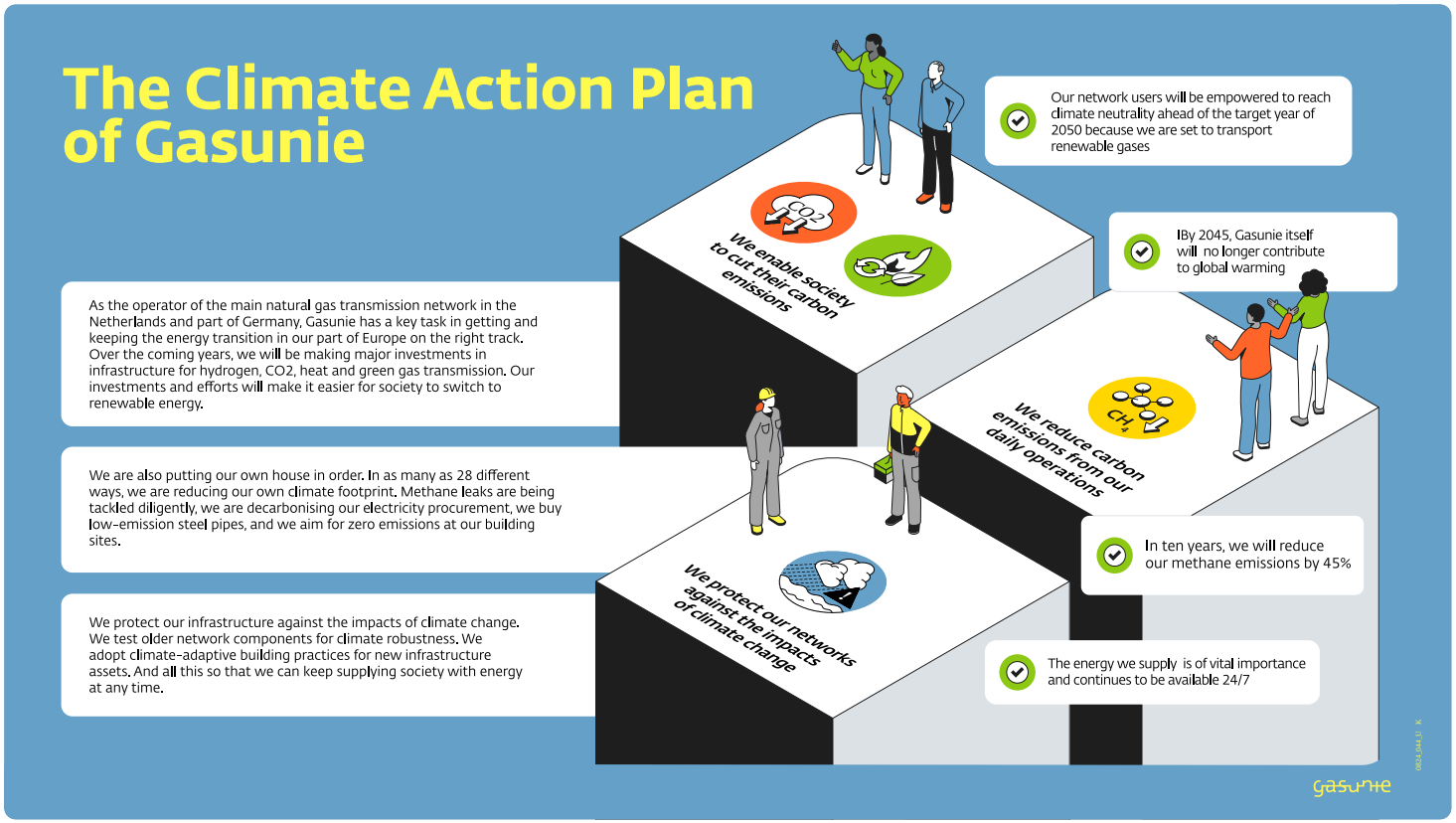
Action on three fronts

The Climate Action Plan of Gasunie

Inhoudsopgave

Summary


The Climate Action Plan of Gasunie
As the operator of the main natural gas transmission network in the Netherlands and part of Germany, Gasunie has a key task in getting and keeping the energy transition in our part of Europe on the right track. Over the coming years, we will be making major investments in infrastructure for hydrogen, CO2, heat and green gas transmission. Our investments and efforts will make it easier for society to switch to renewable energy.
We are also putting our own house in order. In as many as 28 different ways, we are reducing our own climate footprint. Methane leaks are being tackled diligently, we are decarbonising our electricity procurement, we buy low-emission steel pipes, and we aim for zero emissions at our building sites.
We protect our infrastructure against the impacts of climate change. We test older network components for climate robustness. We adopt climate-adaptive building practices for new infrastructure assets. And all this so that we can keep supplying society with energy at any time.
We enable society to cut their carbon emissions
We reduce carbon emissions from our daily operations
We protect our networks against the impacts of climate change
Our network users will be empowered to reach climate neutrality ahead of the target year of 2050 because we are set to transport renewable gases
IBy 2045, Gasunie itself will no longer contribute to global warming
In ten years, we will reduce our methane emissions by 45%
The energy we supply is of vital importance and continues to be available 24/7
gasunie

Foreword

Of all the transitions that are needed to curb climate change, the energy transition is one of the most important ones. As the operator of the main natural gas transmission network in the Netherlands and part of Germany, Gasunie has the crucial task to steer that energy transition in the right direction in our part of Europe.

Over the coming years, we will be investing heavily in infrastructure for hydrogen, CO_2, heat and green gas transmission and storage. Having the right infrastructure in place will make it easier for society to switch to renewable energy, while also interlinking energy networks for renewable electrons and renewable molecules into one single jointly operating whole.

This Climate Action Plan is a transparent summary of the actions that Gasunie is taking to combat global warming and protect our assets against the impact of this heating up of the Earth's surface. Compared to our first climate plan (July 2023), this second climate plan provides a clearer picture of our efforts and results.

We have taken into account the Corporate Sustainability Reporting Directive in compiling the document (CSRD). For investors, we are publishing our very first Sustainable Finance Report shortly after this Climate Action Plan to set out how our green bonds and sustainability-linked bonds are performing.

Successes and setbacks

We do not only have successes. There have also been setbacks in the energy transition that have occasionally caused renewable infrastructure projects to be delayed. On top of that, the Russian war in Ukraine has changed the gas landscape in Europe, with one effect of this being an increase in our total carbon emissions.

At the same time, however, the outlook for the longer term is good. We are confident that Gasunie infrastructure users will be able to achieve climate neutrality sooner than the Dutch government's target year of 2050. And we are also putting our own house in order. In this plan, we describe the 28 ways in which we are reducing our scope 1, 2, and 3 emissions and state our ambition to cease to be a net contributor to global warming by 2045.

Gasunie is taking the lead to bring parties together, making plans and, quite literally, rolling up its sleeves. We are doing this because new energy opens up a wealth of opportunities. With new energy, together we can bring about a clean future for generations to come. We have no time to lose.

Hans Coenen, Willemien Terpstra, Bart Jan Hoevers and Janneke Hermes

Executive Board of N.V. Nederlandse Gasunie

October 2024

1. Climate change and Gasunie

1.1 Action on three fronts

For as long as six decades now, Gasunie has been serving the public interest, providing safe, reliable, effective transmission of natural gas so that households and companies in our core markets have access to energy at any time.

Most of the gas that flows through our pipelines is of the fossil kind. Extraction, transmission and consumption of that gas all contribute to the heating up of the atmosphere. The European Union's goal is to become climate neutral by 2050. This means the EU is aiming for an economy with net zero greenhouse gas emissions

This is why Gasunie is transforming from a gas network company into an energy infrastructure company. We are in a unique position to get and keep the energy transition in our part of Europe on the right track. Transmission and storage of renewable gaseous energy such as green gas and hydrogen will be indispensable ingredients of the energy mix of the future, as will the transmission and storage of captured CO_2. Natural gas may play a smaller rol by 2050, in combination with CCUS (carbon capture, utilization and storage).

As we move towards a carbon-neutral future, Gasunie's knowledge, experience and expertise will continue to be important. And as we transform, we, as a public company, want to set the right example: we have identified opportunities in our day-to-day operations to reduce our own and our value chain partners' carbon footprint.

The fact that the atmosphere is already heating up is leading to an increase in weather-related risks to our infrastructures (referred to as 'assets' in the rest of this document), including extreme precipitation, drought, heat waves, and flooding. These risks can cause transmission interruptions and do damage to people and the environment.

Given all of the above, our Climate Action Plan is made up of three pillars:

Energy transition

We enable our network users to cut their carbon emissions.

Emissions

We reduce carbon emissions from our own operations.

Climate change adaptation

We protect our assets against the impacts of climate change.

We will share for each of these pillars what strategy we have developed, what actions we are already taking, what goals we have set ourselves, and what progress we have made towards those goals. In writing this plan, we also came up against gaps in our strategy, policy, and goals. In some aspects, the strategy has not been fully fleshed out yet, the policy formulated is not yet comprehensive enough, we have set too few goals, and too few goals have actually been achieved. There is also too little interconnection between our strategy, policy, goals, and achievements sometimes. We expect to fill many of these gaps over the coming years.

1.2 Climate change is material

‘Energy transition’ and ‘Emissions’ are material topics for Gasunie, i.e. topics that our stakeholders feel we should report on in our annual report. From 2024, reporting on the material topics will be a CSRD requirement. For the 2023 annual report, we identified our material topics based on the double materiality principle, as required by the CSRD. This means that we considered the relevance of our sustainability topics from two perspectives:

- Impact Materiality: the impact that Gasunie has on people and the environment (the inside-out perspective)
- Financial Materiality: the risks and opportunities that various developments and events (ESG and other factors) create for Gasunie (the outside-in perspective)

‘Energy transition’ and ‘Emissions’ are the topics for which Gasunie scores relatively high in terms of both impact materiality and financial materiality and where risks and opportunities have been identified. This outcome is comparable to that of the previous materiality assessments.

Energy transition: Accelerating the transition to a sustainable energy supply. With our infrastructure and knowledge, we want to enable our users to make the switch to zero-emission energy.

Emissions: Limiting the environmental impact of our processes, products and services by reducing GHG emissions and nitrogen deposition.

2. We enable our network users to cut their carbon emissions

2.1 Strategy

Gasunie pursues a three-pillar strategy resting on the foundations of our organisation.

Optimising infrastructure: We facilitate our customers as much as possible with our infrastructure. We keep our costs down while retaining our social licence to operate.

Connecting Europe: We strengthen our position in our core area (Netherlands and Germany) through partnerships and greenfield projects. We advise on how to maintain security of supply and a liquid gas market.

Accelerating the energy transition: We lead the way in hydrogen and green gas and we play an active role in developing CO_2 and heat transmission infrastructure.

Foundations of our organisation: We create a workforce with the right proportions and skills. We create a work environment and working conditions geared towards increasing focus, performance, a sense of purpose and job satisfaction. We continuously improve our governance, processes and collaboration.

Energy transition

Over the past few years, accelerating the energy transition has become an important, if not the most important, driver for Gasunie's strategy and the reason why we have decided to transform our company from a gas transmission company into an energy infrastructure company.

In the 2020s, we have invested and will continue to invest in sustainable energy infrastructure on a major scale. We will reap the benefits of these investments in the 2030s and 2040s, as it will be easier on the demand side for society to switch to renewable energy and on the supply side to interlink different networks for electrons and molecules into one single jointly operating whole in what we refer to as 'system integration'.

This is because we believe in a sustainable future with a balanced energy mix and a lasting role for diversified molecules. We believe that we serve our customers best with innovative energy infrastructure solutions.

The road to zero

The Netherlands has charted an ambitious decarbonisation pathway, aiming to reduce greenhouse gas emissions by 55% by 2030 compared to 1990 levels, with further targets of 70% reduction by 2035, 80% by 2040, and ultimately net-zero emissions by 2050. This pathway means that carbon emissions will have to be cut at a faster rate of six instead of two megatonnes on average per year.

Hitting the above targets will require significant investment and innovation across all sectors, especially in energy-intensive industries and home heating. The challenge is further compounded by the fact that a relatively large share of the Netherlands' total emissions are what's referred to as 'hard-to-abate emissions': 41% compared to 25% in Germany and 31% in the United Kingdom (source: McKinsey). These hard-to-abate emissions include emissions from industries with production processes that are difficult to electrify.

2.2 Policy

In 2020, Gasunie captured its strategy in an outlook for the coming ten years: Vision 2030. Over this current decade, we will transform from a gas transmission company into a broad energy infrastructure company by 2030[1], we will be a company that transports, stores and treats natural gas, green gas, hydrogen, CO_2 and heat in a safe, reliable, affordable and sustainable way.

We will play a key role in achieving the ambitious climate goals set in the Netherlands, Germany and the European Union. Every financial year, we update the investment agenda linked to Vision 2030 in our annual report. Gasunie has a Vision 2030 for each form of energy, as outlined in the 'Action plans & Resources' section.

Our strategy, and with that our energy transition strategy, has been prepared by our board of directors and greenlit by our Supervisory Board, having heard our sole shareholder, the Dutch Ministry of Finance. Regulatory authorities in the Netherlands and Germany are kept informed of our energy transition strategy through investment plans.

By cutting carbon emissions, Gasunie is contributing towards the United Nations' Sustainable Development Goals (SDGs). Our efforts primarily go towards SDG 13 (climate action) and SDG 9 (industry, innovation and infrastructure). In addition, we also contribute to SDG 7 (affordable and clean energy) and SDG 17 (partnerships for the goals).

SDG 13: Take urgent action to combat climate change and its impacts

SDG 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy

SDG 17: Revitalize the global partnership for sustainable development

[1] Gasunie is currently working on a review of the business strategy and on the follow-up to Vision 2030: Vision 2040. In both the revised strategy and Vision 2040, climate efforts will feature more prominently than in the current strategy and Vision 2030.

