Marketing Communication

SustainaWeekly

What is driving carbon prices?

- **Economist: Europe's carbon price breached EUR 100 a tonne, but has since struggled to maintain momentum. Continued weakness in industry has played a role, while power sector emissions have been falling. The agreement on ETS reform at the turn of the year – making the scheme more stringent - has been a supportive factor for prices. Carbon prices are not too far off levels that would be meaningful for the energy transition.**

- **Policy: The UK launched an attractive subsidy scheme to encourage homeowners to switch to heat pumps. The take-up rate is low in spite of the grant. Installation and running costs are an important barrier but not the only reason for the low rollout rate. Heat pumps use electricity and electricity is a lot more expensive than gas in the UK. The gap between electricity and gas will have to narrow to improve the cost benefit ratio of heat pumps.**

- **Sector: The influence of sector trends on the trend of total emissions in the Dutch economy is large. We mostly see weak to strong decoupling between the trend in emissions and sector GDP. Strong decoupling - where emissions shrink and value added grows - occurs almost in one-third of all cases. Strong negative decoupling between the two occurs only in 12% of cases among sectors.**

- **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.**

In this edition of the SustainaWeekly, our first note examines the drivers behind recent moves in carbon prices. The EU's carbon price climbed through the EUR 100 tonne mark last month for the first time. However, the price of allowances has subsequently fallen back, with the upward trend struggling to maintain momentum. We go on to assess why the UK government's Boiler Upgrade Scheme – which provides subsidies to home owners for a new heat pump – has failed to achieve its objectives, and what would be necessary for success. Furthermore, we follow up our decoupling of GDP and emissions analysis of last week on the main global economic regions by applying the framework to the sectors of the Dutch economy.

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

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Carbon prices struggle to maintain momentum

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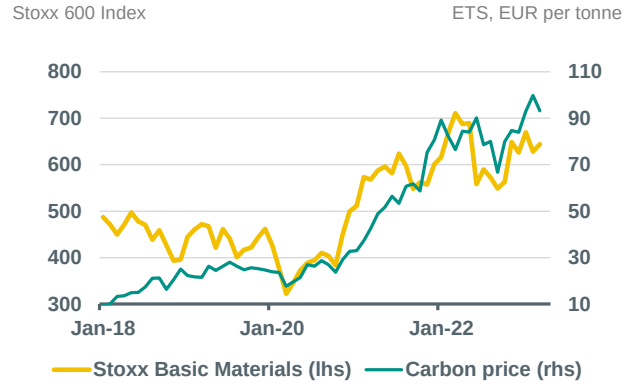
- **Europe's carbon price breached EUR 100 a tonne, but has since struggled to maintain momentum**
- **Continued weakness in industry has played a role, pouring cold water on market optimism**
- **While power sector emissions have been falling, following the decline in share of fossil fuels**
- **The agreement on ETS reform at the turn of the year has been a supportive factor for prices**
- **The changes will make the ETS more stringent, reducing the supply of permits**
- **Carbon prices are not too far off levels that would be meaningful for the energy transition**

The EU's carbon price climbed through the EUR 100 tonne mark last month for the first time. However, the price of allowances traded under the Emissions Trading System (ETS), has subsequently fallen back, with the upward trend struggling to maintain momentum. Unlike a carbon tax, the price of carbon under the ETS is set by market forces, though the EU sets and limits supply, and the market determines demand. The ETS supports the transition by directly reducing the amount of emissions for sectors (energy-intensive industry and power) covered by the scheme. In addition, indirectly, if the carbon price is high enough some companies would find it cheaper to implement energy efficiency measures or switch to lower emission fuels. In this note, we take a brief look at the drivers of the recent developments in carbon prices and whether current levels are meaningful in terms of encouraging the energy transition.

Industrial sector still in recession

Although over the last few months, equity market optimism about a European industrial recovery rose (see chart on the left), recent data have remained rather weak, with manufacturing orders still at levels consistent with a recession. For instance, the PMI survey, shows these indicators under the 50-mark consistent with contraction (see chart on the right).

European carbon prices and equity prices



Source: Bloomberg, ABN AMRO Group Economics

Eurozone manufacturing PMI survey

Source: Refinitiv, ABN AMRO Group Economics

Power sector emissions have been falling

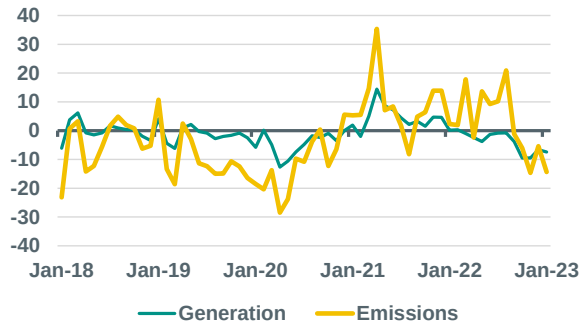
Carbon emissions from Europe's power sector fell sharply at the end of last year and start of this year. For instance, in January, emissions are estimated to have fallen by close to 15% compared to last year, which would be a serious drag on the demand for permits. Behind this trend look to be too factors. First, overall electricity generation is down, likely reflecting steps in energy efficiency that have reduced consumption as well as mild weather. Second, the share of fossil fuels in the power mix has declined rapidly, completely reversing an upward trend seen during the course of last year.

