SustainaWeekly

The cost and financing of Europe's transition

- **Economics Theme: The additional annual investment need for Europe to achieve its goal of a 55% GHG reduction in 2030 amounts to about 2% of the EU's GDP. Bank loans will likely remain dominant in financing, but bonds are becoming increasingly important. Bond issuance trends suggest that green investment is stepping up but there is a way to go.**

- **Strategy Theme: We assessed the portfolio share of ESG bonds in ESG funds. Our analysis indicates that within Fixed Income funds, only 7% of the securities from light green bond investors correspond to ESG bonds. For dark green funds, this share is relatively higher, at 39%. This implies the need for caution in assuming the credentials of these funds is strong.**

- **ESG Bonds: By taking a sample of companies, we analysed how long on average companies take to allocate proceeds of green and/or sustainability bonds. Our analysis shows that some sectors seem to struggle to allocate proceeds. Monitoring of allocation of proceeds by investors can be a clear tool against greenwashing.**

- **Company and Sector news: The raw material costs for making low-carbon technologies have increased significantly. Since 2021, however, the CO2 price has risen more sharply than the price of transition commodities. A higher price for CO2 keeps low-carbon technologies more economically viable and therefore interesting for many companies.**

- **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 start by looking into the investment needs for Europe's energy transition and how this might be financed. Investment in both energy supply and demand should more than double compared to the previous decade. The European Commission has estimated that only around a fifth of the gap will be financed by bonds. Our own estimates suggest that this may end up being closer to a third. We go on to examine the credentials of ESG funds, and are surprised to find that the proportion of their ESG bond holdings is relatively low. We go on to analyse how long on average companies take to allocate proceeds of green and/or sustainability bonds. Finally, we look at price trends for transition commodities, and argue that despite the sharp rises, the rise in carbon prices helps to keep low-carbon technologies more economically viable. Enjoy the read and, as always, let us know if you have any feedback!

Nick Kounis, Head Financial Markets and Sustainability Research | nick.kounis@nl.abnamro.com

How much investment is required for the EU's energy transition?

Anke Martens – Macro Economist Sustainability | anke.martens@nl.abnamro.com
Nick Kounis – Head Financial Markets & Sustainability Research nick.kounis@nl.abnamro.com

- **Additional investment need for a 55% GHG reduction in 2030 amounts to about 2% of the EU's GDP**
- **Investment in both energy supply and demand should more than double compared to the previous decade**
- **Investment requirements are frontloaded but also remain large for an extended period**
- **Bank loans will likely remain dominant in financing, but bonds are becoming increasingly important**
- **Over the last year, bond issuance trends suggest that green investment is stepping up but there is still quite some way to go**

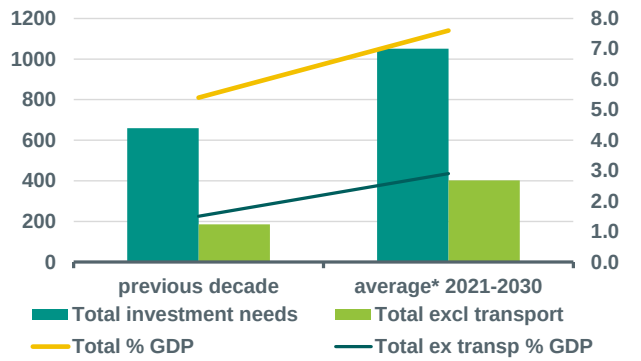
The EU has the objective to reduce greenhouse gas emissions by 55% by 2030, compared to 1990, on its way to reach the climate neutrality (Net Zero) end goal in 2050. More efficient and better insulated buildings, a shift to electric cars, continued rapid penetration of renewable energy in all sectors are needed to achieve the transition towards climate neutrality. This requires significant investments in new technologies and infrastructure. In this note we review estimates of investment needs on the EU level and go on to assess how it might be financed.

Additional investment necessary for -55% GHG reduction in 2030 is about 2% of the EU's GDP

For the EU, the European Commission estimates that reaching the 2030 climate target will require additional annual investments of EUR 390 billion on average (the EC has modelled different scenarios and this is the number for the so-called MIX scenario, which is the central scenario in which a combination of expanded carbon pricing and increased regulation leads to a 55% emissions reduction by 2030). This should see relevant investments rising from an average of EUR 660 billion per year (5.4% of GDP) in the last decade to around EUR 1,050 billion per year (7.6% of GDP).

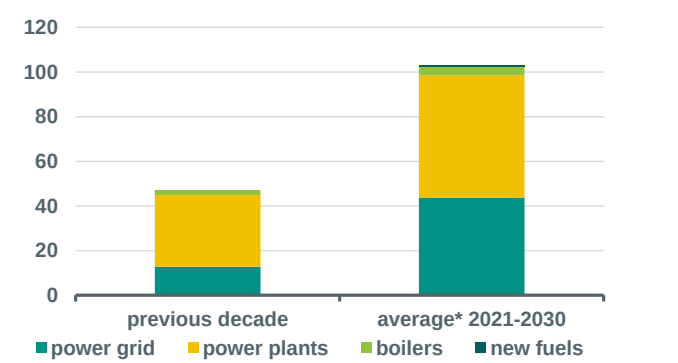
Of those numbers, the investment need for the transport sector makes up a large part in absolute terms, but this includes vehicle replacement and is therefore not directly related to decarbonisation costs. Excluding transport, the total financing requirement increases from EUR185bn (1.5% of GDP) in the past decade to EUR 400bn (2.9% of GDP) in the coming decade.

Total investment EU, MIX scenario*



Source: European Commission, 2021, ABN AMRO Group Economics
* MIX combines policies, measures & carbon pricing

Investment power supply EU, MIX scenario*



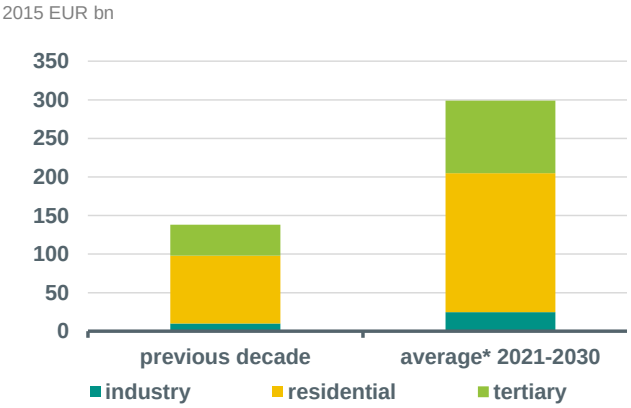
Source: European Commission, 2021, ABN AMRO Group Economics
* MIX combines policies, measures & carbon pricing

Investments in both energy supply and energy demand need to more than double compared to the past decade

Of this additional investment, EUR 56bn is related to energy supply. Investment in power grids needs to more than triple, going from EUR 13bn in the previous decade to EUR 44bn in the next decade to be consistent with a Net Zero scenario. Investment in power plants needs to increase from EUR 32bn to EUR 55bn.