2.3 Action plans

Vision 2030 for natural gas

In 2030, demand for natural gas in the Netherlands has declined, ranging between 55% and 72% of 2020 levels (volume) of natural gas consumption. In 2030, Gasunie is ensuring that the Netherlands has sufficient physical import points for natural gas. We add nitrogen to part of the imported natural gas so that the Dutch market receives sufficient gas of ‘Groningen quality’, which is referred to as ‘pseudo G-gas’. In Germany, where they are switching from nuclear energy and coal to natural gas at the moment, demand for natural gas on the way to 2030 has remained roughly the same. Gasunie is helping industries switch from coal to natural gas or hydrogen to meet their energy needs.

Vision 2030 for hydrogen

On the way to becoming a zero-emission society, natural gas is increasingly being replaced by hydrogen, especially in manufacturing and industry. Our relatively shallow North Sea is suitable as a location for the generation of large volumes of wind energy. This wind power can be used to make hydrogen. Tankers bring in liquefied hydrogen and hydrogen carriers to Europe from overseas, which can be easily unloaded at our seaports. Underground salt layers in certain locations in the Netherlands and northern Germany lend themselves well to building caverns to store gases. By 2030, Gasunie has developed transport infrastructure for hydrogen in the Netherlands (Hynetwork) and northern Germany (Hyperlink) that connects hydrogen suppliers with hydrogen buyers.

Vision 2030 for CO_2

Carbon capture and storage (CCS) is one of the very few options that energy-intensive industries, such as refineries, chemical plants, steel producers, waste processors, cement producers, have to avoid large amounts of carbon emissions at a relatively low cost. CCS allows these industries to contribute to meeting the climate targets and keeps them in our economy. In 2030, Gasunie is active as an operator of pipelines used to transmit CO_2 to transfer hubs and to reservoirs deep under the sea through projects such as Porthos and Aramis.

Vision 2030 for heat

In the Netherlands, in 2020 roughly 90% of the required heat came from fossil fuels (mainly from natural gas), with just under half of that used to heat homes, offices and other buildings. In urban areas the reuse of waste heat, i.e. heat as a by-product of industrial processes, has proven a cost-effective alternative. In 2030, Gasunie is transporting waste heat from the Port of Rotterdam and renewable heat from other sources to The Hague, Delft, Leiden and surrounding areas.

Vision 2030 for green gas

The Netherlands must produce 2 billion m^3 of green gas by 2030, according to the Dutch Climate Agreement. Some of this will be fed directly into Gasunie's main transport network. To achieve this, by 2030 we have enabled initiatives for scaling up green gas production methods, for example through gasification and anaerobic digestion. Being the same quality as Groningen gas and entirely carbon-neutral, green gas is a sustainable alternative to natural gas.

2.4 Resources

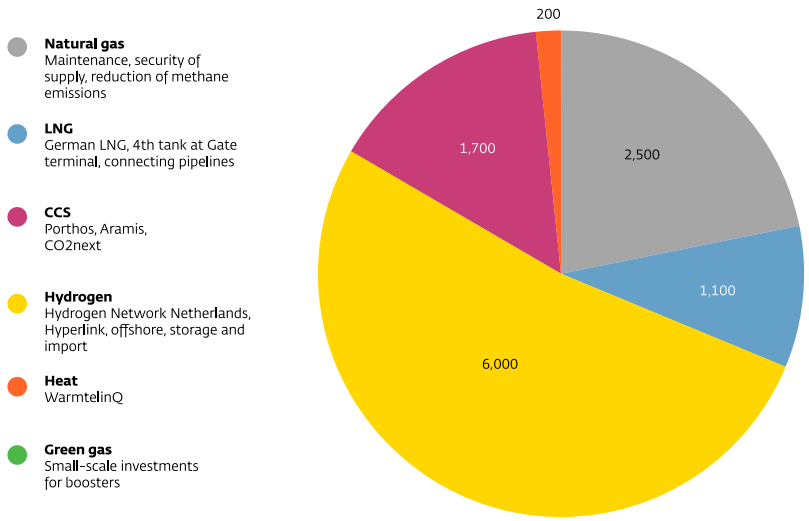
According to our current estimates, the value of Gasunie's total net[2] investment agenda from 2024 through to 2030 will come in at around € 11.5 billion. Of this amount, around € 7.9 billion is expected to be spent on energy transition projects.

We expect the vast majority of these projects to, either immediately or gradually, be made subject to regulation, meaning that we will market these assets at regulated tariffs.

For each project we look at tailor-made solutions that will keep the development and operating risks under control. There is a decision-making process for each project. Investment decisions are made by the Executive Board.

[2] We want to carry out a number of projects with partners. The graphic shows only Gasunie's share of the expenditures. The amounts shown are net of subsidies.

Gasunie's investment agenda through to 2030 (in millions of euros)



2.5 Risks and opportunities

Based on the double materiality assessment

Based on the double materiality assessment, enabling the users of our networks to reduce their carbon emissions leads to the following risks and opportunities for us:

Inside-out impact/risk (Impact materiality)

Positive

Offering access to energy with net-zero greenhouse gas emissions and/or CCUS enables downstream parties to reduce their greenhouse gas emissions and thus combat global warming.

Outside-in impact/risk

(Financial materiality)

Negative

In the long run, these developments will take away the need for natural gas imports, storage, and transmission, which are Gasunie's current source of income.

Positive

The transition to energy with net-zero greenhouse gas emissions creates a need for additional transmission infrastructure for green gas, hydrogen, heat and CO2, both onshore and offshore. However, it remains to be seen whether the total volume of energy transported will be on a par with current natural gas volumes.

Negative

Gasunie may face misalignment between market demand and strategy due to de-industrialisation, electrification, and energy flows not transported through our assets, which can lead to an inability to carry out our strategic investment agenda, reduced growth potential, and declining profitability.

Based on our strategy

Based on our strategy, enabling the users of our networks to reduce their carbon emissions leads to the following risks and opportunities for us:

Geopolitics

OPPORTUNITY

Ranging from the Paris Agreement to EU and national policy measures, legislation is being passed left, right and centre to combat climate change. If we want to hit the net-zero targets by 2050, the energy system will have to change: further electrification with renewable power, the development of renewable gases and the use of CCUS to cut carbon emissions; initially to wean ourselves from fossil fuels and ultimately to create negative emissions.

OPPORTUNITY / RISK

The trend towards further globalisation is thwarted by Russian aggression and China's assertive behaviour. The United States is reinforcing its America First strategy. In an increasingly uncertain world, Europe continues to be dependent on imports for many products, including energy. This dependency is something that needs to be addressed, as it debilitates Europe's position in the world. Production of electrons (offshore wind) and molecules (hydrogen) in the North Sea can provide greater energy autonomy.

RISK

Rising energy costs put European economies' competitiveness to the test. The energy transition is likely to lead to higher energy costs for industry and households. Economic growth is already low in Europe. In order to stay competitive, the costs of the energy system need to stay affordable.

Energy system

RISK

The political, stakeholder, and economic environment is less stable and less predictable. The world around us is more dynamic and more uncertain. Policy objectives change increasingly quickly, shifting from sustainability to affordability or security of supply, for example.

OPPORTUNITY / RISK

More interruptions, decentralisation, and electrification. The major problems with electrification, such as congestion, long waits for a connection, and rising network tariffs, show that there is a need for an interconnected, integrated energy system. Molecules can contribute very cost-effectively to transporting and storing energy because of their high energy density. Pipelines, storage facilities, and cables are all needed for a system that is balanced and reliable, as well as affordable. This requires effective policy, cross-sector collaboration, and faster permitting and planning procedures.

OPPORTUNITY / RISK

The Netherlands has transformed from being a net exporter to being a net importer of energy. Even though TTF continues to be Europe's leading natural gas trading hub, the Netherlands has become an importing European nation like so many others. We are well positioned to be a prominent player in the CCUS domain, thanks to our storage facilities in the Netherlands, but we are competing with other countries around the North Sea. When it comes to hydrogen, we have the benefit of having started early and being able to reuse existing assets. That being said, other countries are also well positioned to galvanise the market.

Internal

OPPORTUNITY / RISK

We are confronted with increasing complexity and uncertainty in our company due to the development of infrastructure for new value chains. These new value chains require new skills and new ways of working: the new asset portfolio we are developing involves risk profiles that differ from those of our current CH4 value chain. There is also growing complexity in customer needs and timing requirements for connections (methane, hydrogen, CO_2, heat). Changing demand in terms of volume and mix leads to different needs of existing and new customer groups, as well as strong growth in our portfolio. This means that we have to rapidly grow our workforce.

Based on the II3050 scenarios

Energy grids connect energy supply with energy demand. The transmission of green energy requires major investments for installing new grids and adapting existing grids. Since we do not know what the world will look like, we consider four cornerstone scenarios within which the carbon-neutral society is likely to take shape in 2050. The Integrated Infrastructure Survey 2030-2050 (II3050) sets out these scenarios in detail.

As a result of the close collaboration between Gasunie, TenneT, regional grid operators and other stakeholders in drawing up this vision, II3050 is a broadly supported outlook and guidance for government bodies, market parties and grid operators. It is Gasunie's social duty to be able to serve society with our infrastructure in all circumstances.

The four future scenarios from II3050

National leadership

- Limited shrinkage of industry.
- New industry synthetic molecules based on recycled carbon and DAC.
- Strong electrification.
- Very high renewable generation, limited nuclear.
- Most district heating networks.

European integration

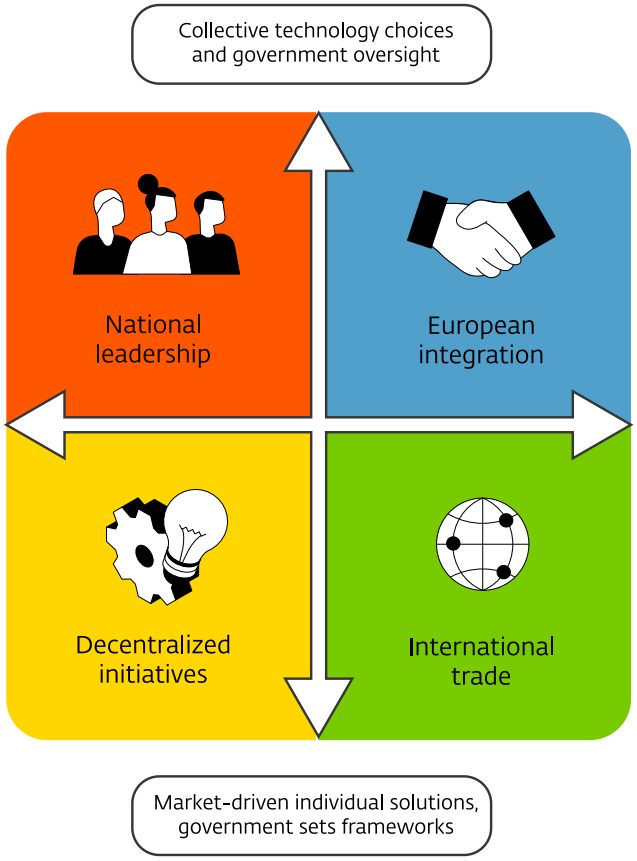
- No to very slight decline in industry.
- New industry synthetic molecules based on CCU and bio carbon.
- Green gas, including imports, alongside electrification and hydrogen.
- CCS remains and blue hydrogen.
- Partly H2 in the built environment.
- Base load nuclear energy.

Decentralized initiatives

- Strong decline in energy-intensive industry.
- Departure of certain industries.
- Strong electrification, but also hydrogen in the industry.
- Very high renewable generation.
- "Energy hubs".

International trade

- Strong decline in energy-intensive industry.
- Relocation of certain industries abroad.
- Lots of hydrogen alongside bio, CCS, DAC and elektrification.
- Lots of H2 import.
- Full H2 in the built environment.



The key conclusions from the II3050 report for Gasunie are:

- Hydrogen, green gas, heat and CCUS will be key elements in bringing about a zero-carbon future;
- Over the 2030-2040 period, we will need to more or less double the hydrogen transmission network planned to be completed by 2030, an expansion that can largely be facilitated by our existing gas infrastructure;
- The storage of hydrogen is essential if we are to keep the supply and demand for energy in balance in the future. This can be done in abandoned salt caverns in the Netherlands and Germany;
- Research is needed to determine the extent to which we can store hydrogen in depleted gas fields. Such storage facilities can play a key role as a strategic buffer during periods of insufficient solar and wind energy generation and as a backup if we lose a portion of the imports;
- The CCS network is not only a short-term solution: it will serve us in the long-term too. In the short term, we will transport captured CO2 to offshore storage fields to reduce industrial carbon emissions. In the long term, we will transport sustainable CO2 to industry for production processes that are currently still based on fossil resources (like oil).

The main understanding we draw from II3050 is that regardless of how the energy transition plays out, Gasunie has an important role to play. However, the opportunities and risks for our company differ per scenario. We have illustrated this in the visual below.

