SustainaWeekly

Are emission reduction targets consistent with 1.5°C?

- **Economist: There are several paths to net zero, but only limited paths to 1.5°C temperature increase as this depends on the carbon budget. Even if the EU and the Netherlands meet current emission reduction targets, their contribution may not be sufficient for a 1.5 °C scenario. To stay within the 1.5°C - especially with a high degree of certainty - emission reduction targets for 2030 would need to be made more ambitious.**

- **Strategist: The CSRD will set a common standard for ESG data disclosures, with the first deadline in 2025. Currently, ESG data disclosures are far from complete, especially related to scope 3 emissions, while comparability is weak, given that companies can use different methodologies. These issues are unlikely to be solved by the CSRD, which means that there should be close monitoring of the first data sets that will become available in 2025.**

- **Sectors: Relatively high gas prices have been a strong incentive for many industrial companies to rapidly reduce gas consumption. Still, the Netherlands is about 70% dependent on gas imports, so the Netherlands has become a lot more sensitive to gas price fluctuations. It remains important for companies to further rationalise gas consumption. This can be done, for example, by further improving the energy efficiency of industrial processes.**

- **ESG in figures: In a regular section of our weekly, we present a chart book on some of the key indicators for ESG financing and the energy transition.**

Reaching net zero by 2050 is the often heard ambition in climate policy. However, achieving net zero is a necessary but not sufficient condition to limit global warming. Specifically, it not only net zero but also the path towards net zero that is crucial as this will ultimately determine the total amount of carbon and other greenhouse gasses released into the atmosphere, which in turn determine the extent of global warming. In this week's SustainaWeekly, we assess whether the current emission reduction targets in EU27 and the Netherlands are compatible with a 1.5°C scenario. Our next note looks at the current sustainable data disclosure requirements and their coverage/completeness as well as comparability. In our final note, we take a closer look at the disruptive nature of the energy crisis on Dutch industry and consider what the main effects of higher energy prices were, especially those of gas.

Enjoy the read and, as always, let us know if you have any feedback!

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Carbon budgets more crucial than net zero

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- **There are several paths to net zero but only limited paths to 1.5°C temperature increase by 2100**
- **This all depends on the carbon budget attached to the 1.5°C, 1.7°C and 2°C scenarios**
- **Even if the EU27 and the Netherlands meet current emission reduction targets, their contribution may not be sufficient for a 1.5 °C scenario**
- **Estimated cumulative emissions 2020-2050 are more in line with 1.5°C -1.7°C using carbon budgets based on current share of emissions**
- **To stay within the 1.5°C, especially with a high degree of certainty – emission reduction targets for 2030 would need to be made more ambitious**

Introduction

Reaching net zero by 2050 is the often heard ambition in climate policy. However, achieving net zero is a necessary but not sufficient condition to limit global warming. Specifically, it not only net zero but also the path towards net zero that is crucial as this will ultimately determine the total amount of carbon and other greenhouse gasses released into the atmosphere, which in turn determine the extent of global warming. The Paris Agreement has as its overarching goal to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” However, in recent years, world leaders have stressed the need to limit global warming to 1.5°C by the end of this century. That’s because the UN’s Intergovernmental Panel on Climate Change indicates that crossing the 1.5°C threshold risks unleashing far more severe climate change impacts, including more frequent and severe droughts, heatwaves and rainfall. The main question we would like to answer in this report is if the current emission reduction targets in EU27 and the Netherlands are aligned to this goal. We start with introducing the concept of the global carbon budget and ways to distribute this between countries. We then provide various estimates for carbon budgets and what they imply for global warming. We then compare these budgets with the estimated cumulative emissions for 2020-2050 under current government targets.

Carbon budget

A carbon budget is a concept used in climate policy to help to set emissions reductions targets in an effective way. It is the maximum amount of cumulative net global anthropogenic carbon dioxide emissions that would result in limiting global warming to a given level. The IPCC estimated that the global carbon budget at the start of 2020 consistent with limiting warming to 1.5°C with a likelihood of 50% was 500 GtCO2. For a 67% likelihood the global carbon budget was 400 GtCO2 and an 83% likelihood 300 GtCO2. For the 1.7°C degree scenario the budgets were: 850 GtCO2 (50%), 700 GtCO2 (67%) and 550 GtCO2 (83%). For the 2.0°C degree scenario the budgets were: 1350 GtCO2 (50%), 1150 GtCO2 (67%) and 900 GtCO2 (83%).

According to Earth System Science Data – Global Carbon Budget 2022, the annual manmade CO2 emissions were 36.6 GtCO2 in 2022 and there was a 380 GtCO2 carbon budget left at the start of 2023 (see **here**). These data are based on the 17th version of the global carbon budget and the 11th revised version in the format of a living data update in Earth System Science Data.

The carbon clock paints a more dramatic picture. It indicates that for a 1.5°C scenario currently 241 GtCO2 is left and for the 2.0° C scenario 991 GtCO2. So the carbon budget for the 1.5° C scenario would be depleted in less than 6 years at current emissions (see **here**). The clock is based on data from the Intergovernmental Panel on Climate Change (IPCC). Annual emissions of CO2 – from burning fossil fuels, industrial processes and land-use change – are estimated to be 42.2 Gt per year, the equivalent of 1,337 tonnes per second.

Distribution of the global carbon budget by country’s share of current emissions

The main question is how to distribute this global carbon budget. There are a number of approaches. The first approach is probably the easiest method to do this. It is the distribution in line with the share of a country’s current emissions of the

global emissions. This would imply that every country needs the same reduction trajectory. The result is that EU27 has a budget of 8% of the global carbon budget. In other words EU27 could emit 8% of the global CO2 emissions annually. This share has 2020 as base year because not all the data are available for 2021 and 2022. The Netherlands is responsible for merely 5% of the emissions of EU27.

The next question is what are the EU27 cumulative expected CO2 emissions for the period 2020-2050 based on the 55% reduction target for 2030 (versus 1990) and net zero in 2050. Here we take the available data for 2020 and 2021 and assume a linear reduction path between 2021 and 2030. We also assume a linear reduction path between 2031-2050. We then add up these yearly CO2 emissions to come to the cumulative emissions of 42.86 GtCO2 for 2020-2050 (red in the table below). Based on the EU27 share of the global (8%) the budget for 1.5°C path with a 50% likelihood would be 38.62 GtCO2, for 1.7°C path 65.66 GtCO2 and for 2°C path 104.28 GtCO2 (blue numbers in the table below). Therefore the cumulative emissions would result in a path between 1.5°C and 1.7°C. In order to increase the likelihood of keeping the temperature rise at 1.5°C, the carbon budgets decrease as well. The results for the 67% likelihood are the dark green numbers and the likelihood of 83% the light green numbers. For example in the 1.5°C scenario with an 83% likelihood the carbon budget for EU 27 2020-2050 is only 23.17 GtCO2, almost half of the expected cumulative CO2 emissions if the EU's targets are met. What would be the emission reduction target for 2030 need to be, to be in line with the carbon budget for 1.5°C path? To stay within the carbon budgets of 1.5°C CO2 emissions need to decline by 65% (with 50% likelihood) to 90% (83% likelihood). This again assumes a linear reduction path after 2030.

