up the energy transshipment companies in the port (coal and oil), energy use in the port must also be made more sustainable. Old wind turbines in the port will be replaced by larger, more efficient turbines. Shore power supply connections will be provided for inland shipping. Sustainable, innovative companies (recycling systems, biofuels, transshipment wind turbines) will set up business in the port. The local authority also plans to provide more space for the application of wind energy in the port.

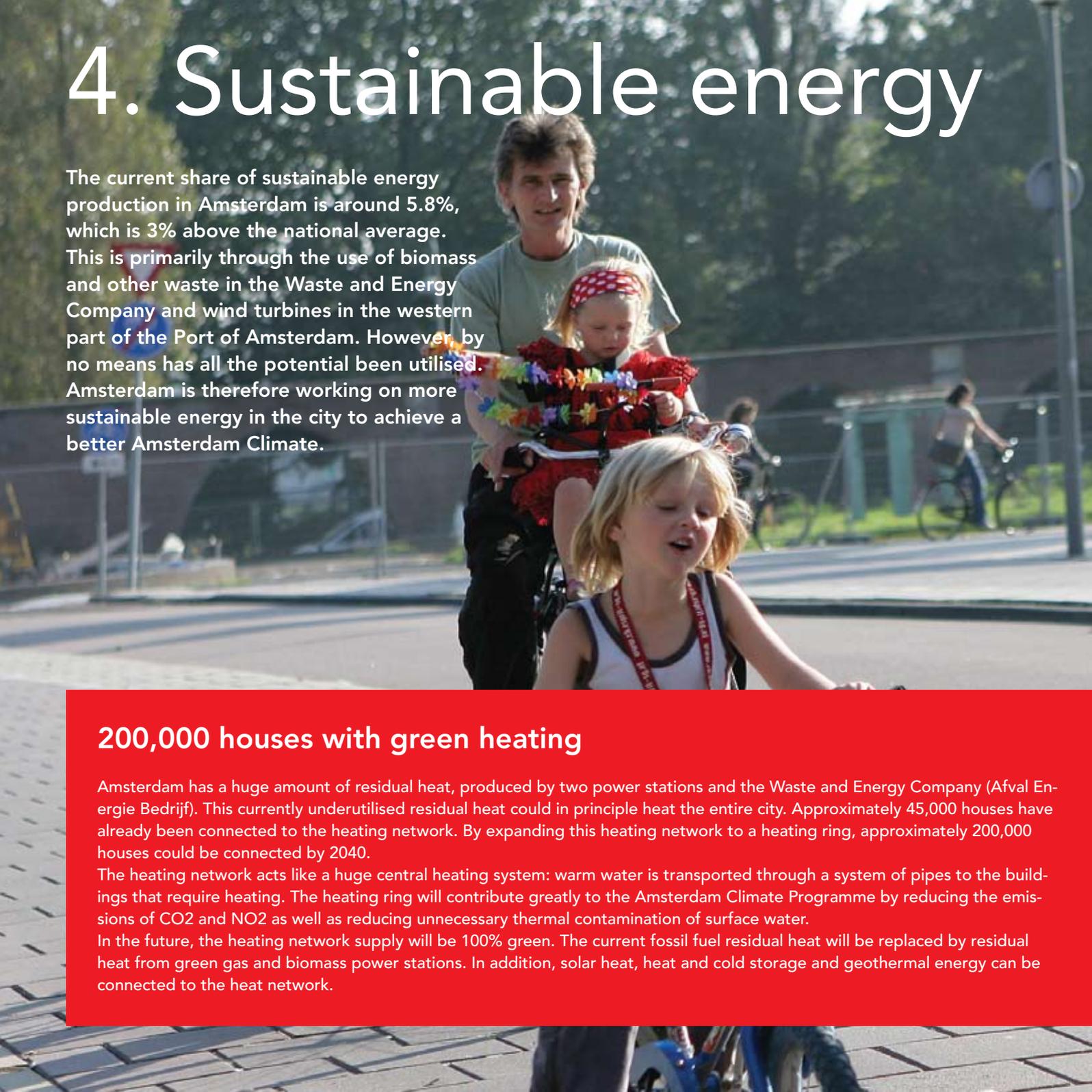
From 2015 to 2025

International legislation and national agreements will increase the energy efficiency of the industry. The use of solar energy will become cost-effective for businesses and be installed increasingly often on large roofs, including in the port. The exchange of high-grade and low-grade heat between companies will be made possible through the installation of a steam and heating network.

From 2025 to 2040

The Port of Amsterdam will be one of the most sustainable ports in Europe. Components for wind turbines will be stored for further transport and biofuels will be transhipped on a large scale. Optimum use will be made of the available space in the port for wind energy and all the roofs will have solar panels. Innovative techniques will ensure the industry's energy efficiency has greatly increased.

