SustainaWeekly

Does climate impact oil and gas company bond spreads?

- **Strategist: Bond spreads of oil and gas companies with lower implied temperature rise (ITR) scores trade tighter when compared to those with high ITR. We present two case studies where we show that bond spreads have moved following negative ESG-related news. We also show that the oil and gas sector trades at wider bond levels compared to the broad market, as more investors incorporate negative screening strategies.**

- **Economist: Many major EU countries are still well behind on their CO2 reduction targets. While the transition to low or zero carbon is now well under way in many countries and climate sectors, the pace of this transition is often still slow. Particularly in transport, CO2 reduction is lagging, while in other climate sectors CO2 reduction trends are somewhat more positive in many countries.**

- **Policy: The EU recently published its Critical Raw Materials Act. The EU set targets for domestic capacity and aims to limit the supply from a single country by 2030. It also updated its list of critical raw materials and released a list of strategic raw materials. The US and the UK had have already published their strategies. The EU approach is similar to that of the US.**

- **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, we first take a closer look at how the bonds of oil and gas companies are priced with respect to climate considerations. We assess how they trade relative to the broad market, asking the question of whether negative screening strategies have had an impact once accounting for credit fundamentals. We go on to assess whether implied temperature rise scores have an impact on bond pricing between oil and gas companies. Furthermore, we analyse how their bond spreads have moved following negative ESG-related news. We go on to analyse recent trends in emissions for the EU and member states and compare the pace of reduction to targets. In addition, we look at emission trends across the continent in the large climate sectors. Finally, take a closer look at the EU's Critical Raw Materials Act and how it compares to similar strategies published by the US and UK.

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

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Do climate considerations impact oil and gas company bond spreads?

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- **In this piece, we show that bond spreads of oil and gas companies with lower implied temperature rise (ITR) scores trade tighter when compared to those with high ITR**
- **This seems to be a more recent trend, which has particularly gained ground after the energy crisis driven by the Russia-Ukraine war**
- **We also examine two case studies where we show that bond spreads have moved following negative ESG-related news**

We have previously argued that utilities with high exposure to renewables and/or strong ambitions to grow renewable energy have performed relatively well in 2022. Does this also apply for integrated oil and gas companies? In this piece, we analyse to what extent investors in the euro bond space are also differentiating between oil and gas majors based on their climate strategy. We also take a historical view to evaluate whether this is only a more recent trend.

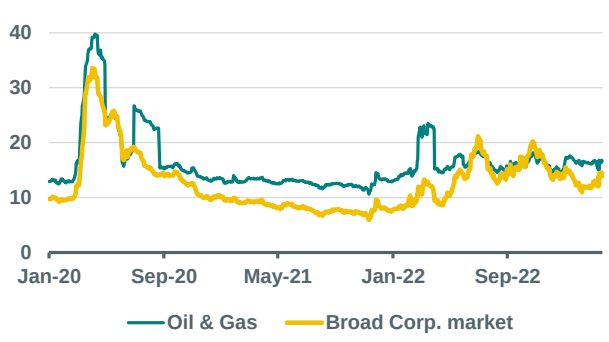
Are exclusions paying off?

A lot of ESG-focused investors rely on negative screening strategies, which involve mainly fully excluding the entire oil and gas sector from their investment universe. But could these exclusion strategies have impact on bond spreads?

There are different ways of approaching this question. Firstly, we look at bond spreads of investment grade euro energy companies, and compare those with the performance of the broad investment grade euro corporate market. As shown in the chart below (left side), spreads of bonds from oil and gas companies have over the last 2 years traded at wider spread levels vis-a-vis the broader market. This is however hard to justify by looking exclusively at credit fundamentals. For example, as shown in the chart below on the right side, leverage for oil and gas companies has come down considerably over the years. In fact, these companies are even close to being net debt free at the moment (and it does not seem they are embarking on new development projects, which would normally push up debt levels again). Oil and gas prices have also risen significantly over the same period, boosting revenues. Also, the lower debt levels are reflected in the euro oil and gas index carrying an A3 rating (which was even A2 briefly over this time period), while this is BBB1 for the broad corporate market. Hence, there seems to be another reason, not related to credit risk per se, that is influencing credit spreads.

Spreads on Oil & Gas bonds trade wider

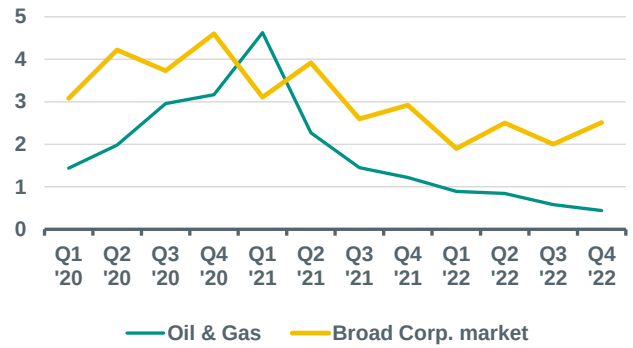
Spreads per duration (bps/years)



Source: ICE BofAML, Bloomberg, ABN AMRO

Oil & Gas companies are now almost net debt free

Net debt/EBITDA



Source: Bloomberg, ABN AMRO

While the above is an analysis based on only a few data points, one could argue that one of the reasons for wider spreads are ESG exclusion strategies. Particularly in Europe, data shows that funds from socially responsible investments (SRI) subject to exclusions grew from EUR 184bn in 2002, to almost EUR 10tn in 2020 (according to the Global Sustainable Investment Alliance, or GSIA). With oil and gas companies being commonly part of this exclusion list, this could be one of the drivers behind the sector underperformance vs. the broader market.

Are investors differentiating amongst oil and gas companies?

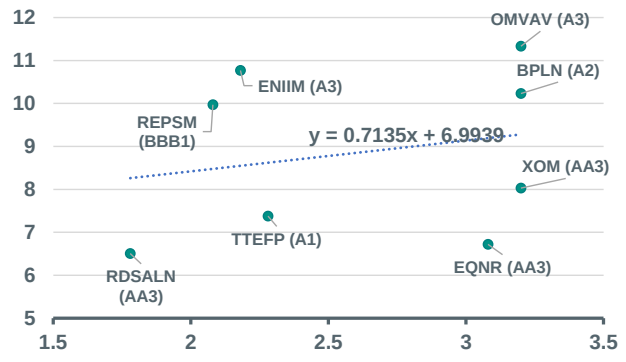
For the bond investors that are still allowed to invest in oil and gas companies, are they taking climate strategies and decarbonization pathways into consideration for their investment decisions? Our results show that they do.

We have taken the average spreads over asset swaps in the euro bond space, and divided these by the average bond duration across different investment grade oil and gas companies. We compare this unified market valuation to an indicator of issuers' climate strategy. As an indicator for the robustness of a company's climate strategy, we look at the Bloomberg's Implied Temperature Rise metric. Bloomberg has partnered with the Science Based Targets initiative (SBTi) to develop a temperature rise metric that translates corporate emission reduction forecasts into implied temperature changes. For example, a 2.5 degree implied temperature rise suggests that the company follows an emission trajectory that aligns with a scenario where global temperatures would increase by 2.5 degrees (vs pre-industrial levels). For the companies where a relevant, publicly disclosed target is not available, or where the target does not cover an important scope of the company's emissions, the methodology assigns a default temperature score of 3.2 degrees. This is the case with **British Petroleum** (BP) (which only has short-term targets) and **OMV**. For this analysis, we focus on mid-term targets, as well as targets that take into account all emission scopes (1, 2 and 3).