CO2 expected emissions 2020-2050 and different carbon budgets in GtCO2

	EU27 policy			NL policy		
2020	2.69			0.14		
2020-2030	26.00			1.32		
2031-2040	12.87			0.49		
2041-2050	3.99			0.15		
Total 2020-2050	**42.86**			**1.95**		
Annual global CO2 emissions 2020	34.80					
IEA NZ scenario cumulative CO2 2020-2050	484.60					
	1.5° C	**1.7° C**	**2.0° C**	**1.5° C**	**1.7° C**	**2.0° C**
Global carbon budget 2020 IPCC 50% likelihood	**500.00**	**850.00**	**1,350.00**			
Carbon budget EU27 2020-2050 Gt CO2						
EU27 share of global emissions (2020)	**38.62**	**65.66**	**104.28**	**1.97**	**3.35**	**5.32**
UPC: equality 5%	25.00	42.50	67.50	1.28	2.17	3.44
UPC: historical 4.6%	23.00	39.10	62.10	1.17	1.99	3.17
UPC: capacity 2%	10.00	17.00	27.00	0.51	0.87	1.38
UPC: sustainability 2.3%	11.50	19.55	31.05	0.59	1.00	1.58
UPC: weighted average 3.5%	17.50	29.75	47.25	0.89	1.52	2.41
	1.5° C	**1.7° C**	**2.0° C**	**1.5° C**	**1.7° C**	**2.0° C**
Global carbon budget 2020 IPCC 67% likelihood	**400.00**	**700.00**	**1,150.00**			
Carbon budget EU27 2020-2050 Gt CO2						
EU27 share of global emissions (2020)	**30.90**	**54.07**	**88.83**	**1.58**	**2.76**	**4.53**
UPC: equality 5%	20.00	35.00	57.50	1.02	1.79	2.93
UPC: historical 4.6%	18.40	32.20	52.90	0.94	1.64	2.70
UPC: capacity 2%	8.00	14.00	23.00	0.41	0.71	1.17
UPC: sustainability 2.3%	9.20	16.10	26.45	0.47	0.82	1.35
UPC: weighted average 3.5%	14.00	24.50	40.25	0.71	1.25	2.05
	1.5° C	**1.7° C**	**2.0° C**	**1.5° C**	**1.7° C**	**2.0° C**
Global carbon budget 2020 IPCC 83% likelihood	**300.00**	**550.00**	**900.00**			
Carbon budget EU27 2020-2050 Gt CO2 50% likelihood						
EU27 share of global emissions (2020)	**23.17**	**42.48**	**69.52**	**1.18**	**2.17**	**3.55**
UPC: equality 5%	15.00	27.50	45.00	0.77	1.40	2.30
UPC: historical 4.6%	13.80	25.30	41.40	0.70	1.29	2.11
UPC: capacity 2%	6.00	11.00	18.00	0.31	0.56	0.92
UPC: sustainability 2.3%	6.90	12.65	20.70	0.35	0.65	1.06
UPC: weighted average 3.5%	10.50	19.25	31.50	0.54	0.98	1.61

Source: IPCC, ABN AMRO Group Economics, UPC, European Advisory Board, International Energy Agency (2022), World Energy Outlook 2022, IEA

The same exercise can be done for the Netherlands. The Netherlands has a share of 5.1% of EU27 emissions. For the Netherlands the cumulative emissions 2020-2050 would total to 1.95 GtCO2 (see in red in the table). The budget would be 1.97 GtCO2 (1.5°C), 3.35 GtCO2 (1.7°C) and 5.32 GtCO2 (2.0°C) for 50% likelihood (blue numbers in the table above). Based on the cumulative estimated emissions would result in a path quite close to 1.5°C. However, the government would need to step up targets under increased likelihood scenarios.

Alternative methods for the distribution of global carbon budget

The distribution of the global carbon budget by the country's share of emissions is probably the easiest way to do this. This approach has also drawbacks. It doesn't take into account the historical emissions of a country, population and population growth and income per capita. There are several alternative approaches on how to distribute the global carbon budget, which some may argue is fairer to emerging and developing countries.

We start with four approaches presented by Universitat Politècnica de Catalunya BarcelonaTech (UPC) in a recent report (see **here**). The first approach is based on responsibility. This dimension aims to relate responsibility for contributing to climate change via GHG emissions of a country to its historical contribution to the problem. It considers the historical and present GHG emissions of a country and can be measured using the cumulative historical emissions per capita of that country. Simply put, the more emissions a country has emitted in the past, the lower its carbon budget in the future. This dimension dictates that the EU should be allocated 4.6% of the global carbon budget. The second dimension is based on capacity, specifically the degree of resources a country has to mobilize. The higher a country's ability to mobilize, the lower its carbon budget. This dimension dictates that the EU should be allocated 2.0% of the global carbon budget. The third one is an approach based on equality. This means that each human has the same GHG emissions level. This dimension dictates that the EU should be allocated 5.0% of the global carbon budget. The last dimension is the right to development. It is the right of all countries to meet the needs of present and future generations. This dimension dictates that the EU should be allocated 2.3% of the global carbon budget. The equal weighted average of these approaches is 3.5% for the EU27. Based on this percentage the carbon budget of the EU is only **14** GtCO2 from 2020 (likelihood 67%), implying much more drastic emission cuts. If based on equality this budget would be **20** GtCO2. The table above shows the outcomes for the four approaches and the weighted average of the four (the rows with UPC). Moreover a study done by Air Pollution & Climate Secretariat shows that a carbon budget of 5.07% based on average population share. For the 67% likelihood the carbon budget would be **20.2** GtCO2 and for the 83% likelihood **15.21** GtCO2.

Furthermore, Climate analytics indicate that the cumulative emissions for the EU27 for the period 2020 to 2050 are between 12 and 23 GtCO2. In the 1.5°C compatible pathways assessed, cumulative CO2 emissions from 2020 to 2050 (excluding LULUCF) are 23-35GtCO2. If the average LULUCF sink from the above sources is included, then the EU27's cumulative CO2 emissions from 2020–2050 would be 12-23GtCO2. This represents about 2.2-4.6% of the global 1.5°C compatible carbon budget. For comparison, the EU27's fraction of global population is around 5.6%, and one would expect that as a developed region its carbon budget would be substantially less than its population share (see **here**).