Of course, the energy crisis in Europe played a big role in all these trends. The surge in electricity prices during the course of last year triggered falls in consumption. Over the last few months we have seen a recovery in generation from hydro (following shortfalls for much of last year due to drought) and nuclear (numerous plants had gone offline). The share of coal in generation rose during the first nine months of last year, but has subsequently fallen back. The share of wind and solar rose significantly last year compared to 2021 (and together were the EU's top power source for the first time ever). Overall,

demand from both industrial and power sectors has been lacklustre reflecting a combination of fundamentally positive (energy efficiency, increased use of cleaner fuels) and other (cyclical weakness, mild weather) factors.

Power sector generation and emissions

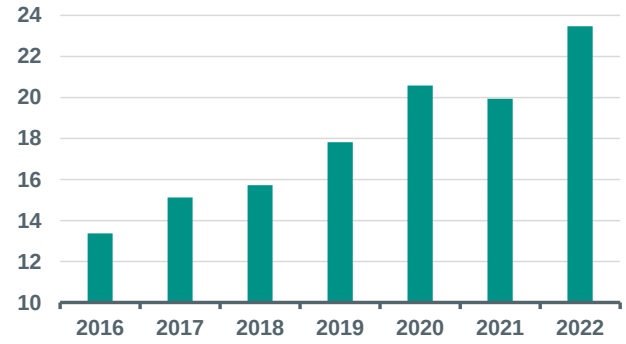
% yoy



Source: Ember, ABN AMRO Group Economics

Share of wind and solar

% total power generation



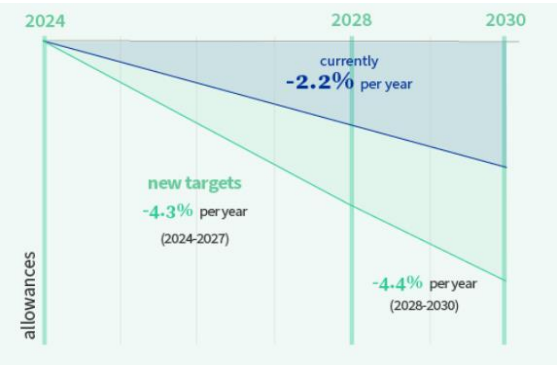
Source: Ember, ABN AMRO Group Economics

Progress on ETS reform

As part of the Fit-55 package first set out in 2021, the European Commission set out a proposal to reform the ETS to be consistent with a more ambitious emission reduction target for 2030. The Council and the European Parliament reached a provisional political agreement on ETS reform in December of last year, which will reduce the supply of emission permits. The agreement may have added support to carbon prices, and more broadly, will be a structural supportive factor for carbon prices in the coming years, though the extent will depend on the pace of transition. Under the reform: (a) the target annual reduction in emissions will be doubled (see chart on the left), (b) free allowances for certain sectors will be phased out - in parallel with the introduction of the carbon border adjustment mechanism (c) two one-off 'rebasings' of the cap, reducing it by 90 million allowances in 2024 and an additional 27 million in 2026.

ETS reform

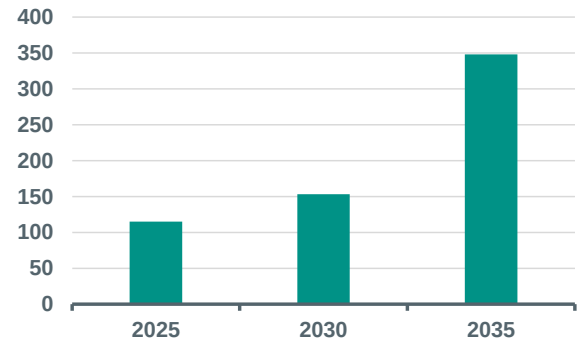
Change in linear reduction factor for allowances



Source: European Commission

Carbon price projection under net zero scenario

Industry, EUR per tonne



Source: NGFS REMIND-MAgPIE 3.0-4.4, ABN AMRO Group Economics

Carbon prices and the transition

Carbon prices are not too far off levels that would be meaningful for the energy transition. For instance, the NGFS estimates that carbon prices for industry would be just over EUR 100 in a net zero scenario in 2025, though they rise sharply thereafter. Arguably, under an ETS rather than a carbon tax, a fast orderly transition with rapid technological development, could see demand for permits falling just as quickly as the reduced supply, keeping the price rise constrained. However, the NGFS and other transition scenarios, take the view that high carbon prices would be needed to make such a fast orderly transition possible in the first place. For instance, a number of emission reduction solutions would require carbon prices sustaining at around USD 100 as a necessary (but not sufficient) condition to become economical (see **here** for instance).