Risks and opportunities for Gasunie in the II3050 energy transition scenarios

Decentralized initiatives	Sustainable revenue model	Technology choices	Labor market	Geopolitical influence on utilization rate or business development	Climate goals
Risks	Tariff increase for GTS due to decreasing network utilization. Risk of reputational damage and reconsideration of regulation.	Offshore wind, offshore electrolysis and nuclear energy are only limitedly realized. Green hydrogen is only needed for power plants and industry.	x	Citizens and local communities make their own choices within their own sphere of influence. No place for large-scale national and international projects.	Delays in Gasunie projects pose a risk to achieving national and international climate goals.
Opportunities	Realization and management of hydrogen storage capacity.	Offshore wind, offshore electrolysis and nuclear energy are only limitedly realized. Green hydrogen is only needed for power plants and industry.	Relief on tight labor market due to regional networks not being converted and because certain industrial companies are leaving the Netherlands.	x	x

National leadership	Sustainable revenue model	Technology choices	Labor market	Geopolitical influence on utilization rate or business development	Climate goals
Risks	Tariff increase for GTS due to decreasing network utilization. Risk of reputational damage and reconsideration of regulation. Financial risks due to large investments in the offshore hydrogen network.	Offshore wind leads to strong electrification in all sectors. Many end users opt for technologies that fall outside of Gasunie's strategy. CCS becomes less important after 2030. Short depreciation time for offshore CO2 pipelines.	Gasunie is attracting too few personnel to realize the hydrogen network on time.	x	Delays in Gasunie projects pose a risk to achieving national and international climate goals.
Opportunities	x	Heat transport required due to mandatory connection to district heat networks. Significant H2 storage and transport needed onshore. Large H2 network at sea required to connect electrolysis and interconnection. Onshore CCS investments retain earning potential due to demand for sustainable carbon for synthetic fuels and materials production.	x	The government participates in large-scale projects of national importance and is committed to retaining the major industries and attracting new industries (synthetic fuel and raw material production) to the Netherlands.	x

European integration	Sustainable revenue model	Technology choices	Labor market	Geopolitical influence on utilization rate or business development	Climate goals
Risks	Limited increase in GTS tariffs. Many investments needed in green gas boosters and gathering pipelines.	x	Gasunie is fully engaged in green gas, hydrogen and CO2. Tightness in the labor market across the entire chain, projects may not be completed on time.	x	Delays in Gasunie projects pose a risk to achieving national and international climate goals.
Opportunities	Netherlands attractive for existing and new industry and as a transit country for energy. Positive for the financial operation of Gasunie assets. Large-scale application of CCS, including BECCS and for the production of low-carbon H2. Also storage of CO2 from neighboring countries. Prolonged use of Gasunie assets.	Due to the large supply of green gas, the GTS natural gas network remains largely in place. Also, in the built environment, a significant capacity of the natural gas network is still required through hybrid heat pumps.	x	Limited geopolitical risk due to the strong focus on European energy production and protectionist industrial policy.	x

International trade	Sustainable revenue model	Technology choices	Labor market	Geopolitical influence on utilization rate or business development	Climate goals
Risks	The departure of part of the industry puts pressure on the payback period of the H2 network. Natural gas usage is decreasing significantly. Green gas is growing, but remains small in scale. Utilization of the GTS network is dcreasing.	A large H2 network is needed for industry, horticulture, mobility, the built environment and transition. Gasunie needs to invest heavily in people and capital.	Tightness in the labor market, despite the departure of part of the industry. Reputation damage if Gasunie cannot meet high societal expectations.	Dependency on imports leads to higher prices for energy and materials during geopolitical tensions.	x
Opportunities	Dominant position of H2 in the energy system. Many existing pipelines can be used for hydrogen. Upward pressure on gas transport tariffs remain limited.	CCS is important for achieving the 2030 goals. It remains essential after 2030 to achieve negative emissions. Storage of CO2 from neighboring countries.	x	x	Delays in Gasunie projects do not pose a risk to achieving national and internationnal climate goals.

The Cluster Energy Strategies

Gasunie's infrastructure (today and in the future) is particularly important for (energy-intensive) industry. In the Netherlands, industry and network operators are working increasingly closely together to align their respective sustainability plans. This culminated in the publication of the third edition of the Cluster Energy Strategies (CESs) in September.

These publications provide an overview of the sustainability plans of the Netherlands' largest industry clusters. These clusters are the northern Netherlands, the North Sea Canal Area, Rotterdam-Moerdijk, Zeeland province, the Chemelot chemical industry park in Limburg province, and companies in other regions (the 'sixth cluster'). For the third edition of the CESs, Gasunie and other network operators were closely involved in compiling this publication from the very beginning, which led to better insights.

Gasunie worked closely together with the clusters and other network operators. Our involvement amounted to surveying the 50 largest industrial companies on their sustainability plans through data formats and interviews, validating their plans, and conducting an initial analysis of how these plans line up with our infrastructure plans and the future energy system. Each CES contains such an infrastructure analysis and each cluster publishes its own CES.

While there is no guarantee that all sustainability plans surveyed will actually be carried out, taking stock of the plans and their uncertainties enables network companies to develop infrastructure at a faster rate and with greater customisation. This is how the CESs help overcome the chicken-or-egg problem of industry only investing once they know for sure that the infrastructure is there, while network companies only invest once they know for sure that the infrastructure will be used.

What picture do the new CESs paint?

- Demand for methane (natural gas and green gas) is declining less rapidly due to developments in blue hydrogen and there may continue to be demand for methane in the long term.
- There are more plans for carbon capture and storage (CCS), partly on the back of developments around blue hydrogen.
- In the short term, demand for hydrogen is stable. In the long term, we are still seeing a potential underestimation of demand, mainly because we do not yet have a clear idea of what new industry (such as synthetic fuel production) is yet to develop.
- Partly due to an element of incompleteness in the CES (especially with regards to imports), the supply of hydrogen is slightly lower.
- Demand for electricity will continue to rise in several clusters.

2.6 Measurable goals

Gasunie is building a broad portfolio of heat grid, hydrogen and CCUS projects. The first investment decisions have now been made, driven by a broader definition of value creation and not only by maximising financial returns. The energy transition projects Gasunie is developing will enable Gasunie grid users to cut many megatonnes of emissions in the coming years.

Gasunie helps grid users cut many megatonnes of emissions annually on the way to 2030*

Project	2022	2023	2024	2025	2026	2027	2028	2029	2030
Hydrogen	0.0	0.0	0.0	1.3	2.7	3.3	4.0	5.6	8.7
CCS	0.0	0.0	0.0	0.0	1.3	2.5	6.3	10.0	15.0
Green gas	0.1	0.1	0.2	0.2	0.6	0.9	1.2	1.5	1.8
Heat	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Total:	0.1	0.1	0.2	1.5	4.7	6.8	11.5	17.2	**25.6**

* We published a similar table in the 2022 annual report. Our expectations at that time were as follows:

- for hydrogen: (2025: 0.9) (2026: 2.5) (2027: 3.0) (2028: 3.5) (2029: 5.2) (2030: 6.7);
- for CCS: (2025: 1.3); (2026: 2.5); (2027: 5.6); (2028: 8.8); (2029: 12.5); (2030: 12.5).

Gasunie investments in Hyperlink cut carbon emissions in Germany by megatonnes annually

Hyperlink Germany	2022	2023	2024	2025	2026	2027	2028	2029	2030
Hydrogen	0.0	0.0	0.0	0.0	0.0	1.7	2.2	2.6	4.5

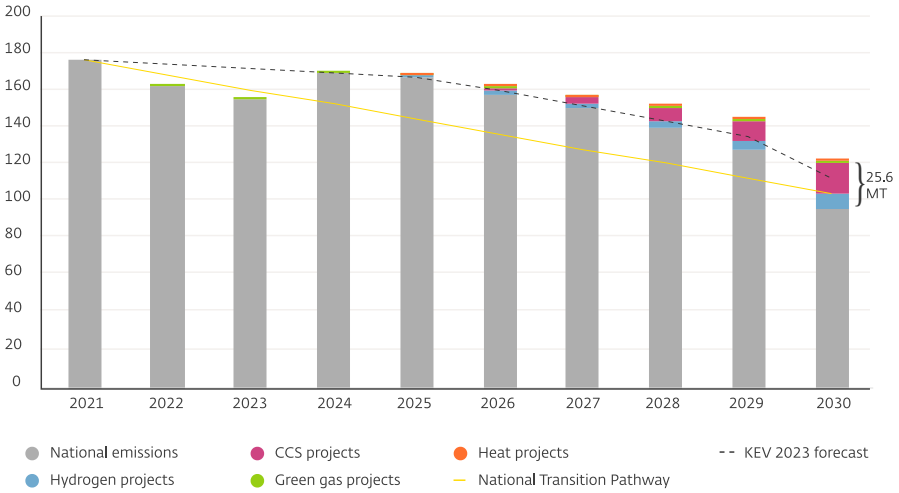
Our investment plans for the German national hydrogen transmission network Hyperlink can also deliver several megatonnes of carbon cuts and contribute to Germany moving further along its transition pathway.

The Netherlands aims to be climate neutral by 2050. To get there, as a country the Netherlands must cut its average carbon emissions every year over the coming decades: it needs to the what's called the National Transition Pathway (see the yellow line in the bar charts below). However, as can be seen in the Climate and Energy Outlook (C&EO) report published by PBL Netherlands Environmental Assessment Agency, the Netherlands is lagging behind on this pathway (see the dotted line in the bar charts below).

If Gasunie were to be facilitated in implementing its current investment programme in the coming years completely and without delay, we in turn would be able to facilitate the Netherlands in closing a significant part of the gap between the Climate and Energy Outlook and the Transition Pathway. We think that, through our energy transition projects, grid users can cut 25.6 Mt of carbon emissions by 2030. To illustrate: the Netherlands' total carbon emissions in 2022 were 158.4 Mt.[3]

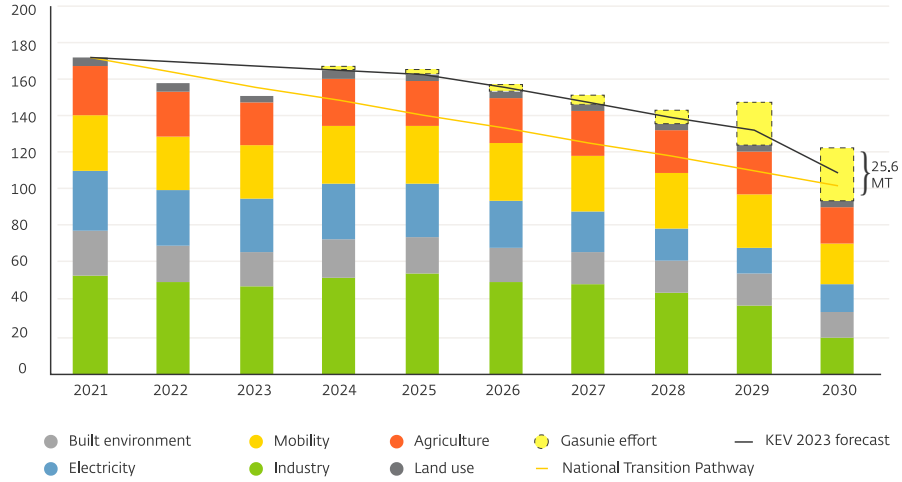
[3] Statistics Netherlands (CBS), Emissions of greenhouse gases according to IPCC guidelines

Investments ensure that the Netherlands does not lose sight of the Transition Pathway (figures in Mt/year)



The chart above shows the avoided emissions in the Netherlands facilitated by Gasunie; for 2030 these are expected to be 25.6 megatonnes (Mt). Gasunie's transition investments mainly ensure carbon reductions in the industry and built environment sectors. If other sectors in the economy play their part, the rest of the gap can be closed, too, and we will stay on track to become carbon neutral in the Netherlands by 2050.[4]

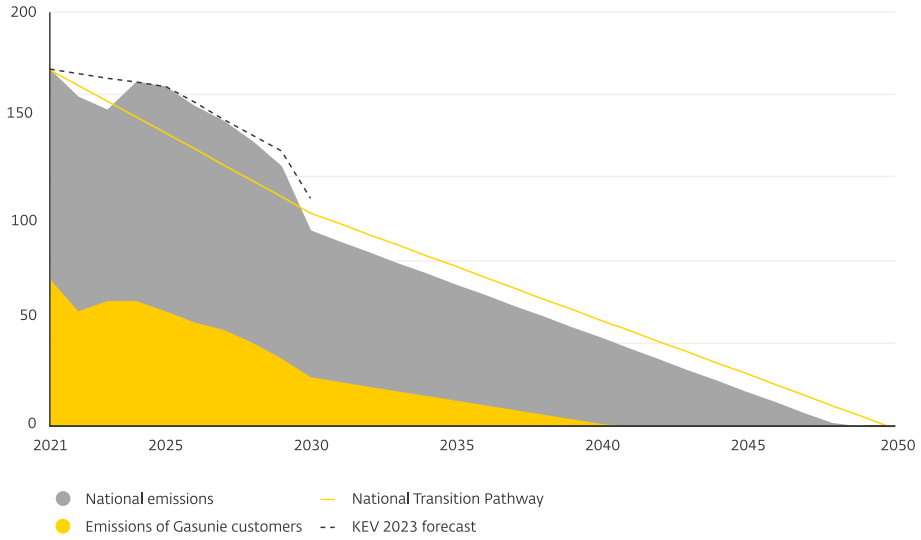
Other sectors must also play their part in closing the gap (figures in Mt/year)



The effect of our investments up to the end of 2030 is also apparent if we extend the horizon to 2050, as shown in the illustration below. Users of the Gasunie infrastructure will then emit less CO_2 (see the yellow area) and can even achieve net-zero emissions sooner than the national target date.

[4] See the appendix to this document for an explanation of our calculations.

Gasunie infrastructure users can reach climate neutrality sooner than the target date (figures in Mt/year)



Gasunie will still have a big job ahead of it after 2030. The hydrogen system in particular will need to be expanded, and we also foresee further growth in green gas and follow-up investments in CO_2 transmission. For an explanation of our contribution to the National Transition Pathway, see the appendix to this Climate Action Plan.

We are, for now, only considering the effects of our investments between 2020 and 2030. A new series of Gasunie investments for the period from 2030 to 2040 could lead to a steeper decline along the Dutch transition pathway.

2.7 Achievement of our goals

In 2023, our sustainable energy grids helped grid users reduce their emissions by 0.1 megatonnes. This is in line with the ambition we had set ourselves for that year.

In late 2023, we made the final investment decision for the first projects from the Vision 2030 portfolio. While we are seeing some slowing of the development of our hydrogen portfolio through to 2030, our CCS portfolio has grown. Gasunie is not allowed to get involved in the production of gases (renewable or otherwise), but we are working to increase the share of renewable gases in our network by enabling the transmission and storage of such energy carriers.

