

SustainaWeekly

Are Transition Critical Materials the new oil?

- ▶ **Economist:** Demand for Transition Critical Materials would need to increase sharply to achieve net zero. Lithium and nickel demand would outstrip supply under Net Zero and Delayed Transition scenarios. Though the passthrough to consumer prices will be smaller than an equivalent sized shock to fossil fuel prices. Bottlenecks may cause policy challenges and operational delays, particularly for low carbon tech production.
- ▶ **Strategist:** The EC released a draft delegated act proposing the inclusion of new activities under the Taxonomy. These include for example aviation and shipping. Research shows that a significant share of existing aircraft complies with the proposed EU Taxonomy criteria, which brings into question whether the inclusion of these activities will in fact incentivise financing towards the development of sustainable aircrafts and jet fuel.
- ▶ **Sectors:** The maritime sector is responsible for around 2-3% of greenhouse gas emissions. The sector will likely be included in the EU ETS in 2024. The inclusion of shipping will follow a phased approach in terms of emissions, but also in terms of what ships are included. For the maritime sector, all GHG emissions will be included from 2027 onwards. The EU has put the heat on the maritime sector to bring down emissions at a faster pace.
- ▶ **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 focusing on Transition Critical Materials (TCMs). Strong growth of demand for these materials may create supply-demand bottlenecks as the path to net zero accelerates. We assess the macroeconomic consequences of the evolving demand for these materials and the risks to the economy of potential supply-demand bottlenecks. We go to analyse the EU Commission's inclusion of new activities under the Taxonomy. These include for example aviation and shipping as transitional activities. Finally, we look at the consequences of the possible inclusion of the maritime sector in the EU ETS next year.

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

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Are Transition Critical Materials the new oil?

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- ▶ **Demand for Transition Critical Materials would need to increase sharply to achieve net zero**
- ▶ **Bottlenecks could arise from supply concentration and geopolitical risks**
- ▶ **Lithium and nickel demand would outstrip supply under Net Zero and Delayed Transition scenarios**
- ▶ **The passthrough to consumer prices will be smaller than an equivalent sized shock to fossil fuel prices**
- ▶ **Bottlenecks may cause policy challenges and operational delays, particularly for low carbon tech production**

Introduction

The path to net zero is paved with images of low carbon technologies such as wind turbines, solar panels and battery storage facilities. Embedded in these technologies are a wide variety of materials such as lithium, cobalt, and nickel that are critical inputs in the manufacturing process and many of these are already difficult to source. Strong growth of demand for these materials may create supply-demand bottlenecks as the path to net zero accelerates. In this note we focus on the macroeconomic consequences of evolving demand for these Transition Critical Materials (TCMs) and the risks to the economy of potential supply-demand bottlenecks.

Demand for Transition Critical Materials may increase sevenfold until 2040 in transition scenarios

Starting with demand, we know that demand for key minerals is on the rise, but a reliable long term forecast is tricky. The most important source of that uncertainty is the level of climate ambition and the speed with which that ambition is to be realised, both of which are ex ante unknown. But it is equally important to highlight other known factors that will influence demand, including shifting consumer preferences and technological innovation, especially where the priority of that innovation is to replace difficult-to-source critical minerals. And where technology already exists, for example in the substitutability of aluminium and copper for the grid, demand will additionally depend on the relative price of each metal, which again is hard to forecast with certainty.

[Miller et al \(2023\)](#) look into the emergence of potential TCM bottlenecks in two well-known climate scenarios from the Network for Greening of the Financial Sector (NGFS): the Net Zero orderly and timely transition scenario and the Delayed Transition scenario. The Net Zero orderly scenario is a high ambition scenario in which governments and the private sector acts immediately and with the level of intensity that is sufficient to eliminate emissions by 2050. The ambition levels are similar in the Delayed Scenario except that policy only starts to bite in 2030.

The paper finds that under Net Zero, demand for critical materials doubles from 2025 to 2035, and increases 7 times between 2021 and 2040. Under the 'Delayed Transition' scenario, the absolute annual increases are necessarily substantially larger after 2035. This faster increase in demand over the observed timeframe could have a more disruptive impact on the market. Most "critical" in terms of demand side pressures are found to be cobalt, copper, graphite, lithium, manganese, molybdenum, nickel, rare earth elements, and vanadium.

