City of Amsterdam

Public version

New Amsterdam Climate

Roadmap Amsterdam Climate Neutral 2050

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Marieke van Doorninck

Alderperson, Spatial Development and Sustainability

Can you picture it? By 2030, Amsterdam's streets will be free of exhaust-emitting cars. By around 2040, every home will have switched from natural gas to sustainable heating. By 2050, we will have ended our dependence on coal, gas and oil. We will instead get all of our energy from the sun, wind, plants and the heat of the earth itself. For some, this is future talk or even an alarming prospect; for others, it is already daily practice. In any case, the transition to clean energy has begun and can no longer be stopped.

Why? In the first place, because of the disruption to our climate. Over the past 150 years, we've burned through the vast majority of our fossil fuels. The earth is becoming warmer as a result, with many places in the world uninhabitable due to drought, forest fires and hurricanes. What's more, melting ice is causing sea levels to rise. We may sometimes forget it, but our city lies below sea level. Yet another reason: in order to avoid more earthquakes, we want to stop drilling for gas in Groningen. The transition to clean energy is thus something we're doing for ourselves, for people elsewhere in the Netherlands and the world, and for our children.

It is not simply a question of replacing coal power with green power. The appearance of our city and its surroundings will change radically. Fossil energy came out of the ground. Clean energy – in the form of wind turbines, solar panels and heat pumps – is much more visible; think of electricity substations and power lines, for example. It is a challenging prospect for a densely-populated city.

We will also notice the transformation at home. Electric cars are attractive and environmentally friendly, but are they affordable? Well-insulated homes are cosy, but being connected to the district heating system also means cooking with electricity. And what's it all going to cost, who's going to manage it, and when will it happen? These are legitimate questions. The municipality will take the lead on making the switch to natural gas-free housing. The basic principle is that housing costs should not rise for citizens with low and middle incomes.

Thousands of Amsterdam's citizens are already involved in initiatives and projects to save energy or generate clean energy, or to share things. People are keen to become the owners or co-owners of solar panels, independent of large energy companies. More than in the past, we will generate our energy collectively, closer to home. This will create opportunities for participation and profit-sharing.

The challenges for large companies are also considerable. The appearance of the harbour will change radically in the coming decades. Clean energy generation and storage will transform the harbour into a battery for the city, and by dismantling waste for new materials, it will become the linchpin of our circular economy.

This roadmap, *Amsterdam Climate Neutral 2050*, shows what the transition to clean energy will mean in the shorter and longer term; sometimes very specifically, because we already know what we need to do, and sometimes in outline, because although we know which direction to take, we still need to work on the details. We have already succeeded in reversing the trend and using fewer fossil fuels. The next step is for climate-neutral to become the new normal. And that can't happen without you.

"Climate-neutral is becoming the new normal. And that can't happen without you"

Marieke van Doorninck

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Set by the Mayor and cabinet on the 3rd of March 2020

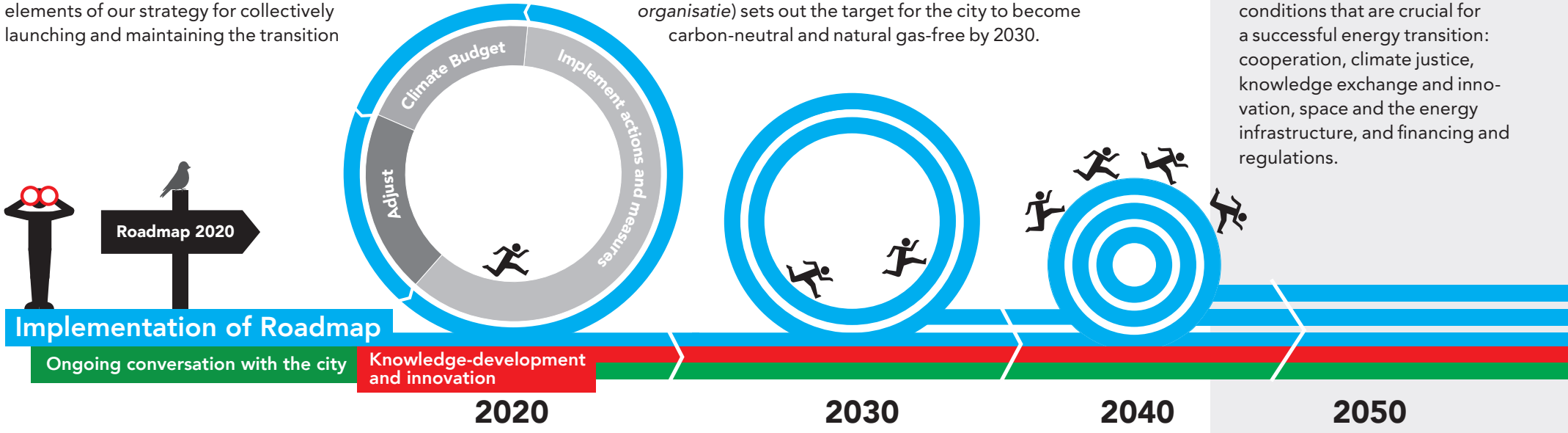
What is the roadmap?

The climate is changing so rapidly that the quality of everyday life is under pressure. Climate change is the result of human action. The key to turning the tide lies in our own hands. All around the world, more and faster action is needed to limit climate change. It was the realisation that no one can halt climate change alone that led 197 countries to sign the Paris Agreement in 2015. For the first time, it has been agreed at the global level that global warming must be limited to a maximum of 2 degrees Celsius, and ideally no more than 1.5 degrees. Achieving this will require an energy transition that will impact our economy and our daily lives. By 'energy transition', we mean the shift from a world in which we are dependent on fossil fuels, such as oil and coal, to a world in which we only use sustainable energy.

The Amsterdam Climate Neutral Roadmap is an ambition document that sets out a long-term vision of the energy transition in Amsterdam, and the actions to be taken in the short term. In the Roadmap, we describe the most important elements of our strategy for collectively launching and maintaining the transition from fossil fuels to sustainable energy. We outline the challenge ahead and the impact of the measures and manage the transition using a Climate Budget. The Roadmap marks the start of a flexible process that will entail intensive collaboration in the city, experimentation, data-gathering and learning, allowing us to adjust our approach where necessary. The developments and progress will be covered in the annual reports.

In addition to the Amsterdam Climate Neutral Roadmap, in the spring of 2020, a strategy on Circular Amsterdam (including the Innovation and Implementation Programme 2020-2021) will be adopted. The two approaches complement one another. The Amsterdam Climate Neutral Roadmap focuses on reducing carbon emissions in Amsterdam, and the circular economy programme focuses on cutting the use of primary raw materials, which will have the effect of reducing carbon emissions beyond Amsterdam.

The sustainability action plan (*Uitvoeringsagenda Duurzame organisatie*) sets out the target for the city to become carbon-neutral and natural gas-free by 2030.



Note to readers

This public version of the Roadmap contains a number of sections. The first section explains why we are doing this, and sets out our vision and strategy for becoming a climate-neutral city. In section 2, we discuss the approach and the quantitative part of the Roadmap. How much CO_2 is emitted in Amsterdam and what impact will the measures in the Roadmap have on reduction? We then describe what we are going to do to achieve the desired carbon reduction in four areas or 'transition paths': Built Environment, Mobility, Electricity, and Harbour & Industry.

Finally, we describe the preconditions that are crucial for a successful energy transition: cooperation, climate justice, knowledge exchange and innovation, space and the energy infrastructure, and financing and regulations.

Vision and strategy

Amsterdam is a great city in which to live and work.
We want to be a green, healthy, prosperous and sustainable city for all. We also want to be a climate-neutral city with a circular economy, where energy is used efficiently and generated sustainably, and where raw and other materials are reused in a never-ending cycle. We are asking every citizen of Amsterdam to play their part.

What if we do nothing?

All around the world, floods, changing temperatures and drought are having a massive impact on societies, public health and the economy. When areas become uninhabitable due to a lack of drinking water or the inability to cultivate food, the prospect of war and refugee flows increases. If we do nothing, Amsterdam will also be hit hard by the consequences of climate change. In that case, in 2050 we will suffer yet more heatwaves and heavier downpours. The demand for energy is rising. If we do nothing, there will be a shortage of electricity and heat. Power failures will disrupt production processes and throw public life into disarray. Taking action does lead to promising results. Despite the growth of the city, carbon emissions have been falling in Amsterdam since 2010, and we are using more and more clean energy. Residents, companies and institutions are taking up the challenge. The city is bursting with initiatives - some small, others large. This is delivering results and inspiring others to take part. There is significant support for the measures among Amsterdam's citizens.

What do we want to achieve?

To make a real contribution to meeting the Paris climate goals, we want to reduce carbon emissions by 55% in 2030 and by 95% in 2050, compared to the reference year of 1990. We aim to phase out natural gas by 2040, and want to end all carbon emissions from vehicles on Amsterdam's roads by 2030. We also want the city to be climate-neutral by 2030. By 2030, we will use 50% fewer new raw materials, and by 2050 we will have a fully circular economy. We will phase out fossil fuels such as oil, natural gas and coal, and switch to 100% sustainably-generated energy. Moreover, we will become 'climate adaptive': we will design the city in a way that allows us to handle the consequences of climate change well.

We want to reduce carbon emissions by 55% in 2030, and by 95% in 2050

- More rainfall with heavier, more frequent downpours. Increasingly wet due to 6% more rainfall
- Since 1950, the average temperature has risen by 1.6°C
- An increase to 40 summer days is expected by 2085
- Heat-related stress and sleep disturbance
- 21 tropical nights per year (in 2050), compared to 7 at present
- Rising demand for electricity. Shortage of electricity and heat
- Fall in the number of frosts
- 85 cm rise in the sea level this century

What is our vision?

In our vision, the city will only become climate-neutral if we conceive of the energy transition as a social transformation, if climate justice is adopted as a guiding principle, we work together, the municipality takes the lead in the process, and we take responsibility as a capital city.

1 The energy transition requires social change

It is crucial to realise that the transition to becoming a climate-neutral city is likely to be the most far-reaching operation since the industrial revolution. It will require a broad social transition, which will have a great impact on our economy and daily lives. Large and rapid changes such as these sometimes raise concerns. We have to let go of the old, yet uncertainty still surrounds the new.