We recalculate this contribution to the National Transition Pathway every year, taking the latest knowledge and insights from within the company and from external parties into account. Compared to the 2022 reporting year, we anticipated later-than-expected commissioning of the Porthos project but higher reduction levels in the 2023 reporting year, as well as lower-than-expected utilisation of the national hydrogen transmission network. We were also able to draw on new emission forecasts from the 2023 Climate & Energy Outlook.

The Vision 2030 investment portfolio is adapted on a regular basis to market demand and permitting process lead times. At the time of writing this plan, we went by the following forecasts for the pending final investment decisions and the completion timelines:

Type	Project	Year of FID*	Year of completion*
Heat	WarmtelinQ Vlaardingen-Den Haag	2021	2025
CO2	Porthos	2023	2026
Hydrogen	Waterstofnetwerk Rotterdam	2023	2025
Heat	WarmtelinQ Rijswijk-Leiden	2023	2027
Heat	WarmtelinQ Vondelingenplaat-Vlaardingen	2024	2026
Hydrogen	Hyperlink -1	2024-2025	2027
Hydrogen	Hyperlink-4	2024-2025	2027
CO2	Aramis	2025-2026	2028
CO2	CO2next	2025-2026	2028
Hydrogen	Hyperlink-3	2024-2025	2028
Hydrogen	Hyperlink-5	2024-2025	2028
Hydrogen	Hyperlink-2	2024-2025	2029
Hydrogen	Hyperlink-6	2024-2025	2030
Hydrogen	Hynetwork**	2024-2027	2030
Hydrogen	Hystock 1e caverne	2025-2026	2030
Hydrogen	Hyone	2025-2026	2031-2032

** estimate if this year is in the future*

*** Gasunie is working on an updated rollout plan for Hynetwork because the construction and delivery of the Delta Rhine Corridor has been delayed. In doing so, we are exploring the possibility of developing alternative routes.*

2.8 Financial impact

Given that Gasunie sells natural gas transmission and storage capacity to third parties, Gasunie's cash flow is relatively predictable. How much revenue we are allowed to generate from this core business is determined annually by the regulatory authorities in the Netherlands and Germany, i.e. ACM and BNetzA respectively. In determining this, they consider the infrastructure management and maintenance costs incurred by Gasunie today and over the coming decades.

Under Vision 2030, Gasunie aims to invest a total of € 11.5 billion, with € 3.6 billion for maintenance and replacement and € 7.9 for new CO_2, hydrogen, heat and green gas transmission and storage infrastructure projects. We expect that at least the new business units that will operate in the hydrogen and heat domain to also come under the supervision of the regulatory authorities.

We intend to use borrowed capital to fund a substantial part of our energy transition investments, preferably borrowed capital in the form of green bonds, i.e. bonds where the proceeds are invested in energy transition projects in full. Another part of the investments will be financed from our own cash flow and through grants from the Dutch state. On the back of these investments, our balance sheet total will nearly double to around € 20 billion by 2030.

Degree of regulation of Gasunie's future portfolio of activities

Fully regulated	Interim agreements with government, fully regulated in time	Partly regulated and/or long-term contracts	To be divested
Gasunie Transport Services (GTS)	Hyperlink	BBL	SCW
Gasunie Deutschland (GUD)	Hynetwork	Gate	
	HyStock	EemsEnergyTerminal	
	WarmtelinQ	German LNG	
		Energystock	
		Porthos	
		Aramis	
		CO2next	

Methane · Heat · Green gas · Hydrogen · CCS


3. We reduce carbon emissions from our day-to-day operations
100% ELEKTRISCH
E88.1

3.1 Strategy

The transmission of natural gas requires energy, energy we use to keep the gas grid at pressure, to blend natural gas with nitrogen, and to compensate for frictional losses during transmission. Gasunie uses natural gas and electricity for this. Burning this natural gas and generating this electricity produces CO_2 and NOx emissions.

Gasunie Transition Pathway Calculator

To make our societal contribution to carbon-neutralising the Netherlands even more transparent, Gasunie posted the Gasunie Transition Pathway Calculator. In our base scenario, all new-build projects between now and 2030 will be operational by the delivery year we have set. Using this calculator, everyone can calculate the situation in more favourable and less favourable scenarios. Our Transition Pathway Calculator considers the effects of our investments between 2020 and 2030 and is updated annually.

Furthermore, methane (natural gas) is emitted to the air during management and maintenance work on our infrastructure. Methane (CH_4) is a potent greenhouse gas. We have to deal with so-called ‘fugitive emissions’ (natural gas losses due to leaking connections in Gasunie’s gas transmission network) and controlled emissions (gas vented from pneumatic regulators, depressurising compressors, gas vented during work).

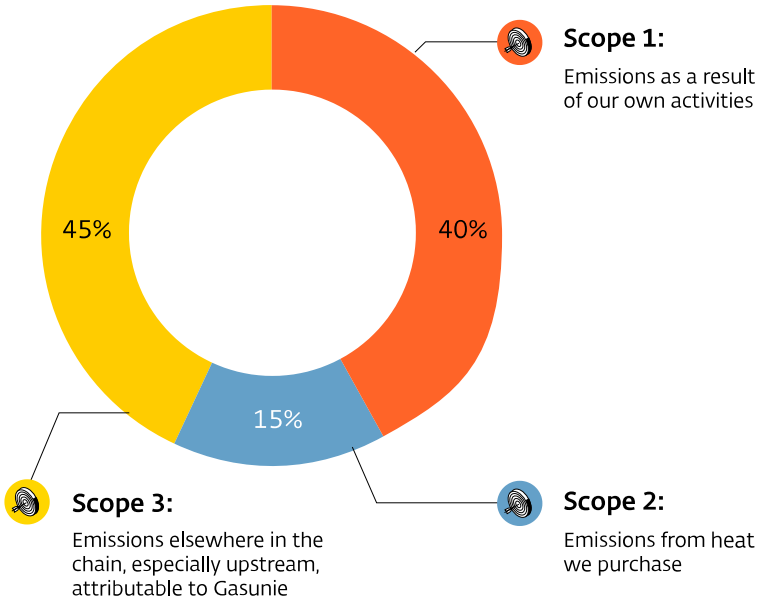
We want to help society switch to a carbon neutral energy system, and we set the right example ourselves as well, by reducing both our energy consumption and methane emissions where possible. Only then will we be able to retain our social licence to operate. As a state-owned company, we have to be an example to follow.

3.2 Policy

Gasunie pursues an integrated policy for the reduction of CO_2-related emissions. Our CO_2e emission reduction policy applies to all Gasunie-operated energy-consuming assets in the Netherlands and Germany. These can also include assets owned by associate companies or third parties but operated by Gasunie. The policy also applies to future assets that fall into this definition.

Through to 2023, our policy revolved around emission reduction targets for 2030, with 2020 as the base year. As of 2024, the target in our policy has shifted to reaching net-zero emissions by the year 2045. Net-zero means cutting the volume of emissions to below 10% of the 2020 level, while offsetting remaining emissions through responsible carbon offsetting measures. Where possible, we do this based on criteria that are similar to those of the Science Based Targets initiative (SBTi). In evaluating our road to zero, we are going by emission data from 2023 as a well developed starting point. Where necessary, we recalculate cost and emission calculations based on this point of reference.

Distribution of Gasunie's CO_2-related emissions (market-based, reference year 2023) across the various scopes



Scope 1

Scope 1-emissions are all emissions that are a direct result of our own activities. Gasunie's main focus so far has been to drive back these kinds of emissions. The dominant emissions in this category are methane emissions, which made up 34% of Gasunie's scope 1 emissions in 2023. The other 66% of Gasunie's scope 1 emissions consist of emissions from heating up gas at gas receiving stations (GRSs), compressor drive systems, and heating buildings. The new **EU Methane Regulation** that took effect earlier in 2024 requires us to further reduce our methane emissions.

Scope 2

Scope 2-emissions are indirect emissions from the energy we procure. Gasunie's scope 2 emissions, consisting partly of emissions from heat procured for EemsEnergyTerminal, are relatively minor thanks to the purchase of Guarantees of Origin (GOs). There are no greening options for the heat procured. Over the coming years, we will gradually replace the GOs with a more sustainable solution: Power Purchase Agreements (PPA).

Scope 3

Scope 3-emissions are all indirect greenhouse gas emissions related to upstream and downstream activities in our value chain. The extent of this category of emissions is the hardest to ascertain. We have mapped all our scope 3 emissions for the year 2023, which was a first for us. Gasunie's scope 3 footprint is largely made up of purchased goods and services and capital goods. Emissions from these two categories make up 84% of the total corporate scope 3 footprint.

3.3 Action plans

Scope 1 reductions

Scope 1 emissions are all emissions that are a direct result of our own activities, i.e. the emissions that come out of our own chimney. They include the emissions from our compressors, our own gas consumption to heat buildings, the gas used by the boilers at our gas receiving stations, etc. This category also includes our CO_2 equivalents in methane emissions and hydrofluorocarbons (HFCs, for cooling processes).

This is how we reduce our scope 1 emissions:

Zero-emission regulating equipment

Gas-emitting regulators are no longer used in newly built or refurbished installations. We will be replacing pneumatically driven components such as pressure regulators and flow regulators. By the end of 2029 we will have replaced all regulating equipment with emissions with zero-emission variants.

LDAR programme

Through our leak detection and repair (LDAR) programme, we detect leaks in connections and appendages (valves, flanges, etc.) at compressor stations, gas receiving stations, metering and regulating stations and valve locations. For this we apply the NEN-EN 15446 standard, which is based on the measuring methodology developed by the US Environmental Protection Agency (EPA).

BERK task force

Over the period from early 2023 to mid-2025, we will be scaling up our LDAR programme by deploying a temporary task force. The BERK task force (‘BERK’ is the Dutch acronym for controlled emission reduction pathway) aims to substantially drive back the number of methane leaks. The basic aim is not to emit any methane, unless there is no other way due to technical or safety reasons. The BERK task force will also get Gasunie ready for the European Commission’s Methane Regulation that came into force in early August 2024. This new EU legislation sets strict requirements for the frequency of leak detection and how quickly leaks are to be repaired.

Nitrogen displacement

One way to avoid having to vent natural gas from a pipeline is to use nitrogen to displace the gas and by this means transfer it to a different section of the pipeline.

Mobile recompression

We use a mobile recompression unit to recompress as much of the gas as possible that would otherwise have had to be vented. This gas is then transferred to another pipeline. In 2023, recompression returned around 0.8 million m^3 of gas to the network (2022: 0.9 million m^3). With this we avoided the emission of 13 kilotonnes of CO_2e in 2023.

Flaring

If recompression is not an option, flaring offers a way to reduce the environmental impact of the methane in the natural gas by burning it off. In 2023, 342,791 m^3 of natural gas was flared (2022: 340,522 m^3). Flaring instead of venting yielded environmental savings of 5 kilotonnes of CO_2e in 2023 (2022: 5 kilotonnes of CO_2e).

Mini recompression units

The pressure down to which recompression units can reduce is relatively high. We are looking into whether mini recompression units would be able to reduce to a lower pressure so that there will be less natural gas left over that we have to flare and vent, which would mean a reduction in methane and other emissions.

Temporary decommissioning of compressor stations

As production from the Groningen gas field is phased out, we are decommissioning a number of our compressor stations on a temporary basis so that these can be used later for the energy transition.

Electric-drive compression

In all the operational choices we have to make, emission reduction is a compulsory selection criterion. Where technically and financially possible, we favour electric-drive compression over gas-powered compression.

Limited energy needs

At 900 gas receiving stations we are gradually reducing the pressure of gas at inlet points, reducing the temperature of the gas at outlet points, and using a variable boiler water temperature based on the then current heat demand. This has reduced total gas consumption at our Dutch gas receiving stations. We are also considering replacing the current central heating boilers at gas receiving stations with a hybrid heat pump system. We would only need to switch over to the system's gas-fired boilers when gas throughput is high, like in winter for example. In the near future, we need to see if this concept is feasible at gas receiving stations, for example, because we depend on larger electricity connections.

Greening our own gas consumption

In 2023, we greened more than 1.9 million m^3 of our own gas consumption in the Netherlands with GOs[5] , and in Germany we covered 1% of our total own gas consumption with green gas. We requested bids in 2023 to obtain additional volumes for 2023 and 2024; however, these volumes were not yet available on the market on reasonable terms.

Quality measurement tools

We are currently conducting a study to look into ways to reduce methane emissions from our quality measurement tools.

[5] Green gas is not covered by the system of guarantees of origin because there is no internationally recognised certification of green gas. At present, green gas certificates are accepted as ways to reduce scope 1 and scope 3 emissions, provided that a party is connected directly to the green gas supply and able to prove that.

The BERK task force

Luuk Pastoor is the programme manager for BERK, the Gasunie programme that sees us work hard on reducing our methane emissions. BERK is a task force, meaning that it is a temporary group of people that we have assembled to step up our efforts to cut our methane leaks in a controlled manner. The BERK task force is made up of a core team of specialists. And they work together with various departments, experts, and stakeholders within and outside Gasunie. Collaboration is a priority for the task force.

‘Within BERK, we work to reduce methane emissions caused by leaks,’ Luuk explains. In order to track down those leaks, Gasunie measures all connection points, including couplings, flanges, valves, etc. every four years in full. We do some of this measuring ourselves as Gasunie and also have third parties do part of it. The task force subsequently decides which leaks need to be repaired first. Together with operators and cluster project managers, we explore ways to streamline this in part through maintenance work or project-based work, so as to do it as efficiently as possible. The regional operators doing the actual work subsequently look into how best to incorporate this into their ongoing work. They are best placed to do that. It all adds up to super-efficient collaboration.’