As shown on the chart below, investors seem to be indeed pricing in climate strategies of oil and gas companies. This is also seen by the steepness of the trend line established from our sample of bonds. All else equal, a 1 degree higher implied temperature rise would result in bond spreads being 1bps wider. One could argue that the impact is not substantial (yet), but it is clearly an indicator that climate considerations are slowly starting to be accounted for in investment decisions. We note that this does not take into account a company's credit rating, as we indeed show that in some cases (such as **Repsol**), the lower rating seems to have a big influence on bond spreads. Nevertheless, perhaps a good example to see how the climate strategy has been impacting bond spreads would be to compare **Shell**, **Equinor** and **Exxon** - all rated as AA3 companies. Shell has the lowest implied temperature rise amongst the three, and this also clearly results in lower spread levels. Exxon, on the other hand, is clearly lacking in its decarbonization ambitions, resulting in a relatively higher average bond spread per year of duration, even though it holds the same credit rating (and hence, probability of default) than Shell. We see the same trend with Equinor, although to a lesser extent, as bond spreads have been benefitting largely lately from the company's exposure to gas. While one could attribute the tighter bond spreads of Shell to the ECB purchase programmes, a good counter-argument would be to look at Eni and OMV, which are both ECB-eligible and both hold a composite rating of A3. Still, Eni bond spreads perform slightly better than OMV, since Eni also has a better implied temperature rise score. Again, we could argue that investors in oil and gas companies seem to account for climate targets when allocating investment funds.

March 2023: Spreads per duration vs. ITR

Average spread per average duration (bps/year)



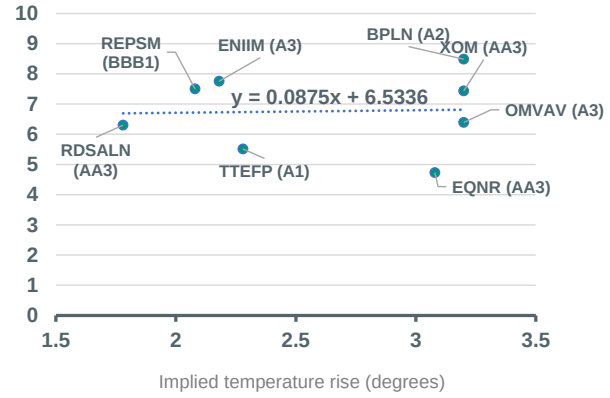
Source: Bloomberg, ABN AMRO. Note: data labels refer to company tickets and credit ratings (as per Bloomberg composite rating).

Have oil & gas investors always been "climate conscious"?

As a next step, we are interested in evaluating whether this differentiation between oil and gas companies based on their climate strategies by euro investors is a more recent trend. Below, we have replicated the same analysis but choosing four other points in time: January and August 2022 (pre- and post- energy crisis), January 2021 and January 2020 (pre- and post-Covid crisis). While spreads per duration will vary, we keep implied temperature rise variables the same. That is because unfortunately, there is no historical data availability for those. Climate strategies of oil and gas companies have evolved with time, in particular after mid-2020, which can to a certain extent impact our conclusions. However, we still argue that our results are valid, especially the ones after mid-2021, given that by then, almost all oil and gas companies of our sample had released climate targets.

August 2022: Spreads per duration vs. ITR

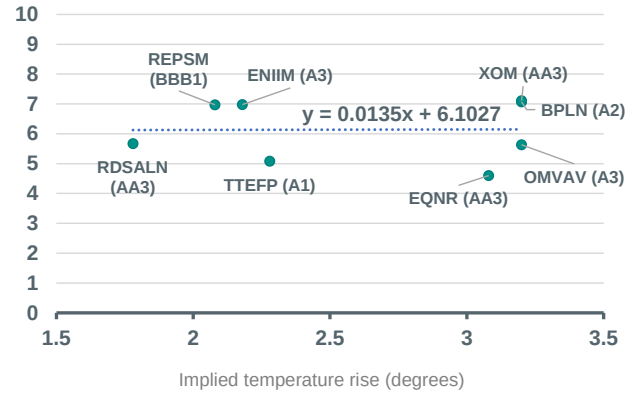
Average spread per average duration (bps/year)



Source: Bloomberg, ABN AMRO. Note: data labels refer to company tickets and credit ratings (as per Bloomberg composite rating).

January 2022: Spreads per duration vs. ITR

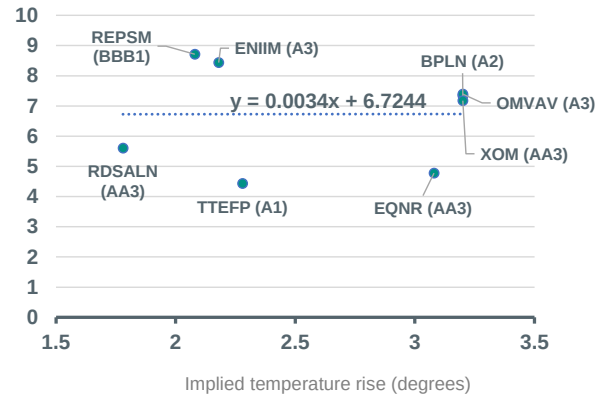
Average spread per average duration (bps/year)



Source: Bloomberg, ABN AMRO. Note: data labels refer to company tickets and credit ratings (as per Bloomberg composite rating).

January 2021: Spreads per duration vs. ITR

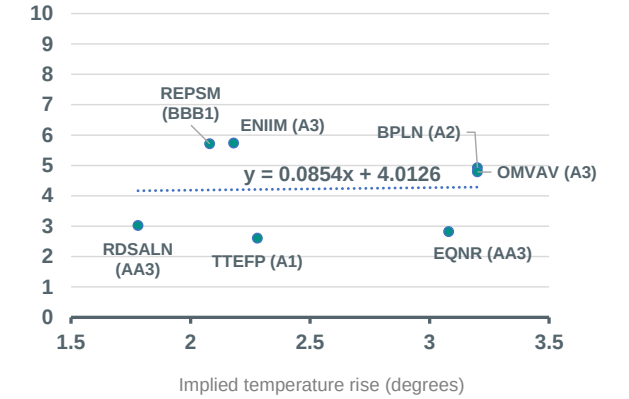
Average spread per average duration (bps/year)



Source: Bloomberg, ABN AMRO. Note: data labels refer to company tickets and credit ratings (as per Bloomberg composite rating).

January 2020: Spreads per duration vs. ITR

Average spread per average duration (bps/year)



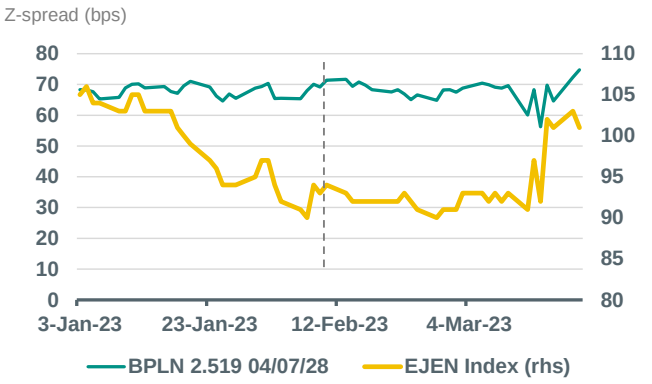
Source: Bloomberg, ABN AMRO. Note: data labels refer to company tickets and credit ratings (as per Bloomberg composite rating). No Exxon bonds available, which can be impacting results.