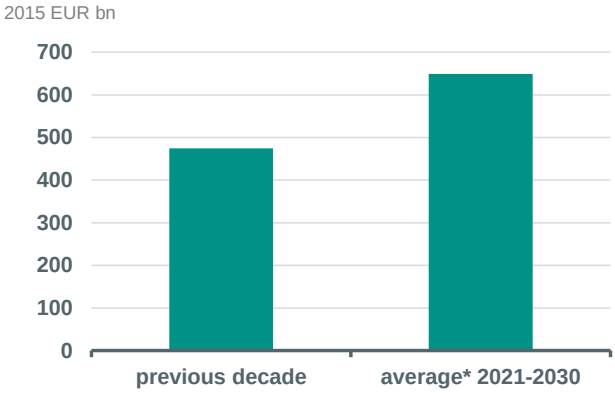
On the demand side, investments in all categories (industry, residential, and tertiary) should more than double. The largest additional investment need in absolute terms is created in the residential sector (mainly residential heating), with investment requirements increasing from EUR 88bn in the previous decade, to an annual EUR180bn in the coming decade.

Investment power demand EU, MIX scenario*



Source: European Commission, 2021, ABN AMRO Group Economics
* MIX combines policies, measures & carbon pricing

Investment transport EU, MIX scenario*

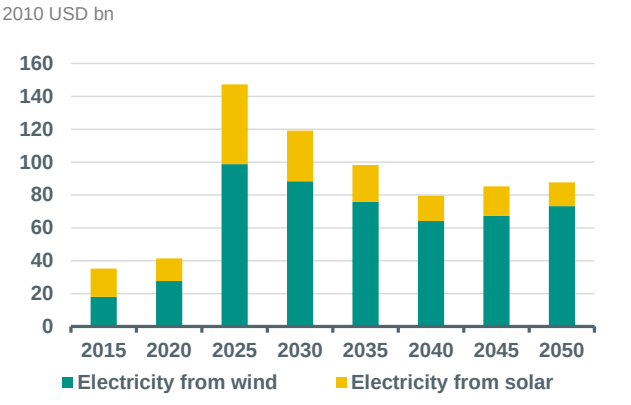


Source: European Commission, 2021, ABN AMRO Group Economics
* MIX combines policies, measures & carbon pricing

In the Net Zero scenario, investment needs in renewables peak in 2025 and remains large thereafter

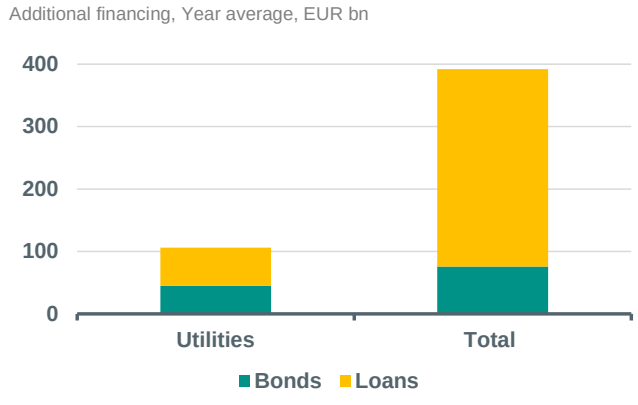
In the energy supply sector, a lot of the required investment is obviously aimed at renewables, such as solar and wind. In the Network for Greening of Financial Services' (NGFS, a network of central banks and supervisors that aims to accelerate the scaling up of green finance and share knowledge) Net Zero 2050 scenario, investment in wind and solar as sources of electricity increase sharply from USD 40bn in 2020 to more than USD 140bn in 2025. After this peak, investment in in particular wind energy remains more than double that of the previous decade over the forecast horizon.

Investment in electricity from wind and solar EU, NZ



Source: NGFS, REMIND model; NGFS Net Zero 2050 scenario

Bond versus loan financing of investment gap



Source: European Commission, ECB

While an around 1.5-2% of EU GDP rise in investment needs is a significant increase, it should be put in the perspective of an investment rate of the EU of around 21% over the past decade. But looking towards the 2050 horizon and the net zero objective, it is clear that investment in the energy system would need to be kept at a higher level relative to GDP for a longer period.

Loan finance dominant, but bonds becoming increasingly important

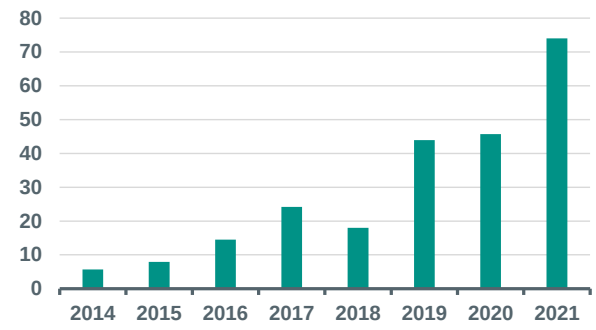
The European Commission has also estimated how the investment gap might be financed and these calculations were subsequently updated in an ECB research note (see **here**). For the overall investment gap, it is estimated that only around a fifth will be financed by bonds. Our own estimates – based on trends in the ESG bond market and EBA data on the green asset ratios of banks – suggest that this may end up being closer to a third. Meanwhile, the European Commission does estimate quite some variation in the financing mix between sectors. For instance, for utilities, the loan-bond mix is seen at around 60-40.

Trends in bond markets suggest that green investment is stepping up

Data on recent loan developments in terms of the financing of green assets is not available, however we do of course have data on the bond side. The trends in the issuance of green and sustainable bonds last year were very encouraging, and likely suggest that the investment gap is starting to close.

Bond issuance corporates (total green & sustainable)

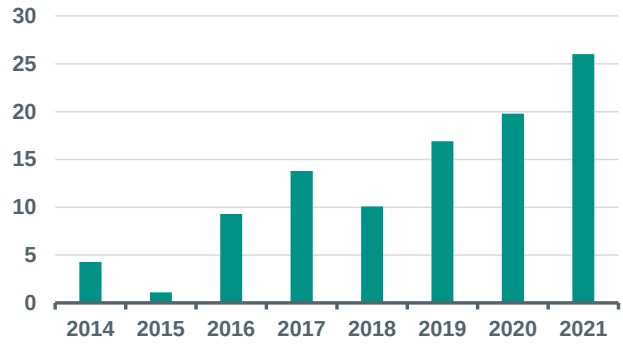
Annual gross, EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Bond issuance utilities (total green & sustainable)

Annual gross, EUR bn



Source: Bloomberg, ABN AMRO Group Economics

However, there is still quite some way to go. The current strong growth rates in issuance would need to continue over the next couple of years to achieve the levels of additional financing necessary. So far this year, the ESG bond market has been off to a slow start compared to 2021 (see our Q1 market review **here**). However, this relates to broader market volatility rather than more fundamental shifts in demand and supply of green investments in our view.