The BERK task force is expected to stay operational until mid-2025. Luuk says, ‘After that, the measuring activities need to have been reincorporated into the regular organisation in a controlled manner or run as a separate maintenance project. This is why our focus is not only on 2024/2025, but also further ahead to the future. The idea is for us to be able to have anything that we can already see coming incorporated into regular projects now.

BERK draws on lessons learned previously in other projects. ‘That’s right,’ says Luuk. ‘We use the Gasunie Lessons Learned register. It was also the source of inspiration for BERK’s risk management. And we also draw opportunities from that! At BERK, we not only have a risk register but also a special opportunities register.’

Scope 2 reductions

Scope 2 emissions are indirect emissions from the energy we procure. We procure electricity for our electric compressors and for the production of nitrogen we use to convert imported high-calorific gas into Groningen quality low-calorific gas ('pseudo G-gas'). Scope 2 also includes the electricity used in our offices and the buildings housing our installations. Besides electricity we also procure heat, mainly for the regasification of LNG. Quality conversion from imported high-calorific gas to pseudo G-gas takes place using self-produced nitrogen (Scope 2) and nitrogen procured from third parties (Scope 3). For calculations, we use our market-based scope 2 emissions, i.e. any scope 2 emissions that remain after decarbonisation. In 2023, we decarbonised all the electricity we procured (277 kilotonnes of CO_2e) using GOs. As of 2024, we procure part of the electricity we need from green producers directly, meaning that we need fewer GOs.

This is how we reduce our scope 2 emissions:

Smart design and smart management

In designing our transmission systems, we look for ways to reduce the energy needed to operate them. On a daily basis, we try to guide our gas flows through the network in a way that keeps the transmission route as short as possible and minimises the required compression.

Decarbonising our electricity consumption

Our aim is to stop using energy produced in a way that involves emissions. We do that by eliminating electricity generation from coal and gas from Gasunie's portfolio and replacing it with clean sources of energy. Our electricity consumption in 2023 was completely decarbonised. In 2023, we purchased GOs from European wind farms for our Dutch activities. In Germany, 100% of our electricity needs are covered by electricity from European hydroelectric power stations.

Power Purchase Agreements (PPAs)

Under a five-year contract we signed with Greenchoice, a quarter of all the electricity we consume (250 GWh) will come directly from Dutch wind farms from 2024. Over the coming years, we intend to enter into more such PPAs. Procuring green energy directly at the source creates a direct link between generation and our consumption, which is another step up on decarbonising electricity procurement through GOs in terms of quality. The idea is for the PPAs to push up our 24/7 Carbon-Free Energy (CFE) score. The CFE score measures the degree to which each hour of electricity consumption by Gasunie is matched with procurement of renewable energy from local sources. Gasunie wants to take its CFE up to 25% in 2025 and to 60% by 2030.

Transport and mobility

From 2021, Gasunie employees who have a company-leased car at their disposal can only order electric cars when their lease expires.

Limited energy needs

Boilers at the head office: at the initiative of the Gasunie Green Teams employee platform, all boilers were removed from the pantries, work cabinets, and accessible toilets and replaced (where there was no other option) with energy-efficient alternatives in a project called ‘Boil Off’ in 2023. The old boilers kept the water inside warm at a constant temperature of 80°C, while they were hardly ever used.

Our head office's annual carbon emissions

Gasunie is committed to emitting as little CO_2 as possible, which includes emissions from the generation of the electricity we procure.

In order to calculate how much CO_2 is emitted in the process of generating the electricity we procure, we, like most companies, use average emission factors. These provide an overall view of emissions in the Netherlands.

But we want to do more. We want to procure as much of the electricity we need at times with lots of sunshine or wind, because that is when there is a lot of renewable energy in the Dutch electricity production mix.

The first step in this direction is to check our electricity consumption every fifteen minutes and link the resulting readings to real-time data on the carbon intensity of the Dutch electricity production mix.

Knowing exactly when the electricity we need has the smallest carbon footprint sets us up for the next step: dynamic regulation of our power consumption. In other words, it allows us to shift our consumption from times of high carbon intensity to times of lower carbon intensity wherever possible.

The first step we have meanwhile taken over the past few months is to map the carbon footprint of our head office in Groningen by taking a snapshot of our footprint every fifteen minutes. We obtained the electricity production mix data from the National Energy Dashboard (NED.nl), a public online database that Gasunie has set up in partnership with TenneT.

It has already given us a far more realistic picture of our head office's carbon footprint, and we are now looking into which electricity needs at the head office are suited for dynamic regulation.

We are also considering mapping the carbon footprint of other Gasunie sites in this way. Gasunie has a wide variety of sites, each with different characteristics. Some sites are, therefore, better suited for dynamic consumption regulation than others.

The obvious place to start would be the larger sites, such as Deventer, Ommen, Ravenstein, and Wieringermeer. We also believe that dynamic consumption regulation will deliver major carbon emission reduction gains within our network assets, such as our gas receiving stations.

Scope 3 reductions

Scope 3 is the third and broadest reporting category from the Greenhouse Gas Protocol (GHG) and generally makes up the largest part of a company's carbon footprint. This scope includes emissions across Gasunie's value chain, i.e. all indirect greenhouse gas emissions related to upstream and downstream activities in the value chain.

Gasunie has thus far reported only a small part of its scope 3 emissions in its public report: emissions from business travel and commuting[6] and from the production of the nitrogen we purchase. In 2024, we identified, for the first time, all of our scope 3 emissions across all categories as per the GHG protocol, using 2023 as the base year from which we start calculating reductions. In doing so, we aimed to collect as much high-quality, primary activity data and emission factor data from suppliers as possible.

[6] The Gasunie Green Team (a group of Gasunie employees that initiates sustainability initiatives) is looking into the possibility of offering free public transport passes for the commute to and from work, as well as a tax credit for the purchase of a commuter bicycle.

The main components of our scope 3 footprint are:

- Emissions from purchased goods and services. These are made up mainly of pipeline maintenance activities to guarantee the safety and reliability of our network. Emissions from the production of the nitrogen we procure also constitute a significant part of this category.
- Emissions from capital goods. These are made up mainly of infrastructure development activities (procurement of steel pipes), and then especially projects with hydrogen and CO_2 pipelines.
- Upstream emissions from energy consumed. Gasunie consumes a great deal of energy to keep the pressure in the high-pressure network at a constant level and this energy needs to be extracted in the beginning of the value chain, causing emissions there.

For our scope 3 emission calculation for 2023, we were able to obtain primary data that covers 41% of our scope 3 emissions. Wherever primary data was not available or not available in time, we used secondary data such as industry averages. The aim in the long term is to improve data quality and reduce data uncertainty, so as to ultimately be able to track our performance as effectively as possible.

After taking stock of our scope 3 emissions, we have put together a roadmap in 2024 with eleven measures for scope 3 emission reduction[7] that we intend to implement along with details of the savings, costs, and implementation timeline of these measures. We have also set a scope 3 goal for 2030 and 2035, with 2023 as the base year, which can help us accelerate and steer our reduction plans. Overall, we believe we can reduce our scope 3 emissions by over 200,000 tonnes of CO_2e[8] by implementing the following set of measures.[9]

[7] These goals were formulated using SBTI's Target Setting Tool.

[8] This figure was calculated based on the 2023 scope 3 footprint. If growth leads to scope 3 emissions increasing, this figure will have to grow accordingly.

[9] The percentages are an indication only: they may change with time as new insights emerge.

This is how we intend to reduce our scope 3 emissions:

Measure	Share of targeted scope 3 emission reduction
Creating zero-emission building sites by using zero-carbon or low-carbon construction equipment. The new engineering and works procurement strategy (see box) specifically seeks to partner with contractors and engineering firms in sustainability endeavours. Together with our partners, we want to adopt clean methods in building infrastructure for renewable energy.	approx. 35%
Switching to steel pipelines made using DRI technology that reduces carbon emissions caused by the extraction of iron from iron ore. Switching to steel produced using hydrogen-based DRI technology instead of natural gas-based DRI technology.	approx. 20%
Procuring goods with greater fuel efficiency, such as machine components with less frictional resistance.	approx. 15%
GTS uses nitrogen to convert high-calorific gas into low-calorific gas (called pseudo Groningen gas, or 'pseudo G-gas' for short), which is suitable for use by small-scale gas consumers in the Netherlands. Where possible, we get our nitrogen suppliers to decarbonise the energy they use to produce nitrogen by purchasing Guarantees of Origin (GOs). In 2023, Gasunie purchased GOs for 60% of our nitrogen supplies, and we plan to take this up to 100% green nitrogen procurement in 2024.	approx. 15%
Switching to pipelines made of scrap steel produced in electric arc furnaces. We are currently expecting a pilot delivery of the first batch of this circular steel from Mannesmann Line Pipe. Using recycled metal cuts emissions by as much as 80%. The first pilot will let us test feasibility and scale-up options, get a good understanding of the price difference between various supply options, and obtain verifiable data on the degree of circularity of this material. We are also negotiating with other suppliers for similar pilots.	approx. 7%
Replacing gas-powered compressors with electric compressors at Gasunie Deutschland (GUD). This avoids emissions from natural gas extraction.	approx. 5%
Installing heat pumps at gas receiving stations. This avoids emissions from natural gas extraction.	approx. 1%
Decarbonising power consumed by the IT systems running the trading platforms in which Gasunie holds a stake.	less than 1%
Reducing emissions from pipelines at GUD's associate companies where GUD does not have operational control.	less than 1%
Reducing emissions at Gate terminal. Since Gasunie holds a 50% stake in Gate, its emissions fall into Gasunie's scope 3 emissions instead of its scope 1 and 2 emissions.	less than 1%

In our tendering process, we are going to make scope 3 emission reductions by suppliers and their deliverables/services/works a key factor in our assessment of tenders. Gasunie is working on guidelines on suppliers' involvement in procurement. We have selected thirty strategic suppliers we want to team up with to tackle our emission hotspots. These parties supply materials (pipelines, valves, flanges, and static drivers) and operate in the contracting or engineering domain. In addition, several IT service providers and nitrogen-producing companies have also joined the programme. Gasunie's collaboration with its suppliers is intended to result in:

- gaining a better understanding of the options for making the value chain more sustainable;
- identifying decarbonisation and sustainability projects, including the associated conditions and needs;
- having access to better data to calculate greenhouse gas emissions in the value chain, as well as reductions over time.

Gasunie and the Clean and Zero-Emission Construction covenant

With a gas grid stretching out over 17,000 kilometres and an energy transition investment agenda of many billions of euros, Gasunie is set to commission a large number of infrastructure construction projects over the coming years. In the fall of 2023, we signed the Clean and Zero-Emission Construction covenant. This programme sees 45 parties working together on one single approach to cleaner construction, maintenance, and demolition projects using a roadmap. The roadmap sets out step by step how and at what rate construction equipment will be replaced with less polluting versions over the coming years, so as to ultimately switch to clean or zero-emission versions. Lighter equipment will sooner be available in zero-emission versions than heavier or specialist equipment. Various government ministries, provincial authorities, local authorities, water boards, and network and industry associations in the construction domain have signed the covenant.

National Energy Dashboard

Together with TenneT, Gasunie is developing strategic data services for the energy transition and system integration. Initiatives such as *EnergieOpwek* (energy generation), the CO_2 monitor, and the *Energieweerbericht* (energy weather forecast) provide insight into expected generation and carbon emissions across our energy system. In March this year, all of the joint Gasunie-TenneT initiatives were brought together under the overarching National Energy Dashboard. This dashboard gives households and companies free access to valuable energy data. The core message of the National Energy Dashboard is *Smarter together with data.*

3.4 Resources

To cut emissions across all three scopes, we have developed work packages. Those packages that will deliver the greatest emission reduction at the lowest cost will be carried out first, which we assess based on an internal carbon price of a maximum of € 200 per tonne[10] , i.e. the amount we are currently willing to spend to avoid a tonne of carbon emissions.

For scope 1, we have put together packages of measures that are comparable, and we assess the CO_2e efficiency of each package as a whole. Conditions that are adequate for the whole package may not be adequate for individual measures within those packages. If a total package does not meet the requirements under our policy, we will check which individual measures do meet the criteria.

We work based on efficiency, including risk efficiency, as laid down in our risk matrix. Our risk matrix assigns a financial value to the impact of emissions, and we monitor that value on a periodic basis. We are constantly gauging whether there is a way to further tighten this goal while staying within the boundaries set by our risk-based asset management, such as by intensively looking for innovative technologies and working methods.

We put a lot of time into improving the completeness, accuracy, timeliness, and traceability of our reported emission volumes. In 2024, we have a programme running that is called *Emissies in Kaart*, which translates as ‘Emissions mapped out’. This programme is all about linking emission registration, reporting, and management software to our procurement software systems to get a constant and comprehensive view of our emissions across all scopes. This allows us to add further rigour to our annual plans wherever we can.

[10] The Netbeheer Nederland trade association is currently looking into what would be fair internal carbon pricing. Until their findings are revealed, they go by a price of € 150/tonne.

3.5 Risks and opportunities

Based on the double materiality assessment, having and reducing carbon emissions from our own operations leads to the following risks and opportunities for us:

Inside-out impact/risk (impact materiality)

Negative

Gasunie's operations produce greenhouse gas emissions and nitrogen deposition, which contributes to climate change, human rights issues, and nature and biodiversity loss.

Positive

The financial benefit that comes with reducing methane emissions, i.e. the financial value of the gas is no longer lost. The EU uses this positive to justify stringent requirements: methane emission reduction pays for itself.

Outside-in impact/risk (financial materiality)

Negative

The risk of Gasunie being unable to successfully carry out projects due to inadequate working methods, delayed IT system availability, a lack of experience or expertise on the project team, or an erroneous project management approach, which can cause project delays, budget overruns, and lower-quality results.

Negative

Damage to reputation.

3.6 Measurable goals

Gasunie has currently set itself the following measurable goals. These goals may be adjusted upward or downward with time.