A few interesting insights arise: looking at specifically these four different points in time, it does not seem that climate strategy impacted credit spreads in the past (at least not to the extent that it seems to be now). However, as shown also by the positive slope indicator in the trendlines in the graphs above, even back then, climate ambitions by oil and gas companies seemed to be taken into account. What is also interesting to highlight is that this slope indicator has been slightly growing over time (excl. January 2020, but this sample does not include Exxon, which can be impacting results). Between January 2021 and January 2022, the indicator remained relatively constant, clearly increasing after the outbreak of the Russia-Ukraine war. As we previously noted, investors in the utility space have been putting more emphasis in companies' exposure towards renewable energy generation. It could likely be that this also became an important factor for investors in the oil and gas universe.

To validate our results, we have looked at two case studies. More specifically, we are interested in finding out whether we can see an immediate movement in bond spreads following climate-related news.
Below, we assess how spreads of BP and Shell performed this year against the broader oil and gas market when these companies hit the news due to negative ESG actions. For example, BP announced in February 2023 that it would reduce its target to cut emissions by 35-40% by the end of this decade, to a new target of only a 20-30% cut. Also Shell has been in the news recently due to a complaint lodged by a non-profit group, which has accused the company of misstating its actual spending in renewable energy.

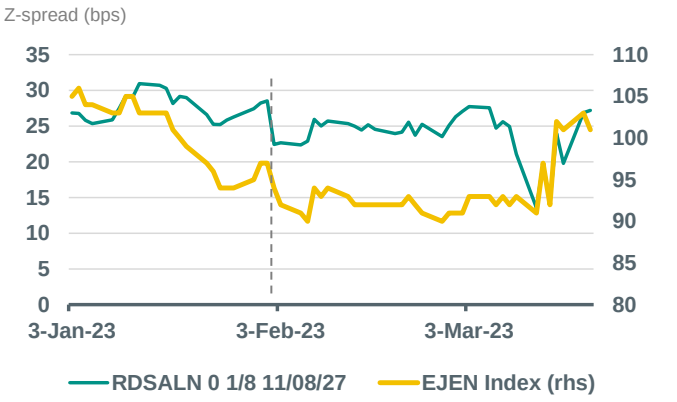
The graphs on the next page show that in both cases, Shell and BP bond spreads have underperformed the broad market on the day or a few days after these headlines. The bonds chosen for this analysis were the ones that more closely matched the spread duration of the broad euro oil & gas index (as a way of correcting for duration effects). One could therefore attribute this to climate considerations being taken into account by investors.

BP bond spreads have underperformed the market following negative climate news



Source: Bloomberg, ABN AMRO. Note: dotted line refers to when BP has reported that it is reducing its targets to cut emissions.

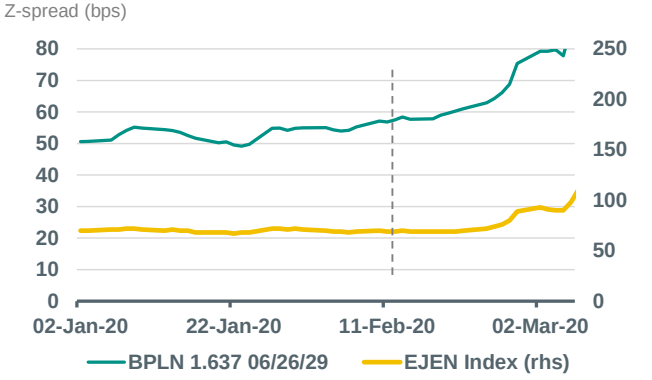
Shell bond spreads have underperformed the market following negative climate news



Source: Bloomberg, ABN AMRO. Note: dotted line refers to when Shell has made the news headlines due to accusations about misstating its renewable energy investments.

As we previously noted, this seems to be a more recent considerations by investors, which particularly seems to have gained pace after the energy crisis. We therefore also take a look at how bond spreads of BP reacted following its announcement in February 2020 that it was aiming to cut emissions to net zero by 2050 – it was one of the first oil and gas majors to announce such measure. However, as shown in the graph below, the announcement did not seem to have had any impact on bond spreads.

No spread movement following BP's net zero targets announcement



Source: Bloomberg, ABN AMRO. Note: dotted line refers to when BP has committed to cut emissions and achieve net zero by 2050.

Climate considerations impact bond spreads

Clearly, oil and gas investors seem to differentiate companies based on their climate ambitions, a trend that was not in place a few years (or even months) ago. The Russia-Ukraine war, and the subsequent energy crisis, seem to have enlightened investors on the importance of more renewable, and consequently less fossil fuel, energy. Although the impact of climate ambitions on credit spreads of oil and gas companies does not seem to be very strong yet, we should expect this to increase as the world slowly moves away from fossil fuel. Hence, while we note that new debt requirements might be limited at the energy majors at this point, their future expansion in renewable energy will likely require a fresh stack of debt and committing to a low rise in temperatures could be helpful at this point.

Furthermore, we also show that the bond spreads of these companies seem to react to negative ESG news, highlighting that investors are conscious of climate-related issues these companies might have. Exclusions also seem to have a big impact on spreads, with the oil and gas sector trading at wider bond levels as more investors incorporate negative screening strategies.

European CO2 emissions reduction still well short of pace

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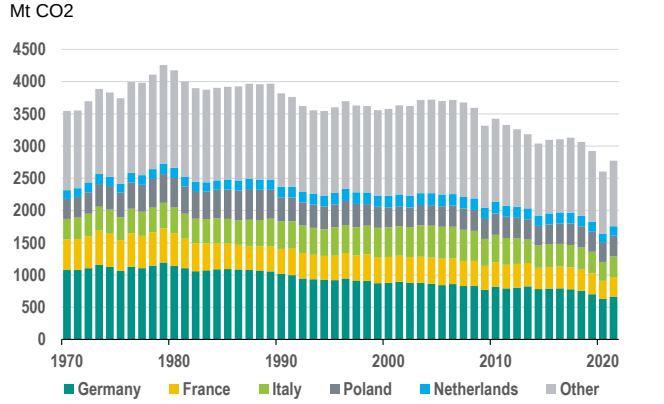
- **Many major EU countries are still well behind on their CO2 reduction targets**
- **While the transition to low or zero carbon is now well under way in many countries and climate sectors, the pace of this transition is often still slow**
- **Particularly in transport, CO2 reduction is lagging, while in other climate sectors CO2 reduction trends are somewhat more positive in many countries**
- **Investments in (new) technology to accelerate emissions reductions in the coming years should start to make a difference**

The energy transition is now well underway in many EU countries and their largest climate sectors, only the pace of this transition is in many cases still too slow. Often, it is only exogenous shocks that trigger substantial CO2 reductions in countries, while a structurally fast-enough reduction pathway still seems far away. Between EU countries, however, we see differences in this. Not only the trends of countries' CO2 emissions differ, but also we notice strong variations in the reduction path in the different climate sectors per country.