Conclusion

There are several paths to net zero but only limited paths to a 1.5°C temperature increase by 2100. This all depends on the carbon budget attached to the 1.5°C, 1.7°C and 2°C scenarios. The IPCC estimated global carbon budgets at the start of 2020 to limit warming to 1.5°C, 1.7°C and 2.0°C at different likelihoods. There are different approaches to distribute the global carbon budget. One approach is to take one country's current share of emissions. If we compare the expected cumulative emissions 2020-2050 for EU27 and the Netherlands with the different carbon budgets, these emissions are between the carbon budgets of 1.5°C and 1.7°C (50% and 67% likelihood). To stay within the 1.5°C carbon budgets CO2 – especially with a high degree of certainty – emission reduction targets for 2030 would need to be made more ambitious. This all assumes that targets will be met, but the policies are not yet in place to meet current targets. According to a report from June 2023 of Climate Analytics under current policies global temperatures are expected to increase by 2.7°C by 2100 and keep rising. Other approaches come with other outcomes as the table above shows. It would be a step forward if at the upcoming COP28 carbon budgets are formulated for the different countries. This will create clarity and help the enormous task at hand. But this will likely be a sensitive topic as there first needs to be an agreement on what approach to use.

ESG disclosures far from complete and comparable

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- **Financial markets will play a key role in the path to net zero, as investment needs are significant**
- **Complete and comparable ESG data disclosures are necessary for investors to properly asses risk and challenges of the companies they invest in (and their impact on the environment as well)**
- **The CSRD will set a common standard for ESG data disclosures, with the first deadline in 2025**
- **Currently, ESG data disclosures are far from complete, especially related to scope 3 emissions…**
- **…while comparability is weak, given that companies can use different methodologies**
- **These issues are unlikely to be solved by the CSRD, which demands close monitoring of the first data sets that will become available in 2025**

The path to net-zero by 2050 requires above all reliable data

The European Commission (EC) presented its Green Deal on 11 December 2019, with the aim to make the EU a climate-neutral continent by 2050. Financial markets will play a key role in achieving the goal, as it requires significant investments. A necessary condition in this respect is that investors have access to reliable information about ESG risks, as well as the challenges and opportunities of the companies that they invest in (for instance, via investments in green, social, and sustainability bonds). To facilitate this, several reporting initiatives have already seen the light of day, with the Corporate Sustainability Reporting Directive (CSRD) probably being the most important.

One of the ultimate goals of the CSRD is to introduce a common standard for companies' sustainability reporting, which should enhance data comparability as well as accountability. Eventually, this will improve the trust of society and investors, which, in turn, will likely give companies better access to sustainable financing. Currently, the lack of reliable information on sustainability risks that companies face, as well as the impact that companies have on people and the environment, is seen as a major impediment to channel sufficient funds to environmentally-friendly activities. Below, we will assess current sustainable data disclosure requirements and their coverage/completeness as well as comparability.

Short history of EU sustainability disclosures regulations

In 2018, the EU set a few objectives under its "Financing Sustainable Growth" action plan, noting that: "the disclosure (…) of ***relevant, comparable and reliable*** sustainability information is a **prerequisite** for meeting those objectives" (see here). This fits the call from investors, regulators, and society more broadly that there is a big gap in terms of ESG information availability, which hampers investors in their decision-making process, while also limiting the accountability of firms on ESG-related matters, while regulators are also left in the dark.

As such, developing a common standard for sustainable data disclosures was (and has been ever since) topping the agenda of European policymakers, culminating in the approval of the CSRD (here).

CSRD: who needs to report and when and what?

The chart on the next page shows the timeline about when and which entities need to report under the CSRD. It shows that the first reporting deadline is in 2025 (over the annual report of 2024), while by 2029 all companies that are in scope of the CSRD will need to disclose their ESG figures.

Graphic overview of scope and timeline

Source: European Commission, ABN AMRO Group Economics.

In terms of what information needs to be reported, the EC asked the European Financial Reporting Advisory Group (EFRAG), and independent and multistakeholder advisory body, to draft common standards, known as the European Sustainability Reporting Standards (ESRS). The ESRS provides, therefore, a common framework that entities rely on when reporting sustainability information. The idea behind having a *common* framework is that it enhances comparability and reliability of ESG information being provided by entities, while also reducing their reporting burdens (and costs).

The ESRS takes a 'double materiality' perspective, meaning that companies not only need to report their impact on people and the environment (impact materiality), but also how environmental and social factors will affect their own operations (financial materiality). The ESRS covers 12 reporting standards, with two of which having a general nature, five related to the environment, four to social issues, and one related to governance. What is more, companies need to report on both a sector level and an entity level, while there are three reporting areas (see below).

ESRS reporting structure

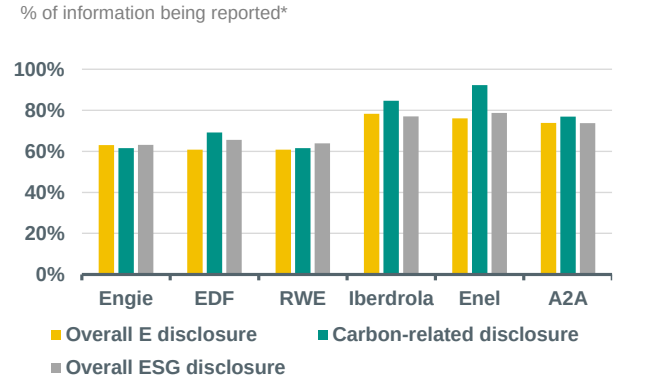
Source: EFRAG, ABN AMRO Group Economics.

On the surface, the adoption of the ESRS paves the way for the much needed common standards in ESG reporting. However, although the intention was there, in practice, the ESRS-compliant data coming to the market could still lead to fragmentation amongst companies, as it is likely that they will still use different definitions or interpret questions in different ways. This embodies a risk, as it would undermine the comparability of data (that, at face value, seems comparable), which in turn harms their reliability. Below we take a closer look at these issues.

ESG data currently far from complete

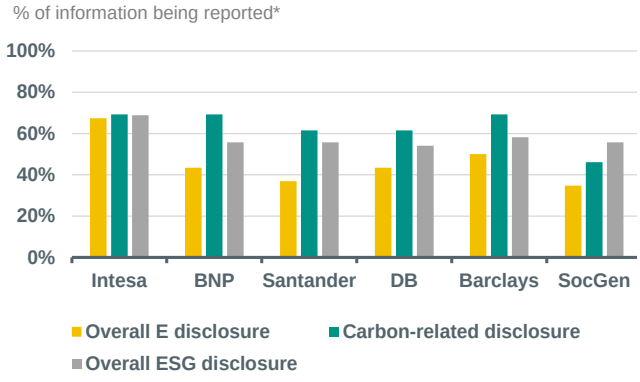
We first take a look at the ESG data that is currently being disclosed by companies. We focus our analysis on a set of companies of two sectors: utilities and financials. As shown in the graphs on the next page, ESG disclosures across different pillars (E, S and G), as well as solely focused on carbon emissions, is still significantly lacking. Particularly for banks, only around 60% of the environmental and carbon-related data is being disclosed. That clearly shows that for banks, ESG disclosures is still very much focused on governance.

Companies still lack on their ESG disclosures



Source: Bloomberg, ABN AMRO Group Economics.*Note: Related to information provided across the various ESG areas which form the Bloomberg ESG scores. Data as of 2022 annual reports.