Bottlenecks could arise from supply concentration and geopolitical risks

Set against that uncertain demand outlook are a number of possible bottlenecks that relate to supply. A stable supply chain would ideally have a diverse geographical spread of material reserves supported by multiple facilities for extraction and processing. This is not the case for a number of critical minerals, including cobalt and rare earth elements where, for example, the Democratic Republic of Congo and China control 70% and 60% of global production respectively and China controls 90% of refining capacity. China also controls 50-70% of lithium and nickel refining capacity (Miller et al, 2023). Worries about geographical and processing concentration are further amplified by very legitimate concerns about human rights/child labour and other ESG issues in the mining and processing of these minerals. For example, some 50% of lithium and copper production is concentrated in areas that are considered water-scarce. That's not all. Other possible hurdles to

supply include emerging protectionist policies such as those embodied in the Inflation Reduction Act and potential tit-for-tat policy responses elsewhere.

Lithium and nickel demand to outstrip supply under Net Zero and Delayed Transition

Abstracting from these concentration risks and geopolitical tensions and according to the paper, under both NGFS scenarios, the production and supply of TCMs would have to significantly increase to meet the demand created by the projected capacity additions for low-carbon technologies. When combining demand pressures with projected supply developments, a picture of where possible demand-supply pressures might arise materialises (in this part the paper focuses on lithium, copper and nickel, for their relevance for the transition and availability of data). The rate of increase of demand as a proportion of supply is taken as an indication of supply-demand mismatches that could have implications for financial and price stability.

Results show that demand for lithium (especially for batteries in electric vehicles and storage generally) starts to outstrip supply in both the Early and the Delayed scenario already in the next few years. With nickel, the point at which projected demand would outstrip projected supply is further into the future but it does happen. Also the projected increase of nickel demand in terms of total nickel supply points in the direction of potential bottlenecks. For copper, global demand is not expected to outstrip global supply but the sharp increase in transition demand in terms of total supply could still cause market disruptions. The rate of increase under the 'Delayed Transition' scenario excluding EVs between 2030 and 2035, with the annual demand increase as a proportion of supply increasing from 4.73% to 35%, may have substantial implications for the price of copper. Furthermore, because copper is one of the most widely used materials across a typical advanced economy, sudden increases in demand will likely translate to higher prices.

Potential supply/demand bottlenecks for lithium, nickel and copper

Net Zero	2025	2030	2035	2040
Lithium	133%	172%	244%	368%
Nickel	35%	56%	81%	90%
Copper	24%	36%	43%	49%

Delayed Transition	2025	2030	2035	2040
Lithium	104%	146%	241%	404%
Nickel	21%	41%	107%	99%
Copper	6%	13%	48%	71%

Source: Miller et al, 2023. Demand as % of total supply under Net Zero and Delayed Transition scenarios

“Net Zero” associated with near-term demand pressures, “Delayed Transition” mostly after 2030

The paper finds that for all three metals the 'Net Zero by 2050' scenario presents near-term demand pressures, whereas the 'Delayed Transition' scenario has less demand pressure prior to 2030, but creates significant pressures because of the abrupt increase in demand after 2030. Under both scenarios, it finds that the increase in the rate of annual demand increases could present substantial challenges for the supply-demand balance.

Comparison with fossil fuels only goes so far

A fundamental macroeconomic lesson from our experience with volatile fossil fuel prices is the heterogenous impact on producing and consuming economies. The most proximate example of that divergent impact was the shock to European gas prices in the last 12 months. In this case, gas exporting economies such as Norway benefited from a favourable terms-of-trade shock and importers such as Germany suffered a negative terms-of-trade shock. Adverse temporary price changes can be cushioned by counter cyclical fiscal policy, as was the case in Europe, but permanent changes, such as the shift in demand for transition critical minerals, require structural changes in the economy, which possibly includes a currency appreciation for the exporting country and depreciation of the importing country.

The transition to net zero will create winners and losers. The net balance for each economy will depend on the endowment mix of each country but, in general, fossil fuel exporters and importers of critical materials will suffer a negative terms of trade shock and fossil fuel importers and critical mineral exporters will enjoy a favourable terms of trade shock (see [Holland et al \(2021\)](#) for more details).