2 Climate justice is a guiding principle

Greenhouse gas emissions are causing a decline in the quality of life around the world. Despite having the smallest share in global warming, poorest countries are being hit the hardest. The same is true for our children and future generations. In Amsterdam, too, the consequences of the energy transition are not equal for everyone. Some residents or neighbourhoods are more vulnerable or will benefit less from the opportunities offered by the energy transition. We want the energy transition to be a fair transition.

3 We work together

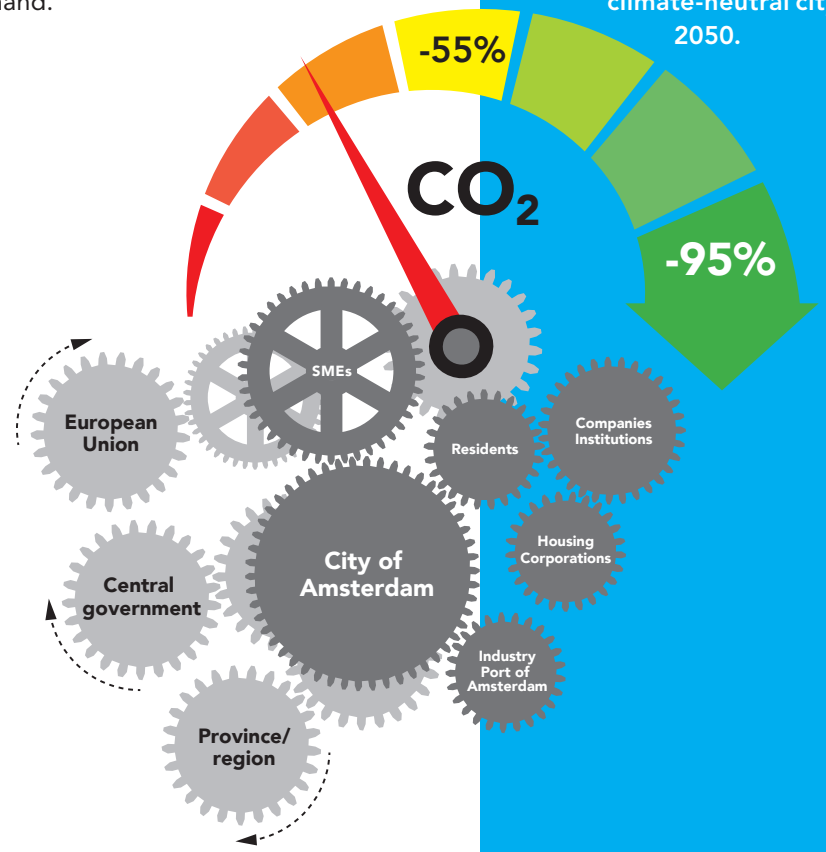
No one can make the difference alone. We all bear responsibility, and we are dependent on each other to achieve our goals. Along with many citizens, the municipality has been working for many years to save energy and generate clean energy. But we need to accelerate our efforts. We will work with residents, companies and institutions in Amsterdam, but also with the region, the province, central government and Europe.

4 The municipality takes the lead

Without stimulation, governance, regulation from above and firm agreements with the larger parties, we will not meet our CO_2 targets. We see it as our task to take the lead and set clear public goals for the whole city.

5 We are a responsible

As one of the most affluent cities in the world and the Dutch capital, Amsterdam is responsible for making a real contribution to the transition to a sustainable world. And in doing so, we have winning cards in our hand.



No one can achieve the energy transition alone

Many different parties will be involved in transforming the city from fossil-fuel dependency to using 100% sustainable energy from renewable sources. Only by working together will we be able to move in the right direction and make rapid progress towards becoming a climate-neutral city by 2050.

What is our strategy?

How can we ensure that the transition to a climate-neutral city gets started and keeps going? We will work with four transition paths and twenty pillars, play different roles as a municipality, focus our efforts and resources, run through the same steps every year, and work from the top down and the bottom up.

1 We work substantively with four transition paths and twenty pillars

Similar to the national system, we are working with four transition paths to achieve a climate-neutral city: the built environment, mobility, electricity and harbour & industry. For each of these transition paths, we describe what we will do to reduce carbon emissions in sixteen areas or 'pillars'. In four additional pillars, we describe measures that will not lead directly to a drop in carbon emissions, but that are essential for the energy transition, such as cooperation, climate justice, innovation, space and the energy infrastructure.

2 We play different roles that change over time

To be able to achieve the transition, the municipality will play various roles that will change over time. This will depend, among other things, on our position relative to other players and the current phase of the transition. We have identified four roles for the municipality: performing, regulating, cooperating and supporting.

3 We focus our efforts and resources

The role that the municipality plays in each transition path will also determine the efforts we make and the quantity of resources we commit, such as from the Climate Fund. This also requires us to understand the nature of the task for each transition path, the scale of the investment and savings, and any inevitable losses. And this demands a case-by-case approach. The municipality will play the largest role in the Built Environment transition path.

4 We work systematically and cyclically

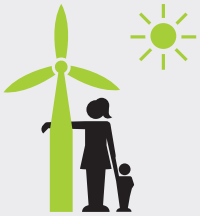
The measures described in this Roadmap can have a direct impact on carbon emissions, but they can also have an indirect impact. Some measures will work immediately, others later. Sometimes the impact will be great, other times limited. How can we determine whether we are on the right path? And how can we adapt in good time if we risk failing to meet our targets? To manage this, we will work cyclically and run through the same steps every year.

5 We work from the top down and from the bottom up

We are taking two approaches to becoming a climate-neutral city: a top-down approach and a bottom-up approach. On the one hand, we take the initiative from above and work systematically to achieve our targets. But at the same time we are deeply dependent on a core of thousands of smaller initiatives. Citizens who want to get involved, residents, businesses and institutions, individually or collectively, can count on the municipality's support.

Built Environment

Mobility

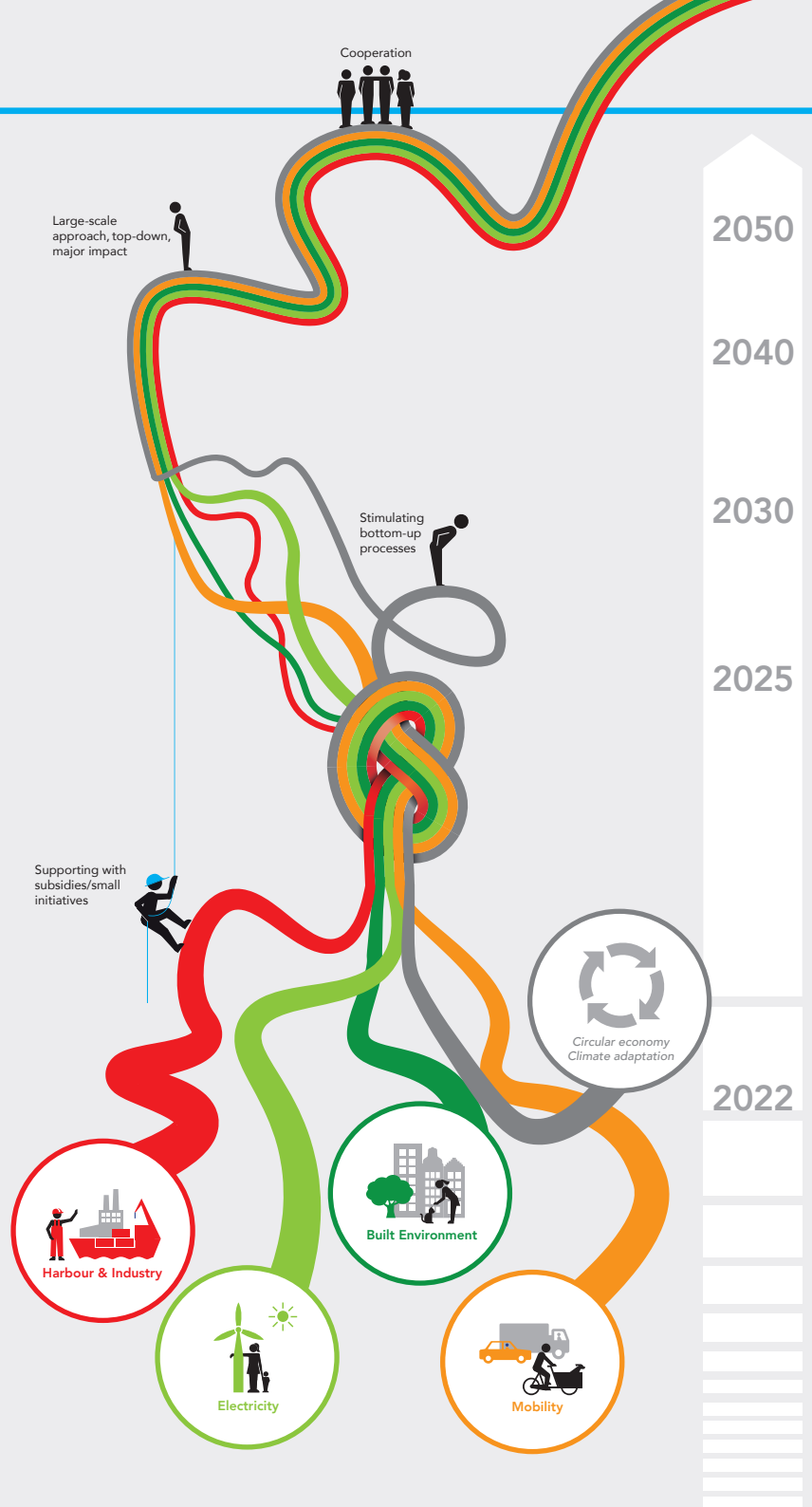


Electricity

Harbour & Indrustry

The energy transition is a journey

We do not yet know what the city will be like in 2050. But as a municipality, we are marking clear milestones along the way. The paths will sometimes become interwoven and sometimes interests will conflict. But in the process of learning and doing, the transition will increasingly converge.



2050
- All buildings in the city are carbon-neutral
- Harbour & Industry climate-neutral and circular

2040
- All districts in Amsterdam natural-gas free

2030
- 50 MW extra wind energy generated
- Half of all suitable rooftops fitted with solar panels: 550 MW
- Municipal organisation climate-neutral
- Amsterdam's traffic emissions-free
- Energy label 'A' for offices

2025
- All permits granted for new wind turbines
- Implementation of carbon capture system at AEB

2024
- Realisation of 100 MW electrolysis plant H2ermes, Tata Steel

2023
- Housing corporations' carbon emissions reduced, from 1.5% in 2019 to 3% in 2023

2022
- Three districts/twelve neighbourhoods in an irreversible process to become natural gas-free

2020
- Tightening of national legislation on energy-neutral buildings (BENG)
- 'Year of the Sun'
- New strategy for a sustainable harbour
- First 29 GVB buses emissions-free

Climate Budget

The Climate Budget is the quantitative part of the Roadmap. Amsterdam emits 5,000 kilotons (kt) of CO_2 equivalents every year. In order to achieve our target of reducing carbon emissions by 55% by 2030, compared to 1990, a reduction of 3,290 kt will be needed by 2030.