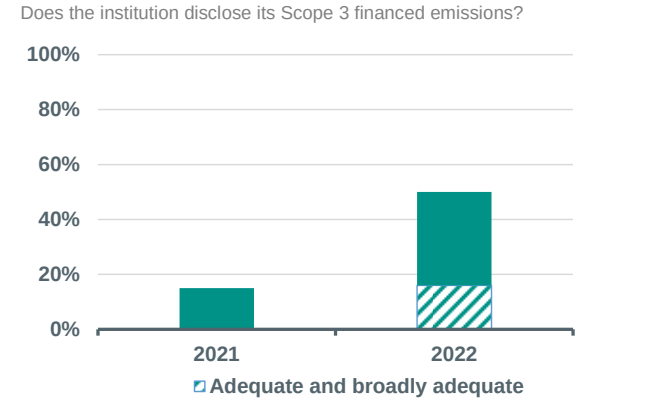
Banks still lack on their ESG disclosures



Source: Bloomberg, ABN AMRO Group Economics. *Note: Related to information provided across the various ESG areas which form the Bloomberg ESG scores. Data as of 2022 annual reports.

With the ESG data not yet touching upon all relevant information for investors, one could argue that the current data is not complete. A good example is, for instance, reporting on scope 3 emissions. While these account for the majority of banks' emissions, a significant share of banks still does not include financed emissions within their scope 3 reporting (or does not assess their entire lending portfolio). According to the ECB, half of the EU banks do not report on scope 3 financed emissions, and 85% of those that do report, do not report it with an at least (broadly) adequate quality (see **here**).

Only half of the banks report financed emissions



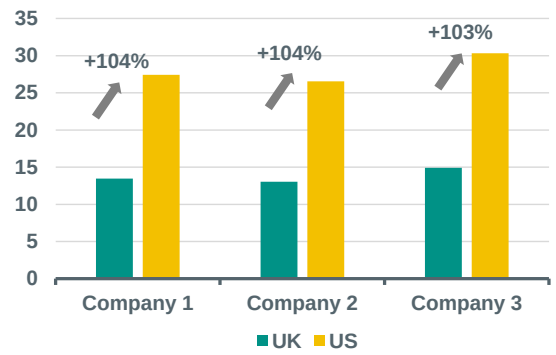
Source: ECB, ABN AMRO Group Economics.*Note: Adequate and broadly adequate refer to banks that fulfilled minimum criteria with regard to existence (of data) and minimum requirements with regard to Substantiation (of data). The analysis of the quality of the data was not part of the 2021 analysis.

ESG data also not fully comparable

Moving on, we try to investigate the comparability of current ESG data disclosures of various companies. One key aspect related to disclosures of carbon emissions is the emission factor that companies choose to calculate CO2 emissions. It now seems possible that two similar companies from a similar sector could report different carbon emissions just by using different emission factors. Indeed, a research study by Kings College (see **here**) shows that there are significant differences in the emission factors of two of the most used global datasets (UK-Defra and US-EPA), in which factors from the UK-Defra database are on average 10% lower than those in the US-EPA database. As shown in the chart below, when re-calculating emissions from one database to the other, companies would show a significantly different carbon footprint.

Emission factors plays a big role in ESG reporting (1)

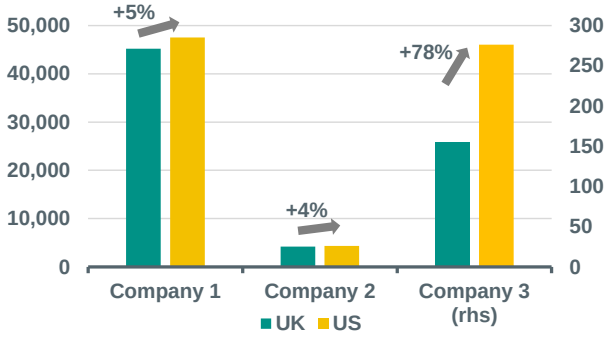
Scope 2 emissions (ton CO2e), location-based



Source: Kings College London, ABN AMRO Group Economics. Note: company 1 assembles products for onward sale, company 2 manufactures refrigerators, and company 3 is a professional services company with shared offices. US refers to US-EPA dataset, while UK refers to UK-Defra dataset.

Emission factors plays a big role in ESG reporting (2)

Scope 3 emissions (ton CO2e), average-based



Source: Kings College London, ABN AMRO Group Economics. Note: company 1 assembles products for onward sale, company 2 manufactures refrigerators, and company 3 is a professional services company with shared offices. US refers to US-EPA dataset, while UK refers to UK-Defra dataset.

The results clearly illustrate that existing standards that specify and guide companies on their GHG emission reporting do not clearly specify the methodology that needs to be used by companies. For example the GHG Protocol Corporate Standard (which is not only the most widely used standard globally for carbon reporting, but also required to be considered by undertakings that report under the CSRD) does not prescribe which dataset of emission factors should be used. Therefore, it allows companies to also use the dataset that fits their ambitions better. The ESRS, which specifies the reporting of the CSRD (see above), requires undertakings to "consider the principals, requirements and guidance provided by the GHG Protocol Corporate Standard", but by doing so, also does not require calculations to be coherent across peer companies.

A long way to go

Overall, it seems that there is still a long way to go before ESG disclosures from companies will be complete and comparable. The CSRD (and the common standards set out in the ESRS) is a good starting point, but still leaves room for different methodologies and assumptions that companies base their ESG data disclosures on. This is a risk in our view, as in the end, it will limit the use of this data for investors (and other stakeholders) to assess the sustainability performance of companies as well as the risks and challenges they face in this respect. Ultimately, it could undermine the aim of the EC in channelling more private sector financing into sustainable activities and the market for sustainable investments more broadly. Therefore, it will be key to monitor closely the quality of the first ESG data disclosures under the CSRD that will be published in 2025. Investors should not take the incoming data "as given", and should still put these under the microscope before using it "blindly" for investment decisions.

Energy crisis has disruptive effect on Dutch manufacturing

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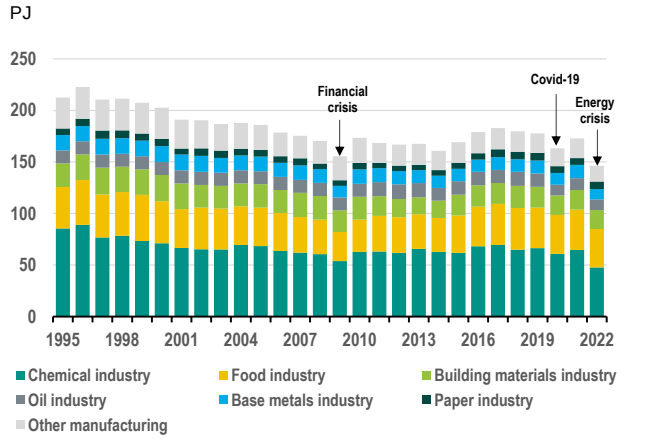
- **Relatively high gas prices have been a strong incentive for many industrial companies to rapidly reduce gas consumption**
- **In 2022, greenhouse gas emissions in total industry were reduced by 11%, while industrial gas consumption fell by around 25%**
- **Currently, the Netherlands is about 70% dependent on gas imports; thus, the Netherlands has become a lot more sensitive to gas price fluctuations**
- **Compared to the eurozone average, the import price of gas is about 11% higher in the Netherlands**

Energy prices rose rapidly from the beginning of 2021. The energy crisis was born. The rapid rise in energy prices stemmed from the rapid economic recovery after Covid-19. Energy stocks and supply - which had been significantly reduced by Covid-19 - could not keep up with the sudden surge in energy demand. Russia's attack on Ukraine in early 2022 exacerbated the situation considerably. The energy crisis had grown into a many-headed monster. In response to the crisis, some European gas-intensive industries stopped production because they could not afford to keep producing. In this analysis, we take a closer look at the disruptive nature of the energy crisis on Dutch industry and consider what the main effects of higher energy prices were, especially those of gas.