Cycles in emissions

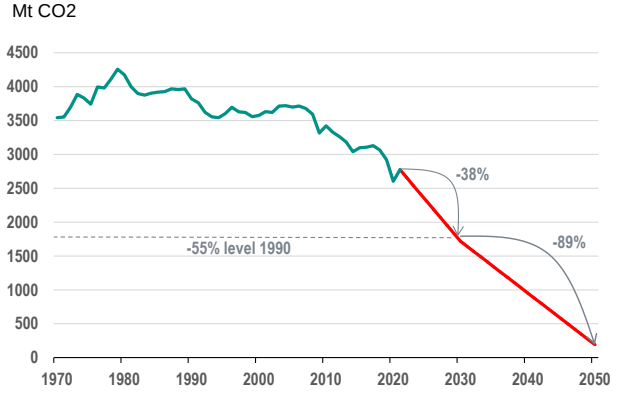
Dutch greenhouse gas emissions were 9% lower in 2022 than in 2021, the CBS recently reported. And according to figures from the *Umweltbundesamt* (UBA, the German environment agency), German greenhouse gas emissions fell by 1.9% overall in 2022 compared to the previous year. The UK also fared better. An analysis by *Carbon Brief* showed that greenhouse gas emissions fell by 3.4% in 2022. All good news. But for the most part, the fall last year was due to an exogenous shock rather than a structural reduction in CO2 emissions through, for example, stronger growth in renewable energy. In 2022, it was record high energy prices that depressed EU energy demand and reduced CO2 emissions. Such external shocks more often have major impacts. Indeed, a similar fall also occurred in 2020, when Covid-19 crippled the global economic system and CO2 emissions shrank as a result. Not only did industrial activity decline abruptly, but there were also significantly fewer transport miles travelled globally. On the return to largely normal conditions in 2021 and global greenhouse gas emissions rose rapidly back to the pre-Covid levels seen in 2019. All in all, then, emissions trends within the Europe do not directly point to a structural reduction path in emissions. While emissions have fallen in many EU countries compared to 1990 levels, the erratic nature of the wave patterns of emissions each year is still relatively large. As a result, on balance many EU countries are still behind on their CO2 reduction targets.

EU CO2 emissions by country 1970-2021



Source: IEA-EDGAR CO2, ABN AMRO Group Economics

EU emissions and target towards 2050



Source: IEA-EDGAR CO2, ABN AMRO Group Economics

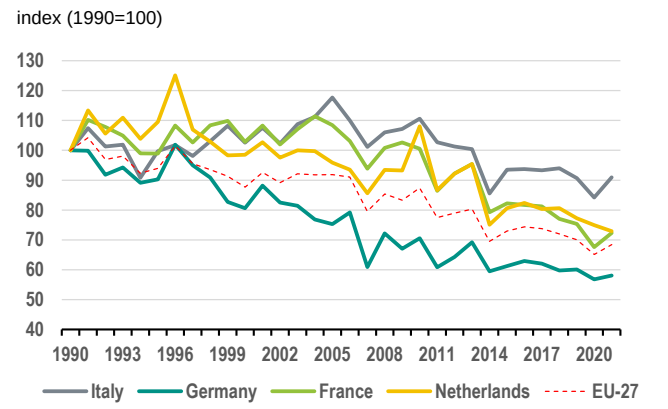
Germany is by far the largest emitter of CO2 in Europe, followed by Poland, Italy and France. The Netherlands is the sixth largest emitter of CO2 within the EU. Germany was the largest emitter of CO2 in 1990 and this is also the case in 2021. However, over the past 30 years, these emissions have decreased by 36%, 8 percentage points more than the EU (27) average. But there are EU countries that have done better. For example, the Baltic states' CO2 emissions have fallen by

around 65% on average and Romania's emissions have fallen by almost 55% over those 30 years. Most countries in the EU have reduced their CO2 emissions, but around 12 have reductions below the EU average, including the Netherlands. Four countries within the EU-27 even show an increase in CO2 emissions over the past 30 years. In Cyprus (+165%), Spain (+40%), Malta (+34%) and Luxembourg (+16%), CO2 emissions have only increased since 1990. The variations between EU countries are thus large and this is also the case in the development of CO2 emissions in different climate sectors. In some cases, emission reduction targets for sectors deviate from the EU target of 55% below 1990 CO2 emission levels. For simplicity, we assume the EU reduction target of 55% in 2030 in the following section.

Emissions built environment and transport by country

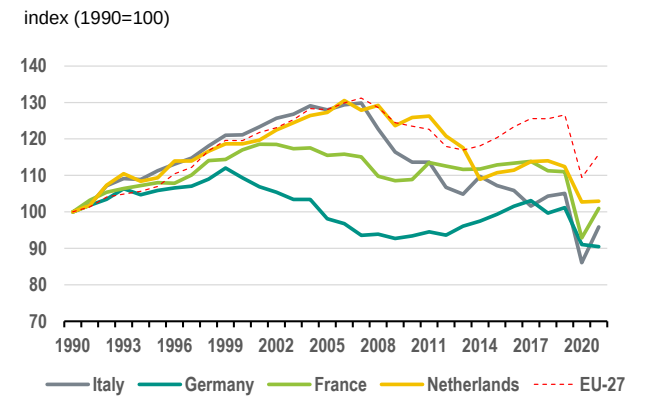
In the built environment within the EU-27, we see the sharpest declines in CO2 emissions especially in the smaller countries. But Germany, too, has seen its emissions decline by 42% since 1990. The country accounted for over 25% of emissions from the built environment within the EU-27 in 2021. The decrease in Germany's CO2 emissions from the built environment is mainly due to a variety of energy innovations and the replacement of outdated energy infrastructure. But higher levels of energy efficiency, renewable energy deployment and further digitalisation have also contributed to the reduction. With a share of around 35%, heat pumps have been the most important primary energy source for heating systems in buildings in Germany in recent years. Natural gas heating systems have a share of around 33%. Partly due to the measures taken, Germany's final energy consumption for buildings has fallen by more than 30% since 1990 and this has resulted in far fewer climate-damaging emissions. For the Netherlands, the 2050 target for the built environment is to get 7 million homes and 1 million other buildings off natural gas. Many different measures are possible to achieve this, the most important being insulation and use of renewable heat and electricity. Trends in CO2 emissions in the Netherlands from the built environment broadly follow CO2 trends in other Europe. Of all EU countries, 9 have now already reached the EU reduction target for 2030. These are mainly the smaller EU countries, especially in the Baltic States and the Nordic countries.

Emissions CO2 per country: Buildings



Source: IEA-EDGAR CO2, ABN AMRO Group Economics

Emissions CO2 per country: Transport



Source: IEA-EDGAR CO2, ABN AMRO Group Economics

Of all the climate sectors discussed in this analysis, transport shows an anomalous trend in CO2 emissions. While the other subsectors have seen a sharp decline in EU-27 CO2 emissions over the past 30 years -built environment (-32%), energy (-39%) and industry (-41%) -, CO2 emissions from transport have increased by 16%. In as many as 20 of the EU-27 countries, CO2 emissions have increased since 1990, with Poland being the big outlier (at +223%). This gives Poland a 9% share of total transport emissions in the EU-27 in 2021. The country thus also pulls the EU average up considerably. In Germany - the largest contributor transport emissions at almost 20% - emissions have fallen by 10% over 30 years, although this has been in big waves over time. Italy too has transport emissions below 1990 levels. For all EU countries, here, no country has yet met the 2030 reduction target. This makes it the sector with probably the biggest challenge to reduce emissions more significantly in the coming years.