Decarbonising buildings with heat pumps – lessons from the UK

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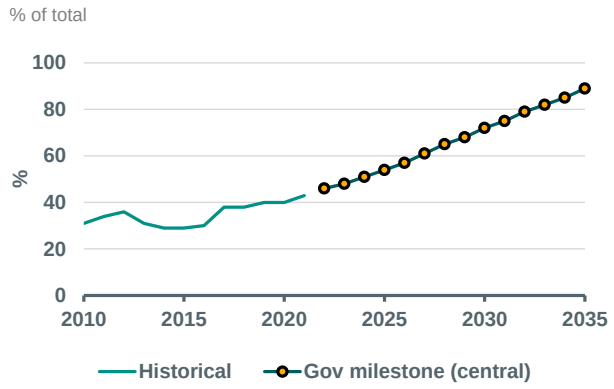
- **The UK launched an attractive subsidy scheme to encourage homeowners to switch to heat pumps**
- **The take-up rate is low in spite of the grant, leading the Lords Environment and Climate Change Committee to conclude that the subsidy scheme has failed to achieve its objectives**
- **Installation and running costs are an important barrier but not the only reason for the low rollout rate. There are important lessons around messaging, skills shortage and the design of grants that are relevant to the green transition more broadly**
- **Heat pumps use electricity and electricity is a lot more expensive than gas in the UK. The gap between electricity and gas will have to narrow to improve the cost benefit ratio of heat pumps.**

There are 28 million homes in the UK. Around 90% of these homes use fossil fuel for cooking, space heating and hot water requirements. Reducing the use of fossil fuels in residential homes is essential for achieving the statutory climate targets. The building sector in the UK which comprises residential and commercial property accounts for some 17% of total GHG emissions, which means that achieving net zero at the national level requires a substantial, if not complete, elimination of GHG emissions from this sector.

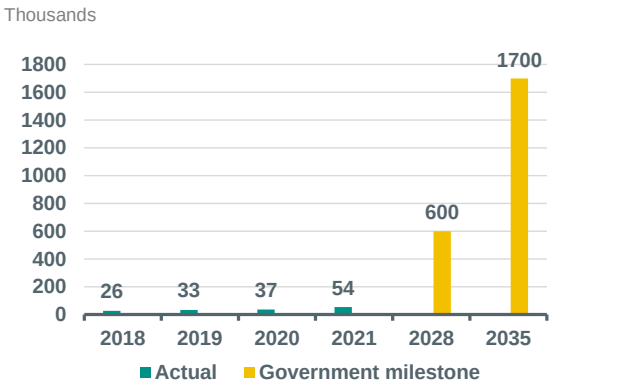
There are two technologies on offer and both involve replacing the existing fossil fuel boiler with clean fuel. The first is a heat pump. A heat pump works like a refrigerator. It uses electricity to extract heat from the air, the ground, or from water, amplifies that heat, and then transfers heat to where it is needed, which in the case of a home is for space heating and hot water. Homes will have to install a heat pump and many energy-inefficient homes will also have to invest in energy efficiencies such as double-glazing, wall cavity insulation, and even new radiators (chart below). The electricity that is used must be from renewable sources. The government has a target of achieving 600k installed heat pumps per annum by 2028 (from 54k actually installed recently).

Share of UK homes with EPC label C or better



Source: Climate Change Committee, ABN AMRO Group Economics

Heat pump installations per annum



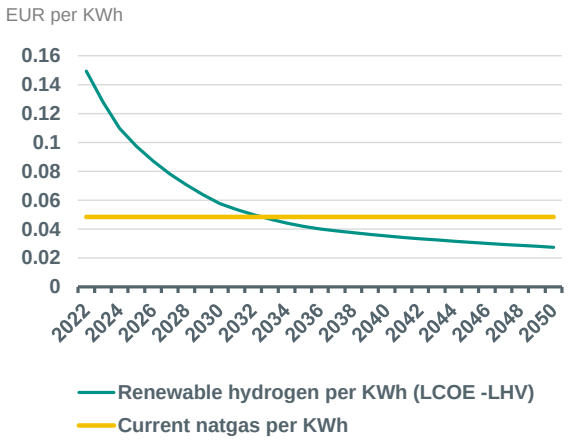
Source: Climate Change Committee , ABN AMRO Group Economics

Hydrogen as a source of heating in homes still far away

The alternative to a heat-pump is to use hydrogen instead of natural gas. Homeowners will simply have to replace their existing home appliances, including the boiler, with a like-for-like hydrogen-compatible boiler. No other adjustments are required by the homeowners. The UK is piloting projects, such as HyDeploy, HyNet and H21, where green hydrogen blended with natural gas is being supplied to homes, with the aim to increase the proportion of the renewable fuel in the blend as much as possible to eventually achieve a zero carbon emission in the heating of homes. However, the well-known issue with green hydrogen is the prohibitively high cost of production. The chart below shows the latest forecasts by Bloomberg New Energy Finance (BNEF) on renewable hydrogen produced in the UK through 2050 and compared against the wholesale natural gas price based on the 1 month forward TTF. The tipping point in an economically viable switch to

green hydrogen will be reached in the first years of the next decades, unless natural gas prices somehow reach pre-Russia/Ukraine conflict levels. In that scenario the tipping point would be reached even further down the road.