That said, there are important differences in the fossil fuel market and transition critical materials. To start with, the consumption of fossil fuels is continuous throughout use of the equipment, so for example, for heating or cooling homes or for transportation. The demand for critical minerals, by contrast, is restricted as an input into key infrastructure such as solar panels, the electricity grid, wind turbines or an electric vehicle. The difference is important for the manner in which price shocks permeate through into the economy. In the case of fossil fuels, such as gas or oil, the passthrough into the import and export price deflator is quick and close to 100% with further consumer prices knock-on effects, which also tend to be fairly quick. Shocks to the price of critical materials will also pass through into the trade prices but the knock on effects are largely restricted to the price of capital equipment. The passthrough to consumer prices will be significantly smaller than an equivalent sized shock to fossil fuel prices.

The results for the two NGFS scenarios reported in Miller et al (2023) are broadly in line with our priors. To start with, and as might be expected, inflationary pressures emerge over a shorter time horizon under the 'Net Zero by 2050' scenario, while the 'Delayed Transition' scenario would likely bring greater inflationary impacts over the longer term. Also, consistent with our priors, the paper points to relatively small inflation effects. For example, for the Euro Area, Landau & Skudelny (2009) estimate that a 10% increase in industrial raw material prices could lead to a rise in Euro Area core inflation by 0.15% over a 3-year horizon. Besides the effect on price trends, there is also the issue of increased short-term volatility in prices of TCMs. Excess volatility can create uncertainty.

Bottlenecks may cause policy challenges and operational delays, particularly for low carbon tech production

The scarcity of TCMs could also hamper the realisation of the transition, if scarcity of TCMs delays production of low carbon technology. This may delay the decarbonisation of the global economy and raise the potential for transition risks that jeopardise the realisation of a Paris-aligned transition. Transmission of the bottlenecks on a micro level would be through operational disruptions and increased inputs costs, especially for low carbon tech production.

It is worth emphasising that the transmission channel into inflation of these supply-demand imbalances are different from those that emerge from a more conventional supply shock such as from oil or gas prices. An oil price shock for an importing country typically has an immediate impact on inflation. By contrast, the volatility and scarcity of critical materials could, as discussed above, have a negative impact on the productive capacity of the economy, and therefore a more persistent form of inflation.

How a country fares in this is dependent on a) the presence in this country of main TCMs in abundance b) the country's ability to move up the value chain in the production of TCMs (ie from mining to refining, from refining to manufacturing). TCM bottlenecks could impact the balance of payments of both exporting and importing countries.

EU Taxonomy for aviation and shipping: expanding the umbrella of transitional activities

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- ▶ **The EU Commission has released a draft delegated act proposing the inclusion of new activities under the Taxonomy Climate Delegated Act**
- ▶ **These include for example aviation and shipping, with the addition not being positively received by the market**
- ▶ **Research shows that a significant share of aircrafts complies with the proposed EU Taxonomy criteria, which brings into question whether the inclusion of these activities will in fact incentivise financing towards the development of sustainable aircrafts and jet fuel**
- ▶ **Furthermore, the Commission has also published a first draft on the EU Taxonomy for the remaining four environmental objectives**

On the 5th of April, the EU Commission released a draft delegated act on the EU Taxonomy for the remaining four environmental objectives. At the same time, the Commission has also published a draft proposing amendments to the EU Taxonomy for climate change mitigation and adaptation. The draft is open for feedback for a four-week period, where market participants can provide input. Below we have highlighted a few of the important take-aways from the drafts:

Amendments to the Taxonomy regulation

In 2020, the EU Taxonomy for two out of the six EU environmental objectives was published. This was commonly referred to as the Taxonomy Climate Delegated Act. Later on, in 2021, the Commission approved a Complementary Climate Delegated Act, which includes criteria for nuclear and gas energy, commonly known as “transitional” or “amber” activities. Now, the recently published draft refers to proposing amendments to the Taxonomy Climate Delegated Act. This includes the addition of new activities, and also the amendment of existing activities, the latter with the goal “to improve the usability, coherence and implementation of that Delegated Act”.