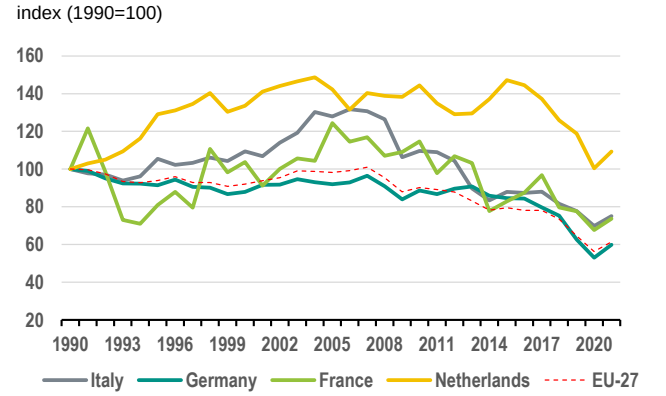
Despite falling visibly faster from 2008 onwards, CO2 emissions in Dutch transport are still 3% higher than the 1990 level in 2021. As in many countries in Europe, Covid-19 caused a big reduction in emissions in 2020, due to the many lockdowns. The reduction in CO2 in the pre-Covid-19 period in many EU-27 countries was as a direct result of the rise of electric vehicles (EVs) - and hybrid variants - and the improved fuel efficiency of many vehicles. But despite the rise of EVs and

increased efficiency, CO2 emissions declined relatively slowly, partly due to greatly increased use. In any case, it is clear that the transition to zero-emission transport (and perhaps also low-emission vehicles running on renewable fuels) is of great importance to meet the EU climate targets for 2030 and 2050.

Emissions energy sector and industry by country

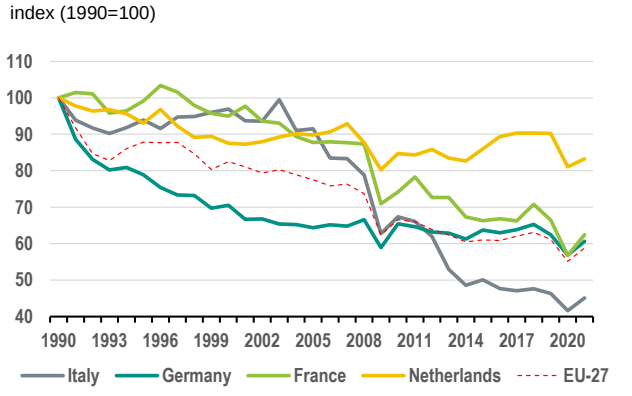
By 2021, 6 EU countries are now already below the 2030 emissions reduction target of 55%. These are again the Baltic states, but also Romania, Denmark and Luxembourg. In addition, some countries are already close to reaching the target, such as Bulgaria, Hungary, Malta and Slovakia. The remaining - mainly large - EU countries still need to take big steps in reducing CO2. In this, the Netherlands is clearly an outlier. The trends in CO2 emissions in the Netherlands differ greatly from the EU-27 average and also our neighbouring countries. While almost all EU-27 countries are now below 1990 levels, the Netherlands (but also Cyprus) still remains above them. The fact that CO2 emissions in the Netherlands have remained at high levels for so long is mainly due to the high importance of natural gas in the energy mix, but also the influence of oil and coal. And still the Netherlands has a relatively high share of fossil fuels, both in the total energy supply and in the electricity mix, and a relatively low share of renewable energy. Shifting this energy mix to a more renewable variant is an important part of a successful transition to net zero emissions. Although Dutch electricity demand is somewhat modest at the moment, we expect it to grow enormously in the coming years. Strong growth is foreseen in almost all sectors, especially for industry and transport. To further reduce energy emissions in the EU-27 energy sector, the share of renewables needs to be accelerated, combined with reduced energy consumption through increased efficiency. In addition, nuclear energy may also play a role.

Emissions CO2 per country: Energy sector



Source: IEA-EDGAR CO2, ABN AMRO Group Economics

Emissions CO2 per country: Industrial sector



Source: IEA-EDGAR CO2, ABN AMRO Group Economics

In only one country within the EU-27 have industrial CO2 emissions increased over the last 30 years. In Austria, industrial CO2 emissions in 2021 are about 5% above 1990 levels. In the Netherlands, industrial CO2 emissions have fallen by 17% since 1990. The decline is obviously a good sign, but the pace is well below the EU-27 average of -41%. This puts the Netherlands in fifth position (out of 27) with countries that have reduced their industrial CO2 emissions the least. Germany, with a 23% share of total EU-27 industrial CO2 emissions, is the largest industrial emitter. The country broadly follows the trend of the EU-27 average. However, the UK has shown an almost constant decline in CO2 emissions since the mid-1990s. As a result, the country has now reduced CO2 emissions in industry by half. The European Commission (EC) indicated that construction of roadmaps in terms of emission reductions is the responsibility of industry itself. Many of these roadmaps show that supportive policies from the government are an indispensable part of meeting emission reduction targets.

Decarbonisation

To move the EU-27 countries towards climate neutrality, much work remains to be done. Our analysis shows that many countries - especially large ones - are still well behind, so time is running out. But despite the relatively slow pace of CO2 reduction in some countries, the transition to low or zero carbon is now well under way. We can see this from the trends in CO2 emissions in major climate sectors by country. However, it is noticeable here that the transport sector in particular lags far behind other sectors in reducing CO2. We also see that in this sector, no country has now met the 2030 EU emission

reduction target, while this is frequently the case in the other climate sectors. Technology can start making a difference here in the coming years. It is a good way to bring emission reduction more up to speed. Here, electrification, efficiency measures, fuel substitution (renewable fuels instead of fossil fuels) and renewable energy generation (such as from solar, wind, geothermal, etc.) in particular are likely to make up the difference in the coming period. Investment in these technologies and also the supporting infrastructure (such as electricity grids) is relatively high at the moment, but in the longer term it will actually deliver significant gains both ecologically and economically.

The strategic approach to critical raw materials

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- **The strategic approaches of the big developed economies to critical raw materials are now all out in the open, with the EU being the latest to publish its plans**
- **The EU sets targets for domestic capacity and plans to limit the supply from a single country by 2030**
- **The EU updated its list of critical raw materials and released a list of strategic raw materials**
- **The US and the UK had already done so**
- **The approach of the US and EU is similar, but the UK seems less hands on**

Introduction

The race is on to decarbonize the world by 2050. There are certain technologies that are crucial to help to this endeavour. However, these technologies depend on a number of raw materials that are experiencing rapid demand growth and high concentration of supply chains in particular countries. Some of these materials are produced in comparatively small volumes or as by-products of other mining activities. In a large number of these minerals, China dominates the extraction, the processing or both. As countries increasingly understand their dependence on the supply of these materials they have come up with strategies to help secure their future supply. In this report we focus on what are critical raw materials and what actions EU, the US and the UK have taken to secure supply.

EU strategy to critical raw materials

On 16 March 2023 the EU released the Critical Raw Materials Act (see link). The Commission proposed a set of actions to ensure the EU's access to a secure, diversified, affordable and sustainable supply of critical raw materials. The EU uses a criticality methodology based on two main criteria: Economic Importance (EI) and Supply Risk (SR). The EU has defined 34 raw materials as critical raw materials (see table below). Within this list, some critical metals are defined as strategic materials as they are seen as crucial to technologies important to Europe's green and digital ambitions and for defence and space applications. Lithium and titanium metals are examples of these. Lithium is used for batteries in electric vehicles and for storage. Titanium metal is used in aerospace and defence. In the list of 34 materials are three material groups such as Platinum Group Metals (PGM), Heavy Rare Earth Elements (HREE) and Light Rare Earth Elements (LREE). The full list of critical raw materials as defined by the EU is in the table at the end of this report (see link).