ESG funds invest only a small share in ESG bonds

Larissa de Barros Fritz – ESG & Corporates Strategist | larissa.de.barros.fritz@nl.abnamro.com

- **We used the Sustainable Finance Disclosure Regulation (SFDR) classification of light and dark green funds to assess the portfolio share of ESG bonds**
- **Our analysis indicates that within Fixed Income funds, only 7% of the securities from light green bond investors correspond to ESG bonds**
- **For dark green funds, this share is relatively higher, at 39%**
- **This implies that there is a need for caution in just assuming that the ESG credentials of these funds is strong**

The Sustainable Finance Disclosure Regulation (SFDR), which entered into force in March 2021, is a regulation on EU-level that imposes mandatory ESG disclosure obligations for financial market participants and financial advisers (hereby named as "investors"). Its goal is to increase transparency on how sustainability is integrated into investors' investment decisions. The detail and type of disclosure depends, however, on the objectives of the financial products offered by investors, which are gathered then under investment funds.

With this in mind, the SFDR distinguishes between Article 8, 9 and 6 funds. Article 8 funds are those that include financial products which *promote* environmental and social characteristics, as long as these investments are made towards companies that follow "good governance practices". Article 9 funds, on the other hand, include financial products that have sustainable investment as their *main* objective, and can be benchmarked against a "green" index. It therefore includes financial products that not only promote but also actively target sustainable investments. Article 8 funds are commonly known as "light green" funds, while Article 9 are referred to "dark green", given their stronger sustainability focus. Article 6 funds, on the other hand, are a simple "none of the above". It therefore covers funds which do not integrate any kind of sustainability into the investment process and could include stocks currently excluded by ESG funds such as tobacco companies or thermal coal producers. These funds are commonly known as "neutral" or "non-ESG".

Investors that fall under the SFDR are required to start some of the reporting already as early as of 10 March 2021 (see our full previous note on disclosure requirements **here**). Reporting, as we pointed out, is dependent on the fund classification. Hence, this implied that investors needed to disclose to which Article their funds belong to – and this is done on a self-assessment basis.

An analysis performed by Morningstar earlier this year showed that more than 1,000 funds that have actually classified themselves as either "light" or "dark green" under the SFDR do not really seem to fit the "green" box (see **here**). Morningstar, who performed an extensive due diligence across all funds, discovered problems including "ambiguous language in their legal filings". These combined reclassified funds have around USD 1.4bn of assets under management. Hence, it seems that finding a common ground on what constitutes a sustainable investment remains a challenge.

Based on this, we have conducted a screening on the funds classified as Article 8 or 9 according to Bloomberg. The idea is to assess to what extent these funds invest in ESG bonds. This is mainly because, while these funds incorporate sustainability characteristics, they are not obliged by regulation to exclusively invest in ESG bonds. However, investments in ESG bonds can assist in disclosing more 'favorable' sustainability metrics (in particular, once the EU Green Bond Standard is in place – which will clarify in a more formal manner which ESG bonds can in fact, be considered 'green' as per EU definitions). Hence, the amount of investment towards ESG bonds can be used as a proxy to assess the greenness of a fund, although of course it is not the only factor (for more on this see below).

The Sustainable Funds universe

Although the investment industry is still adjusting to the measures and uncertainties that remain with regards to the Article classification (as we pointed out above), Morningstar estimates that combined Article 8 and 9 currently represent up to 21% of total European funds and up to 25% of total European fund assets (see **here**). Article 8 funds represent 18% and Article 9

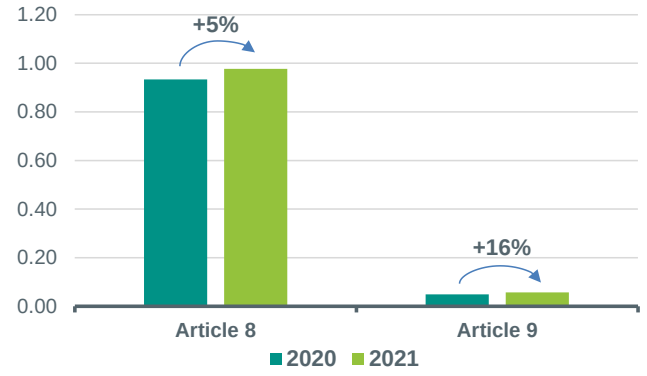
funds 3.6%. The European ESG fund market, based on SFDR definitions, could therefore currently be worth as much as EUR 2.5 trillion as per Morningstar calculations.

Within this universe, we have focused our analysis on ESG funds that have Fixed Income as asset class focus. That is because we want to capture what proportion ESG bonds represent of this total universe, which can be analysed if we focus on funds that have an (almost) exclusive focus on Fixed Income. Our analysis indicates that within the existing ESG fund market, around 40% of these refer to Fixed Income funds.

ESG Fixed Income funds have grown significantly over the years. In 2021, total assets of funds that have classified themselves as Article 8 was EUR 977bn, up almost EUR 50bn from the year before. For Article 9 funds, the growth was a bit less significant in absolute amounts ("only" EUR 8bn), but represented an impressive 16% YoY increase. So far for 2022, we also estimate Article 9 assets to be up by nearly 5%.

ESG funds have grown significantly over the years

Total assets, in EUR trillion



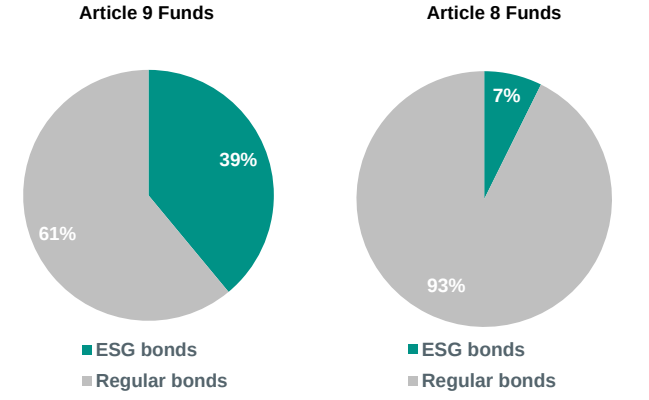
Source: Bloomberg, ABN AMRO Group Economics

ESG bonds represent only a small proportion of ESG funds

As the number of funds classified within Article 8 and 9 are quite significant, we have taken a sample within the total ESG Fixed Income funds universe in order to assess how many ESG bonds these funds have invested in. Nevertheless, we feel our sample is representative enough, as it accounts for 25% and 75% of the entire Article 8 and 9 universe, respectively.

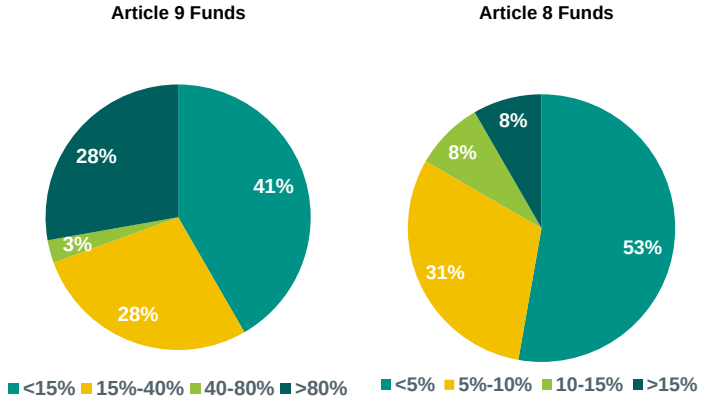
Our analysis indicates that within Article 8 funds, only on average 7% of the funds are invested in ESG bonds. For Article 9 funds, this amount is larger – on average, 39% - but still quite a bit less than expected. A more in-depth analysis indicates that, within our sample, the vast majority (41%) holds actually less than 15% of ESG bonds. Only a 'mere' 28% has more than 80% of proceeds allocated to ESG bonds. Replicating such analysis to Article 8 funds, we can see that the majority of these funds (53%) has actually less than 5% invested in ESG bonds. Assuming equal market value amongst securities in a fund, this would imply that for Article 8 funds, only EUR 72bn is invested in ESG bonds, while this is EUR 22bn for Article 9 funds.