With regards to *new activities*, the proposal is to extend the EU Taxonomy for green activities such as: manufacturing of key components for low carbon transport (climate change mitigation) and flood risk prevention and protection infrastructure (climate change adaptation). But more than that, the draft also proposes to include new transitional activities (which until now were focused exclusively on nuclear and gas), such as aviation. The inclusion of these activities would, according to the Commission, “represent an effective way to help incentivise improvements beyond the status quo”. As it was with nuclear and gas, the Taxonomy regulation allows for inclusion of transitional activities if these refer to “an economic activity for which there is no technologically and economically feasible low-carbon alternative” and which “supports the transition to a climate-neutral economy consistent with a pathway to limit the temperature increase to 1.5 degrees above preindustrial levels”. That being said, the Commission’s inclusion of aviation was based on the fact that aviation plays a crucial role within the transport system – hence, there is a strong need to reduce emissions, but zero-emission air transport or sustainable aviation fuels is not yet technologically available. The definition of what a “green” (or better put – an “amber”) aircraft would be is then based on the best available technologies for airframe and engine fuel efficiency, and on the potential to reduce substantially GHG emissions through the progressive uptake of sustainable aviation fuels.

With regards to amendments of *existing activities*, these include as well waterborne activities (shipping). Technical screening criteria for shipping activities is already included in the existing Climate Delegated Act, but with a threshold until 2025. Under the existing regulation, after 1 January 2026, only vessels that have a zero direct (tailpipe) CO₂ emissions would be considered “green” as per the EU Taxonomy. The draft proposes therefore an amendment to that, where ships which comply with certain GHG gas intensity thresholds (which gradually decline over the years) would also be compliant. This is solely however if it is not technologically and economically feasible to comply with the criteria of zero emissions (that is – the newly proposed criteria would only be valid until there is technology available which allows ships to run with zero emissions).

When it comes to transitional activities, it is set in current regulation that the technical screening criteria needs to be reviewed every three years in order to ensure that transitional activities remain on a credible pathway consistent with a climate-neutral economy.

A quick look at the feedback provided so far shows that market participants seem to not be very welcoming to the inclusion of both aviation and (transitional) shipping in the EU Taxonomy. With regards to aviation, according to Transport & Environment, an umbrella organisation of NGOs, said that, under the current draft proposal, “over 90% of Airbus’ future aircraft orders [could be considered green], despite them still running exclusively on fossil kerosene in the next decade”. Estimates are also that around a third of Air France and Lufthansa’s existing fleet complies with the proposed criteria (see [here](#)).

As it was with gas and nuclear, the goal of the Commission seems to be to use the EU Taxonomy to also finance transitional activities. Nuclear and gas are both extremely important to accelerate the reduction of greenhouse gas emissions, so financing towards those activities is also necessary in order to reach climate neutrality. However, as we pointed out when the Complementary Delegated Act was published (see [here](#)), in the case of gas, the criteria was so strict that we estimated that no natural gas power plant in Europe would comply with the proposed EU Taxonomy thresholds. The difference now is that it seems that the criteria for aviation, for example, is too loose, allowing for a significant share of (existing and future) aircraft to already be an eligible “green” activity. The technical screening criteria for transition activities should incentivise the replacement of less efficient (and sustainable) aircraft, while at the same time, accelerate the development of environmentally efficient aircraft. If a significant share of aircrafts fulfils the criteria, perhaps a stricter criteria would have been appropriate. The criteria is nevertheless based on previous recommendations from the Platform on Sustainable Finance (see [here](#)).

The EU Taxonomy for the remaining four environmental objectives

As previously noted, on the same day, the Commission also published a draft delegated act on the EU Taxonomy for the remaining four environmental objectives, now commonly known as the “Taxonomy Environmental Delegated Act”. These four environmental objectives are: sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems. The draft is based on recommendations of the Platform on Sustainable Finance, which were published and open for feedback in 2021.

With this proposal, the Commission provides not only criteria for “green” activities that were not previously covered by the Climate Delegated Act (such as manufacture of pharmaceutical products and hotels, holiday, camping and similar accommodation), but also a new layer for assessing activities that were already covered by the Climate Delegated Act. For example, construction of new buildings and renovation of existing buildings is also included under transition to a circular economy, but now regarding the use of materials used in the construction and maintenance of buildings, which should come from re-used or recycled (secondary raw) materials, and are in turn prepared for re-use or recycling when the built assets are demolished.