The EU sets clear targets for domestic capacity along the strategic raw material supply chain and to diversify EU supply by 2030. These targets are set as percentage of the annual consumption that is needed by 2030:

- 10% of annual consumption of the minerals needs to be extracted from Europe
- 40% of the annual consumption of processed materials needs to come from within Europe by 2030
- 15% of annual consumption need to come from recycling by 2030.

In addition not more than 65% of the EU's annual consumption of each strategic raw material at any relevant stage of processing can come from a single country. Currently China is the major supplier of 21 critical raw materials of the EU including strategic raw materials.

The EU will take the following steps to meet these targets. For a start, the EU will reduce the administrative burden and simplify permitting procedures for critical raw materials projects in the EU. Indeed, Selected Strategic Projects will benefit from support for access to finance and shorter permitting timeframes (24 months for extraction permits and 12 months for processing and recycling permits). In addition, Member States will also have to develop national programmes for exploring geological resources. Moreover, the Critical Metals Act provides for the monitoring of critical raw materials supply chains, and the coordination of strategic raw materials stocks among Member States. Furthermore, Member States will need to adopt and implement national measures to improve the collection of critical raw materials rich waste and ensure its recycling into secondary critical raw materials. Products containing permanent magnets will need to meet circularity requirements and provide information on the recyclability and recycled content. Finally, the EU will need to strengthen its global engagement with reliable partners to develop and diversify investment and promote stability in international trade and strengthen legal

certainty for investors. In particular, the EU will seek mutually beneficial partnerships with emerging markets and developing economies, notably in the framework of its Global Gateway strategy. The EU will invest in research, innovation and skills.

The proposed Regulation will be discussed and agreed by the European Parliament and the Council of the European Union before its adoption and entry into force.

US inflation Reduction Act

The US had already taken actions to try to secure the supply of critical materials. On 16 August 2022 the Inflation Reduction Act (IRA) was signed into law. The Inflation Reduction Act's $370 billion in investments will lower energy costs for families and small businesses, accelerate private investment in clean energy solutions in every sector of the economy and every corner of the country, strengthen supply chains for everything from critical minerals to efficient electric appliances, and create good-paying jobs and new economic opportunities for workers. Built within the IRA is a commitment to increasing the domestic US supply of critical minerals to provide the materials necessary for a vast expansion in electric vehicles (EVs), batteries, and renewable power production infrastructure. Under the advanced manufacturing production credit outlined in the legislation, mining companies that produce any of the critical minerals listed in the bill will qualify for a tax credit equivalent to 10% of the cost of production for that mineral. The minerals produced must meet specific purity levels to qualify for the credit. To satisfy the IRA's critical minerals requirement, at least 40% the value of the critical minerals contained in the vehicle's battery must be "extracted or processed in any country with which the United States has a free trade agreement in effect" or be "recycled in North America." The required percentage would increase gradually to 80 percent by 2027. Vehicles that satisfy this requirement would receive a tax credit of $3,750, provided that they otherwise qualify as a "clean vehicle" as defined in the IRA. A similar rule in the IRA would provide an additional tax credit of $3,750 if at least 50 percent of the battery's components are manufactured or assembled in North America (increasing to 100% by 2029). An overview of the critical metals defined by the IRA is the table on the next page.

UK's Critical Metals Strategy

The UK has also come up with a strategy to secure the supply of critical metals. On 13 March 2023 the UK government released its policy paper: Resilience for the future: The UK's Critical Minerals Strategy (see **link**). The UK government takes a similar approach to those of the US and the EU. It has defined a list of critical metals. It defines critical metals as minerals with high economic vulnerability and high global supply risk. These 'critical minerals' are not only vitally important but are also experiencing major risks to their security of supply. The strategy is to accelerate growth of the UK's domestic capabilities, collaborate with international partners and to enhance international markets to make them more responsive, transparent and responsible. The UK has not yet set targets as the EU and the US have done.

Lists of critical raw materials

Critical raw materials are materials where the extraction and or processing is often concentrated in area/country, they are difficult to mine, and in high demand for the products used and for the technologies that are crucial to reduce CO2 emissions. The EU, the UK and the US have defined separate lists of critical raw materials. The EU even has a separate list of strategic raw materials. These are the crosses in green in the table on the next page.

These lists have a lot of similarities but there are also differences. To start with the similarities. The US, EU and the UK define often the same materials as critical. Moreover, they may be more specific on the rare earth elements but they are for all three countries classified as critical. There are also a number of differences. As mentioned earlier rare earth elements are mentioned in different detail. The US has provided the most detail. The US named the individual rare earth elements, while the EU splits them into heavy and light rare earth elements and the UK grouped them into one group rare earth elements. Another difference is that some materials are deemed critical for one of the countries but not for the other countries. This difference could be the result of domestic extracting and processing capacity but also less demand for a certain technology where a specific materials are used. For example for the UK Indium is a critical metal that is used in touch screens, flatscreen TVs and solar panels, while the mineral is not on the list of the EU and the US. In case of the EU, Indium was removed from the list because the EU's domestic production largely covers the EU needs. Another example is that the US has Cesium on its list that is used as drilling fluid and to make optical glass while the EU and the UK don't have it on their lists. As a disclaimer the EU did mention all raw materials, even if not classed as critical, are important for the European

economy and that a given raw material and its availability to the European economy should therefore not be neglected just because it is not classed as critical.

EU's, US' and UK's lists of Critical Raw Materials

	EU	UK	US			EU	UK	US
Aluminium/Bauxite	x		x	**REE**			x	
Antimony	x	x	x	**HREE**		x		
Arsenic	x		x		Dysprosium			x
Baryte	x		x		Terbium			x
Beryllium	x		x		Holmium			x
Bismunth	x		x		Erbium			x
Boron/Borate	x				Gadolinium			x
Cesium			x		Thulium			x
Chromium			x		Ytterbium			x
Cobalt	x	x	x		Yttrium			x
Coking coal	x				Lutetium			x
Feldspar	x				Europium			x
Fluorspar	x		x		Scandium	x		x
Gallium	x	x	x	**LREE**		x		
Germanium	x		x		Lanthanum			x
Hafnium	x		x		Cerium			x
Helium	x				Praseodymium			x
Indium		x			Neodymium			x
Lithium	x	x	x		Promethium			
Magnesium	x		x		Samarium			x
Manganese	x	x'	x	**PGM**		x		
Natural graphite	x	x	x		Platinum		x	x
Nickel	x	x'	x		Palladium		x	x
Niobium	x		x		Rhodium			x
Phospate rock	x	x'			Ruthenium		x'	x
Copper	x				Osmium			
Phosphorus	x				Iridium		x'	x
Rubidium			x					
Silicon metal	x	x						
Strontium	x							
Tantalum	x	x	x					
Tellurium		x	x					
Tin		x	x					
Titanium metal	x		x					
Tungsten	x	x	x					
Vanadium	x	x	x					
Zinc			x					
Zirconium			x					

Source: EC, UK and US. x'= on watchlist of minerals that are deemed to be increasing in criticality. HREE = Heavy rare earth elements, LREE = Light rare earth elements, PGM = Platinum group metals, Strategic Raw Materials = **x**