4. Sustainable energy

A man is riding a bicycle on a paved path in a park-like setting. He is wearing a light green t-shirt and dark pants. A young girl with blonde hair, wearing a red and white polka-dot headband and a red floral lei, is sitting on the back of the bicycle. Another young girl with blonde hair, wearing a white tank top and a red lanyard, is riding a blue bicycle in the foreground. In the background, there are trees, a fence, and other people on bicycles.

The current share of sustainable energy production in Amsterdam is around 5.8%, which is 3% above the national average. This is primarily through the use of biomass and other waste in the Waste and Energy Company and wind turbines in the western part of the Port of Amsterdam. However, by no means has all the potential been utilised. Amsterdam is therefore working on more sustainable energy in the city to achieve a better Amsterdam Climate.

200,000 houses with green heating

Amsterdam has a huge amount of residual heat, produced by two power stations and the Waste and Energy Company (Afval Energie Bedrijf). This currently underutilised residual heat could in principle heat the entire city. Approximately 45,000 houses have already been connected to the heating network. By expanding this heating network to a heating ring, approximately 200,000 houses could be connected by 2040.

The heating network acts like a huge central heating system: warm water is transported through a system of pipes to the buildings that require heating. The heating ring will contribute greatly to the Amsterdam Climate Programme by reducing the emissions of CO₂ and NO₂ as well as reducing unnecessary thermal contamination of surface water.

In the future, the heating network supply will be 100% green. The current fossil fuel residual heat will be replaced by residual heat from green gas and biomass power stations. In addition, solar heat, heat and cold storage and geothermal energy can be connected to the heat network.



Current status

The district heating network provides heat to approximately 45,000 houses. The Waste and Energy Company and the NUON power station in Diemen are the current primary sources for the collective heating network. It has been decided to expand this network. In situations where district heating and heat and cold storage are not possible, gas will be used to provide heating.

Plans are being developed to expand the number of windmills in Amsterdam. Individual initiatives will also provide a contribution. Many private individuals have joined the 'Sun on your roof' campaign and installed solar panels on their roofs.

Follow-up plans

Up to 2015

Work on installing more windmills is proceeding well. Almost 70% of the potential sites will have been utilised, in particular in the port and Amsterdam-Noord. New, larger windmills will have replaced the old ones in the port. An underground land-use plan for the entire city will have been laid down that specifies the location of the district heating and where heat and cold storage can be used. New-build projects in particular will use these techniques. National subsidy schemes for sustainable energy (SDE) will be the basis for the large-scale introduction of solar panels in the city.

From 2015 to 2025

The last available locations for wind turbines will be utilised during this period. Participation by the public and businesses will be standard. Solar panels will become cost-effective for houses around 2020 and for companies around 2025, which will rapidly expand their application. In 2025, 25% of Amsterdam's electricity needs will be generated sustainably within the city boundaries. Heat and cold storage and district heating will also be used to make existing buildings more energy efficient.

From 2025 to 2040

Larger, more efficient wind turbines will replace the old wind turbines. Innovative applications such as solar power paint will be introduced for the generation of solar power. In the city, small wind turbines will be integrated into advertising pillars and on the roofs of new-build offices. In 2040, 50% of Amsterdam's electricity needs will be generated sustainably within the city boundaries. Furthermore the district heating network will be made more sustainable through the large-scale use of solar heat and geothermal energy.

Amsterdam's passion for a better climate

Amsterdam is passionate and dedicated in its work to improve the climate: an optimally clean and habitable city for everyone.



An aerial photograph of Amsterdam, showing a dense urban landscape with traditional European architecture, a canal, and a busy harbor area with numerous trucks and boats. A white text box is overlaid on the right side of the image.

There must be a 75% reduction in CO2 emissions in the city by 2040, compared to 1990. An immediate transition from traditional to sustainable energy supplies is required to achieve this. Amsterdam has chosen to make the power supply chains more sustainable on the basis of Trias Energetica. All parties involved in the city are working together on this task.

If Amsterdam is to achieve a sustainable power supply within thirty years, then action and decisiveness must be key from this moment on, in the short term but also in the long term. The required efforts are huge, but realistic, and necessary.

However, Amsterdam cannot accomplish this on its own. An international climate agreement must form the basis. Legislation from Europe and the government will be needed to ensure the details of the agreement are implemented. Standardisation and price incentives are necessary to ensure fair competition, whereby the cost of polluting is no longer transferred elsewhere but expressed in these prices. This will further stimulate innovation and sustainable consumer behaviour. A rigorous strategy is required on all fronts.

Amsterdam is doing its utmost to provide a local contribution, together with its citizens, building owners, housing corporations, schools and SME.

Colophon

City of Amsterdam, Klimaatbureau Amsterdam

Weesperstraat 4
Postbus 922
1000 AX Amsterdam
The Netherlands

www.nieuwamsterdamsklimaat.nl



City of Amsterdam