Total emissions

By 2045, Gasunie aims to have reached net-zero emissions across all three scopes. This means that, on balance, i.e. after decarbonisation through GOs or carbon removals, we no longer contribute to global warming. By that year, our absolute emissions (kilotonnes of CO_2e) must have been reduced by 90% compared with the respective base years of 2020 (scope 1 and 2) and 2023 (scope 3).

To paraphrase SBTi's definition, net zero describes a state in which the greenhouse gas emissions in the value chain are in balance with the emissions that are removed from the atmosphere by reducing emissions as much as possible and subsequently using carbon offsetting resources to remove the remaining emissions.

Methane emissions

Our methane emissions (CH_4) have to be below 70 kilotonnes of CO_2e by 2030[11], which boils down to a 49% reduction compared to the base year of 2020. Of this 70 kilotonne target, Gasunie's Dutch assets have to deliver 50 kilotonnes and Gasunie's German assets 20 kilotonnes. This target is not subject to how our transmission volumes develop. Our methane emissions make up a significant part of our scope 1 emissions.

[11] Since methane is a more harmful greenhouse gas than initially thought, we upped methane's global warming potential in 2022, from 25 to the new AR5 IPPC standard of 28, i.e. 1 tonne of methane emissions means 28 tonnes of CO_2 emitted into the atmosphere. Gasunie follows the Dutch government's lead in this respect. If we are to stick to the target figure for 2030, at a GWP of 28 we will have to reduce more methane in the coming years than would have been the case with a GWP of 25.

Scope 1 and market-based scope 2 emissions

In a year when we transport large volumes of natural gas, we produce more emissions than in a year when we transport less natural gas. With this simple fact in mind, we have set a relative goal for the combination of our scope 1 and market-based scope 2 emissions, based on GTS' and GUD's combined transmission volumes equalling those of the base year of 2020 (1,085 TWh).

The formula for this is as follows:

$$CO_2e\ [kilotonnes] = 70\ [kilotones\ CO_2e] + (0{,}137 \times transmission\ volume\ [TWh])$$

In 2020, we emitted a total of 330 kilotonnes of CO_2e across scopes 1 and 2 (market-based). By 2030, this figure must not exceed 219 kilotonnes, provided that volumes remain unchanged, which means a 34% drop.

Scope 3 emissions

The biggest part of Gasunie's scope 3 emissions is caused by the development of new infrastructure to enable the energy transition. Given that we will be running more and more energy transition projects, we will also procure more and more goods and services, causing our scope 3 emissions to rise. With this in mind, Gasunie has adopted a carbon intensity reduction target that covers 77% of all our scope 3 emissions.

The following categories come under Gasunie's scope 3 goal: emissions from the production and transport of the steel, nitrogen, fuels, and electricity we purchase, and emissions from procured construction services and investments.

Emissions in target range	% of scope 3
Emissions caused by the production of purchased steel materials (associated with the production of steel pipes, valves, flanges, etc.)	29%
Emissions caused by procured construction services (occurring at Gasunie's construction sites)	28%
Emissions caused by the production of procured nitrogen	8%
All emissions caused by the production and transport of purchased fuel and energy, i.e. the upstream component of reported scope 1 and 2 emissions, except for emissions associated with EemsEnergyTerminal*	11%
Emissions associated with Gasunie's investments	1%
Total	77%

** Gasunie excludes the upstream emissions from the EemsEnergyTerminal LNG regasification plant from the scope 3 target because the EemsEnergyTerminal parties are currently weighing up whether to keep the terminal operational beyond 2027. The parties are looking beyond the terminal's LNG processing capabilities and also exploring options to expand the terminal with hydrogen reception and regasification and CO_2 transit and storage capabilities, or even to convert the terminal into a hydrogen and CO_2 terminal.*

Gasunie has committed to reducing scope 3 emissions by 51.6% in kilogrammes of CO_2e per euro of procurement spending by 2030, as well as to a 66.3% reduction by 2035 compared to the base year of 2023. This target is an economic intensity target in terms of kilogrammes of CO_2e per euro spent, creating room for spending to grow while minimising the impact on the climate.

The ambition level is aligned with projects that limit the global warming rate to below 2°C.[12] The time frame proposed for this target is 2023-2030, in line with the SBTi criteria, with an additional target for 2035 for a future net-zero target.

[12] This is known as the WB2D (well-below 2°C) pathway.

Our end users' emissions

Although Gasunie is committed to cutting its overall carbon footprint, it is important to draw attention to the limitations that are inherent to addressing emissions caused by end users' burning of natural gas (scope 3, category 11).

Being the operator of a transmission network, Gasunie is in the business of transporting natural gas, not burning natural gas. Natural gas is burnt by the end users to whom Gasunie transports and distributes it. Emissions from end users' burning of natural gas occur beyond Gasunie's direct scope of influence and are, therefore, excluded from the target.

Not including these natural gas combustion emissions in the target enables Gasunie to set ambitious but attainable targets and focus on areas where we can exert the most influence and achieve significant greenhouse gas emission reduction.

However, we do share responsibility for the climate impact caused by the use of natural gas by our customers and report regularly on these emissions to Dutch authorities. We have set the emissions produced by end users as they burn the natural gas we transported at 197 megatonnes of CO_2e for 2023.

SBTi requires companies to include at least two thirds of their total scope 3 emissions in their greenhouse gas reduction targets for the short term. Gasunie proposes limiting the target for scope 3 emissions in the short term to sources that produced 77% of the scope 3 emissions in 2023. We cannot yet have SBTi validate the target proposed by Gasunie because Gasunie generates more than 50% of its revenue from fossil fuels.[13]

[13] Currently, SBTi does not validate the targets of companies that generate more than 50% of their revenue from fossil fuels. This will change as soon as SBTi releases its latest oil and gas sector guidance.

3.7 Achievement of our goals

Since our scope 3 goal was formulated recently, there is no progress to report on yet. We can, however, report on the progress we have made on the overall goal for our scope 1 and 2 emissions. We want to reduce these by 34% by 2030, compared to 2020, assuming unchanged transmission volumes at both Gasunie Nederland and Gasunie Deutschland. Given that transmission volumes affect the extent of the emissions, we use the following formula: *CO_{2eq} [kilotonnes] = 70 [kilotonnes CO_{2eq}] + (0.137 × transmission volume [TWh]).*

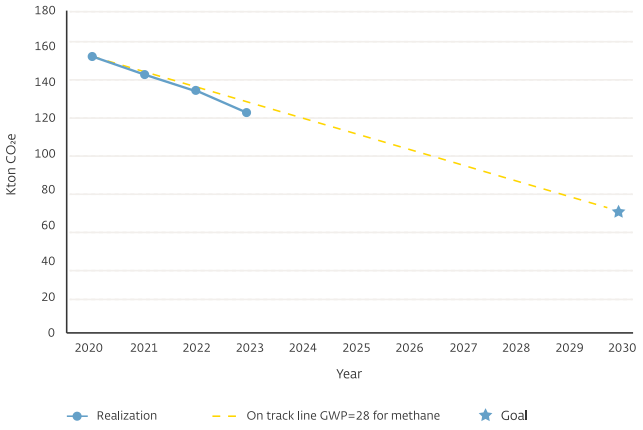
In 2020, Gasunie Nederland and Gasunie Deutschland transported 1,085 TWh of natural gas between them. Assuming that these transmission volumes do not change, this means emissions cannot exceed 219 kilotonnes of CO_2e at corporate level in 2030. The share of methane emissions must not exceed 70 kilotonnes of CO_2e (regardless of the transmission volumes), with 50 kilotonnes of CO_2e emitted in the Netherlands and 20 kilotonnes of CO_2e in Germany, compared to 2020.

When this target was set, the global warming potential (GWP[14]) of one kilotonne of methane was assumed to be 25 times higher than that of a kilotonne of CO_2e. In 2022, we upped the GWP to 28 based on new scientific insights, but we did not adjust our formula accordingly, meaning that our reduction target became more ambitious. 2022 was also the year that EemsEnergyTerminal was put into operation. Due to the large amount of energy needed to power this LNG terminal, we are no longer on track to hitting our 2030 reduction target for scopes 1 and 2.

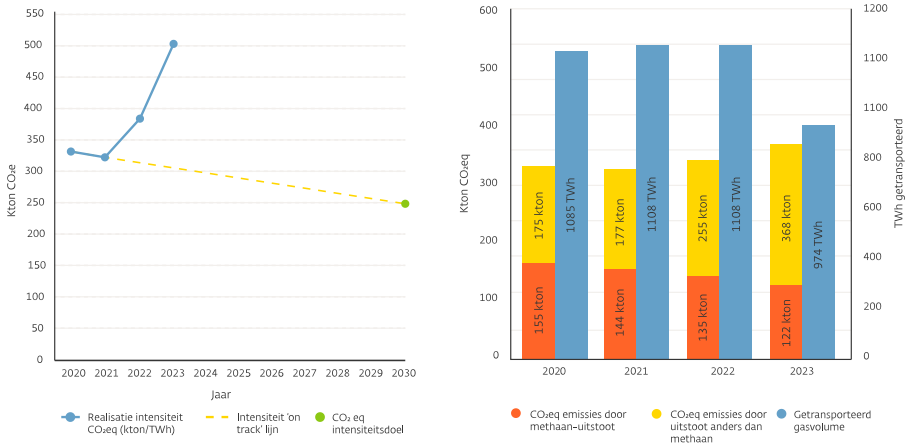
In June 2024, we announced that we, for the sake of security of supply, are considering extending operation of EemsEnergyTerminal beyond 2027. This would mean an increase in our scope 1 and 2 emissions, putting the 2030 emissions target out of reach, unless we can also compile a significant emission reduction package for the restarted EemsEnergyTerminal. We are currently considering how to proceed in this situation and exploring emission reduction options that would be feasible if we were to keep running the LNG terminal after 2027.

[14] In order to be able to add up the impact of different greenhouse gas emissions (GHGs), emissions are converted to CO_2e. GHG emissions are not only methane emissions but also CO_2 emissions caused by the burning of fossil fuels and, to a minor degree, also refrigerants, SF6, and diesel. The conversion is based on the global warming potential figure over a 100-year time frame (GWP100). The GWP100 value (factor) is in line with the value set by the Dutch government. The current factor for methane is 28. The GWP100 factor used in cost-benefit analyses follows the most recent insights (IPCC). This factor currently stands at 29.8 for methane.

Our methane emissions in 2023: on track to meet our reduction target in 2030

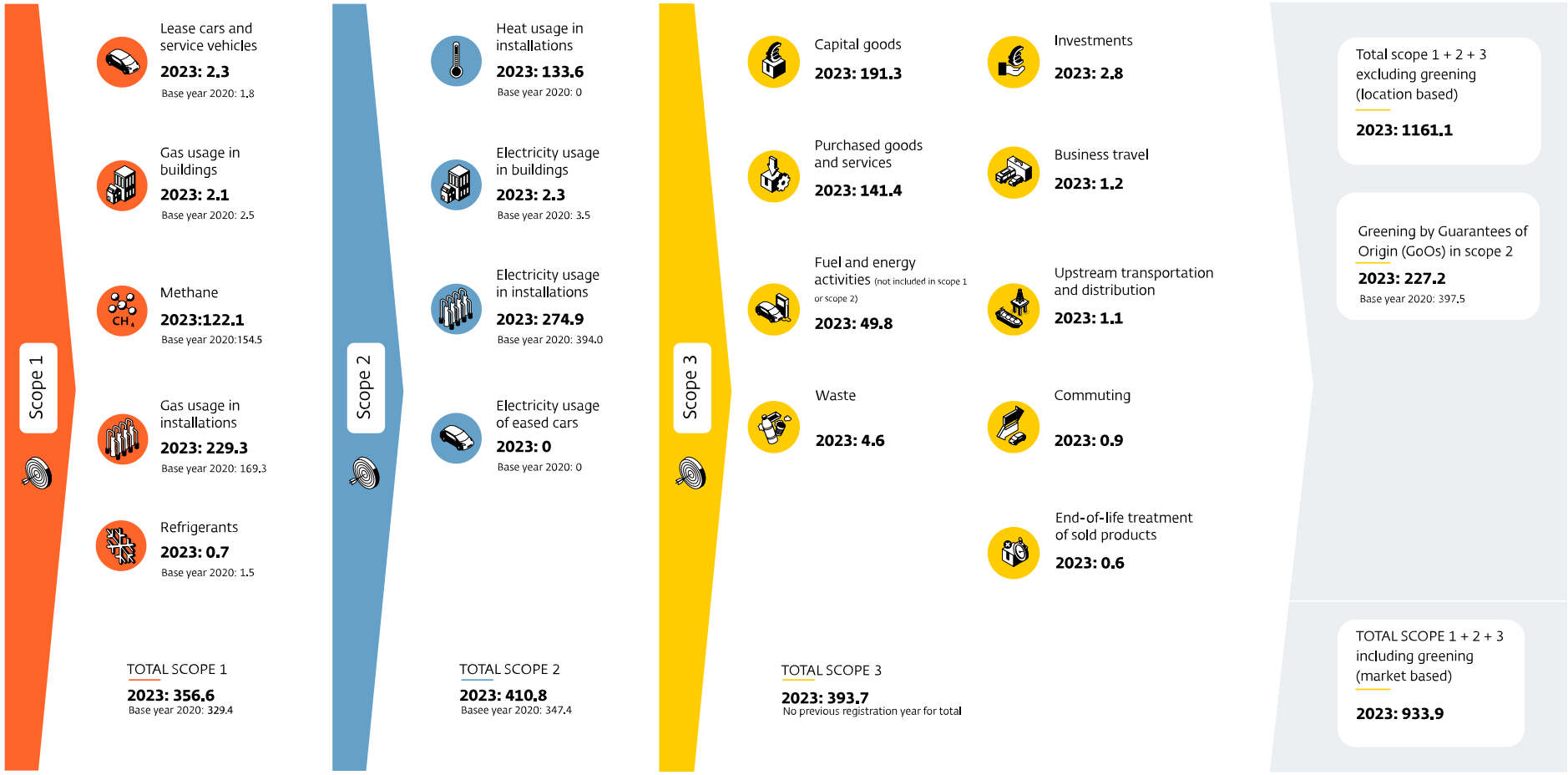


Our total CO_2 emissions in 2023: not on track to meet our reduction target in 2030



The increase is mainly due to the use of EemsEnergyTerminal. In the first half of 2023, the electricity required for the processes on the FSRUs was supplied by onboard generators powered by engines that run on LNG. These engines produce methane emissions. In the second half of the year, the FSRUs at Eemshaven no longer used their own generators but ran on onshore power. EemsEnergyTerminal also uses a lot of heat to regasify the LNG supplied. There are no greening options for the heat procured.