Combined with autonomous developments, the planned package of measures in this Roadmap is expected to lead to a 48% reduction in carbon emissions by 2030. The calculation has a range of between -21% and -55%. The goal of a 55% reduction thereby lies within reach. To achieve this, we will need to implement the planned measures successfully and in full. Additional efforts will also be needed.

Understanding the challenge

We have a good picture of where carbon emissions are taking place in Amsterdam. An overview is presented in the diagram below. As well as understanding the carbon emissions, we also monitor other aspects of the energy transition, such as social support, climate justice and the installed capacity of wind and solar energy.

Understanding the effects

We have done calculations in order to understand the effects of the planned actions and measures by central government, residents, companies, institutions and the municipality. A calculation has been made for each of the four transition paths, and also divided over the different portfolios.The expectation is that the emissions level in 2030 will be 48% lower than in 1990. This is practically in line with the national reduction target of -49% by 2030.

Current greenhouse gas emissions in Amsterdam

Total emissions
5,000 kton CO_2 equivalents

100%

Built Environment

25%

Natural gas and heat consumption and other greenhouse gases

Housing 14%

Business market 7%

Social & civic buildings 4%

Mobility

18%

Fuel consumption

Amsterdam's roads 9%

Motorways 6%

Mobile machinery 2%

Ferries, recreational boats and diesel trains 0.2%

Other greenhouse gases 0.6%

Electricity

39%

Electricity consumption

Business market 21%

Housing 8%

Social & civic buildings 6%

Industry 4%

Harbour & Industry

18%

Waste incineration 11%

Natural gas and heat consumption industry 5%

Fuel consumption inland shipping and fishing 0.5%

Other greenhouse gases industry 1.5%

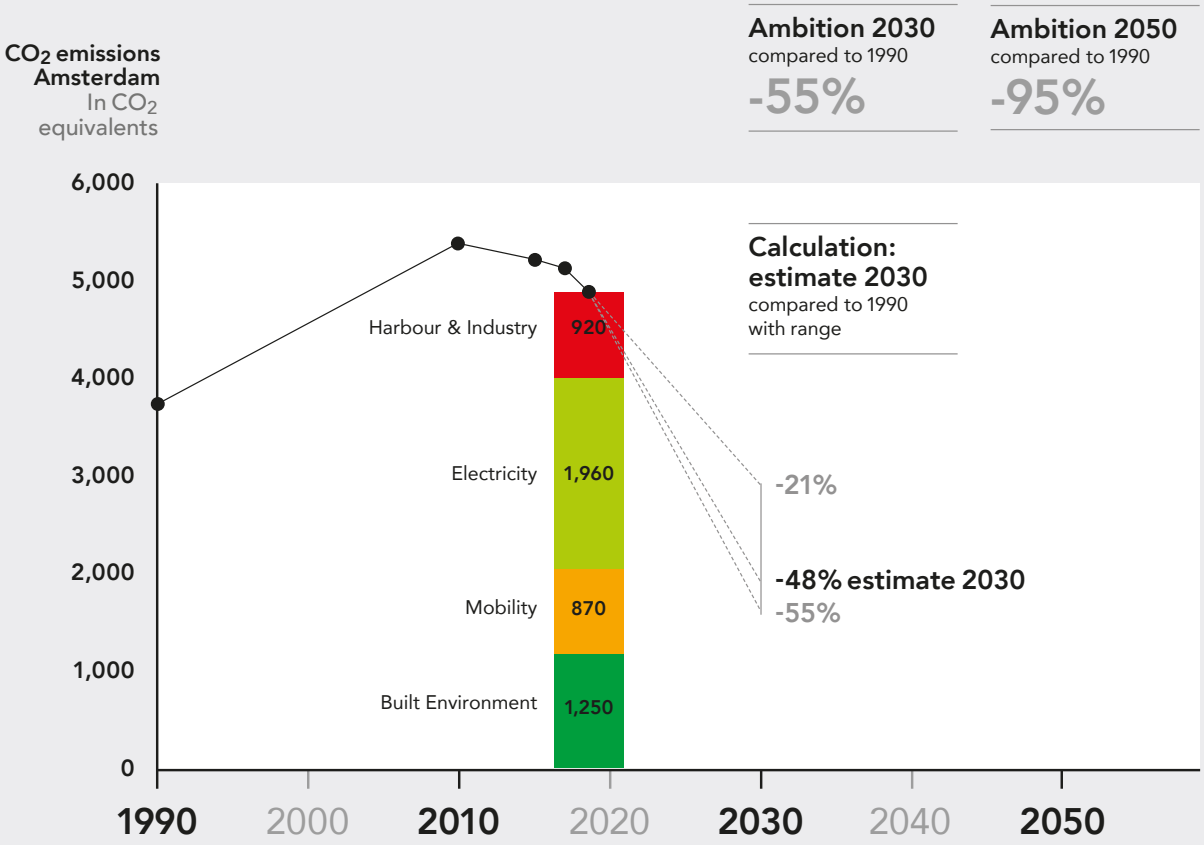
Given the uncertainty surrounding how far we will succeed in implementing the planned actions and measures, and the size of the effects, the calculation includes a range. The range of the calculation is between -21% and -55%. Our ambition of -55% thereby lies within reach. In order to achieve this ambition, the planned actions and measures must be implemented successfully and in full. Additional efforts will also be needed. Many actions and measures still need to be worked out, and policies have to be developed and adopted in most cases. In doing so, we will be highly dependent on regional, national and EU developments in relation to regulations and (financial) resources.

Updating the Climate Budget

Whether progress is being made will be clear from the annual reporting on the Roadmap. We will report on the quantitative part by producing an annual update on the Climate Budget. This will reflect on the past and look to the future. We will describe the progress made on various indicators and measures, including carbon emissions. The estimate for Amsterdam's carbon emissions in 2030 will be updated annually in a standardised way. If we see that we have yet to achieve our carbon ambitions, we will adapt our approach by including additional measures in the annual report on the Roadmap.

Calculation of remaining greenhouse gas emissions in Amsterdam in 2030

This diagram shows the estimated CO_2 reduction by 2030 for each transition path. The estimate consists of four elements: the impact of national measures, the impact of measures taken in Amsterdam, shifts in energy consumption leading to more or fewer emissions, and extra emissions resulting from the growth of the city. With the measures announced to date, emissions are expected to fall by 48% by 2030.



A citizen has their say

Chris Grijns

Health coach, district nurse and mindfulness trainer

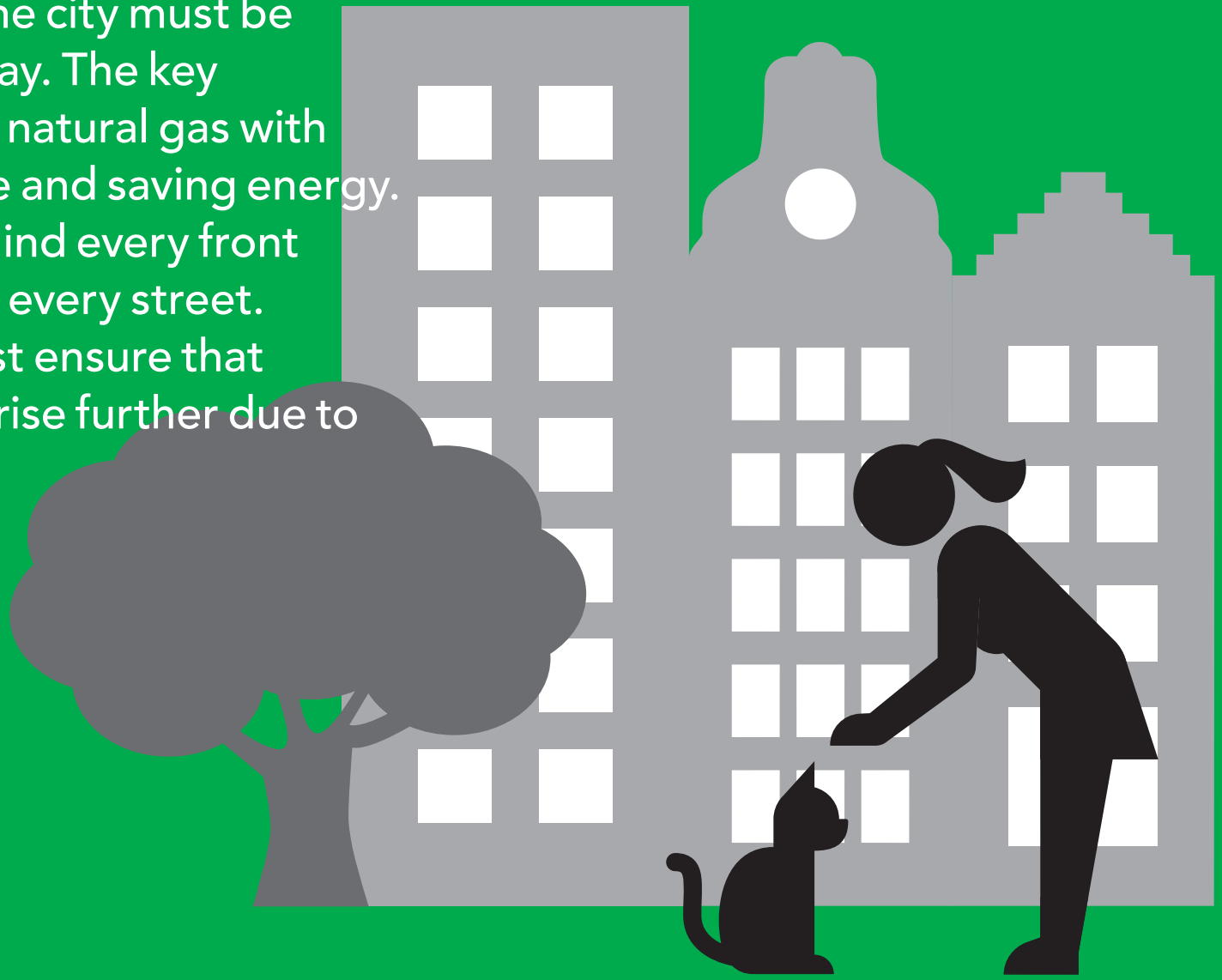
"My partner and I don't have children, but there are more people and children who want to live in this world. I'm very concerned, and I often wonder about how I can contribute to a healthy and liveable world.