Gas usage Industry

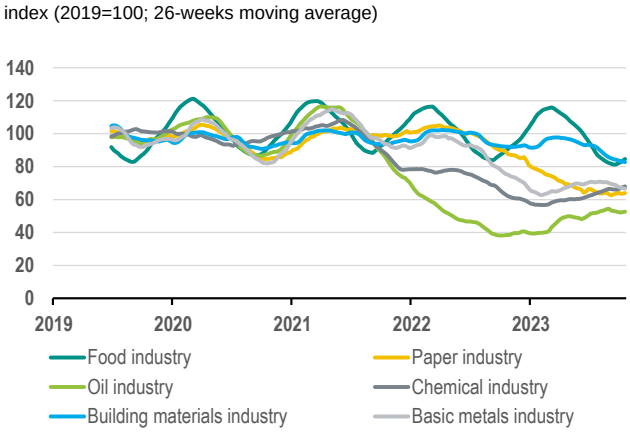
Rationalisation of energy consumption is not new in industry. Since the oil crisis in the 1970s, designing the production process to be as efficient as possible became part of the DNA of many industrial companies. From then on, all kinds of measures were taken to improve processes. After the crisis of the 1970s, things are actually not much different. The financial crisis of 2008-2009, the Covid-19 crisis and the recent energy crisis also put the business continuity of many industrial companies on high alert and triggered them to reduced energy consumption.

Total natural gas usage industry and subsectors



Source: CBS, ABN AMRO Group Economics

Natural gas usage by subsector on a weekly basis



Source: CBS, ABN AMRO Group Economics

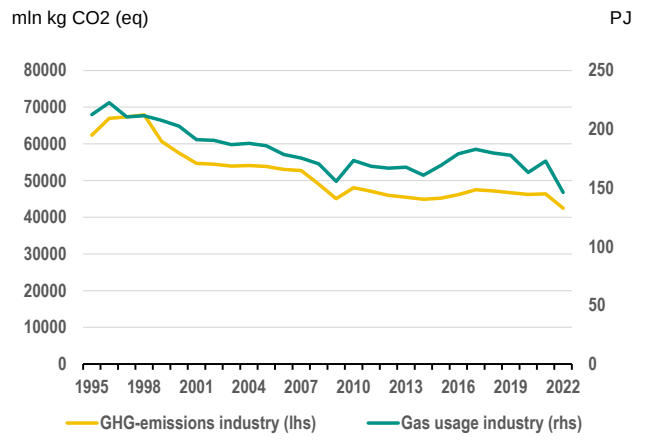
More than three quarters of total Dutch natural gas consumption is accounted for by economic activities in sectors. Most of this is consumed by industry, with a 40% share of total gas consumption. In Dutch industry, six subsectors are then dominant when it comes to volumes of gas consumption. These are - in order of most gas consumption - the chemical industry, the food industry, the building materials industry, the petroleum industry, the basic metal industry and the paper industry. Together, these six sectors account for 85-90% of total industrial gas consumption. The chemical industry accounts one third of gas consumption, followed by the food industry with a share of25% and then the building materials industry (13%).

In 2022, gas consumption was significantly lower in almost all sectors due to higher gas prices. Only in the paper industry did gas consumption increase in 2022 (by 7%). In the other five largest gas consumers in the industry, gas consumption decreased by an average of 14% in 2022. In 2023, at a time when gas prices are normalising somewhat, gas consumption in three sectors is increasing again. For instance, gas consumption in mid-October in the petroleum industry is 101% higher

compared to the first week of 2023. And in the chemical industry and the basic metal industry, the increase is 29% and 11% respectively. In other sectors, gas consumption has continued to fall in 2023.

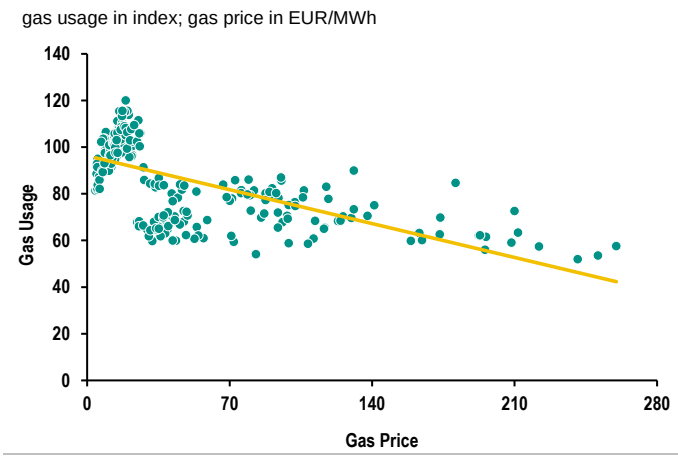
Lower gas consumption in industrial sectors has helped reduce greenhouse gases. In 2022, greenhouse gas emissions in total industry decreased by 11%, while industrial gas consumption fell by around 25%. With the reduction of gas in the production process, the use of other fuels often increased to maintain production levels. The fact that the non-fossil option could often not be chosen directly when reducing gas consumption contributed to the fact that the rate of emission reduction is slower than the rate of reduction in gas consumption. Other and additional measures are needed to accelerate GHG reductions.