On average, only 39% of the portfolio of dark green funds are ESG bonds…



Source: Bloomberg, ABN AMRO Group Economics. Note: refers to the average within our sample in terms of number of securities.

…While the majority actually holds only less than 15%



Source: Bloomberg, ABN AMRO Group Economics. Note: refers to the average within our sample in terms of number of securities.

A cautious approach towards ESG funds

The relatively small proportion of the total investments of ESG Fixed Income funds that constitute ESG bonds indicate that investors should take a cautious approach. A more detailed "under the hood" analysis should be required before assuming the ESG credentials of a fund that claims itself to be "green". We do acknowledge, of course, that a relatively low proportion of investments in ESG bonds does not necessarily mean that the fund itself is not dedicated to sustainability. However, it is unusual to see ESG bonds (in special, green ones) coming from high-emitting carbon companies, such as Oil and Gas. These issuers also have to comply with additional transparency requirements (such as the ones set by the ICMA), and within Europe, most of them also already map their green investments against standards such as the EU Taxonomy. Hence, we believe that the number of ESG bonds a fund invests in can be used as a proxy to assess its "greenness".

Furthermore, our research adds to other analysis previously performed on the topic, such as the one by Util, the impact analysis firm (see **here**). Util assessed earlier last year that a big chunk of US funds labelled as "sustainable" did not have a significant positive impact on the UN's Sustainable Development Goals. Also Morningstar itself (as we previously noted) has concluded that more than 1,000 funds that have classified themselves as either Article 8 or 9 were not really *per se* "green". The financial services firm also analysed later on that around 16% and 7% of light and dark green funds, respectively, rate as either "low" or "below average" within their internal sustainability rating assessment.

The growing reputational risk of greenwashing within ESG funds can also be illustrated by DWS's, Deutsche Bank's asset management arm, recent ESG scandal. A whistle-blower came public last year affirming that the DWS was "misleading its client with bold sustainability claims that did not stand up to scrutiny" and concluded that "some so-called ESG funds were best seen as general 'strategy funds'" (see **here**).

We hope that increased transparency being brought forward by regulation such as the SFDR will help to reduce the risk of greenwashing in the future.

Do companies take long to allocate proceeds of ESG bonds?

Larissa de Barros Fritz – ESG & Corporates Strategist | larissa.de.barros.fritz@nl.abnamro.com
Max Thissen – Associate Global Markets | max.thissen@nl.abnamro.com

- **By taking a sample of companies, we have analysed how long on average companies take to allocate proceeds of green and/or sustainability bonds**
- **For companies that reached full allocation, this has been done within one year after issuance**
- **However, our analysis also shows that some sectors seem to struggle to allocate proceeds**
- **Technology companies, for example, have so far on average allocated only 16% of proceeds, while they only have up to 4 years until maturity of these bonds**
- **Some sectors such as Industrials also have clear outliers, with some companies clearly underperforming against peers in terms of allocation**
- **Monitoring of allocation of proceeds by investors can be a clear tool against greenwashing**

The ESG bond market continues its significant growth. As we previously pointed out (see here), in 2021 the issuance of ESG bonds hit an all-time record of over EUR 1 trillion. The cumulative global market is estimated to have already reached more than EUR 2.5 trillion. In terms of number of issues, we estimate that more than 3,500 European issuers have placed ESG bonds at some point. And although there is more and more scrutiny by investors towards these bonds, in special prior to issuance, a lot of uncertainties still remains with regards to the year(s) following an ESG bond issue. There is no database where one can track allocation on green bonds, or easily compare environmental and/or social impact of those bonds. Dedicated ESG investors have certainly developed their own internal tools, but assessment becomes rather hard for those that do not have the internal resources.

Hence, we have taken a look at how allocation of ESG bond proceeds is currently performed in the market. The most-notable international standard for ESG bonds – the Green Bond Principles set out by the International Capital Markets Association, or ICMA – requires issuers to disclose, on an annual basis until full allocation, information on the allocation of proceeds. There is therefore no real requirement for issuers to allocate proceeds within a certain timeframe, although we do note that market practice has been to complete allocation 12 or 24 months after issuance. Some issuers even provide soft commitments to that in their Frameworks. The intended temporary placement of the amount of unallocated proceeds (for example, to be invested according to the issuer's internal treasury policies) needs to be properly disclosed in the Framework - but again, there is no clear requirement that prohibits companies to, for example, use that money to invest in fossil-fuel or carbon intense projects. Also it is rarely disclosed in allocation reports what actually the company is investing in. Hence, we deem it to be equally important for investors to analyse the Green Bond Framework as well as annual allocation (and impact) reports.

With this mind, we have performed an analysis on the allocation reporting of green and sustainability Euro bonds issued by non-financial companies included in the Bloomberg MSCI Euro Aggregate Sustainability index. As allocation reports are usually published 12 months after issuance, no datapoints for the Energy and Healthcare sector companies included in the index were available. Hence, in this case, we have added at random two companies to the analysis as representative for their respective sectors.

The idea of this exercise is to try to find out how long companies usually take to reach full allocation following the issuance of ESG bonds. Furthermore, our analysis tries to grasp whether in some sectors, allocation is lagging behind. We note that results should be read with caution in some cases, since some sectors are represented by only one or two datapoints each. The analysis included a total of 48 datapoints over 9 sectors. Results are presented below.

Sector	Allocation data available	Average allocation	# of bonds with unallocated proceeds
Energy	1 / 4	100%	-
Health Care	1 / 3	100%	-
Consumer Staples	2 / 5	100%	-
Communications	6 / 7	94%	1 / 6
Materials	7 / 9	93%	3 / 7
Industrials	12 / 14	89%	4 / 12
Utilities	11 / 11	87%	3 / 11
Consumer Discretionary	6 / 8	81%	2 / 6
Technology	2 / 2	16%	2 / 2
Sum:	**48 / 63**		

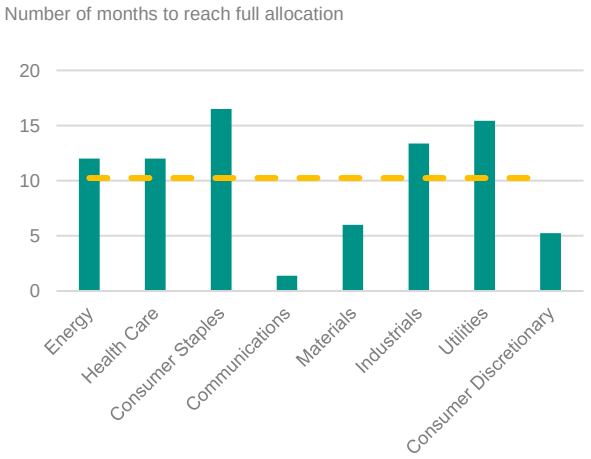
Source: ABN AMRO Group Economics

From the descriptive table above, the technology sector immediately stands out as it has by far the worst average allocation across all sectors. Other sectors such as energy, health care and consumer staples (although represented by only one or two companies), seem to reach allocation at a faster pace. We also do note that the unallocated proceeds for utility companies all refer to green bonds that have not yet completed one year after issuance.