Our house has solar panels. It's great, in any case, to be less dependent on gas. Five years ago, we had to replace the boiler. I was very unsure about what to do at that point, because natural gas will eventually be phased out. At that time, even less was known about it. We nevertheless decided to go for a condensing boiler. I'd be interested in having a heat pump, but I don't know enough about them. Should we buy even more solar panels? That might allow us to become climate-neutral.

We separate our household waste and we have a compost bin. But I do sometimes wonder how much difference it makes to do this as a citizen. Are the city's major polluters being tackled? What's the situation at the AEB plant? I think that everyone should do their bit, but you shouldn't leave everything to the individual."

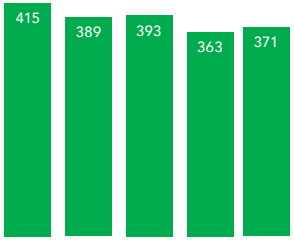
The Built Environment

By 2050, all buildings in the city must be heated in a sustainable way. The key focus is thus on replacing natural gas with an alternative heat source and saving 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.



Consumption and CO_2 emissions

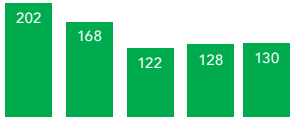
Housing natural gas consumption



mln. m^3

648 kt (52%)

Business market natural gas consumption



mln. m^3

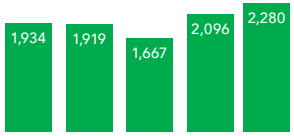
263 kt (21%)

Social & civic buildings natural gas consumption

mln. m^3

222 kt (18%)

Housing and other buildings heat consumption



TJ

68 kt (5%)

Other greenhouse gases

N/A no energy consumption

49 kt (4%)

CO_2 emissions

1,250

Share of total CO_2 emissions

25%

Pillar 1

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

What is the challenge?

The built environment will become natural gas-free. All housing and buildings (commercial or social/civic) that are still dependent on natural gas must be provided with a different form of heating.

We will do this by creating alternatives to natural gas, district by district. The current district-by-district approach taken by the Amsterdam City Deal partners (housing corporations, tenants' associations, energy companies and the municipality) is active in 28 neighbourhoods, and will be expanded into a citywide, systematic approach with increasingly rapid processes. This large-scale operation is based on the vision document on the heating transition (*Transitievisie Warmte*).

How will we get there?

NOW

There are 91,000 natural gas-free homes or other buildings in the city.

SOON

By 2030, we aim to have 260,000 natural gas-free homes or other buildings in the city.

LATER

By 2040, all (existing) 650,000 homes or other buildings in the city will be natural gas-free.

What are we going to do?

We are going to create the right legal, financial and organisational conditions to allow building owners to take the step to becoming natural gas-free. Our measures will include:

- Adopting the *Transitievisie Warmte* vision document, which clarifies when districts will be disconnected from the natural gas grid and which alternative heating technologies will be offered.
- Making neighbourhood plans to phase out natural gas, district by district. We will do this with the City Deal partners, among others.
- Continuing to develop the communicative and participatory approach to phasing out natural gas, focused on social support.
- Connecting 110,000 homes to the district heating network via the *Amsterdamse Warmtemotor* agreement.
- Supporting and subsidising (local) natural gas-free initiatives.
- Contributing financially to natural gas-free projects from the Climate Fund.

Pillar 2

Developing sustainable sources for the district heating network

What is the challenge?

Scaling up the district-by-district approach will increase demand for sustainable heat. This demand will need to be met. Attention must be paid to diverse sources in order to create a robust system.

The current district heating network is powered by AEB's waste incineration plant and Vattenfall's Diemercentrale plant. These sources currently provide enough heat, but they will not be able to meet the growing demand and are not yet sustainable enough. Potential new sources include geothermal heating, aquifer thermal energy systems and waste heat from industrial processes, such as that from datacentres.

How will we get there?

The fuels that we use to provide heat will change over time.

NOW

We mainly use natural gas, high-temperature (HT) district heating (from AEB and the Diemercentrale plant) and a small amount from biomass- and electrically-powered heat exchangers.

SOON

We use less natural gas. Growth in high-temperature (HT) and medium-temperature (MT) district heating (from AEB, the Diemen biomass plant, aquifer thermal energy and waste heat from datacentres) and heat exchangers.

LATER

Heat provision is CO_2-free. The fuel mix consists of HT and MT district heating (from AEB, aquifer thermal energy, geothermal heating, waste heat from datacentres), green gas and local heat exchangers.

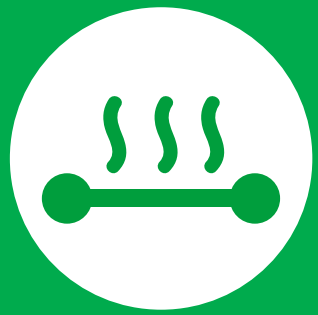
What are we going to do?

We are going to maintain, expand and green existing sustainable heat sources, and develop new, alternative sustainable heat sources. We will do this by:

- Developing a sustainable heat source strategy.
- Investigating the role that should be played by heat from the waste incineration plant in the future heat mix.
- Preparing for carbon capture at the waste incinerator plant.
- Using carbon capture to make the heat supply from the waste incinerator CO_2-free.
- Implementing programmes on aquifer thermal energy, geothermal heating and waste heat from datacentres.

Pillar 3

Building a city-wide heating infrastructure



What is the challenge?

In order to phase out natural gas in Amsterdam, we need to develop the heating infrastructure into a citywide infrastructure that delivers the right heat to the right place. In addition, more decentralised grids will develop, fuelled by decentralised sources. A key issue is that the infrastructure should not develop exclusively in districts with a sound business case. It must be possible to disconnect every home and building in Amsterdam from the natural gas grid. Constructing this new infrastructure will have a major impact on public space in the city.

How will we get there?

NOW

There is high-temperature/medium-temperature heat distribution infrastructure for ca. 91,000 homes and other buildings. Since 2002, it has been standard policy to connect all new buildings to the district heating network where possible.

SOON

The heat distribution infrastructure grows, including to areas within the ring road. As soon as it is feasible, the district heating network will deliver low- and medium-temperature heating where possible.

LATER

Expanding the district heating network to cover 50-60% of the total number of connections.

What are we going to do?

We will further develop plans for the optimal infrastructure for a natural gas-free city, including all of the preconditions needed for implementation. Our measures will include:

- Drawing up a heat infrastructure strategy, including a strategy for reusing materials and an investment agenda.
- Lobbying central government for the funding needed to invest in the heat distribution infrastructure, and to adjust legislation to allow for the use of mandatory instruments
- Undertaking research into the market regulation of the heat distribution chain.

Pillar 4

Making housing energy-efficient

What is the challenge?

Electricity and heat consumption in housing must be reduced. Housing is responsible for more than 50% of the 690 kt of carbon emissions in the built environment, and 14% of Amsterdam's total emissions. There are currently around 441,000 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 at the logical moment, but preferably sooner rather than later, because the pace must increase. In this way, everyone can contribute to achieving a climate-neutral city by 2050.

How will we get there?

NOW

Homes currently emit 690 kt of CO_2.

SOON

We are working towards a situation in which all homeowners, including all owner-occupier associations, have received advice and are taking measures. The housing corporations have increased their efforts to reduce CO_2.

LATER

All homeowners, including all owner-occupier associations, have made their homes energy-efficient and natural gas-free.

What are we going to do?

We are making homeowners aware of the opportunities to save energy and supporting them with information, advice and financing. This will include:

- Giving advice and guidance to owner-occupier associations.
- Organising collective purchase schemes for sustainable measures, such as insulation.
- Implementing cooperation agreements with housing corporations and tenants on energy-efficient and natural gas-free housing, solar panels and reduced carbon emissions.
- Entering into partnerships with parties that own many homes.
- Deploying energy coaches to boost energy-efficient behaviour.
- Researching whether legislation and municipal authority can be used to compel energy-saving measures.

Pillar 5

Making the business market energy-efficient

What is the challenge?

All commercial buildings must become natural gas-free and climate-neutral. The business market covers various sectors and is characterised by a wide range of building types: offices, catering facilities, shops, shared office buildings and industrial buildings. Each sector presents its own opportunities and challenges. Making the business market more sustainable will require energy-saving measures in buildings and connecting to the heat distribution infrastructure for access to sustainable heat. Business processes will also need to become more energy-efficient.

How will we get there?

NOW

There is currently an energy-saving and information obligation in the Environmental Management Act, a compulsory energy audit for large enterprises in the Energy Efficiency Directive (EED), and incidental support for businesses that request it.

SOON

Over time, enforcement of the Environmental Management Act and the EED will be intensified, support for businesses will gain a more structural character, and a mandatory energy label 'C' will be introduced and enforced for offices as of 2023.

LATER

From 2030, there will be a mandatory energy label 'A' for offices, and all companies will eventually become natural gas-free and climate-neutral.

What are we going to do?

We will establish an accelerated approach for an energy-efficient business market, and take measures including:

- Providing information and support for businesses via the New Amsterdam Climate online platform.
- Activating channels for entrepreneurs, including sector organisations, business investment zones, entrepreneurs' organisations and industrial parks.
- Following a sector-specific approach, paying particular attention to offices, catering, industrial parks and datacentres, and optimising the smart utilisation of opportunities and challenges in each target group or area.
- Continuing or developing financial support for the business market, such as subsidies and loans, and establishing whether these are sufficient.
- Strengthening support by scaling up energy consultations and providing other support more proactively and collectively.
- Intensifying enforcement of the Environmental Management Act among companies, compelling mandatory energy savings.

Pillar 6

Making social and civic buildings energy-efficient

What is the challenge?

Energy consumption must be reduced in community centres, schools, sports facilities, hospitals and arts and cultural facilities in the city. These ca. 3,000 buildings can play an exemplary role in the energy transition and inspire citizens to take sustainable measures themselves. There are many variations of social and civic buildings in terms of building type, use and ownership. Building owners and users are responsible for creating climate-neutral buildings. The municipality will offer tailor-made support.