Our emissions in 2023 by scope



* Retrospectively adjusted 2020 methane emission number.

Scope 1: Direct result of own business activities
Scope 2: Indirect result of purchased energy
Scope 3: Other indirect consequence, e.g. purchased nitrogen

in kilotonnes of CO2e	2023	2022	2020 (base year)	% change compared to base year
Scope 1 emissions				
Gas consumption in installations	229.3	241.3	169.3	
Methane	122.1	135.0	154.3	
Leased cars and company cars	2.3	2.5	1.8	
Gas consumption in buildings	2.1	1.1	2.5	
Refrigerants	0.7	0.6	1.5	
Emergency generators	0.0	0.4	-	
Total scope 1 emissions	**356.6**	**380.9**	**329.4**	**8%**
Percentage of scope 1 emissions from regulated emissions trading systems (%)	76%	77%		
Scope 2 emissions				
Electricity consumption in installations	274.9	336.1	394.0	
Heat consumption in installations	133.6	8.8	-	
Electricity consumption in buildings	2.3	2.5	3.5	
Electricity consumption by company-leased vehicles	-	-	-	
Total scope 2 emissions (location-based)	**410.8**	**347.4**	**397.5**	**3%**
Decarbonising through GOs				
Share of green power used in installations	274.9	336.1	394.0	
Share of green power used in buildings	2.3	2.5	3.5	
Total decarbonisation through GOs	**277.2**	**338.6**	**397.5**	
Total scope 2 emissions (market-based)	**133.6**	**8.8**	**-**	**-**
Total scope 1 + 2 emissions (location-based)	**767.4**	**728.3**	**726.9**	**6%**
Total scope 1 + 2 emissions (market-based)	**490.2**	**389.7**	**329.4**	**49%**

in kilotonnes of CO2e	2023
Scope 3 emissions	
(1) Capital goods	191.3
(2) Purchased goods and services	141.4
(3) Fuel-related and energy-related activities (not included in scope 1 or scope 2)	49.8
(5) Waste generated in operations	4.6
(15) Investments	2.8
(6) Business travel	1.2
(4) Upstream transportation and distribution	1.1
(7) Employee commuting	0.9
(12) End-of-life treatment of sold products	0.6
Total indirect scope 3 emissions	**393.7**

Location-based

This figure is based on the greenhouse gas emissions caused by the generation of electricity in the region where the electricity is used. The location-based figure is then calculated by multiplying the electricity consumption (in kilowatt-hours, kWh) by the CO_2 emission factor for electricity in accordance with the list of CO_2 emission factors.

Market-based

This figure is calculated based on the greenhouse gas emissions from the energy installations where the procured electricity originates. We use Guarantees of Origin (GOs) to prove the origin of the electricity we procure.[14] In the Netherlands, Gasunie purchased GOs from European wind farms in 2023. In Germany, Gasunie procured green electricity directly from its electricity supplier.

[14] Part of Renewable Energy Certificates (RECs).

Notes

Energy consumption and mix in MWh	2023
Consumption of energy from fossil sources	
Consumption of fuel from crude oil and petroleum products	7,357
Consumption of fuel from natural gas	1,303,726
Consumption of purchased or obtained electricity, heat, steam, and cooling from renewable sources	485,200
Total consumption of energy from fossil sources	**1,796,282**
Share of consumption of energy from fossil sources (%)	**72%**
Consumption of energy from renewable sources	
Consumption of fuel from renewable sources, including biomass	118
Consumption of purchased or obtained electricity, heat, steam, and cooling from renewable sources	713,981
Consumption of self-generated energy	1,609
Total consumption of energy from renewable sources	**715,708**
Share of consumption of energy from renewable sources (%)	**28%**
Total energy consumption	**2,511,990**

Methane emissions

Reducing our carbon footprint is hugely important to us. We can make the most impact by reducing our methane emissions: 1 kg of methane emissions is equivalent to the emission of 28 kg of CO_2. Our methane emissions over the past five years were as follows:

In tonnes of methane	2023	2022
Netherlands	3,544	3,331
Germany	817	1,491
Total	**4,361**	**4,822**

Gas consumption in installations

Our natural gas consumption in 2023 in the Netherlands was lower than our consumption in 2022. There has been a shift, however. The reduction in gas consumption was mainly due to the lower need for compression at our compressor stations. Approximately 40% of the company's own natural gas consumption in the Netherlands can be attributed to the use of the EemsEnergyTerminal. In Germany, natural gas consumption was on par with that of 2022. Since 2022, use of Gasunie Deutschland infrastructure has been higher than previously. This is down to natural gas transmission routes having to be rerouted due to the war in Ukraine. This has resulted in our compressors having to work harder and more often.

In millions of kWh; conversion factor 9.77 kWh = 1m3	2023	2022
Netherlands	389	445
Germany	879	886
Total	**1,268**	**1,331**

Heat consumption in installations

Since it was brought into operation at the end of 2022, EemsEnergyTerminal has been by far the largest consumer of heat within Gasunie. At the terminal, liquefied natural gas is converted into gaseous natural gas using heat. Aside from this, we use a relatively small amount of heat from third parties to heat natural gas at the gas receiving stations. Gasunie Deutschland does not consume heat.[15]

In millions of kWh	2023	2022
Netherlands	417	51
Germany	-	-
Total	**417**	**51**

[15] At a number of gas receiving stations, we use heat procured from third parties to heat up natural gas. Whenever we have the option to choose between different energy carriers, emission reduction is a compulsory criterion in selecting a carrier.

Electricity consumption in installations

We saw opposing effects in our electricity consumption in 2023. On the one hand, because less natural gas was transmitted in 2023 compared to 2022, less electrical compression was required as well. On the other hand, the commissioning of the EemsEnergyTerminal has had a significant impact on our electricity consumption.

In millions of kWh	2023	2022
Netherlands purchased	705	749
Netherlands self-generated	2	2
Germany	9	10
Total	**715**	**761**

Our energy efficiency goal

Gasunie has an internal energy efficiency target: we are aiming to use 12.5% less energy by 2030 compared to the base year 2020. We have seen now that this target is unrealistic given Gasunie's ever-growing remit of activities relating to security of supply and the energy transition. We are in the process of formulating a new energy efficiency target to replace the old energy efficiency target.

3.8 Financial impact

As stated previously, Gasunie intends to invest a total of € 11.5 billion as part of Vision 2030. Of this amount, € 3.6 will go towards maintenance on and replacement of existing infrastructure. The investments we deem necessary to be able to cut carbon emissions in our day-to-day operations are incorporated into this amount.

4. We protect our assets against the impacts of climate change

In our climate change adaptation policy, we have identified the following climate risks:

Extreme precipitation

Drought

Heat

Flooding

Gasunie's assets are and will continue to be designed with safe, long-term use in mind. Identifying weather-related and climate-related risks to our assets and the purpose they are supposed to serve, and defining measures to take in response, is not something new for us. The climate change adaptation measures we design are, therefore, mainly intended for new-build assets and existing assets that will be renovated. We will be checking the existing network for the degree of climate change adaptivity, both on a local and regional level.

4.1 New builds and renovations

Measures on a national level for new-build assets and assets for renovation will be included in our Gasunie Technical Standards for future new-build and renovation projects. For specific regional measures, these measures will be recorded in the project documentation.

4.2 Current network

We will be running national and regional stress tests to see to what extent the existing network is sufficiently robust to remain fit for purpose when the climate changes further. These stress tests can be conducted in partnership with other network operators and as needed in each of the Netherlands' emergency services/crisis management regions (referred to as 'Safety Regions').

The necessity of climate change adaptation

In July 2021, Gasunie Transport Services (GTS) was faced with flooding in the southern tip of Limburg province for five consecutive days following extreme rainfall upstream in Germany. Two GTS gas receiving stations, one in Itteren and one in Meerssen, were damaged and fouled by flooding.

Around 35 sites were inspected during those days, some even several times a day. As a precaution, roughly ten of them were de-energised, while others were put on standby.

On Thursday 15 July 2021, the water level at the Itteren gas receiving station rose rapidly to 1.30 metres. Pictures taken in the morning and evening clearly show the difference.

The Itteren and Meerssen gas receiving stations were fouled and damaged so severely that professional cleaners had to be called in. Various repair work was also needed, as was an extensive inspection.

Thanks to outstanding interventions by our employees and emergency services on-site and the deployment of a mobile gas receiving unit, the event did not result in transmission disruptions.

4.3 Climate adaptation risks

In our climate change adaptation efforts, we draw on the scenarios from the Climate Change Impact Atlas compiled by the Royal Dutch Meteorological Institute. This Climate Change Impact Atlas uses the same data as the national risk maps, supplemented with possible further climate change scenarios. When it comes to choosing scenarios, we align with Netbeheer Nederland's methodology. We evaluate the scenarios on an annual basis to see if they are still sufficiently up to date.

To identify risks and define measures, we set availability requirements related to the four climate risks categories for each asset. The relevant scenarios (vertical) and climate risks (horizontal) are specified below. Since we are an asset operator on a national scale, these scenarios will lead to regional differences, meaning that some measures will have to be applied on a regional level.

Classification of climate-related hazards

	Temperature-related	Wind-related	Water-related	Solid mass-related
Chronic	Changing temperatures (air, fresh water, seawater)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow, ice)	
	Heat stress		Precipitation and/or hydrological variability	Coastal erosion
	Temperature variability		Ocean acidification	Soil degradation
	Permafrost thawing		Saline intrusion	Soil erosion
			Rising sea levels	Solifluction
			Water stress	
Acute	Heat wave	Cyclone, hurricane, typhoon	Drought	Avalanche
	Cold wave/frost	Storm (including blizzards, dust storms and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
	Wildfire	Tornado	Flood (coastal, fluvial, pluvial, ground water)	Subsidence
			Glacial lake outburst	

From 2024, we will include the relevant climate scenarios in the bowtie analyses[16] to be conducted every five years. The focus of current bowtie analyses will, therefore, be shifted from national and category to local deployment.

Our climate change adaptation policy has not yet been developed sufficiently to be able to use it as a basis to describe risks and opportunities, quantify impacts, and formulate and maintain measurable goals. Gasunie intends to further flesh out this policy over the coming two years.

In 2023, there were no transmission interruptions or safety incidents caused by extreme weather.

[16] A bowtie analysis is a qualitative risk assessment methodology. It offers a visual overview of the causes and impacts of an unwanted event and the measures to take to prevent or control that event. The diagram looks like a bow tie, with the unwanted event in the centre. The causes (threats) are listed to the left and the impacts to the right. Between these two sections, there are preventive and mitigating measures that can be taken to control the risks. This is a useful methodology because it delivers a clear overview of complex risks and the associated control measures.

Appendices

Climate goals and progress

2023 TARGET	2023 RESULT	ON TRACK?
Reduce Gasunie's (gross total) direct emissions in scopes 1 and 2 to 605 kilotonnes or lower.	767 kilotonnes	no
Facilitate carbon reduction at users of our infrastructure by 0.7 megatonnes or more.	0.1 megatonnes	no

2030 TARGET	2023 RESULT	ON TRACK?
Our scope 1 methane emissions (CH4) must be below 70 kilotonnes of CO2e by 2030, which boils down to a 49% reduction compared to the base year of 2020. This target is absolute and, consequently, not subject to how our transmission volumes develop.	122.1 kilotonnes of CO2e	yes
We want to reduce our scope 1 and 2 CO2e emissions by 34% by 2030, compared to the base year of 2020, assuming unchanged gas transmission volumes at both Gasunie in the Netherlands and Germany. For scope 2, we use net emissions, i.e. after offsetting decarbonisation through Guarantees of Origin.	490.2 kilotonnes of CO2e	no
Our scope 3 emissions in kilogrammes of CO2 per euro of product purchased must be 52% down on the 2023 base year by 2030 (2023: 0.42 kilogrammes of CO2e per euro of product purchased).	0.42 kilogrammes of CO2e per euro of product purchased	NYA

2035 TARGET	2023 RESULT	ON TRACK?
Our scope 3 emissions in kilogrammes of CO2 per euro of product purchased must be 66% down on the 2023 base year by 2035 (2023: 0.42 kilogrammes of CO2e per euro of product purchased).	0.42 kilogrammes of CO2e per euro of product purchased	NYA

2045 TARGET	2023 RESULT	ON TRACK?
Gasunie wants to be net-zero across all scopes by 2045. This means that, on balance, i.e. after any decarbonisation, we no longer contribute to global warming. By that year, our absolute emissions (kilotonnes of CO2e) must be 90% lower than in 2020.	1161 kilotonnes	NYA

These goals may be adjusted upward or downward with time

Definitions and scope of application

Gasunie's greenhouse gas emissions are referred to as 'CO_2e emissions' and categorised as per the Greenhouse Gas Protocol. The protocol distinguishes the following three scope classes: (1) scope 1, CO_2e emissions as a direct result of our own business activities ('out of our own chimney'), (2) scope 2, CO_2e emissions as an indirect result of procured energy (electricity and heat) and (3) all other indirect CO_2e emissions (across the value chain). Gasunie's specific policy on CO_2e-related emission reduction covers all three scopes.