To get a better understanding of the results, we decided to run an analysis on the average amount of months it takes for company to reach full allocation. We have therefore zoomed into issuers that have reached full allocation. As depicted in the chart on the left hand side below, most companies allocate proceeds from green or sustainability bonds within one year from issuance. It seems though that consumer staples and utilities tend to, on average, take slightly more time. In case of the former, it is likely due to the intrinsic lower amount of eligible green and/or sustainable assets that companies from these sectors have. In the case of utility companies, however, the slightly higher time required to reach full allocation is likely due to the large amount of green bonds these companies usually issue.

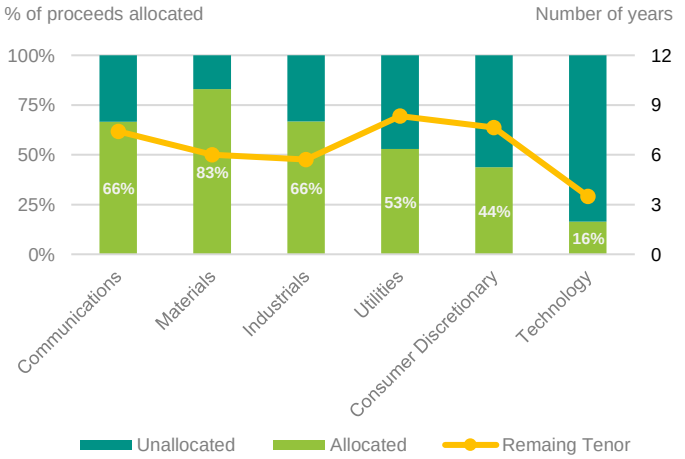
For the companies that issued green or sustainability bonds, but proceeds have not yet been fully allocated, we have tried to estimate how much more time they have until the maturity of these bonds. As shown in the chart below on the right hand side, a few sectors with relatively high amount of unallocated proceeds (such as consumer discretionary and utilities) have more than 7 years to reach full allocation. Other sectors such as materials, industrials and communications have a bit less time - on average, 6 years, but allocation is also relatively higher (ca. 10% more). The outsider is then technology, which is by far the worst performing in this regard. On average these companies have only spent 16% of their funds, whilst only having up to 4 years of tenor left before all proceeds should be allocated.

Most sectors reach full allocation within one year after issuance



Source: ABN AMRO Group Economics. Note: data refers to securities of companies that have reached full allocation. Dotted yellow line refers to cross-sector average

For bonds with unallocated proceeds, technology companies have less than 5yrs to reach full allocation

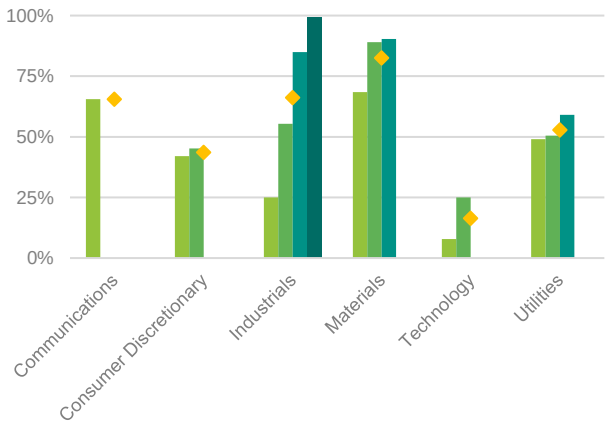


Source: ABN AMRO Group Economics. Note: data refers to securities of companies that have not yet reached full allocation. The unallocated proceeds of utility companies refer to securities which have been issued less than one year ago, but were already included in the companies' allocation reports.

While running the previously mentioned analysis, we have relied on averages. However, we observed that some companies drag the average of their sectors down. Hence, by plotting the companies separately one can get an insight in the distribution within sectors (see graph below). As a result, we observe the largest disparities between percentage allocated is within the industrials sector. The industrials sector has an average of 66% allocation of proceeds and has a minimum of 25% and maximum of 99%. From this chart we can also observe that over all sectors, there is one company with less than 10% allocation of funds, mainly from the technology sector.

Industrials companies present the largest distribution in terms of the share of funds allocated

% of proceeds allocated



Source: ABN AMRO Group Economics. Note: yellow dot refers to average. Bars refer to individual companies per sectors.

The results presented above add to the idea that investors still need to conduct some monitoring of ESG bonds after issuance. This involves as well, making sure that proceeds are allocated within a timely manner and, if not, that the company is transparent enough to disclose how proceeds have been managed so far and whether there are green / sustainable investment plans for the future. Doing such analysis at issuance is also a possibility. Investors should prioritize companies that have already prior to issuance clear plans on where proceeds will be allocated to, and have even already possibly identified a large enough pool of green assets and / or investments. If issuers disclose and determine their use of proceeds at offering, the overall process of allocation of funds can be speed up. This also gives more comfort to investors that it will not take years for the proceeds of these bonds to start having an environmental and/or social impact. The allocation of proceeds can therefore be an additional tool to avoid greenwashing. Companies that used the issuance of ESG bonds as cheaper financing alternative, whilst not having enough eligible projects or assets, struggle to allocate the proceeds after issuance.

Higher CO2 price keeps lower-carbon technologies profitable

Casper Burgering – Economic Transition Economist | casper.burgering@nl.abnamro.com

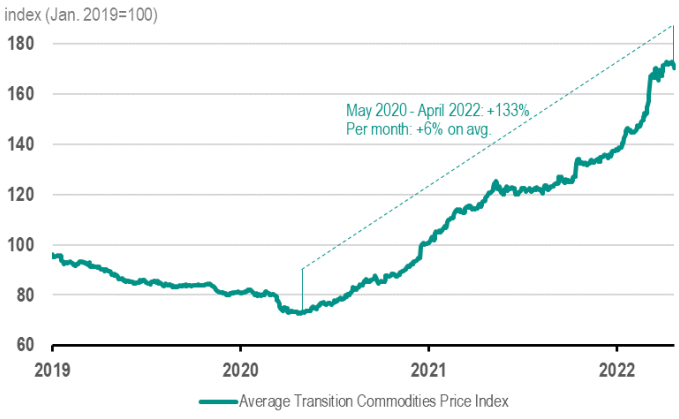
- **The raw material costs for making low-carbon technologies have increased significantly**
- **Since 2021, however, the CO2 price has risen stronger than the price of transition commodities**
- **A higher price for CO2 keeps low-carbon technologies more economically viable and therefore interesting for many companies**
- **Demand growth for low-carbon technologies will continue in the coming decades and will keep prices of many transition commodities relatively high**

It is important not to lose sight of the costs and availability of the materials needed to produce the low-carbon technologies needed for the energy transition. As the manufacturing of these technologies requires a lot of raw materials, mainly metals and minerals. In recent years, the raw material costs for making, for example, solar panels, wind turbines, geothermal installation and energy storage techniques have increased considerably. With the expected continued strong growth in demand for these technologies, the lower availability of the transition commodities and thus their continued high price level, will become an obstacle for a smooth energy transition.