How will we get there?

NOW

Incidental support is given to social and civic buildings that request it. This frequently delivers great results, such as the 100 schools in Amsterdam that now have solar roof panels.

SOON

Support for social and civic buildings gains a more structural character.

LATER

All social and civic buildings eventually become natural gas-free and climate-neutral, providing a source of inspiration for the city.

What are we going to do?

We are developing an acceleration approach focused on making social and civic buildings climate-neutral, in line with the target group and the building's specific function. We will build on recent examples of good practice. We are keen to cooperate and make agreements with large social and civic institutions. When the municipality owns a building, we will take action. Measures will include:

- Offering targeted support to schools, sports associations, arts and cultural institutions and social services.
- Investing wisely when maintaining our social and civic buildings, so that buildings can be made climate-neutral immediately, or steps can at least be taken in the right direction.
- Implementing energy-saving measures and installing solar roof panels in cooperation with school boards.
- Making agreements with hospitals on their buildings' energy consumption.
- Making swimming pools natural gas-free and replacing lighting in sports complexes with LED lighting.

Energy-neutral construction

What is the challenge?

There is just one moment to ensure that the city's new buildings are of a sufficiently high quality, and that is when they are built. The buildings and public spaces that are built in the coming years must not add to the task of reducing carbon emissions. In the future, only energy-neutral construction methods will be used (well-insulated, fitted with solar panels and connected to a sustainable heat source). We will continue Amsterdam's line on energy-neutral construction. At present, we are still one step ahead of what is required by national legislation. Wherever possible, the market will be challenged to deliver energy-producing buildings. A contribution will also be made during the construction phase, by using emissions-free building materials and emissions-free delivery and removal of building material. We will also keep encouraging innovation area by area.

Energy-neutral homes generate all of the energy they consume (and/or receive sustainable energy from a grid), without recourse to fossil fuels. The energy-neutral construction challenge applies not only to buildings, but also to public space and under the ground.

How will we get there?

NOW

Environmental permits for new buildings set an energy rating coefficient (EPC) of less than or equal to 0.2. The tendering of new buildings also delivers fantastic results, including energy-producing buildings.

SOON

Energy-neutral construction for all use functions.

LATER

We see increasing numbers of energy-producing buildings and local energy exchanges.

What are we going to do?

All building contractors will be asked to take steps towards energy-neutral construction, and where possible even energy-producing buildings. We will do this by:

- Establishing standards in Amsterdam for the energy-neutral construction of new buildings, offices and other functions, using building regulations or environmental plans, and regulating these with environmental permits.
- Continuing to challenge the market, for example via tenders for new buildings, to use energy-neutral and (where possible) energy-producing construction methods.
- Continuing to issue zero-rate environmental permits for sustainable renovations.
- Continuing to provide grants for sustainable self-construction.
- Implementing the EU ATELIER project on developing an energy-positive district in Buiksloterham.

A citizen has their say

Djian Sadadou

Expat and solar energy specialist at Sungevity

"When I was growing up in Latin America, I witnessed at first hand the negative effects of climate change, such as water shortages and air pollution.

I've also seen how important it is to have a fair and socially-inclusive transition to a sustainable world. Sustainability is an international issue and CO_2 knows no borders. But there are great differences between countries, groups and cultures.

In Amsterdam, too, there are differences between people and their sustainability options. The municipality must try to iron out these differences as much as possible. For example, there are several projects where people who don't have usable roofs can buy or hire solar panels cheaply. But the municipality could do even more.

At present, if you don't have a roof, it can be a tricky process to get solar panels. You have to do a lot of research, and share the solar energy that's produced fairly. My building doesn't have any solar panels. I think it's the owner's responsibility to arrange this.

Through my work at Sungevity, I notice how enthusiastic people become about their solar panels. It's also an easy way to get to know more about other aspects of sustainability. It's cool to have solar panels. You produce your own energy, they ultimately pay for themselves, and you're helping the climate."

Mobility

Amsterdam is attracting increasing numbers of residents, visitors and jobs. But more people also means more journeys. If we do nothing, this will result in more carbon emissions. That's why we are asking every vehicle-owner or driver consciously to choose a sustainable alternative form of transport. The municipality will encourage, facilitate and, if necessary, regulate this switch.

CO_2 emissions resulting from fuel consumption

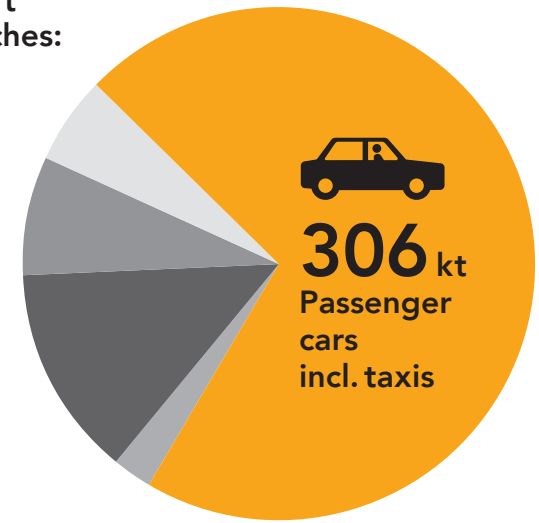
Emissions on Amsterdam's roads per vehicle category (kt CO_2 2017)

Public transport buses and coaches: 24 kt

Trucks: 33 kt

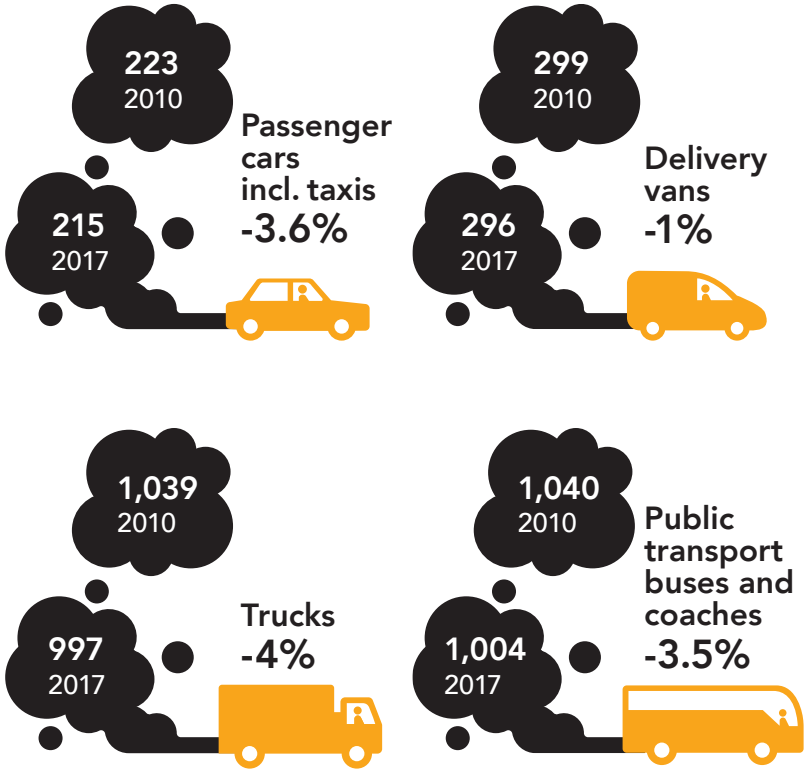
Delivery vans: 57 kt

Motorbikes, mopeds and motor-assisted bicycles: 10 kt



CO_2 emissions per vehicle type

(gr per km)



CO_2 emissions

870

Share of total CO_2 emissions

18%

Limiting polluting traffic

What is the challenge?

The main goal is to minimise the number of polluting kilometres travelled, in order to reduce carbon emissions from transport in Amsterdam. For many years, we have been working to reduce and clean up the vehicles in the city, and encouraging people to walk, cycle and use public transport. This not only helps to make Amsterdam cleaner and more peaceful, but it also makes the city more attractive and liveable for everyone. Every vehicle-owner or driver will be asked consciously to choose a sustainable alternative form of transport. The municipality can encourage and facilitate this switch. Our approach consists of three elements:

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

How will we get there?

NOW

Despite the sharp growth in residents and employment, the number of car journeys in the city has fallen slightly in recent years, and carbon emissions from transport have remained roughly level since 1990. More and more citizens are opting to cycle or use public transport: 70% of journeys from, to and within Amsterdam are made sustainably.

SOON

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

LATER

There is enough space in the city for pedestrians, cyclists and playing children, and there are fewer car journeys. Sustainable forms of transport, such as cycling and public transport, offer an attractive alternative to motorised traffic. The city remains open and accessible.

What are we going to do?

Based on the multiannual cycling plan, the limited car-traffic agenda and the *Smart Mobility* programme, our measures will include:

- Boosting cycling with comfortable cycle routes and convenient bicycle-parking.
- Providing more and affordable public transport with good connections and transfer facilities.
- Making space for alternative clean transport thanks to fewer car journeys and fewer parking spaces.
- Achieving a better and more attractive range of car-sharing vehicles.
- Creating (logistical) hubs for the switch to sustainable forms of transport.

Greening all polluting vehicles and vessels

What is the challenge?

For many citizens, companies and visitors, the car remains an important means of transport. Most vehicles are still powered by fossil fuels. 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 cleaner traffic. We are a world leader when it comes to facilitating electric transport, and we are setting an example for many cities. Although most vehicles are owned by parties other than the municipality, with a broad package of measures we can ensure that the movement in the city goes in the right direction. We will do this in three ways:

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

How will we get there?

NOW

Motorised traffic (including ferries and recreational boats) in Amsterdam is responsible for 18% of the city's total carbon emissions. Of the 200,000 passenger cars that enter the area within the ring road each day, 3% are currently electric. Taxis, passenger boats and moving vans are already further ahead in the transition.

SOON

All traffic within the A10 ring road – with the exception of passenger cars and motorbikes – is emissions-free. Mopeds and motor-assisted bicycles must be emissions-free across the whole built-up area.

LATER

We want all traffic on Amsterdam's roads to be emissions-free by 2030.