Particularly with regards to transition to a circular economy, the technical screening criteria sets design requirements for products’ longevity, reparability, and reuse, as well as requirements on the use of materials, substances and processes that allow for quality recycling of the product. It therefore introduces a whole new set of thresholds and metrics, while the Climate Delegated Act is (naturally) focused on CO2 emissions.

Furthermore, interestingly, the proposal also highlights that the financing of activities that comply with the criteria of substantially contributing to a circular economy could “limit the dependency of the Union’s economy on materials imported from third countries, which is particularly important in respect of critical raw materials”. It therefore urges that there should be a focus first on “activities and sectors that have the greatest potential to achieve those aims”. One could argue that this highlights that the EU Taxonomy also has a (geo)political agenda, behind only exclusively targeting the decarbonization of the EU.

The draft also touches upon some rather specific activities, such as digital solutions, including the use of digital product passports, which can provide real-time data about an item's location, condition, and availability. These should improve the transparency and efficiency of environmental monitoring and enforcement, and in turn, enable the move to circular business models.

The Taxonomy Environmental Delegated Act completes therefore the set of EU Taxonomy with regards to the environmental activities, opening up room for the Commission to focus in the future on for example, social activities. Still, important to note that not all activities are yet covered in the proposed draft. As the Commission highlights, for now, the analysis "prioritises those economic activities and sectors that were identified as having the biggest potential to make a substantial contribution to one or more of the four environmental objectives and for which it was possible to develop or refine the recommended criteria without further delay". That being said, activities such as agriculture, forestry and fishing are not yet included and should be also developed in the upcoming future.

As companies and undertaking in general are required to report on the alignment of their activities towards the remaining four environmental objectives from 2024 onwards, the delegated acts will likely be finished this year and start application as of 1 January 2024.

What will ETS inclusion mean for shipping?

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- ▶ **To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050**
- ▶ **The maritime sector is responsible for around 2-3% of greenhouse gas emissions**
- ▶ **The sector will likely be included in the EU ETS in 2024**
- ▶ **The inclusion of shipping will follow a phased approach in terms of emissions, but also in terms of what ships are included. For the maritime sector all GHG emissions are included from 2027 onwards**
- ▶ **The EU has put the heat on the maritime sector to bring down emissions at a faster pace**

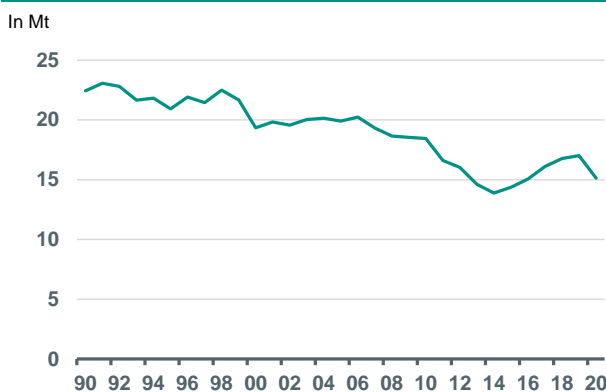
Introduction

To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050. All transport modes, including maritime transport, would have to contribute to the reduction efforts for that scenario to take shape. Maritime shipping carries close to 80% of global trade and accounts for 2-3% of global greenhouse gas (GHG) emissions annually. Achieving significant reductions in emissions of international maritime transport requires using both less energy (increasing energy efficiency) and cleaner types of energy (using renewable and low-carbon fuels). Next year shipping will likely be added to the EU's Emission Trading System. In this report we focus on this and the consequences for the shipping industry.

Recent trends in emissions

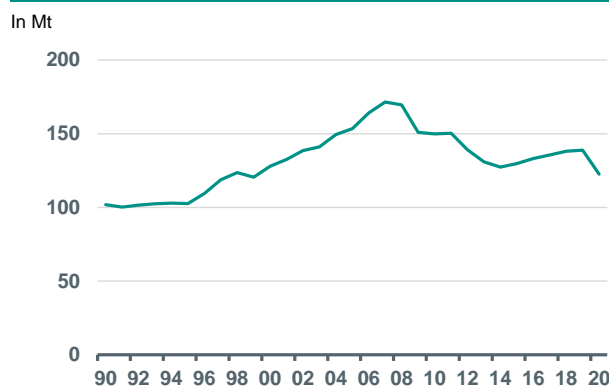
Since 1990, we have seen contrasting trends in emissions between domestic navigation and international navigation. Between 1990 and 2020, domestic navigation declined on average by 1.2% per annum while international navigation increased by 0.7% on average. In 2020 greenhouse gas emissions of international shipping were 20% higher compared to 1990, while domestic navigation declined by 32%, which is in line with whole-economy emission trends for the EU as a whole. As percentage of total EU 27, the share of emissions of domestic navigation remained broadly unchanged (at around 0.5%), while international navigation almost doubled to 3.7% (Eurostat). So domestic navigation reduced emissions in line with EU 27, but international navigation is clearly not moving in the right direction. The EU has put in place a number of policy measures that attempt to accelerate the transition of maritime shipping.