Strong rising prices

The price of many raw materials needed for a smooth energy transition has risen substantially over the past two years. For example, the ABN AMRO price index for a collection of transition commodities has increased by 133% in two years, which is about 6% on average per month. This price index includes the main price trends of the 'green' raw materials (unweighted), such as: corn & sugar (for the production of ethanol), aluminium, copper, nickel, zinc, cobalt, lead, lithium, manganese, gallium, indium , tellurium, steel, steel scrap, chromium, vanadium, molybdenum, graphite, silver and titanium.

Price index transition commodities



Source: Refinitiv, ABN AMRO Group Economics

CO2 price index versus transition commodities

Source: Refinitiv, ABN AMRO Group Economics

A two year old analysis by the World Bank (May 2020) showed that the growth in demand for transition commodities would remain high in the coming decades. The bank predicted that the additional demand for making the low-carbon technologies would eventually lead to more supply problems. In addition, not only are the minerals becoming scarcer and more difficult to extract, the mining industry itself is also confronted with all kinds of stricter sustainability regulations and environmental regulations. It increases the pressure on the supply of metal ores and minerals. And keeps prices elevated.

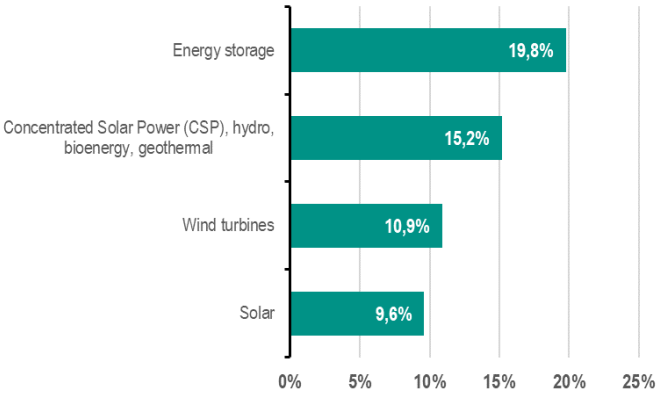
Carbon pricing is a method used by policymakers as a strategic option to reduce greenhouse gas (GHG) emissions. It has now become an essential part of EU climate policy. Higher carbon pricing encourages technological innovation towards lower-carbon options. Provided, however, that the raw material costs for making low-carbon technologies should not increase disproportionately. Until now, it appears that soaring prices for transition commodities have not proved to be a real obstacle to investing in low-carbon technologies. Since 2021, the price of CO2 per tonne of emissions has risen much more strongly. And because of a higher price for CO2, lower-carbon technologies remain economically more profitable, viable and therefore interesting for many companies.

Continued growth of low-carbon technologies

The energy transition will remain a metal-intensive process. Base metals – such as aluminium, copper, nickel and zinc, as well as steel – are widely used and processed in low-carbon technologies, such as solar panels, wind turbines, geothermal systems and energy storage techniques. But the so-called 'minor metals' – such as rare earth metals, lithium, cobalt, vanadium, molybdenum and manganese – also play an essential role in the production process of low-carbon technologies.

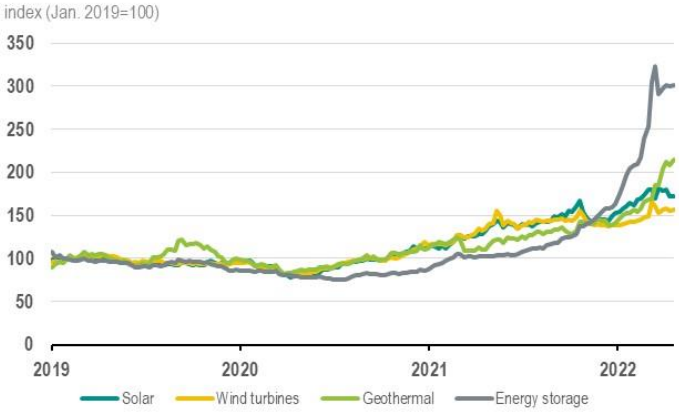
A **recent study by the Catholic University of Leuven** (in collaboration with *Eurometaux*) shows that the energy transition requires a much larger supply of many metals needed to achieve climate neutrality by 2050. This because the growth in demand for low-carbon technologies will continue in the coming decades. The average annual growth in demand for solar panels, wind turbines, geothermal systems and energy storage technologies is between 10 and 20%.

Yearly growth low carbon technologies 2020-2050



Source: KU Leuven, ABN AMRO Group Economics

Commodity price trend (index) low carbon technologies



Source: Refinitiv, ABN AMRO Group Economics

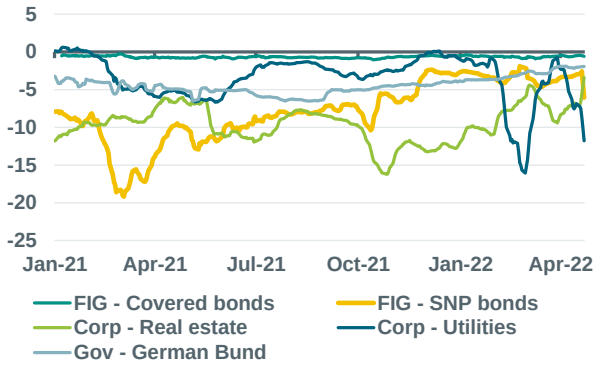
When we combine the required metals per low-carbon technology in a separate commodity price index per technology, it is striking that the price of energy storage in particular has risen much more sharply since the end of 2021. This is mainly due to a very strong increase this year in prices of lithium (+183%), vanadium (+73%) and nickel (+66%). And material costs for geothermal systems have risen sharply more recently due to much higher titanium and nickel prices.

With such high growth rates in demand for low-carbon technologies, it is not surprising that commodity prices for making them will remain relatively high for the time being. Certainly at a time when the availability of metals and minerals is also under pressure. This is a major obstacle for the EU, as the continent is not very self-sufficient in many of these metal markets.