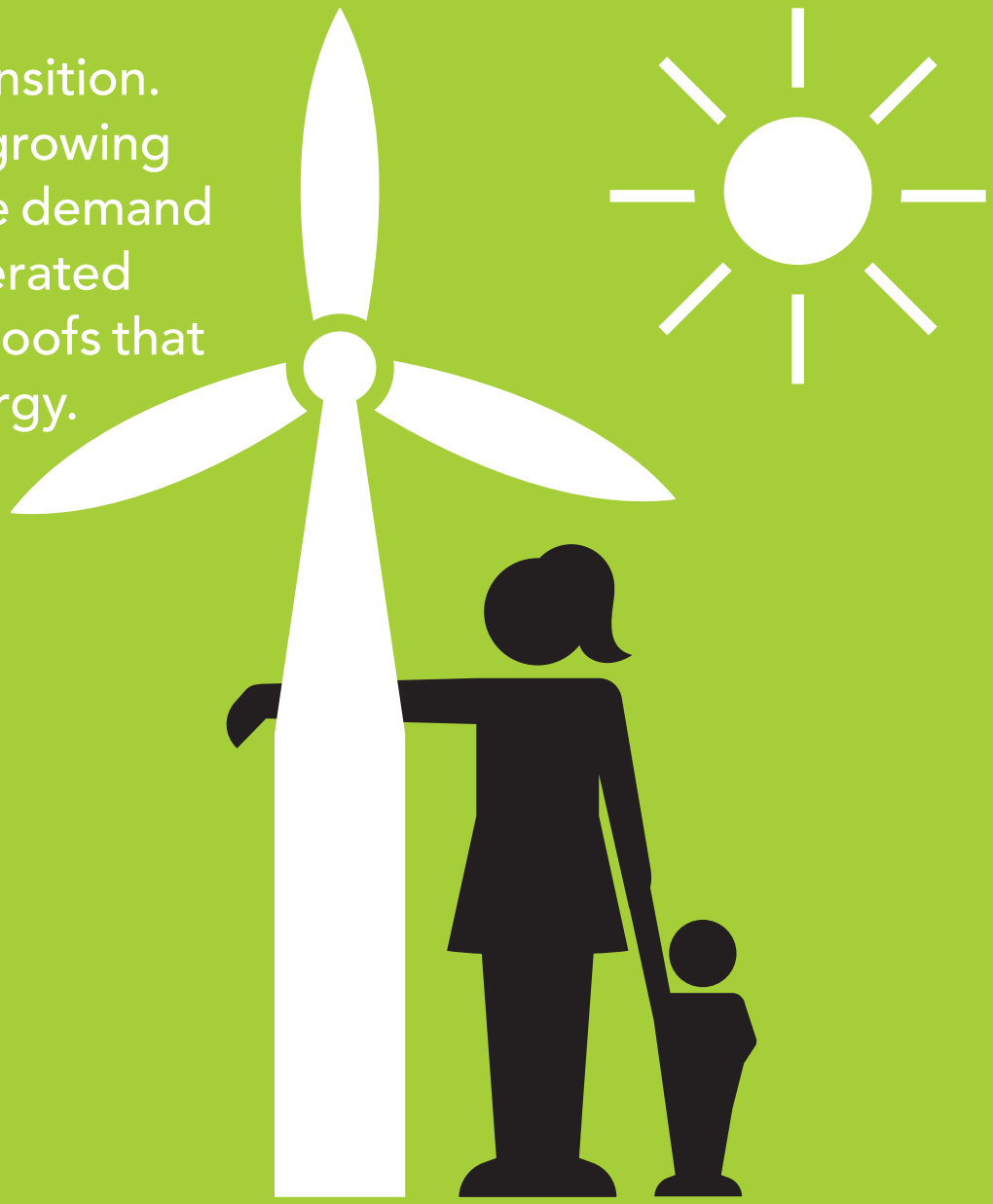
What are we going to do?

We are working on the basis of the water transport programme (*Programma Varen*) and the *Clean Air Action Plan*, and broadening and accelerating our approach. We will take a tailormade approach to each target group, with specific measures for an emissions-free Amsterdam. Our measures will include:

- Introducing an environmental zone for passenger cars in 2020 and tightening up other environmental zones.
- Introducing subsidies for emissions-free vehicles.
- Agreeing covenants with sector organisations.
- Facilitating and tendering for more charging points and rapid-charging locations for electric vehicles, vessels, taxis, buses, and passenger and pleasure boats.

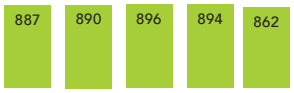
Electricity

Electricity plays a key role in the energy transition. Phasing out natural gas in the city and the growing number of electric vehicles will increase the demand for electricity. This electricity must be generated sustainably. In Amsterdam, we have many roofs that are suitable for the generation of solar energy. But there are also opportunities for generating sustainable energy with wind turbines.



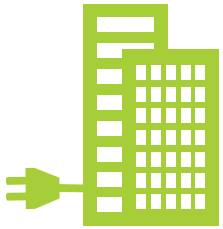
Electricity consumption and CO_2 emissions

Housing

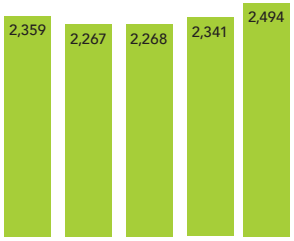


mln kWh

397 kt (20%)

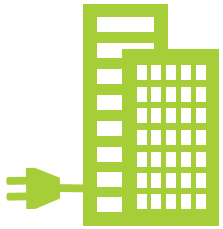


Business market



mln kWh

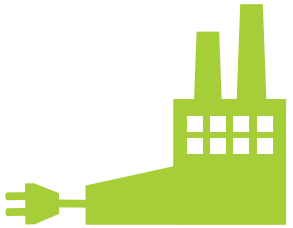
1.064 kt (54%)



Social & civic buildings

mln kWh

283 kt (14%)



Industry

mln kWh

221 kt (11%)

CO_2 emissions

1,960

Share of total CO_2 emissions

39%

Pillar 10

Maximising solar energy generation on roofs

What is the challenge?

There is a lot of roof surface in Amsterdam. We want to use this space optimally to generate sustainable energy. Electricity can be generated on roofs for 400-500,000 households. The advantage of solar panels is that installation is technically straightforward, and it tends to be a profitable investment. We have opted for an approach whereby we inspire Amsterdam's citizens and remove obstacles, allowing them to make more effective use of the opportunities for generating solar energy. When it comes to solar energy generation, the key parties are the owners and users of the city's buildings. As part of the introduction of the Environment and Planning Act, Amsterdam will investigate the options for managing solar energy on the roofs of new and existing buildings.

How will we get there?

NOW

We are currently working on the realisation of 250 MW of solar energy in 2022.

SOON

Our aim is for half of all suitable roofs to be in use by 2030.

LATER

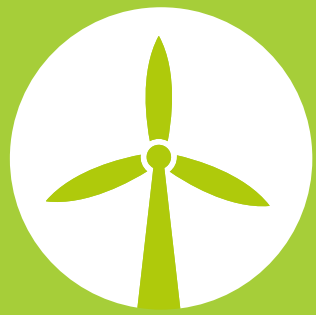
By 2050, all suitable roofs will be used for the generation of sustainable energy.

What are we going to do?

We have opted for an approach whereby we inspire Amsterdam's citizens and remove obstacles, allowing them to make more effective use of opportunities for generating solar energy. Our measures will include:

- Developing an online step-by-step plan for getting started with solar energy.
- Supporting the installation of solar panels in conservation areas or on monuments.
- Working with housing corporations to accelerate solar projects, advising and guiding owner-occupier associations, and organising collective purchase schemes for solar panels.
- Challenging and supporting companies and civil society organisations to install solar rooftop panels.
- Installing solar panels on municipal roofs and making our roofs available to citizens.
- Making agreements on solar panels with the owners of large roofs.
- Researching the options for facilitating municipal management of roof use for sustainably generating solar energy.

Optimising use of potential wind energy



What is the challenge?

By generating more wind energy, we want to make an appropriate contribution to greening electricity production. If provincial policy is broadened, the number of possibilities will increase. The ambition is to install 50 megawatts (MW) of extra capacity in Amsterdam by 2030 (on top of 11 additional MW due to replacement with larger wind turbines). This will result in 127 MW of total installed capacity, which can be used to provide 150,000 households with wind energy. Within the search areas for wind energy, we are seeking locations in which to install new wind turbines. In consultation with spatial planning experts, nearby residents and other stakeholders, we are preparing the decision-making process for installing wind turbines. Our aim is for at least 50% of production to be locally owned. Depending on the situation, the municipality may decide to play a role in the development of wind turbines. For example, if a location is not sufficiently attractive for private-sector parties, or if more residents are able to participate as a result.

How will we get there?

NOW

In the summer of 2019, there were 38 wind turbines in Amsterdam with an installed capacity of 66 MW. As of the summer of 2019, sixteen small wind turbines will be replaced with ten large wind turbines. In 2022, the total installed capacity will be 77 MW.

SOON

The permits required for installing new wind turbines will be issued between 2021 and 2024. By 2030, there should be 127 MW of installed capacity.

LATER

Research on the expansion and intensification of wind energy generation.

What are we going to do?

The most important role that we play as a municipality is to create the right legal and planning conditions for the installation of wind turbines. Our measures will include:

- Replacing smaller wind turbines with larger wind turbines.
- Establishing 7+1 search areas for new wind turbines in the Regional Energy Strategy and the Spatial Vision and spatial plan.
- Investigating the spatial and technical feasibility of wind turbines in each search area.
- Organising project plans, operating models, development strategies and participation for appropriate locations.
- Preparing permits for each appropriate location and, if necessary, participating in developing the wind turbines.

Developing a future-proof electricity infrastructure

What is the challenge?

Electricity plays a key role in the energy transition. More and more electricity is being consumed to heat buildings and power electric vehicles. Having sufficient capacity in the electricity grid is an important condition for the climate-neutral city. The municipality is cooperating with Liander and other stakeholders to develop a future-proof electricity grid, by:

- Strategically planning electricity provision in combination with the major municipal tasks.
- Extending and strengthening the electricity grid.
- Using the electricity grid in a better and smarter way.

How will we get there?

NOW

Together with Liander, we are investigating what is needed to adapt the electricity grid to the growing city and the energy transition.

SOON

The strategic planning of electricity provision is linked to the planning of major municipal tasks. The electricity grid is used in a better and more efficient way.

LATER

The electricity grid makes an optimal contribution to a larger sustainable electricity system, in which there is coordination of electricity generation and consumption at the local level.

What are we going to do?