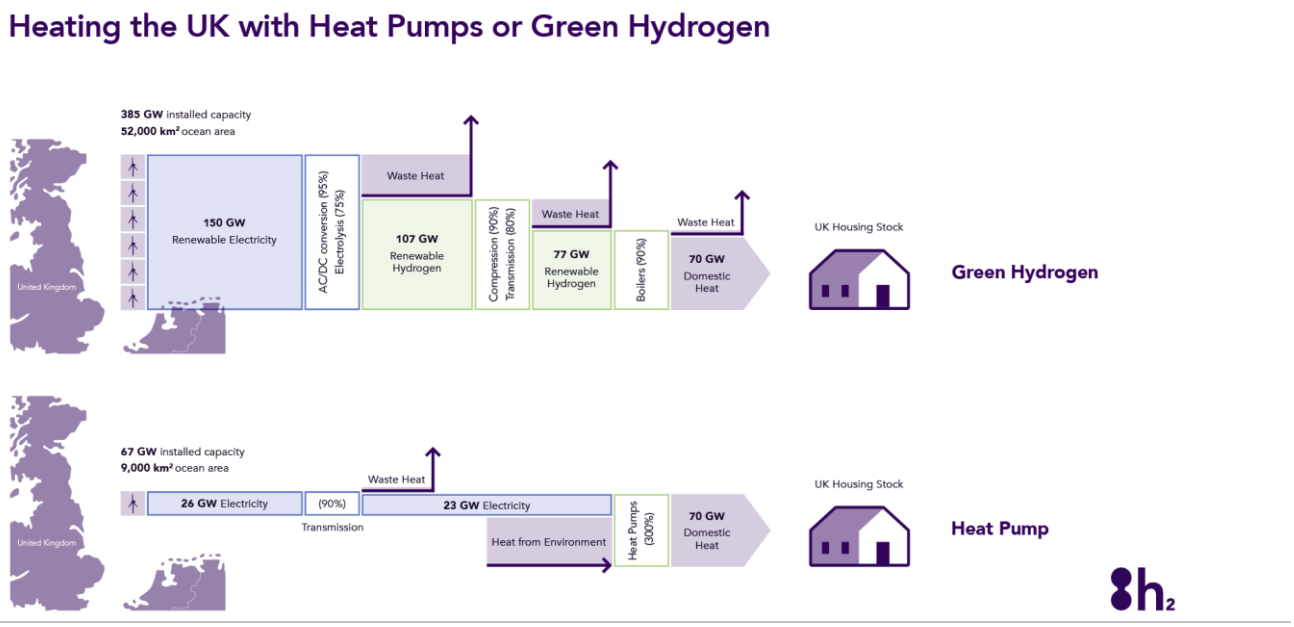
Green hydrogen as heating fuel – waiting for 2030's



Source: BNEF, Bloomberg, ABN AMRO Group Economics, LCOE = levelized cost of energy = lifetime costs divided by energy production, LHV = lower heating value equivalent

Further analysis by the Hydrogen Science Coalition shows an interesting comparison of how much renewable capacity would be required to heat the UK housing stock through renewable hydrogen or heat-pumps. Renewable hydrogen would require nearly 6 times for capacity. The key driver behind this difference is that producing green hydrogen based on existing technologies results in losses in energy through electrolysis, whereas heat-pumps can actually convert heat captured from the environment to heat used for domestic purposes by a factor of 3.

Heat pumps versus green hydrogen



Source: Hydrogen Science Coalition

Another big challenge with hydrogen is the infrastructure to manufacture and repurposing the existing gas network. The UK government will take a strategic decision on the safety and feasibility of hydrogen as a heat source by 2026. The UK cannot wait for that decision if it is to meet its climate targets.

The BUS is failing to deliver

In a green hydrogen to natural gas showdown the latter clearly has the upper-hand. But how does a heat-pump stack-up against holding on to a gas powered boiler? To support the transition, the government launched the Boiler Upgrade Scheme and earmarked GBP450 million to provide GBP5,000 subsidy to home owners for a new heat pump. In spite of the subsidy and the fact that heat pumps are more efficient that conventional boilers, only 2% of UK homes have a low-carbon heat source and just 50,000 heat pumps were installed last year, leading the House of Lords Environment and Climate Change Committee to conclude that the BUS is failing to deliver. Why has the scheme failed to deliver?

We highlight four main reasons:

1. Pre-requisites: only homes with a minimum EPC rating and insulation qualify for the heat pump subsidy. Many homes in the UK fail to make the grade. The government should relax this restriction.
2. Cost: We compare the total cost of installing and running a heat pump with the cost of a conventional boiler in the next section. The key takeaway is that heat pumps are less attractive from a cost perspective when the price of electricity is high relative to gas as is the case in the UK. The government might also consider offering grants or loans to retrofit the home to improve energy efficiency.
3. Skill shortage: There are around 2,000 qualified heat pump installers in the UK. Around 12,000 installers will be required to ramp up installation capacity to 600,000 per annum by 2028 and to 50,000 by 2030 to achieve the 1 million target.
4. Advice: Heat pumps are a new technology and therefore, unfamiliar to most homeowners. Homeowners would benefit from independent advice, which is specific to their home and their circumstances.
5. Hydrogen or heat pumps: Homeowners will be reluctant to make the investment in heat pumps if there is a chance that hydrogen is a viable option. The government should announce its decision on hydrogen as soon as possible to lift the uncertainty. We already show that competitiveness of hydrogen is very distant.