ESG in figures

ABN AMRO Secondary Greenium Indicator

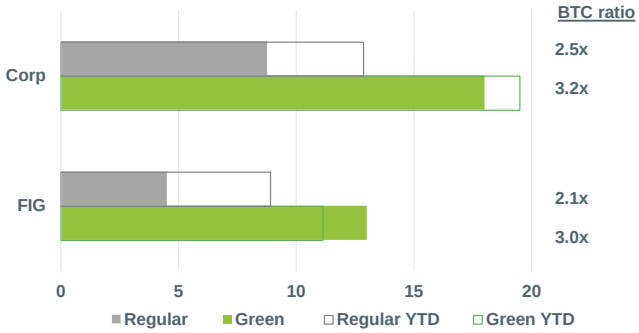
Delta (green I-spread – regular I-spread)



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

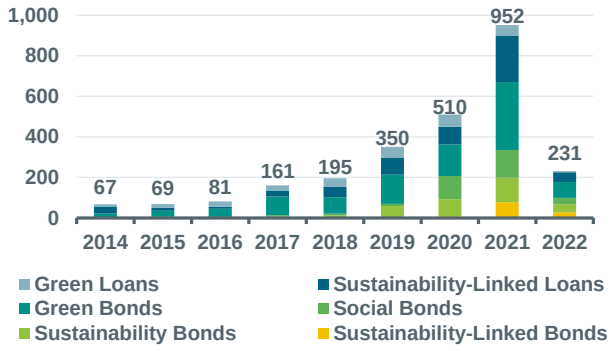
NIP in bps



Note: Data until 28-4-22. BTC = Bid-to-cover orderbook ratio. Source: Bloomberg, ABN AMRO Group Economics.

Sustainable debt market overview

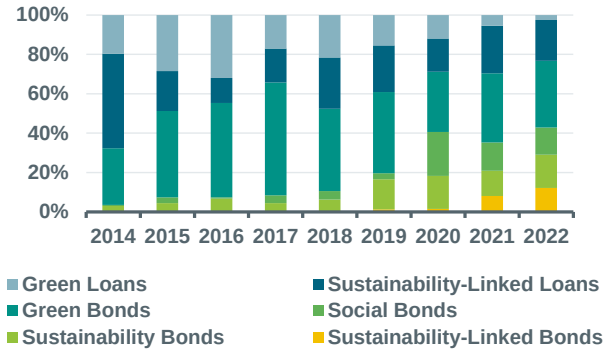
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of sustainable debt by type

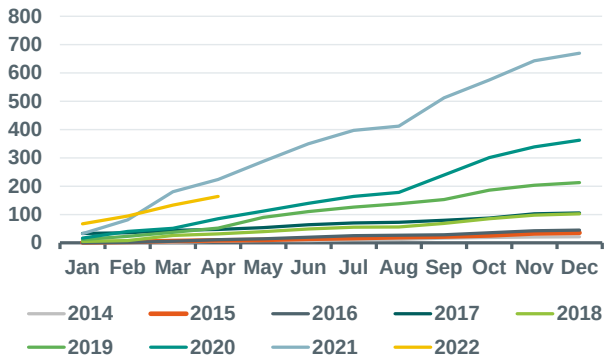
% of total



Source: Bloomberg, ABN AMRO Group Economics

YTD ESG bond issuance

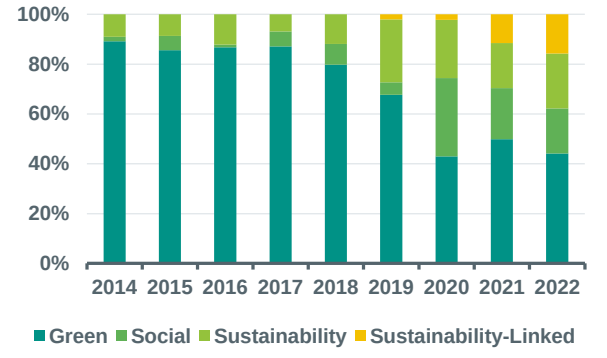
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by type

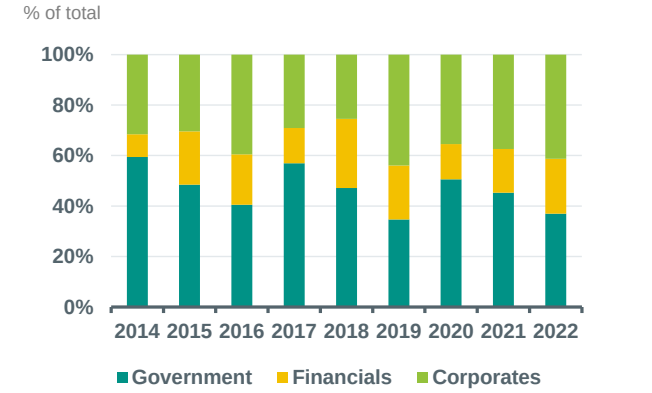
% of total



Source: Bloomberg, ABN AMRO Group Economics

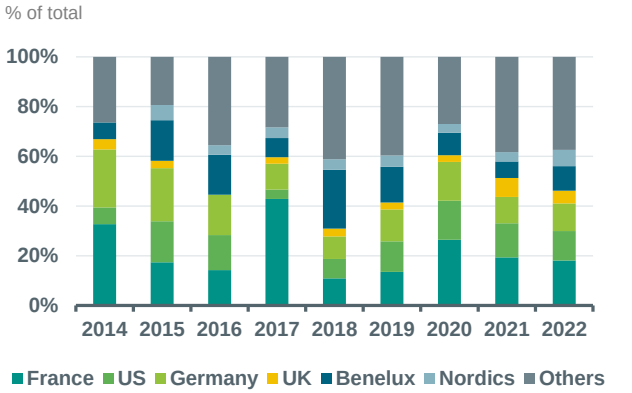
Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Breakdown of ESG bond issuance by sector



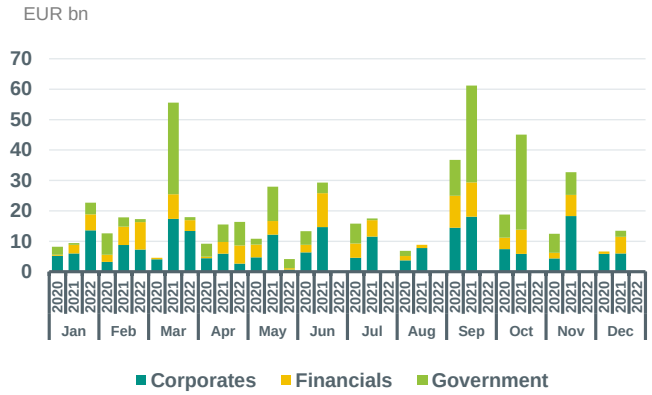
Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by country



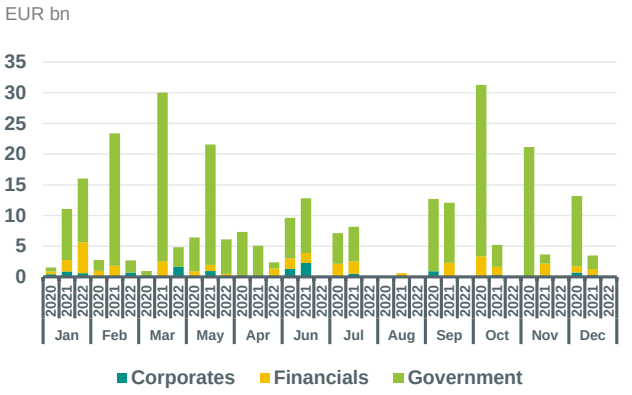
Source: Bloomberg, ABN AMRO Group Economics