We can manage electricity demand by determining where new housing and large energy-consumers, such as datacentres, will be built, and we can manage supply by establishing locations for generating sustainable energy. We will also take the lead on the construction and adaptation of the electricity grid, whereby we will limit disruption as much as possible. Our measures will include:

- Establishing new locations for sub-stations.
- Supporting projects to reduce peak load in the electricity grid, for example by using smart charging infrastructure, storage options or smart grids.
- Charting the impact of the developments in the city on demand for space above and below ground, and managing this.

Harbour & Industry

Energy plays a central role in Amsterdam's harbour. Energy is produced and fuels are stored and shipped on a large scale. The opportunity and the 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.

Consumption and CO_2 emissions

CO_2 emissions

920

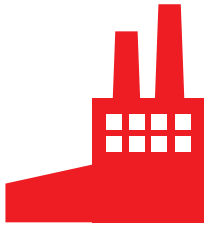
Share of total CO_2 emissions

18%

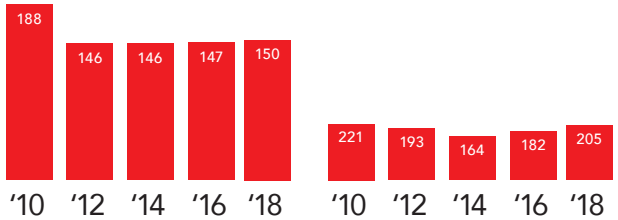
Waste incineration

N/A no energy consumption

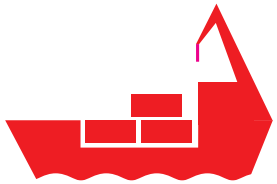
553 kt (60%)



Natural gas and heat consumption industry



262 kt (29%)



Fuel consumption inland shipping and fishing

No data available on energy consumption

24 kt (3%)

Other greenhouse gases industry

N/A no energy consumption

76 kt (8%)

Pillar 13

Transforming the harbour into a sustainable battery

What is the challenge?

'The harbour as a sustainable battery for the city, region and Europe' is the shared vision of the harbour as a place where sustainable energy will be generated, produced, converted, stored and distributed to end-users on an industrial scale in future. We support this vision, and will ensure that the Port of Amsterdam and the companies based in the harbour are able to implement this transition successfully. The harbour will also contribute to the energy transition beyond Amsterdam and to sectors such as industry, mobility, electricity and the built environment.

How will we get there?

NOW

At present, Amsterdam's harbour economy is largely based on the storage and transshipment of cargo flows of fossil fuels, such as coal and oil products.

SOON

From 2030, Amsterdam's harbour will be one of the most sustainable harbours in Europe. We aim to phase out coal by 2030.

LATER

From 2050, Amsterdam's harbour will be a 100% sustainable energy and fuel cluster, with green hydrogen, bio-fuels and synthetic fuels. We aim to phase out fossil fuels by 2050.

What are we going to do?

Together with the Port of Amsterdam and companies in the harbour, we will transform the harbour into a 'sustainable battery for the city, region and Europe.' Our measures will include:

- Exploring financing instruments for achieving the energy transition, including whether part of the Port of Amsterdam's income from fossil-fuel activities could be used for this.
- Establishing a lobbying strategy based on how the harbour as a sustainable battery can contribute to national and EU climate targets, and vice versa.
- With the Port of Amsterdam, developing an ambitious target for the generation and storage of sustainable energy in the harbour.
- Together with the most important stakeholders, organising four expert sessions with key players in the harbour area to further clarify the design and operation of the 'sustainable battery for the city'.
- Charting the consequences and potential of the climate ambitions for employment in the harbour area.

Pillar 14

Developing the green hydrogen economy

What is the challenge?

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.' Green hydrogen cannot replace sustainably-generated electricity, but it is an essential raw material and fuel for industry, heavy goods traffic and shipping and aviation. In the longer term, hydrogen may play an important role in temporary storage and switching capacity in the energy supply. In order to achieve this, we need to launch a partnership with the key players in the region that are active in the hydrogen chain. We also need to ensure that the crucial preconditions, such as infrastructure and location policy for the development of hydrogen chains, are in place.

How will we get there?

NOW

At present, green hydrogen is still in the initial phase. The first promising hydrogen projects will take shape in the coming years.

SOON

To allow hydrogen to play a substantial role in the regional energy system from 2030, it will be necessary to build and scale up the production, distribution and consumption chain in the coming years.

LATER

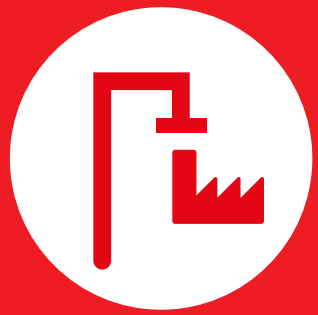
Green hydrogen becomes a standard part of the energy supply.

What are we going to do?

We will work with others to ensure that the crucial preconditions are in place. Our measures will include:

- Contributing to the realisation of a regional and national hydrogen infrastructure.
- Where possible, the municipality will play the role of 'launching customer' to boost the regional hydrogen market.
- Together with the Regional Agency for the Environment, designing regulations in such a way that they contribute to the development of a hydrogen economy.
- Participating in research aimed at the realisation of a one-gigawatt electrolysis plant in the North Sea Canal Area.
- Along with partners in the harbour and the region, mobilising demand for green hydrogen by inventorying the conditions under which parties would be prepared to commit to using green hydrogen.

Carbon capture, storage and utilisation



What is the challenge?

CCSU stands for 'carbon capture, storage and utilisation'. 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 no alternative fossil-free production methods for now. A growing number of parties is convinced that CCSU is an important measure for achieving a reduction in carbon emissions in a relatively short time. The Dutch government and Amsterdam also need to utilise CCSU in order to meet their carbon reduction targets. Carbon capture is most efficient in places where a high concentration of flue gases containing CO_2 is released into the atmosphere, such as waste incineration plants. In the future, the captured CO_2 can be used for the production of synthetic kerosene, which is essential for making aviation more sustainable.

Biomass will only be used if there are no sustainable and affordable alternatives. The municipality is cautious on this point, but does not exclude biomass as an alternative to natural gas in the heat supply.

How will we get there?

NOW

CCSU is currently in the research phase.

SOON

To be able to use CCSU, we will need to address various issues over time: the capture system, infrastructure, and use or storage under the North Sea. We want to have created this chain by 2030.

LATER

In the future, the captured CO_2 can be used for the production of synthetic kerosene, which is essential for making aviation more sustainable.

What are we going to do?

The municipality supports carbon capture, and our measures will include:

- Supporting AEB's carbon capture ambitions.
- Establishing partnerships for innovation in the production of sustainable fuels for shipping and aviation.
- Together with partners, developing a regional carbon infrastructure (ATHOS).
- Researching the role of biomass in Amsterdam's energy transition.

Pillar 16

Saving energy in industry

What is the challenge?

Industry uses natural gas and electricity. This leads to carbon emissions, which need to be cut radically 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), industrial companies will be subject to a national carbon tax from 2021. As a local authority, we have limited instruments available to manage the reduction of energy consumption and CO_2 emissions from industry. Although central government is the lead actor here, our options include discussions, cooperation and, in some cases, enforcement.

How will we get there?

NOW

There are fourteen industrial companies in Amsterdam with annual carbon emissions of more than 1 kt per company. Together they emit 275 kt of CO_2 each year.

SOON

By 2030, carbon emissions from industry in Amsterdam will have been halved at a minimum, in line with the National Climate Agreement.

LATER

By 2050, industry will have switched to 100% sustainable energy sources, as part of the harbour's role as a sustainable energy and raw materials hub.

What are we going to do?

Central government plays a major role with regard to industry. Our measures will include:

- Implementing the Environmental Management Act effectively, in partnership with the Regional Agency for the Environment.
- Together with the Province of Noord-Holland and the Regional Agency for the Environment, holding consultations with the largest industrial emitters on saving energy and reducing CO_2.
- For the Harbour Strategy 2021-2025, calling on the Port of Amsterdam to chart its clients' energy consumption and encourage these companies to switch from fossil fuels to sustainable alternatives.
- Calling on the Port of Amsterdam to manage its location policy in line with sustainability targets.

A citizen has their say

Mehrdad Gholani

Interpreter and proud resident of the Zuidoost district

"When it comes to sustainability, I'm a beginner. My reasons for trying to save energy are mainly economic, such as buying low-energy lightbulbs or turning down the heating. There aren't any solar panels on this building. I think that's something the housing corporation or municipality should sort out.

For the last couple of months, we've had separate refuse containers for different kinds of waste in our street. That motivates me to start separating waste. I think that's how it works for other people, too. The municipality takes the first step, showing we're worth it by investing in our neighbourhood, and then we have to take the next step. Zuidoost has really changed as a result, too. It's lovely and green here, and people enjoy wandering outside in the summer. I think that if people are happy, if there are low levels of crime or unemployment, then they are more prepared to get involved in sustainability issues.

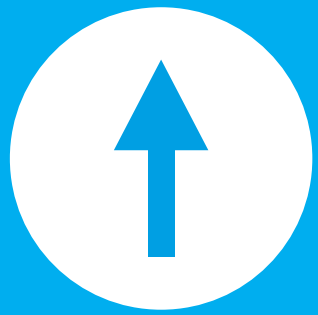
In the future, I want to separate my waste more and buy things more consciously, whether it's a new pair of shoes or a car. But I think that electric cars are still way too expensive."

What needs to be done?

To achieve a successful transition from fossil fuels to sustainable energy, we cannot 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 of Amsterdam can participate.

Pillar 17

Building the movement in the city



What is the challenge?

In the absence of governance, regulation and firm agreements with the larger parties, we will not meet our CO_2 targets. At the same time, we are deeply dependent on the thousands of smaller actions and projects by individual citizens and groups of people. Change is always a combination of individual choices and top-down, collective decisions, and the power of a transition l ies in the combination of the two. Citizens who want to get working on the transition can count on our support. We want to talk to them about what they are doing to contribute to the climate targets, and what they need for this. Based on their experiences, we will improve our procedures and policy. We are also learning about the solutions that citizens need, so that we can support them in the energy transition. We call this the 'Conversation with the City'.

How will we get there?

NOW

We are in conversation with the city in all kinds of ways. We are developing a more comprehensive understanding of where changes are occurring and where the obstacles lie. This allows us to optimise our offering to each target group and area.