The switch to heat-pumps is held back by (still) cheap price levels for running gas boilers

There is a high initial cost outlay to install a heat-pump at home. A UK government website (see **here**) sets out how much net outlay (i.e. after subsidies) could be required for installing air source heat pumps and the resulting conversion from a typical EPC D-labelled property to a B-label. This adds up to nearly GBP 14.5k, as shown in the table below:

Capital outlay build-up heat-pump	GBP k
Wall insulation	9
Energy storage and loft insulation	1.9
Radiator adjustments	1.2
Heatpump device & installation	7.4
Gross outlay	**19.5**
Boiler Update Scheme (BOS) grant	-5.0
Net outlay	**14.5**
Required annual cost benefit heatpump to gasboiler - based on 30y UK Gilt rate of 4.3%	0.62

Source: UK Govt, Bloomberg, ABN AMRO Group Economics

The financial benefits on this switch to a heat-pump would be the foregone return of the net-outlay as proxied by a 30y Gilt yield, which in this case boils down to GBP 620 annually. This would need to be made-up through a lower utility bill. We used the 'air-source heat pump running cost calculator' from Great-Home (see **here**) to provide us 1) the annual GBP 108 loss due to existing electricity and gas price levels as per the Government established price caps (top-right in table below) and 2) to see at which levels of electricity- (which need to be subsidized) and gas prices (which need to be taxed) we get to situation where a heat-pump investment would make economic sense (green cells in the bottom-left).

Gas per KWh	Electricity per KWh (pence, incl VAT)								
	29.5	**30.5**	**31.6**	**32.5**	**33.5**	**34.6**	**35.5**	**36.5**	**37.6***
11.2 *	225.9	184.7	139.4	102.4	61.2	15.9	-21.2	-62.3	-107.6
12.2	345.9	304.7	259.4	222.4	181.2	135.9	98.8	57.7	12.3
13.2	465.9	424.7	379.4	342.3	301.2	255.9	218.8	177.7	132.4
14.2	585.9	544.7	499.4	462.4	421.2	375.9	338.8	297.7	252.4
15.2	705.9	664.7	619.4	582.4	541.2	495.9	458.8	417.7	372.4
16.2	825.9	784.7	739.4	702.4	661.2	603.5	578.8	537.7	492.4

Source: UK Govt, Great-home.co.uk, ABN AMRO Group Economics, Outcome values in GBP per annum

It turns out that when the electricity-to-gas price ratio would drop below 2 times (such as a 31.6 pence cost for electricity and 15.2 cost for gas), a heat-pump investment would be rational. Currently this electricity to gas price ratio stands at 3.4. As the electricity price is normally set by the highest marginal cost producer, perhaps the call by the aforementioned committee to reform the electricity market could be a quick gain in making heat-pumps more attractive and hence increasing the take-up. Otherwise, the take-up would only make sense if gas is taxed more and/or subsidies on heat-pumps become more generous. We have not taken the property price implications from upgrading the home from a D-label to a B-label by installing heat-pumps into consideration. However, given the limited financial benefits at existing energy price levels, perhaps this benefit would be limited anyways.

GHG emissions in sectors often independent of economic growth

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- **The influence of sector trends on the trend of total emissions in the Dutch economy is large**
- **We mostly see weak to strong decoupling between trend in emissions and sector GDP**
- **Strong negative decoupling between the two occurs only in 12% of cases among sectors**

There is a relationship between the trend in CO2 emissions and growth in the value added (GDP) of countries. The specific relationship is highly dependent on the stage of a country's economy. From our previous analysis on decoupling (see here), we concluded that the decoupling between CO2 emissions growth and GDP growth is relatively more common in developed economies. This is a situation called *absolute* decoupling, where total CO2 emissions decline while the economy continues to grow. In still developing or emerging economies, this absolute decoupling occurs only to a limited extent. Here, however, there is a trend toward more *relative* decoupling. This is a situation where emissions still rise as the economy grows, but to a lesser extent than the economic growth rate.

Although the decoupling model is initially intended for country-level analysis, the underlying decoupling methodology is also a good way to understand the relationship between emissions and GDP at the sector level. We use the data in terms of greenhouse gas emissions (GHG, CO2 equivalent) and value added by sector from National Accounts of Statistics Netherlands (CBS). The matrix below provides insight into the specific sector outcomes.

Decoupling between trend GHG emissions and value added by sectors

Broadly speaking, two colours appear in the matrix: green and red. The colour green refers to a more positive development in the trend between GHG emissions and added value. We then speak of a decoupling of GHG emissions and growth in added value. The lighter the colour green in the matrix, the weaker this decoupling is. The colour red refers to a more negative development in the trend between GHG emissions and added value. Again, the lighter the colour red, the weaker the negative decoupling is. All data come from the National Accounts of Statistics Netherlands.

Source: CBS (National Accounts), ABN AMRO Group Economics

While the trend in the Dutch economy and total sectors in terms of decoupling emissions growth versus GDP growth shows a fairly stable pattern, many underlying sectors show a more erratic trend. The matrix contains more green-tinted areas than red-tinted (60% versus 40%). This is positive because it means that weak to strong decoupling between emissions growth and value-added growth in sectors is more common.

Strong decoupling - where emissions shrink and value added grows - occurs almost in one-third of all cases. And that's a relatively large proportion. Strong decoupling occurs most often in the information & communication sector, real estate sector, and electrical & electronics industries, as well as in public services. A number of other sectors show a fairly constant positive picture over the past six years. These are successively the plastics & building materials industry, energy supply, information & communication sectors and health care.

In only three specific sectors there are more red areas than green areas noticeable: in mining & quarrying, the transportation equipment industry and water utilities & waste management. This is also the case in the residual sector "other industry & repair". But overall, the number of red-tinted areas is in the minority. The extreme case of 'strong negative decoupling' (with the dark red tint) occurs only in 12% of the cases. This extreme situation is most often seen in the transportation equipment industry, the hospitality industry and in the culture & recreation sector, as well as in the petroleum industry.