Monthly Green Bonds issuance by sector



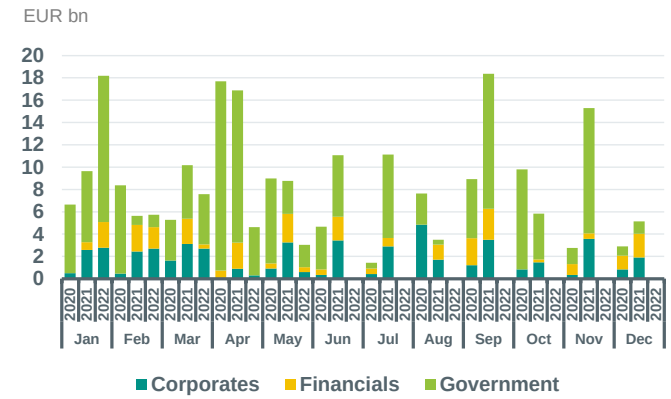
Source: Bloomberg, ABN AMRO Group Economics

Monthly Social Bonds issuance by sector



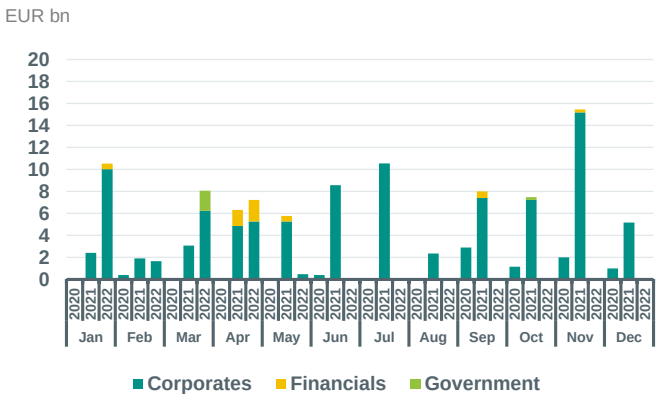
Source: Bloomberg, ABN AMRO Group Economics

Monthly Sustainability Bonds issuance by sector



Source: Bloomberg, ABN AMRO Group Economics

Monthly Sust.-Linked Bonds issuance by sector



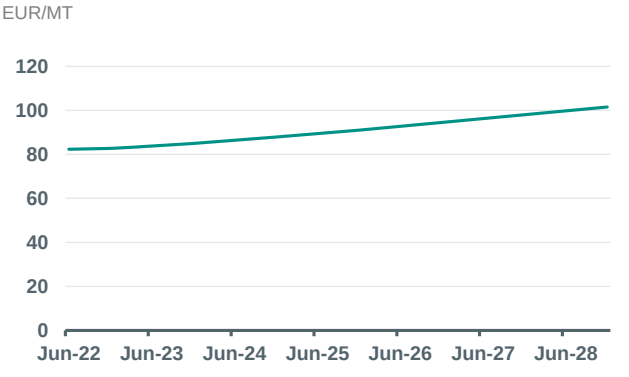
Source: Bloomberg, ABN AMRO Group Economics

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)

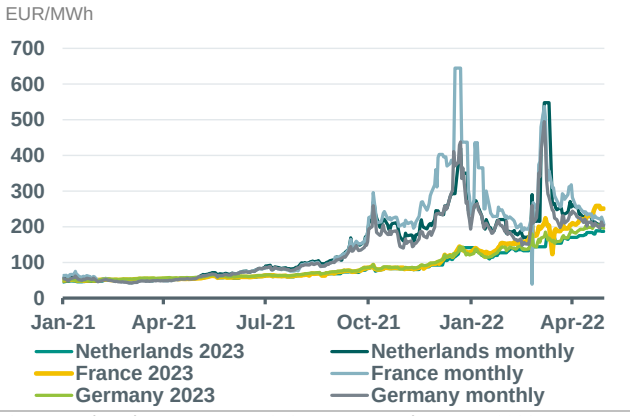
Source: Bloomberg, ABN AMRO Group Economics

Carbon contract future prices (EU Allowance)



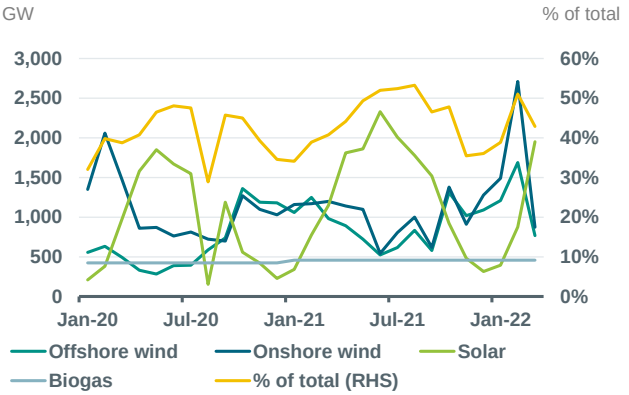
Source: Bloomberg, ABN AMRO Group Economics

Electricity power prices (monthly & cal+1 contracts)



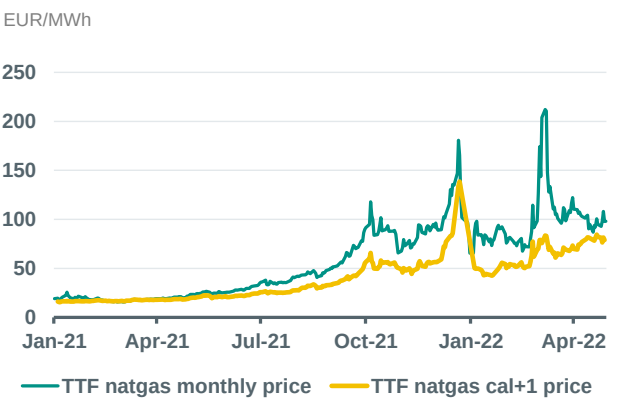
Source: Bloomberg, ABN AMRO Group Economics. Note: 2023 contracts refer to cal+1

Electricity generation from renewable sources (NL)



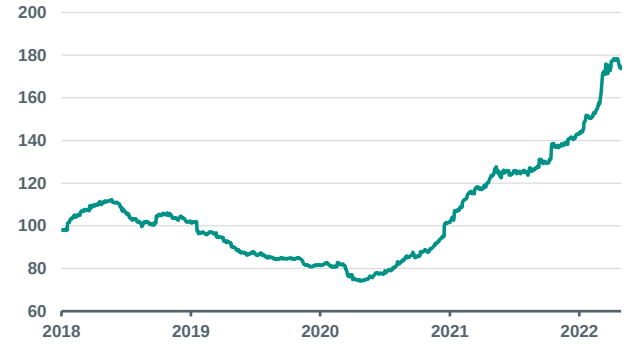
Source: Energieopwek (Klimaat-akkoord), ABN AMRO Group Economics

TTF Natgas prices



Source: Bloomberg, ABN AMRO Group Economics

Transition Commodities Price Index



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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ABN AMRO Bank
Gustav Mahlerlaan 10 (visiting address)
P.O. Box 283
1000 EA Amsterdam
The Netherlands

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