GHG emissions domestic navigation



Source: Eurostat, ABN AMRO Group Economics

GHG emissions international navigation



Source: Eurostat, ABN AMRO Group Economics

Europe's Fit for 55 package

On 14 July 2021 the European Commission adopted the 'fit for 55' package'. It adapted the existing EU climate and energy legislation to the new EU objective of a minimum 55% reduction in greenhouse gas emissions by 2030, compared to 1990 levels. There are several proposals to address maritime transport's climate impact, including

- Extending the EU Emission Trading System (ETS) to maritime transport
- Boosting demand for renewable and low-carbon fuels
- Boosting alternative fuel infrastructures
- Accelerating the supply of renewables in the EU
- Revising the existing Energy Taxation Directive

Emission Trading System including shipping

The Emissions trading system is a cap-and-trade system. First a cap is set on the total number of emissions. The cap is determined by a country's set targets. The emissions cap is gradually lowered, reducing the total number of emissions. The annual reduction factor 2013-2020 was 2.2%. The old ETS system that has been in place since 2005 has been revised in line with more ambitious targets and adding new sectors to the ETS scheme.

Phase 4 ETS 2021-2030

PHASE 4: 2021-2030

In place:

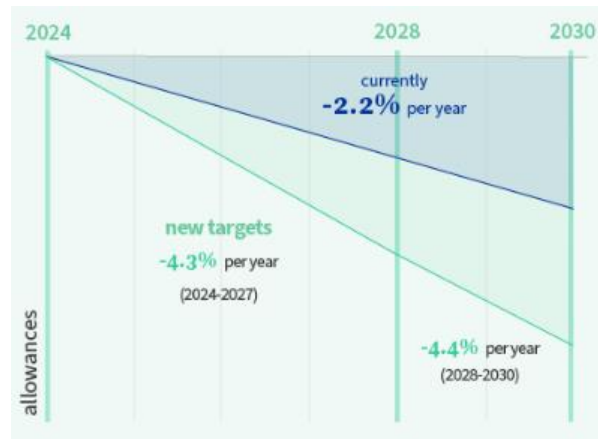
- Geography: the United Kingdom left the EU ETS
- Cap: annual reduction factor increased from 1.74% to 2.2%
- Doubling of the intake for the MSR (from 12% to 24%) until 2023
- Starting in 2023, allowances held in the MSR are limited, excess volumes become invalid

Proposed under the "Fit for 55" package:

- Cap: reduction factor raised from 2.2% to 4.2%
- Allowances: maintaining conditionality for free allowances based on decarbonisation efforts; gradual reduction in free allowances
- Sectors: inclusion of maritime transport in the EU ETS
- Introduction of a separate emissions trading system for building and transport emissions
- Intake of the MSR maintained at 24%

Source: EC

Proposed a faster reduction of the cap



Source: EC

On 17 December 2022, co-legislators reached a provisional agreement to strengthen the EU ETS and apply emissions trading to new sectors. This agreement requires formal adoption by the European Parliament and the Council. The proposal for the new scheme is to reduce emissions from the ETS sectors by 62% by 2030, compared to 2005 levels (see graph on the left above) and to include the maritime sector. To reach this target, there is a one-off reduction of the overall emissions cap by 117 million allowances (re-basing) over two years: 90 million will be removed in 2024 and 27 million in 2026. The annual emissions reduction percentage will also be steeper: -4.3% in 2024-2027 and -4.4% 2028-2030 (see graph on the right above) (source: [EC](#)). The total amount of allowances communicated in May 2022 was 1,449,214,182 (source [EC](#)). Every allowance corresponds to 1 ton of CO₂ emissions. Auction volumes from September 2022 to August 2023 will be reduced by 347,811,404 allowances, which will be placed in the Market Stability Reserve (MSR). The Market Stability Reserve aims to provide stability to the EU Emissions Trading System. On 31 December 2021, there were 2,632,682,062 allowances in the Market Stability Reserve, which includes unused allowances from the new entrants reserve for the period 2013-2020, and allowances not allocated to installations due to reduced activity. The next time the total number of allowances in circulation will be published is by 15 May 2023.