Decreasing emissions GHG

The influence of sector trends on the trend of total emissions in the Dutch economy is large. Economic activity in sectors and emissions associated with that activity account for about 83% of total GHG emissions. Private households account for the remainder.

In the path towards a low-carbon Netherlands economy, sectors therefore have an important role to play, with some sectors perhaps having to contribute more than others. In particular, the big emitters - such as industry, energy supply, agriculture - still need to make big efforts in reducing their greenhouse gas emissions. This can be achieved, for example, by increasing the energy efficiency of processes in sectors and decarbonising existing energy mixes. In our recent publication of decarbonisation strategies in sectors, we provide insight into many other opportunities by sector (**see here**). This publication shows that while the drivers for decarbonisation vary widely by sector, the opportunities are often numerous. Moreover, the report indicates that intensive interplay between public and private entities remains an important prerequisite for achieving the targets.

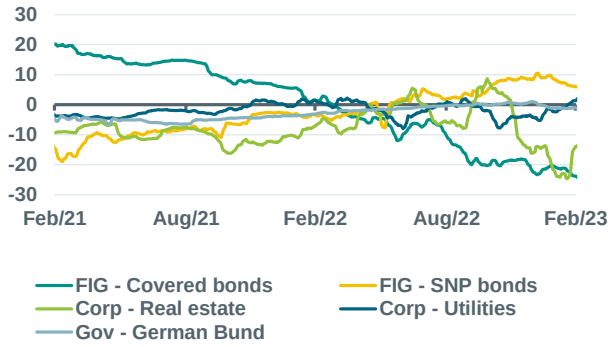
While the decarbonisation path is challenging for some sectors, other sectors are showing better results. A good example in this context is the decoupling of emissions and value added in energy supply since 2016. The continued growth in the energy sector (in terms of added value) went almost simultaneously with further improvements in power plant efficiency and the switch from fossil fuels to a greater share of low-carbon sources. The increase in low-carbon initiatives in the sector have contributed to positive decoupling trends over the past six years. See also the matrix.

Making the transition to low-carbon is, however, not so easy in every sector. Many sectors face obstacles in their path to low carbon or carbon free. It all depends heavily on characteristics of the processes in the sectors, but also, for example, on the preconditions for a smooth transition, such as the infrastructure and network capacity on the power grid. Our analysis shows that many sectors are on the right track, barring exogenous shocks in the economic system. Frequently, enough sectors reach the stage of weak to strong decoupling between trends in value added and emissions. For other sectors, a negative decoupling or even an expansion of the coupling between emissions and value added is still noticeable. In these sectors, the decarbonisation issue is (and remains) still complex, but those sectors are in the minority for now.

ESG in figures

ABN AMRO Secondary Greenium Indicator

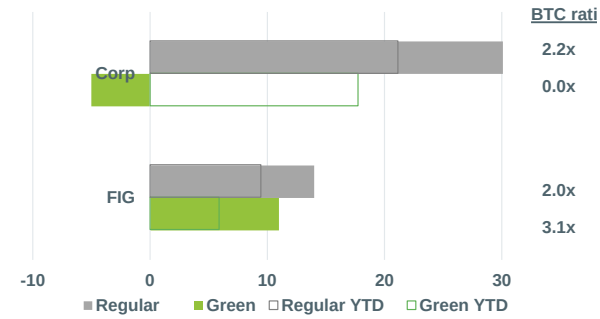
Delta (green I-spread – regular I-spread)



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

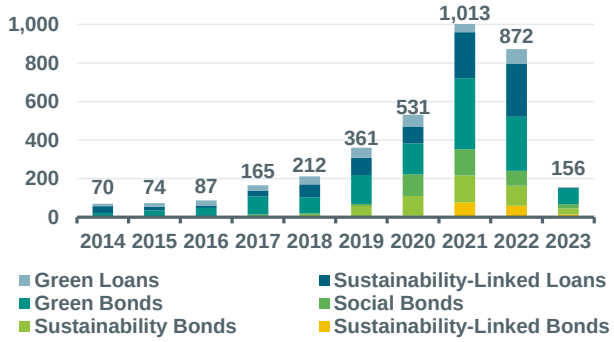
NIP in bps



Note: Data until 23-2-23. BTC = Bid-to-cover orderbook ratio. Source: Bloomberg, ABN AMRO Group Economics

Sustainable debt market overview

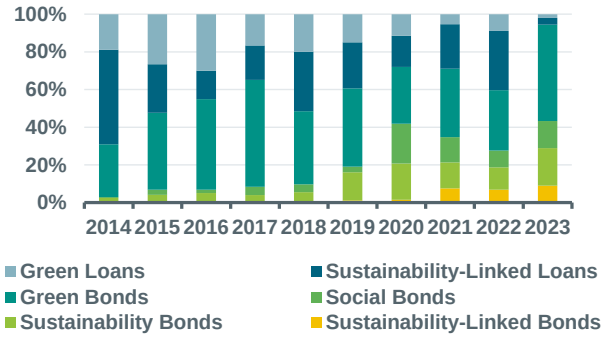
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of sustainable debt by type