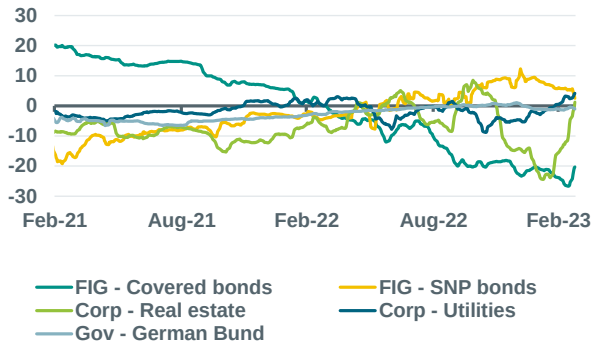
Conclusion

The strategic game of securing the supply for critical raw materials was already underway but has become more clear and determined. China has been far advanced in this and the US, UK and EU are trying to catch up to secure the supply of these materials and support their economies and industries. These materials are also crucial in the technologies to decarbonise the world by 2050. Higher domestic supply and higher recycling will decrease the dependency but some materials can simply only be found in some places in the Earth's Crust. The question is if reserves in these materials will ever be enough to decarbonize the world. We don't think so at current technologies. So it is a race to secure the reserves and to position well strategically as long as there are no significant breakthroughs in technologies that result in substantially lower demand for these materials. Some technologies could even result in no demand for a material that is currently deemed as critical or of strategic importance. An example is cobalt. If battery technology advances and new batteries don't require cobalt anymore then demand for this now critical metals will almost disappear.

ESG in figures

ABN AMRO Secondary Greenium Indicator

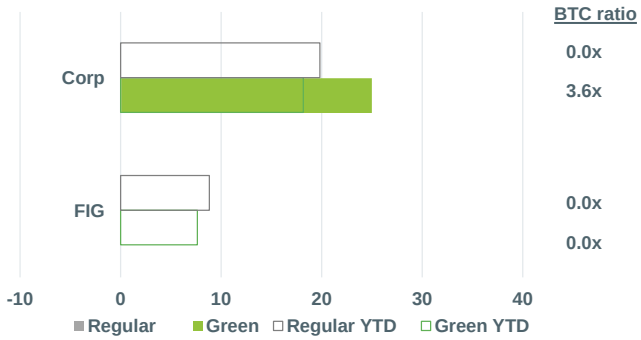
Delta (green I-spread – regular I-spread)



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

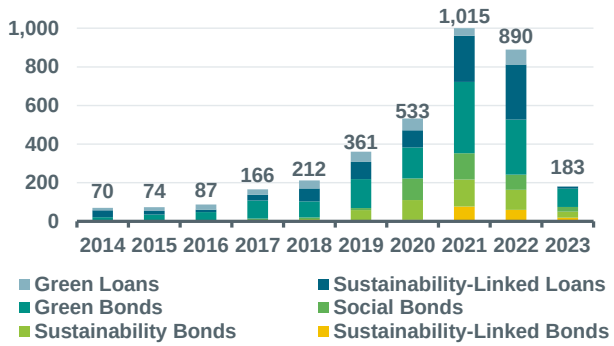
NIP in bps



Note: Data until 24-03-23. BTC = Bid-to-cover orderbook ratio. Source: Bloomberg, ABN AMRO Group Economics

Sustainable debt market overview

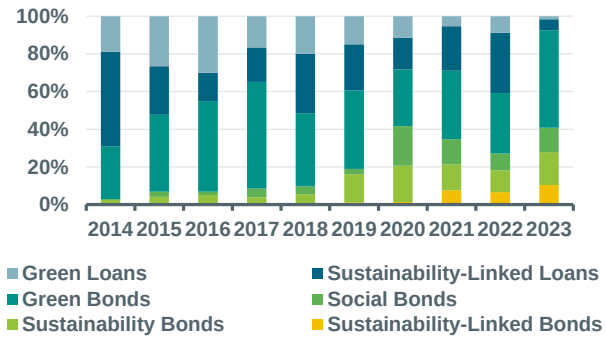
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of sustainable debt by type

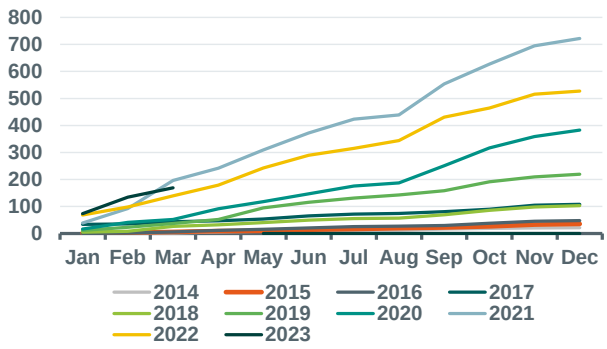
% of total



Source: Bloomberg, ABN AMRO Group Economics

YTD ESG bond issuance

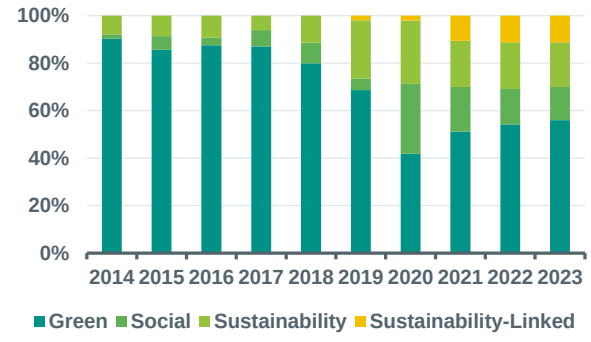
EUR bn (cumulative)



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by type

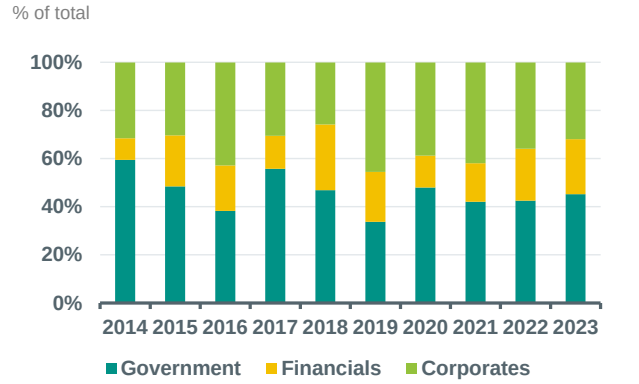
% of total



Source: Bloomberg, ABN AMRO Group Economics

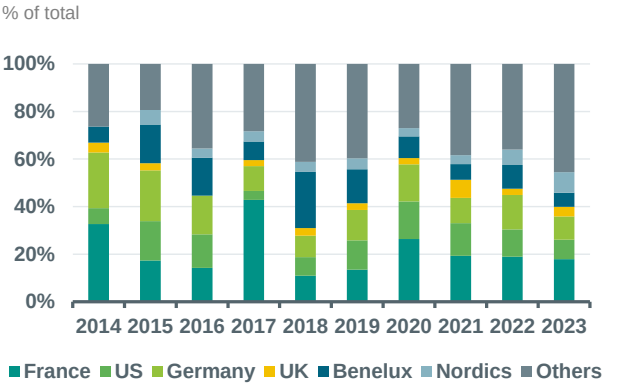
Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Breakdown of ESG bond issuance by sector