Structure of the materiality assessment

The materiality assessment was carried out at an early stage of the reporting process in 2023. This assessment comprised three steps. We worked together with an external consultancy firm to carry out our materiality assessment. For more information, see the notes to the materiality assessment in our 2023 annual report.

Emissions and the Executive Board remuneration policy

Gasunie has integrated climate considerations in the variable part of Executive Board members' remuneration. Executive Board remuneration is for 80 percentage points (%pt) fixed pay plus a bonus, which can, if awarded by the Supervisory Board, add up to a maximum of 20%pt of an Executive Board member's total pay. Bonuses are awarded based on the following five performance indicators:

1. Operational excellence (weighting: 4%pt): performance in the area of safety, financial performance, performance in reducing emissions, developing CSR policy, improving ESG scores, switching to emission targets, IT security
2. Business growth for long-term value creation (weighting: 4%pt): progress made in developing our business development portfolio
3. Organisational development for long-term value creation (weighting: 4%pt): implementing the strategic HR plan, guaranteeing execution capacity, implementing the diversity agenda, anchoring collaboration between the Dutch and the German organisation
4. Positioning of gas (natural and other) and Gasunie for long-term value creation (weighting: 4%pt): advising on policy, legislation, and regulation for natural gas and on the energy transition agenda (hydrogen/CCS/green gas/heat) in the Netherlands, Germany, and at EU level.
5. A fifth target that changes year by year. In 2023, this fifth target related to improving our risk analyses and collaborative practices with third parties. For 2022, it was to revise the governance process and project guidelines.

Two of the total of twelve sub-targets of the 'Operational excellence' remuneration component relate to the climate. For the 2023 reporting year, Executive Board members were set the following climate-related performance excellence targets:

- Reduce Gasunie's (gross total) direct emissions in scopes 1 and 2 to 605 kilotonnes or lower.
  Actual emissions in 2023: 767 kilotonnes > target not met, see explanation.
- Facilitate carbon reduction at users of our infrastructure by 0.1 megatonnes or more.
  Reduction realised in 2023: 0.1 megatonnes >target met, see explanation.

In the 2023 annual report, the 'Operational excellence' target was not yet subdivided into sub-targets. Our aim for the 2024 annual report is to include these targets in the remuneration section of the 'Governance' section.

Explanation of our risks and opportunities

Every year, Gasunie conducts a Corporate Risk Analysis (CRA) to analyse the opportunities and risks associated with Gasunie's strategy. In 2023, the II3050 scenarios were used as the starting point for the CRA, whereby the focus was not solely on the main risks but also on the societal impact of our activities. The extensive outlooks from II3050 are extremes as to what the future could look like.

What does that mean for Gasunie? Together with a broad cross section of Gasunie experts, we have selected four key risks that affect Gasunie's general and social performance and assessed how these can impact on our future position. This leads to four different risk scenarios that jointly make up our CRA.

The risk scenarios foster the awareness that the future is uncertain, and these uncertainties are presented through their actual impact on the organisation, which we believe creates a solid basis for discussion because it makes the risks easier to recognise. The developments underlying the scenarios are analysed in conjunction with the strategy on a periodic basis.

In Gasunie's management control cycle, the CRA trickles down to the various business units, which each perform a Business Risk Analysis (BRA). In the business plan, we include our risk appetite as a guiding principle because it sets the scope for the realisation of the strategy and goals.

We update our risk appetite as our strategy execution progresses. Aligning these two elements is essential for successful strategic planning and execution. Risk appetite remained unchanged in 2024 compared to 2023 and will be updated as soon as Gasunie's new strategy is ready. We will use the Strategy Proceedings to align our risk appetite with the new strategy.

Notes to the National Transition Pathway

The Netherlands wants to have net-zero carbon emissions by 2050. A major contribution to this will come from the users of Gasunie's networks. They will achieve this by reducing their consumption of natural gas while increasing their use of green gas, as well as by making use of the new energy networks Gasunie will be installing this decade for the transmission of green hydrogen, heat and captured CO2. In 2023 (as in 2022 and 2021), we calculated the extent of Gasunie's influence over the coming years on the Dutch 'transition pathway', i.e. on the way to full decarbonisation.

In the previous section, we showed the impact of the investments we intend to make through to 2030 on greenhouse gas emissions in the Netherlands. We show what our influence on the transition pathway is and the average emissions reduction rate that the Netherlands must maintain to become net-zero by 2050. Our calculations show that, if we are able to complete all investments planned up to and including 2030 on time and unchanged, the Netherlands can become net-zero sooner than 2050.

The more Gasunie's sustainability projects are completed on time, the greater the volume of green molecules and captured CO_2 we can start transporting for our customers. This increased sustainability will likely be accompanied by a decrease in the amount of fossil energy we transport. The graphs in the section referred to above show the net emissions (the carbon footprint) of all the energy we transport to and from parties in the Netherlands on behalf of third parties. Reducing these emissions is made possible in part by importers, connected parties and project partners of Gasunie.

We only take into account the gases transmitted through the Gasunie network; we have not taken into account the contribution made by green gas in the networks of the regional network operators, for example. Nor do we include any negative emissions from green gas production. For hydrogen we have only included green hydrogen and imports; to avoid any double counting with CCS projects we have disregarded blue hydrogen.

To determine the contribution that will be made through our investments in green gas and hydrogen, we assume that these will replace natural gas. This assumption results in a somewhat conservative estimate given that, if green gas and hydrogen were to replace oil and/or coal, for example, the emission reduction contribution would be greater still. For CCS projects, the expected transport volumes of captured CO_2 from the Netherlands have been used; we have not included any storage of CO_2 from neighbouring countries in our calculations. Upstream emissions in the value chain are not included.

The emission reduction is determined relative to the situation in base year 2021. We use the Climate and Energy Outlook (C&EO) report published by the Netherlands Environmental Assessment Agency (PBL) as a reference for all external developments (outside Gasunie's sustainability projects). For the years up to and including 2029, we base our information on the 2022 edition of the C&EO report and for 2030 we use the 2023 edition of the C&EO report. We use a natural gas emission factor of 56.4 GJ/m3.

The emissions shown are net emissions. With net-zero emissions there may still be natural gas consumption, because CO_2 emissions from fossil fuels are being captured (through CCS), for example. The cut in emissions due to lower gas demand comes from the 2022 edition of the C&EO report, which takes into account the decreasing use of natural gas and the increasing use of green gas.

Because Gasunie is also active in Germany, in the table we have also included the emission reduction effect of our proposed investments for the German hydrogen network (Hyperlink). We do not include this effect when calculating our impact on the national transition pathway for the Netherlands, however. We have not calculated or visualised Gasunie's impact on Germany's national transition pathway, because the impact we can make in Germany is much smaller than in the Netherlands, where we are the sole natural gas TSO.

Gasunie's scope 3 footprint by category

Scope 3 category	English category name	Dutch category name	Description	Emissions produced in 2023 rounded to the nearest kilotonne of CO2e
1	**Purchased goods and services**	**Ingekochte goederen en diensten**	For Gasunie, this category is the second most dominant one of the scope 3 categories. Until now, we had only recorded emissions associated with the purchase of nitrogen in this category. Where possible, we make arrangements with suppliers for them to decarbonise their energy usage, including through the purchase of GOs, which pushes down emissions for the value chain as a whole. Other goods and services (pipeline materials, engineering and maintenance services, odorant, inspections using helicopters) are also significant contributors to emissions across the value chain. For the most dominant of these goods and services, i.e. pipelines, valves, IT, engineering services, and contracting, we are in talks or will commence talks with suppliers on emission reduction.	141
2	**Capital goods**	**Kapitaalgoederen**	This category includes all upstream (cradle-to-gate) emissions from the extraction, production, and transport of capital goods (pipelines, equipment, IT hardware, buildings, facilities, and vehicles) procured by Gasunie. Emissions for capital goods relate to all capital expenditures and can, therefore, not be related to operating expenses that occur on an annual basis. Emissions associated with capital goods are attributed to the year when the expenditures occurred to guarantee consistency with financial reporting.	191
3	**Upstream energy**	**Upstream energy**	This category includes emissions related to the extraction, production, and transport of fuels and electricity purchased and consumed by Gasunie in the reporting year and that are not included in scope 1 or scope 2. All upstream emissions and transport and distribution losses of purchased fuel and electricity (wheel-to-tank) are reported in this category. This category also covers emissions caused by losses during the transmission and distribution of electricity and upstream emissions from methane leaks (as part of scope 1).	50
4	**Upstream transportation & distribution**	**Transport & distributie (upstream)**	This category encompasses upstream (cradle-to-cradle) emissions from the transport and distribution of products/materials (not being fuels or energy products) purchased or acquired by Gasunie in the reporting year using vehicles and facilities not owned or operated by Gasunie, as well as other transport and distribution services procured by Gasunie during the reporting year (including both incoming and outgoing logistics). Gasunie's operations may trigger additional efforts by upstream partners, such as by allowing higher pressure at feed-in points. The footprint in this category is marginal and, therefore, need not be reported. This view was confirmed by DNV in their memorandum entitled 'Bijdrage Tetrahydrothiofeen (THT) gebruik op broeikasgasemissies' (Contribution of Tetrahydrothiophene use to greenhouse gas emissions). (https://dis/Resultaat/Resultaat/OpenDocumentPopup?strdocumentId=24825768)	0

Scope 3 category	English category name	Dutch category name	Description	Emissions produced in 2023 rounded to the nearest kilotonne of CO2e
5	**Waste**	**Afval**	This category includes scope 1 and 2 emissions produced by waste management providers, generated during disposal and treatment, which is allocated to the waste collected from Gasunie's offices and operational sites. Gasunie has signed contracts with companies such as Milgro and Reym for the processing of several forms of waste, under which the waste processing providers have committed to making transparent reporting on their processing part of the service they provide.	5
6	**Business travel**	**Dienst-, vlieg- en treinreizen**	This category includes emissions from the transportation of Gasunie employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. Emissions from business travellers staying in hotels also come under this category.	1
7	**Commuting**	**Woon/werkverkeer**	This category includes emissions from the transportation of employees between their homes and their work sites in vehicles not owned or controlled by Gasunie. This includes private cars and public transport. This category covers scope 1 and scope 2 emissions caused by employees and transport providers during the commute to and from work, such as due to fuel and electricity consumption.	1
8	**Upstream leased assets**	**Emissies van ingeleaste activa**	Category 8 includes emissions from the operation of assets leased by Gasunie in the reporting year and not already included in Gasunie's scope 1 or scope 2 inventories. We currently do not have any agreements that fall into this category. Leased assets for the LNG facility operated by EemsEnergyTerminal are reported in scope 1 and 2 because we have operational control over this entity.	0
9	**Downstream transportation and distribution**	**Transport & distributie (downstream)**	This category includes emissions from transportation and distribution of sold products in vehicles and facilities not owned or controlled by the reporting company. The transported gas itself is not a Gasunie product and upstream or downstream emissions caused by the treatment or consumption of the transported gas are, according to the definitions of the GHG protocol, not part of Gasunie's scope 3 emissions. Gasunie does not have any other activities that involve emissions in this context.	0
10	**Processing of sold products**	**Verwerking van verkochte producten**	Category 10 includes emissions from processing of sold intermediate products by third parties (e.g. manufacturers) subsequent to sale by the reporting company. Gasunie provides services and does not sell a physical product, see also the explanation for category 9. There are no emissions within the context of this category.	0

Scope 3 category	English category name	Dutch category name	Description	Emissions produced in 2023 rounded to the nearest kilotonne of CO2e
11	**Use of sold products**	**Gebruik van verkochte goederen en diensten**	This category includes emissions from the use of goods and services sold by the reporting company in the reporting year. Gasunie provides a service that consists in transporting and conditioning gas. The gas itself is not Gasunie's product and emissions generated by the use of that gas are, as per the requirements of the GHG protocol, not reported as Gasunie's value chain emissions in this category.	0
12	**End-of-life treatment of sold products**	**Verwerking van verkochte producten aan het einde van hun levensduur**	Category 12 includes emissions from the waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life. Although Gasunie provides transmission services and does not produce physical products, Gasunie's service scope does include adding 'physical substances' to the gas that is transported. The substances in question are nitrogen and odorant. The end-of-life treatment of nitrogen does not generate CO2e emissions, but that of odorant does, albeit to a minor degree. Based on advice from DNV, Gasunie has been reporting 1,995 kg of CO2, which is produced by the combustion of odorant, per kilogramme of odorant from 2022. DNV has recorded its advice in the 'Bijdrage Tetrahydrothiofeen (THT) (odorant) gebruik op broeikasgasemissies' (Contribution of Tetrahydrothiophene (THT) (odorant) use to greenhouse gas emissions).	1
13	**Downstream leased assets**	**Emissies van uitgeleaste activa**	This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in scope 1 or scope 2. Gasunie does not have any agreements that would fall into this category.	0
14	**Franchises**	**Franchises**	This category is applicable to franchisors (i.e. companies that grant licenses to other entities to sell or distribute its goods or services in return for payments). Gasunie does not have any agreements that would fall into this category.	0
15	**Investments**	**Investments**	This category includes the emissions caused by companies/operations where Gasunie has a financial stake but no direct control. This category covers scope 1 and 2 emissions arising from all of Gasunie's equity investments based on Gasunie's stake in the equity of the entity or based on the length of the pipeline (if the entity's primary activity is gas transmission through a pipeline). If the associate entity does not report on its scope 1 and 2 emissions, Gasunie will make a 'best-effort' estimation. For non-gas-transmission assets, emissions are calculated and reported based on estimated values of office emissions per employee per day (kg CO2/m2), even if the required data from the participating interest is not available. DNV provided the calculation methods based on Ecofys' energy label report. Since the associated emissions are very minor and, consequently, not material in this context, they are not reported.	3
total				393

Contact

We invite readers of the Climate Action Plan to provide us with feedback by email: info@gasunie.nl.

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