GHG-emissions vs. gas usage



Source: CBS, ABN AMRO Group Economics

Gas usage industry vs. gas price



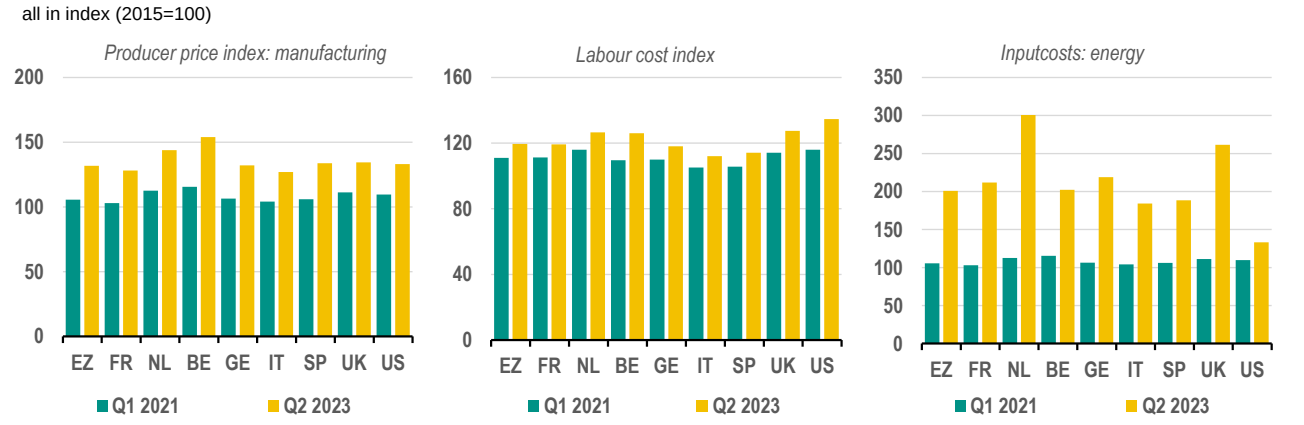
Source: CBS, ABN AMRO Group Economics

Relatively high gas prices have been a strong incentive for many industrial companies to rapidly reduce gas consumption and improve the energy efficiency. We can see this in the chart on the right above. Indeed, less gas consumption translates directly into lower production costs. But rationalisation in gas consumption was also a necessary choice from the perspective of competitiveness. Indeed, higher gas prices also put industrial companies at a disadvantage internationally. For the Netherlands even more so than in other countries within the eurozone.

Energy crisis puts Dutch industry at a disadvantage

Over the years, countries have seen large fluctuations in energy prices, other input costs and also exchange rates. These fluctuations could differ greatly from one country to another. For instance, the ultimate impact of the 1970s oil crisis was much greater for countries that were heavily dependent on oil imports. For some countries, moreover, the crisis had a longer-lasting impact, while others experienced it for a relatively short period of time.

PPI, labour costs and energy costs by country (Q1-2021 vs. Q2-2023)



Source: CBS, ABN AMRO Group Economics
Note: EZ=eurozone, FR=France, NL=Netherlands, BE=Belgium, GE=Germany, IT=Italy, SP=Spain, UK=United Kingdom, US=United States

Although the recent energy crisis hit all countries, we still see large differences between countries. In the three figures above, we compare the producer price index, labour costs and energy costs in the first quarter of 2023 (most recent) with

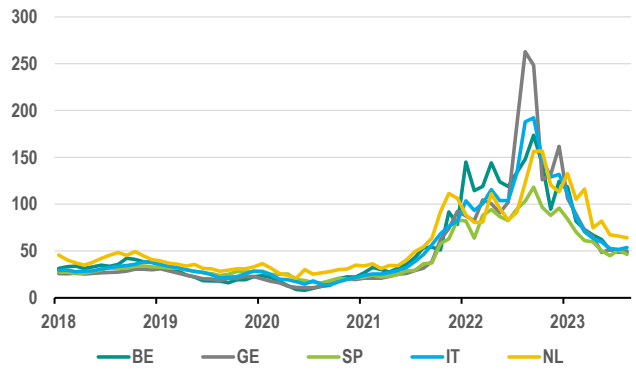
the position in the first quarter of 2021 (at the start of the energy crisis). The Netherlands tends to be worse off in terms of the three indicators compared to the other countries in the figure. But what is particularly striking is that in terms of energy costs, the Netherlands is the worst off in 2023, while in early 2021 the playing field in this area was almost identical for many countries. The import price of gas plays an important role in this.

Netherlands dependent on gas

Currently, the Netherlands is about 70% dependent on gas imports. This makes the Netherlands more sensitive to fluctuations in the gas price. Moreover, the prices of natural gas differ widely worldwide. There is a difference between futures prices and spot prices, and prices on exchanges, such as the *Title Transfer Facility* (TTF) and the *Power Exchange Central Europe* (PXE), also differ widely. For this analysis, we calculated the import price of gas by country by using Eurostat data. In this way, we increase comparability between countries. The calculation of the import price in the left figure is based on import value (in euro) of gas and the quantity imported (in 100 kg).

Import price gas top 5 gas importers in eurozone

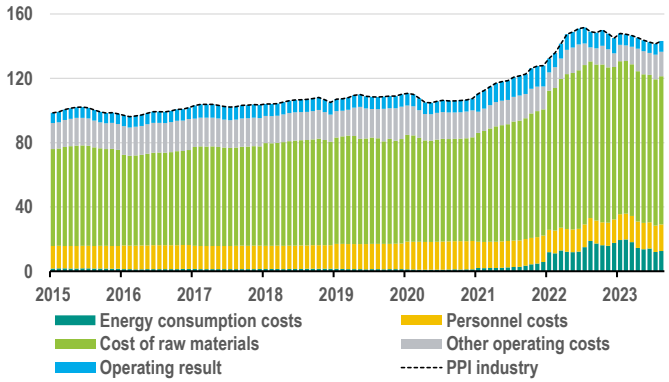
euro per 100 kg



Source: Eurostat, ABN AMRO Group Economics

Trend in PPI Netherlands, cost components and result

index (2015=100)



Source: CBS, ABN AMRO Group Economics

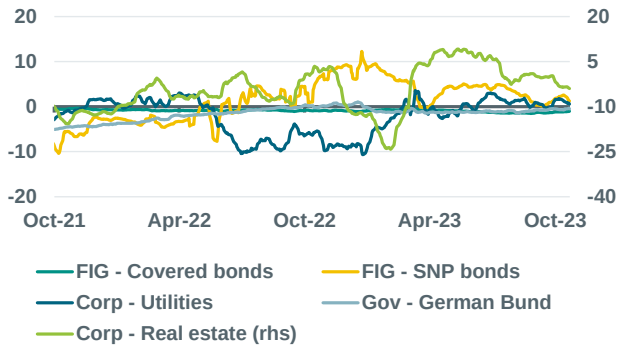
What stands out from this calculation is that the Netherlands pays more for its imported gas. The average import price of gas for the Netherlands over the first eight months of 2023 is on average 35% higher than the average import price of the other four largest gas importers in the eurozone. Compared to the eurozone average, the import price of gas is about 11% higher in the Netherlands. Such large differences come at the expense of price competition in global markets.

Ultimately, these higher gas prices also affect industrial business results. The figure on the right above shows that the cost of energy and also the purchase of raw and auxiliary materials have been important determinants of the trend in the producer price index over the past two years. The sharp rise in the overall industrial producer price index in the Netherlands has been fuelled mainly by sharp price increases in raw material and energy-intensive industries, such as petroleum, chemicals, wood and building materials and basic metals. As energy, as well as other raw and auxiliary materials are important inputs for many industry subsectors, higher energy and raw material prices have undermined Dutch competitiveness. What is more, the uncertainties and risks in the global gas market will continue for some time. So, to become less vulnerable to the volatility of the gas market and further reduce import dependency, it remains important to further rationalise industrial gas consumption. This can be done, for example, by further improving the energy efficiency of industrial processes. In the end, chances increase that competitiveness of Dutch industry will recover and that greenhouse gas emissions will be reduced further.