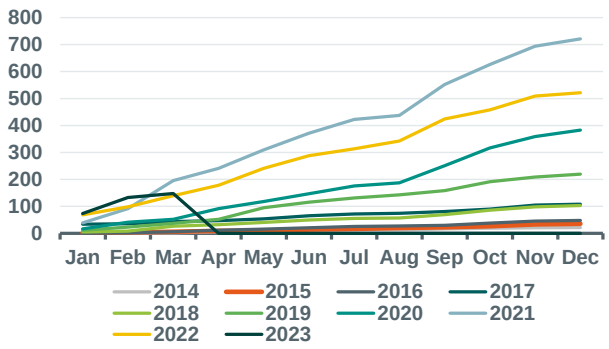
% of total



Source: Bloomberg, ABN AMRO Group Economics

YTD ESG bond issuance

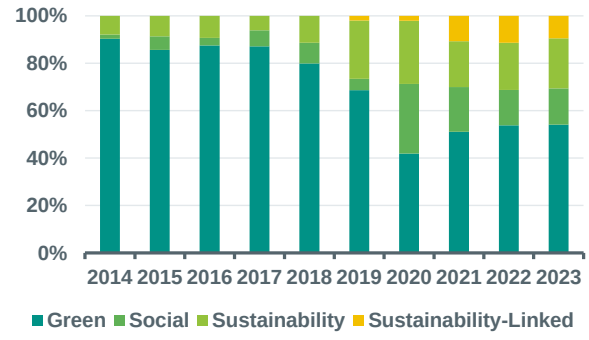
EUR bn (cumulative)



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by type

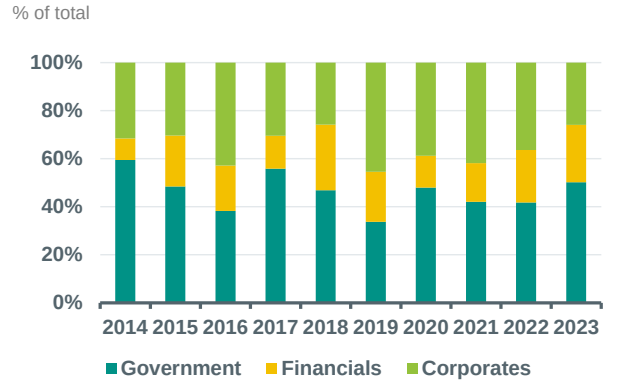
% of total



Source: Bloomberg, ABN AMRO Group Economics

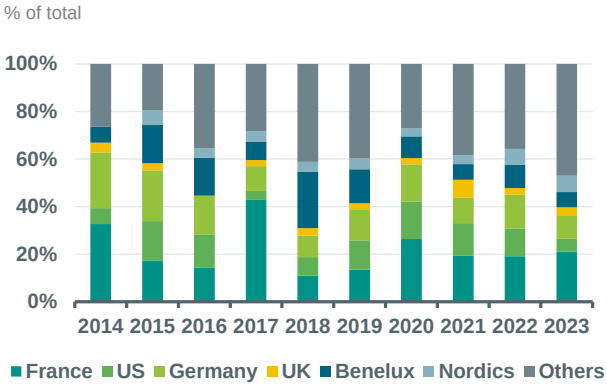
Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Breakdown of ESG bond issuance by sector



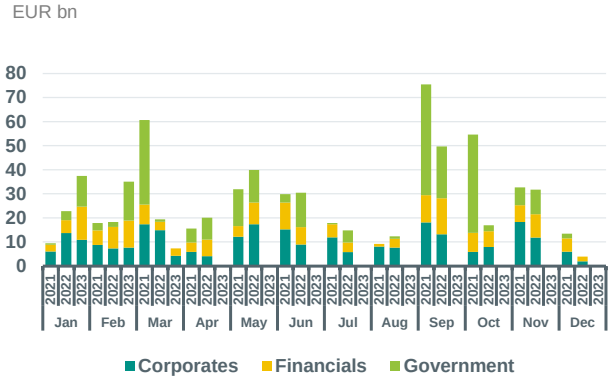
Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by country



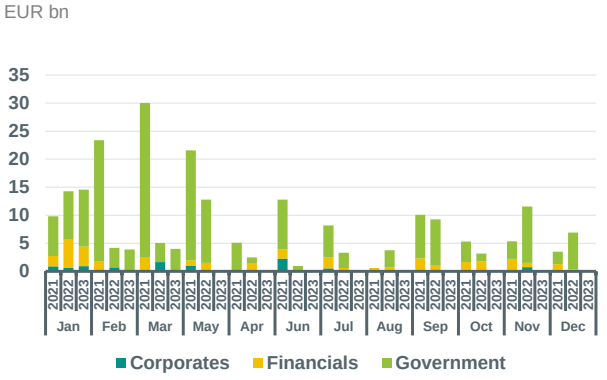
Source: Bloomberg, ABN AMRO Group Economics

Monthly Green Bonds issuance by sector



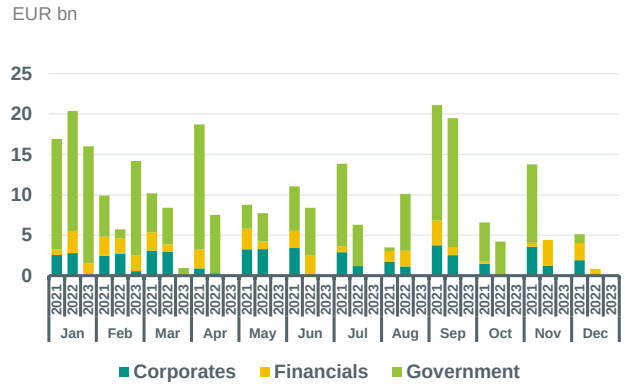
Source: Bloomberg, ABN AMRO Group Economics