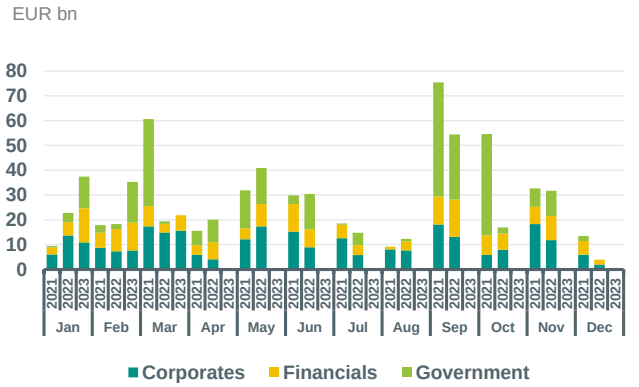
Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by country



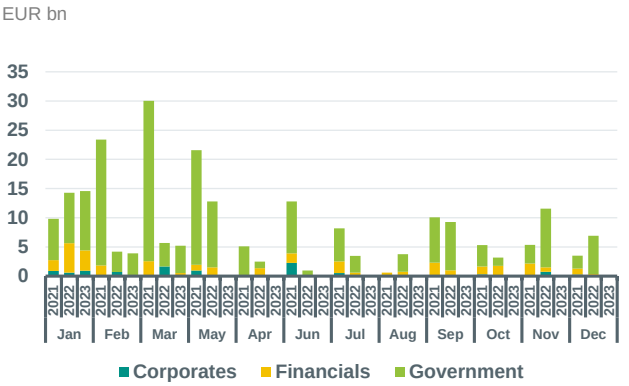
Source: Bloomberg, ABN AMRO Group Economics

Monthly Green Bonds issuance by sector



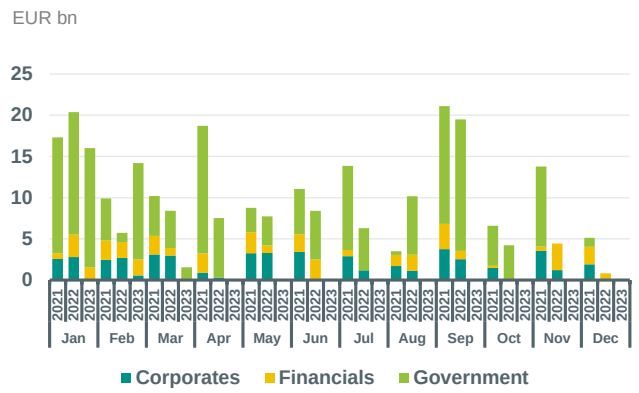
Source: Bloomberg, ABN AMRO Group Economics

Monthly Social Bonds issuance by sector



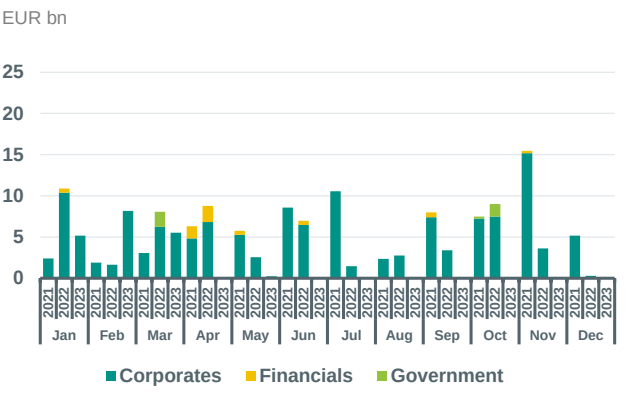
Source: Bloomberg, ABN AMRO Group Economics

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.

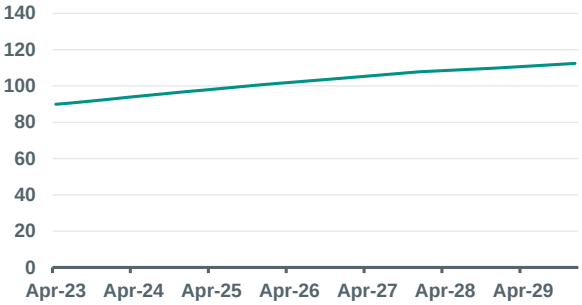
Carbon contract current prices (EU Allowance)

EUR/MT

Source: Bloomberg, ABN AMRO Group Economics

Carbon contract futures curve (EU Allowance)

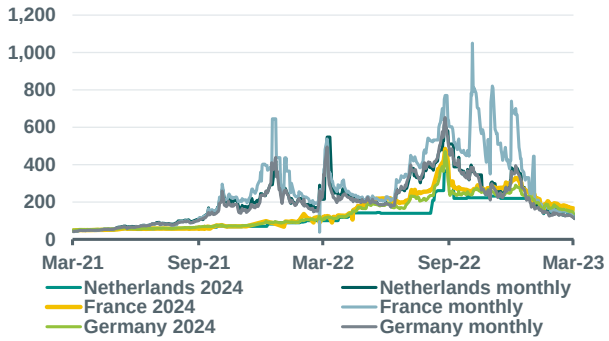
EUR/MT



Source: Bloomberg, ABN AMRO Group Economics

Electricity power prices (monthly & cal+1 contracts)

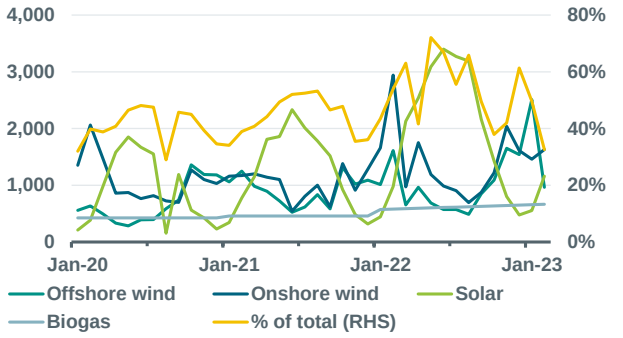
EUR/MWh



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

Electricity generation from renewable sources (NL)

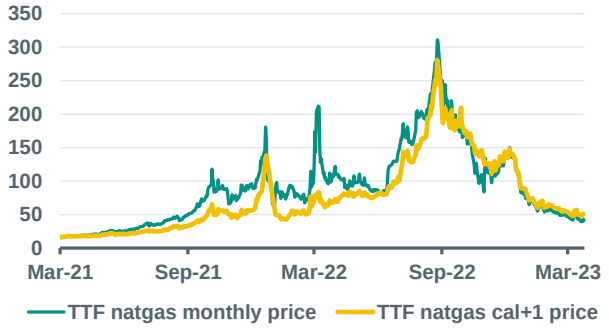
GW % of total



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

TTF Natgas prices

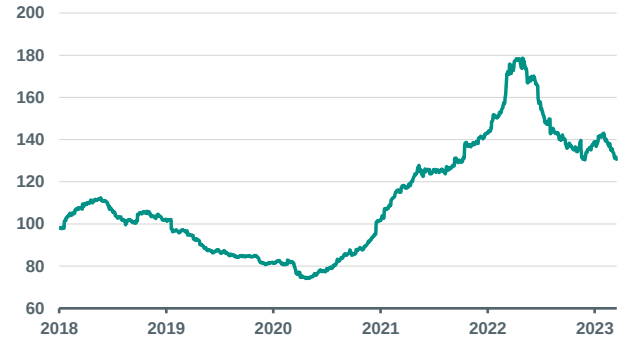
EUR/MWh



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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