ESG in figures

ABN AMRO Secondary Greenium Indicator

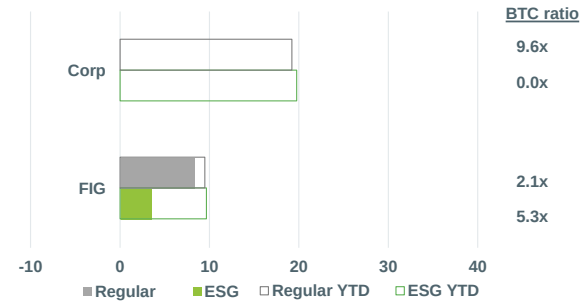
Delta (green I-spread – regular I-spread)



Note: Secondary Greenium indicator for Corp and FIG considers at least five pairs of bonds from the same issuer and same maturity year (except for Corp real estate, where only 3 pairs were identified). German Bund takes into account the 2030s and 2031s green and regular bonds. Delta refers to the 5-day moving average between green and regular I-spread. Source: Bloomberg, ABN AMRO Group Economics

ABN AMRO Weekly Primary Greenium Indicator

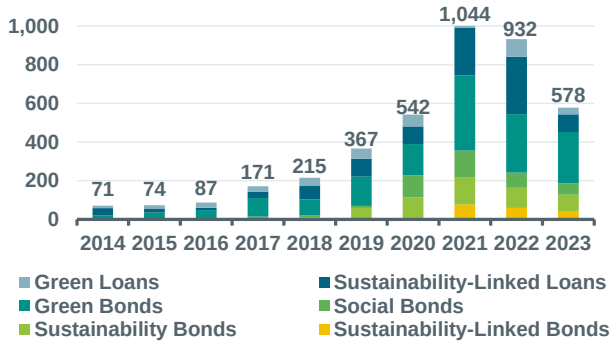
NIP in bps



Note: Data until 03-11-23. BTC = Bid-to-cover orderbook ratio. Source: Bloomberg, ABN AMRO Group Economics

Sustainable debt market overview

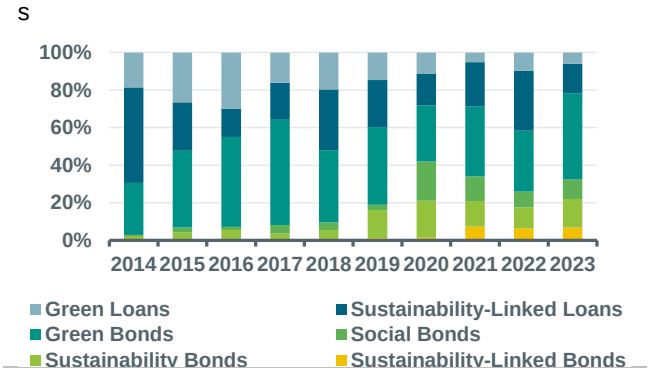
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of sustainable debt by type

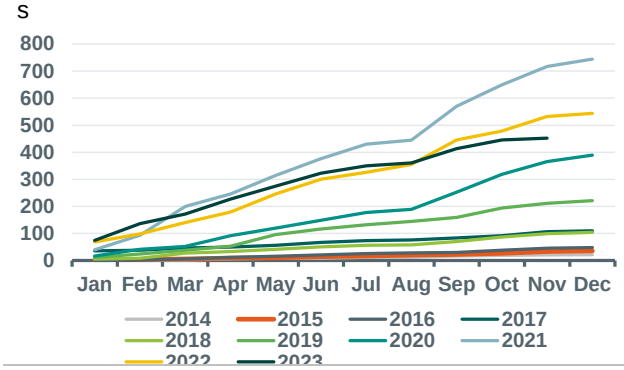
% of total



Source: Bloomberg, ABN AMRO Group Economics

YTD ESG bond issuance

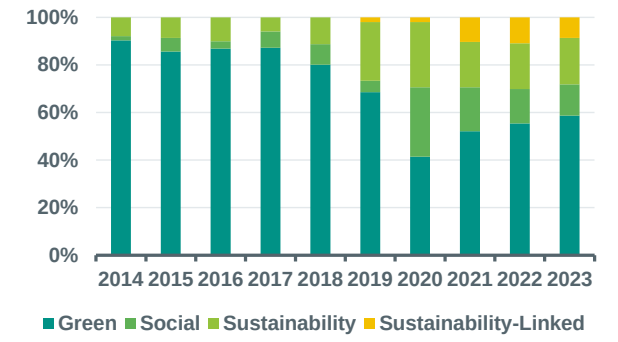
EUR bn (cumulative)



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by type

% of total



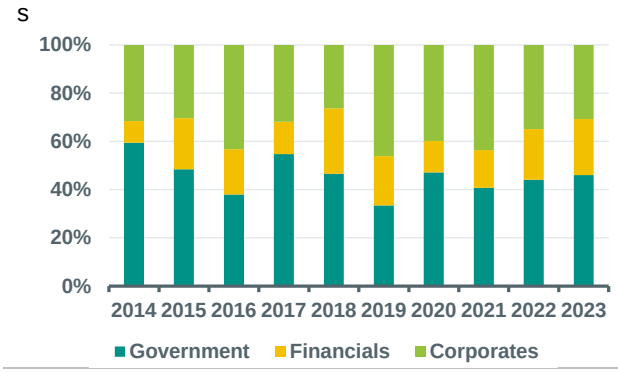
Source: Bloomberg, ABN AMRO Group Economics

Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Breakdown of ESG bond issuance by sector

% of total

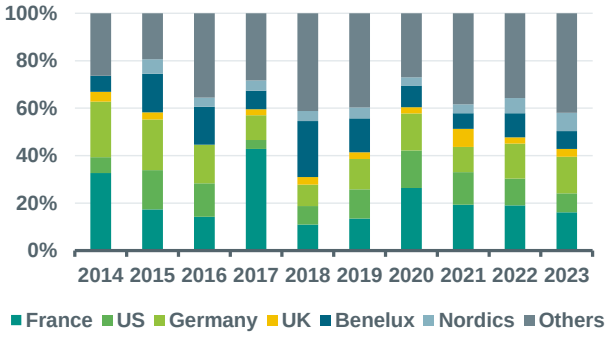
S



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by country

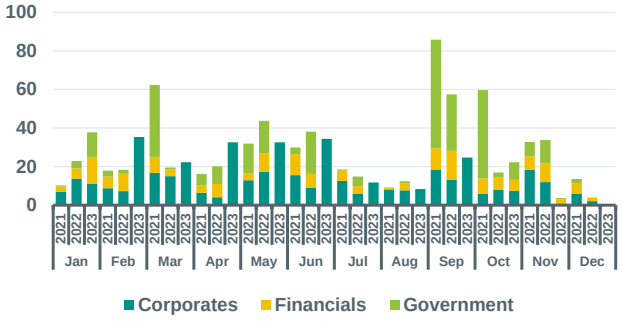
% of total



Source: Bloomberg, ABN AMRO Group Economics

Monthly Green Bonds issuance by sector

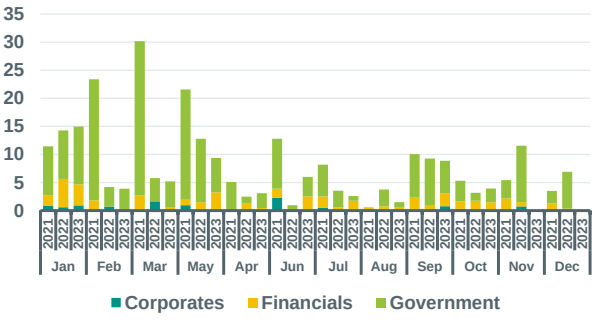
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Monthly Social Bonds issuance by sector