Monthly Social Bonds issuance by sector



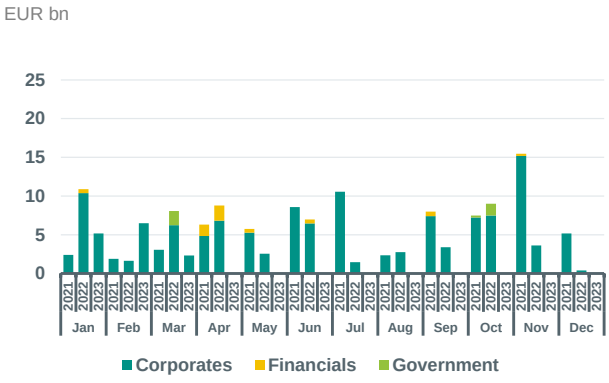
Source: Bloomberg, ABN AMRO Group Economics

Monthly Sustainability Bonds issuance by sector



Source: Bloomberg, ABN AMRO Group Economics

Monthly Sust.-Linked Bonds issuance by sector



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.

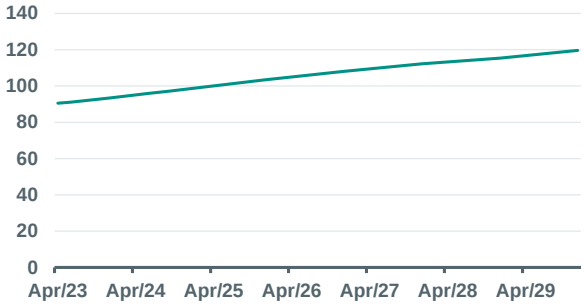
Carbon contract current prices (EU Allowance)

EUR/MT

Source: Bloomberg, ABN AMRO Group Economics

Carbon contract futures curve (EU Allowance)

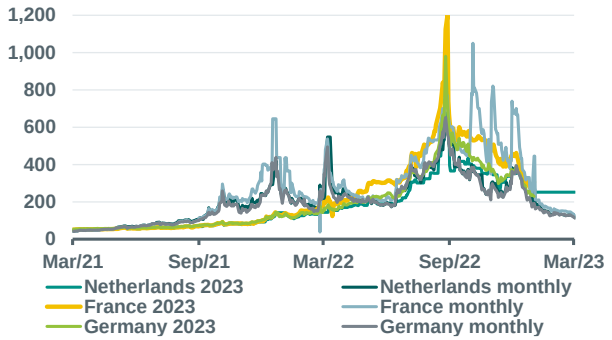
EUR/MT



Source: Bloomberg, ABN AMRO Group Economics

Electricity power prices (monthly & cal+1 contracts)

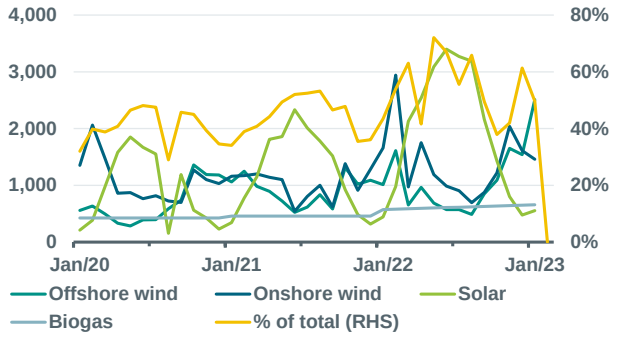
EUR/MWh



Source: Bloomberg, ABN AMRO Group Economics. Note: 2023 contracts refer to cal+1

Electricity generation from renewable sources (NL)

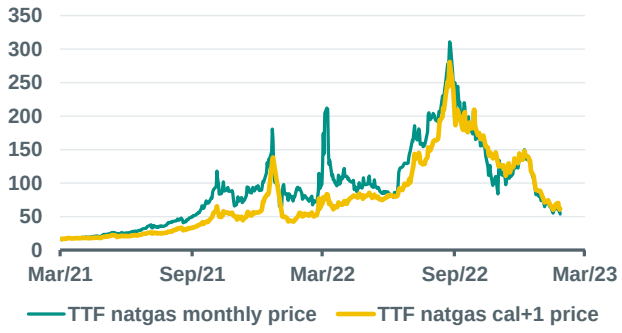
GW % of total



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

TTF Natgas prices

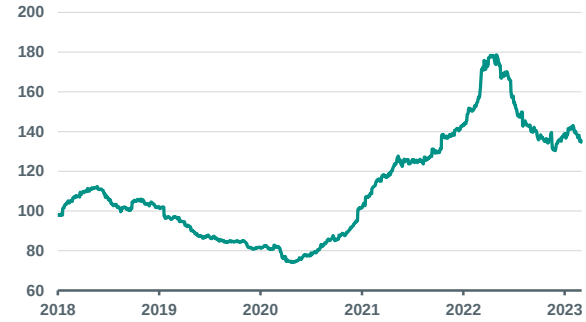
EUR/MWh



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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