SOON

Over time, we are using the New Amsterdam Climate platform (nieuwamsterdamsklimaat.nl) to unlock all the knowledge and information that citizens need, as they work out how to contribute to the energy transition. The platform helps citizens when taking every step.

What are we going to do?

We will help Amsterdam's citizens to get working on their initiatives and ideas, by providing a wide range of technical, organisational and sometimes financial assistance and advice. This is being done both online and offline, for example with initiative coaches, subsidies and online tools on the New Amsterdam Climate platform. Our measures will include:

- Holding an ongoing conversation with the city about the energy transition.
- Supporting and inspiring citizens to get involved with the energy transition, and supporting frontrunners in Amsterdam.
- Encouraging citizens with subsidies, loans and advice.
- Stimulating local ownership of the energy supply and sustainable mobility solutions.
- Continuously improving our service provision and removing barriers such as restrictive rules.
- Further developing the New Amsterdam Climate online platform.

Working towards a fair energy transition

What is the challenge?

Greenhouse gas emissions are leading to a decline in the quality of life around the world. Although people in the poorest countries have the smallest share in global warming, they are the most affected. They are the least equipped to arm themselves against the negative effects of climate change, and have little voice or responsibility in policy-making. This is also true of our children and the generations to come. And this means that the climate problem is a justice problem.

The energy transition affects all of Amsterdam's citizens, but the consequences are not equal for everyone. Some residents and neighbourhoods are vulnerable or will benefit less from the opportunities created by the energy transition. Climate justice is an important guiding principle for all activities designed to achieve a climate-neutral Amsterdam. We are developing this broad concept in three ways:

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

How will we get there?

NOW

Extra attention is being paid to low- and middle-income households in Amsterdam, to ensure that the costs of the energy transition are not distributed unfairly and housing costs do not rise. In 2017, 31% of low-income households in Amsterdam (those eligible for housing benefit) were affected by energy poverty. Energy poverty means that a household spends more than 10% of its income on energy consumption. We are going to reduce this share. We are on the eve of an energy transition that will have many consequences for the labour market. This will be anticipated with an employment policy, to be developed in 2020.

SOON

We will continue to seek opportunities to cut energy poverty. The energy transition will provide employment for more citizens.

What are we going to do?

We are interpreting the climate justice principle in the following ways:

- Implementing energy-coach projects.
- Building on the Pact of Amsterdam meeting to fight energy poverty.
- Organising open access for all of Amsterdam's citizens to the decision-making process.
- Developing a *Green New Deal* employment policy in line with the Human Capital Agenda of the Metropolitan Region Amsterdam (MRA).

Pillar 19

Boosting knowledge development and sustainable innovation

What is the challenge?

If we are to reduce carbon emissions sufficiently by 2030 and beyond, yet more plans and solutions will be needed. This will require us to investigate new and as-of-yet unexplored paths. It is all about innovation in the broadest sense of the word: technically, socially and economically. Innovative collaboration with and between parties will play a crucial role. Space is needed to try out new ideas and find out what does and does not work. In essence, this means giving each other space and security to do things differently, in the shared knowledge that regardless of whether an experiment succeeds or fails, we will keep learning until we have found a way that works. We will get working on a knowledge and innovation agenda for Climate and Energy. This agenda will bring together innovation issues relating to the climate-neutral city, and will be drawn up in cooperation with residents, the private sector and research institutes. We attach great value to international cooperation and knowledge-exchange. We participate in European and global networks for this purpose, and undertake projects with other cities. Together we are learning about what does and does not work, and thereby accelerating the transition in our own city and beyond.

How will we get there?

NOW

All of the planned actions and measures in this Roadmap add up to an expected CO_2 reduction of 48% compared to 1990. More solutions and plans will be needed to achieve the necessary additional reduction in 2030 and beyond. This will require innovation and cooperation. The additional measures will be developed in a Knowledge and Innovation Agenda.

SOON

The outcomes of the Knowledge and Innovation Agenda will form the basis for the new measures. We belong to international networks for sharing knowledge and experience.

What are we going to do?

We will encourage innovation and take measures that include:

- Establishing a Knowledge and Innovation Agenda, together with AMS and public and private partners.
- Participating in European collaborative projects and a global network of front-runner cities.

Space for the energy transition and infrastructure

What is the challenge?

The consequences of the energy transition for our surroundings and the design of the city will remain one of our greatest challenges in the coming years. An energy infrastructure is needed for the generation, transport and delivery of electricity, heat, (green) gas, CO_2 and hydrogen. This includes underground pipes and above-ground installations, for example. Adjusting the energy infrastructure will be an enormous task. It will require a great deal of space, yet there is little space in a compact and growing city such as Amsterdam, both above and below ground. This can lead to bottlenecks. We will search for smart combinations and opportunities that are efficient and appropriate for the city.

At the same time, projects to phase out natural gas in the city, fit solar panels or install wind turbines are already underway.

The energy transition is currently presenting the following challenges, which must be met by the city:

- Space for citizens' ideas and for experimentation and innovation.
- All new buildings and renovations are energy-neutral, at a minimum.
- Appropriate roof surfaces in Amsterdam for generating solar energy.
- Space for new wind turbines.
- The right heating and heat infrastructure in the right place.
- A new spatial distribution and design for a clean city with limited car traffic.
- Creating space and cleaning up the space above and below ground for the electricity and heat infrastructure.
- The harbour as a 'battery for the city, region and Europe.'

The New Spatial Vision for Amsterdam outlines the future vision of the city for 2050 and sets the course. The Regional Energy Strategy and the *Transitievisie Warmte* are serving as input. The Spatial Vision steers the process and provides key principles for the spatial translation of the energy transition.

What are we going to do?

We spelen een grote rol in de ruimtelijke ordening, de inrichting en het werken in de openbare ruimte en de regie op de ondergrond. We gaan in beleid, ruimtelijke planvorming en bij planning van werkzaamheden rekening houden met de benodigde ruimte voor de energietransitie boven en onder de grond. Dat doen we samen met buurgemeenten, MRA, provincie en Rijk. We gaan onder andere:

- Adopting the Spatial Vision.
- Meeting the utilities challenge with two building blocks:
  1) a strategic exploration of the substratum, and 2) a study of above-ground facilities.
- Delivering an integral design method for public space (Ontwerpmethode Openbare Ruimte).
- Implementing the workplan for the substratum 2020.

Financing and regulations

Transforming Amsterdam into a climate-neutral city will require billions in investment before 2050. These funds must be provided by both the government and society. The share that is covered by the municipal budget will gradually become clearer over time. In 2020, the municipality will provide a more detailed overview of the financing possibilities beyond the municipal budget.

Steering with legislation and appropriate national and EU legislation and regulations

The task ahead is not optional; regulations are increasingly transforming voluntary actions into mandatory ones. Take, for instance, mandatory energy-savings for companies, environmental zones for polluting vehicles, and standards for energy-neutral construction. From 2021, the Environment and Planning Act will provide municipalities with more steering options, including in the environmental plan (Omgevingsplan).

We want to be among the frontrunners. A number of national and EU preconditions on financing, law and regulations, the tax regime, and discretionary space for local policy and considerations will be crucial for local implementation of the National Climate Agreement, our carbon-reduction targets and the natural gas-free city. Where these are lacking, we will lobby central government and the EU.

Reporting restrictive rules

Residents and companies sometimes lose their way in the municipal bureaucracy, meaning that their sustainable initiatives or plans are delayed or fail to get off the ground. From mid-2019, a number of initiative coaches will work in the city, supporting sustainable initiatives and giving advice. They will function as a first port of call, have a good network in the city and the municipality, and have the right mindset to find sustainable solutions.

We are taking the following measures:

- Unnecessary and restrictive rules in Amsterdam (or internal processes and procedures) that hold back sustainable measures will be simplified, adapted or even abolished.
- Restrictive non-municipal regulations will be discussed in The Hague.
- In 2020 we will roll out the ‘Green Carpet’, making it simpler to install solar panels on monuments and in conservation areas. This approach can be broadened to cover other themes in future.
- Sharing experiences and step-by-step plans via the New Amsterdam Climate online platform, to boost sustainability.

Restrictive rules that hold back sustainable measures will be simplified, adapted or even abolished

Building a sustainable municipal organisation together

As a municipality, we want to make our contribution to a climate-neutral Amsterdam. We want to be a fully sustainable organisation by 2030. For this reason, we are using sustainable solutions in our operational management, buildings, and purchasing and tender procedures. By 2030, for example, we want to be climate-neutral and to have installed solar panels on all suitable municipal rooftops. We are taking energy-saving measures in our buildings and investigating the options for using alternative heat sources. We aim to have natural gas-free buildings by 2030, and are compensating for our use of natural gas during the transition. We want to develop 100% circular purchasing and commissioning by 2030, and are thus maximising our use of existing raw materials. We are taking measures to offset the negative consequences of climate change by installing green roofs and rooftop water storage, and greening inner areas. We also want to put sustainability at the heart of our way of working. We learn by doing, and we are constantly searching for new solutions. We are experimenting, innovating and sharing the knowledge we have gained with the city and within our own organisation. We are doing this actively, as swiftly as possible and in collaboration with our partners, including suppliers, entrepreneurs and our own employees.

As a municipality, we want to make our contribution to a climate-neutral Amsterdam. We want to be a fully sustainable organisation by 2030

A citizen has their say

Jutta van Ballegooijen

Partnership Manager at Plastic Whale

"Both at home and in my work at Plastic Whale, I'm very involved in sustainability issues. When I go shopping with my children, we always pick up plastic in the street on the way. That's because my children, like me, can't bear seeing litter in the street any more.

Next year, we want to renovate our house as sustainably as possible. Preferably with solar panels, but also with a green or sedum roof. I don't know if it's possible to have both at the same time, but I think a way should be found to combine the two. We also want a heat pump, and we eventually want to disconnect from the gas grid. I hope we succeed, because costs are always an issue. I'm currently trying to find out how we can best manage it all.

In my work at Plastic Whale, we want to inspire as many people as possible to take action and contribute to our mission to rid water around the world of plastic. We do this by literally fishing plastic out of Amsterdam's canals, but also by holding workshops and lectures. We use the plastic we've collected to make furniture and boats."

Colophon

New Amsterdam Climate
Amsterdam Climate Neutral Roadmap 2050
Public version

Set by the Mayor and cabinet on the 3rd of March 2020

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Alderperson Mrs M. van Doorninck (Sustainability)

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amsterdam.nl/klimaatneutraal
nieuwamsterdamsklimaat.nl