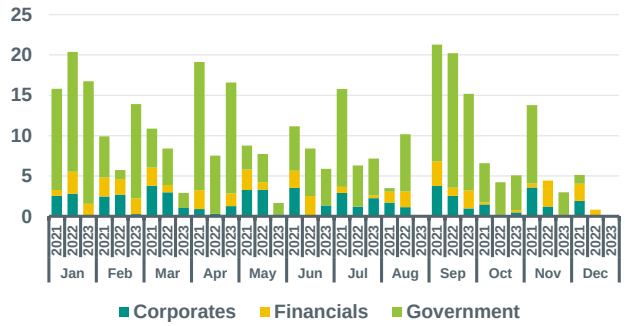
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Monthly Sustainability Bonds issuance by sector

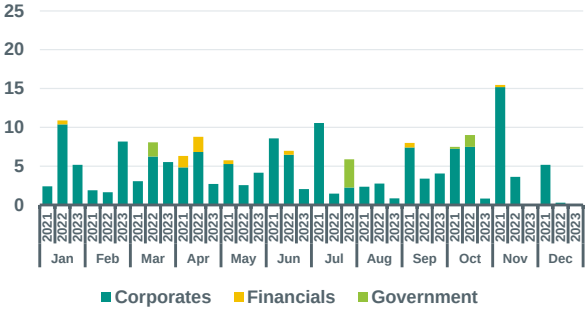
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Monthly Sust.-Linked Bonds issuance by sector

EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Carbon contract current prices (EU Allowance)

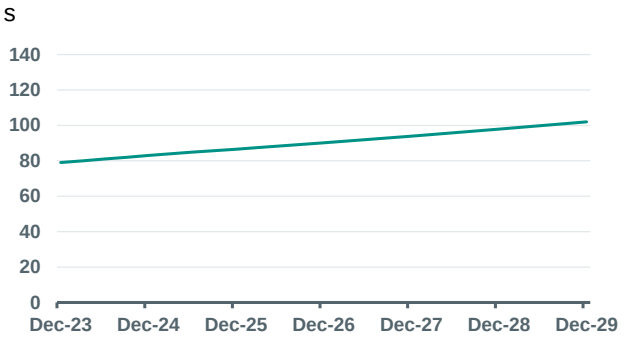
EUR/MT

Source: Bloomberg, ABN AMRO Group Economics

Carbon contract futures curve (EU Allowance)

EUR/MT

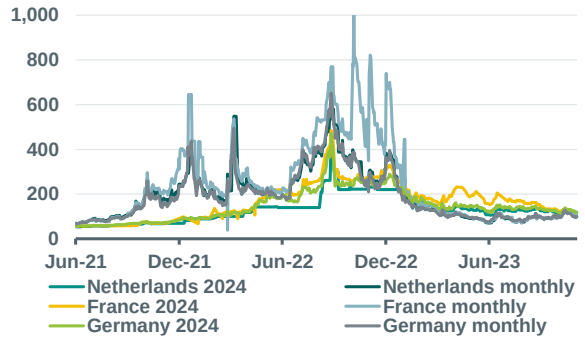
S



Source: Bloomberg, ABN AMRO Group Economics

Electricity power prices (monthly & cal+1 contracts)

EUR/MWh

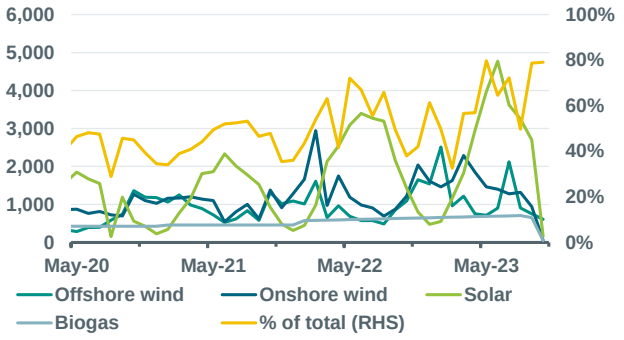


Source: Bloomberg, ABN AMRO Group Economics. Note: 2024 contracts refer to cal+1

Electricity generation from renewable sources (NL)

GW

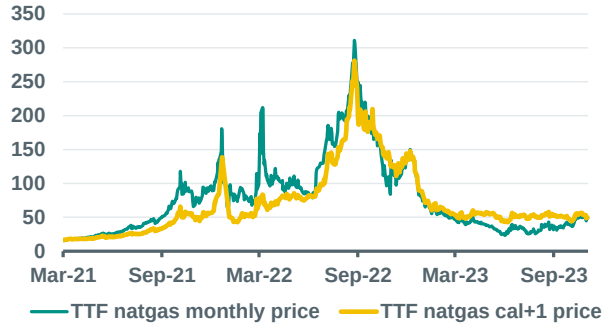
% of total



Source: Energieopwek (Klimaat-akkoord), ABN AMRO Group Economics

TTF Natgas prices

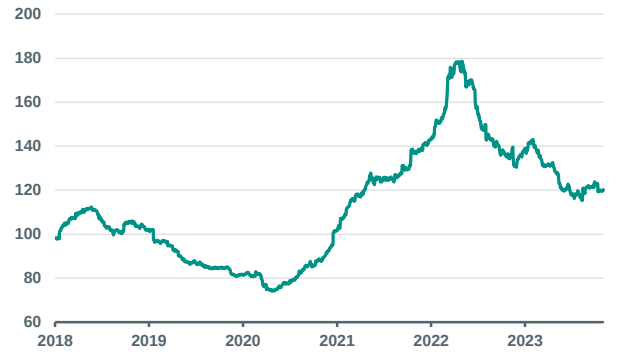
EUR/MWh



Source: Bloomberg, ABN AMRO Group Economics

Transition Commodities Price Index

Index (Jan. 2018=100)



Note: Average price trend of 'transition' commodities, such as: corn, sugar, aluminium, copper, nickel, zinc, cobalt, lead, lithium, manganese, gallium, indium, tellurium, steel, steel scrap, chromium, vanadium, molybdenum, silver and titanium. Source: Refinitiv, ABN AMRO Group Economics

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