What does this mean for the shipping sector?

If the agreement is formally adopted as of 2024, the EU ETS will include the emissions from the maritime sector. So the maritime transport emissions are capped as part of the overall ETS cap. The introduction of shipping into the EU ETS means that an additional approximately 80 to 100 million emission allowances will be put on the market. Of these, auction revenues from 20 million emission allowances will go to the Innovation Fund to be used for shipping specific projects. The remaining revenues will go to the EU member states and will not be earmarked for specific purposes beyond climate and energy-related activities.

The ETS will apply for ships over 5,000 gross tonnage. Offshore ships above 5,000 gross tonnage will be included from 2027 on. General cargo and offshore ships between 400 – 5,000 gross tonnage will be evaluated in 2026. From 2024 to 2026, only CO₂ emissions are in scope for the maritime sector. From 2026, all greenhouse gases (such as CO₂, Methane and Nitrous Oxide) are in scope and will need to be translated to their CO₂ equivalent and surrendered accordingly, e.g. 1 metric tonne Methane = 24 metric tonne CO₂ equivalent.

Shipping companies will pay for the emissions they have reported on the previous year. Some countries with a large presence of the shipping sector will receive additional allowances to support the decarbonisation of maritime activities and for the administrative costs. They could receive 3.5% of the ceiling of the auctioned allowances to be distributed among them. of the additional quantity of allowances. 50% of the quantity of allowances shall be distributed among the relevant Member States based on the share of shipping companies under their responsibility and the remainder distributed in equal shares between them.

To ensure a smooth transition, co-legislators agreed on a phase-in approach. This means that in 2025, ship owners will pay for 40% of the emissions reported in 2024; in 2026, they will pay for 70% of their 2025 emissions, and from 2027 onwards, they will pay for 100% of their reported emissions. All emissions from intra-EU voyages and within EU ports will be covered by the ETS, and half of the emissions for journeys to or from a non-EU country.

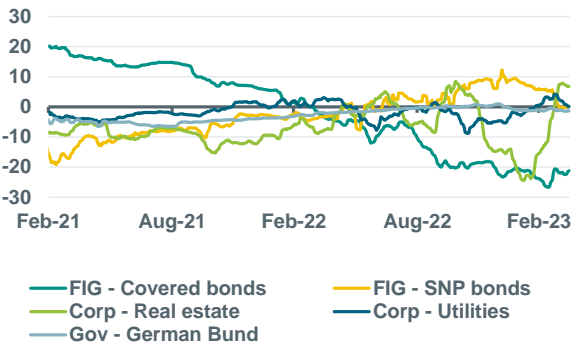
Conclusion

The maritime sector will most likely fall under the EU ETS scheme from 2024 on. The adding of the maritime sector to the EU ETS comes at a time that domestic navigation moved in line with total EU 27 GHG emissions, but the emission trajectory of international navigation was not moving in the right direction. The sector is now forced via the ETS to reduce emissions in domestic navigation at a faster pace and change upward emissions' trajectory into a downward trajectory for international navigation. The inclusion of shipping in the ETS will result in the adding of approximately 80-100 million allowances to the ETS scheme. But the rebasing of the scheme (because of stricter targets) will result in 117 million fewer allowances spread over two years (2024 and 2026) and higher annual reduction percentages in 2024 and 2028. The inclusion of shipping will follow a phased approach in terms of emissions, but also in terms of what ships are included in the EU ETS. Moreover, for the maritime sector all greenhouse gas emissions are included from 2027 on. The EU has put the heat is on the maritime sector. On 3-7 July the International Maritime Organization (IMO) will come with revised targets to bring down greenhouse gas emission at a faster pace in the maritime sector. We will cover this strategy revision in our SustainaWeekly.

ESG in figures

ABN AMRO Secondary Greenium Indicator

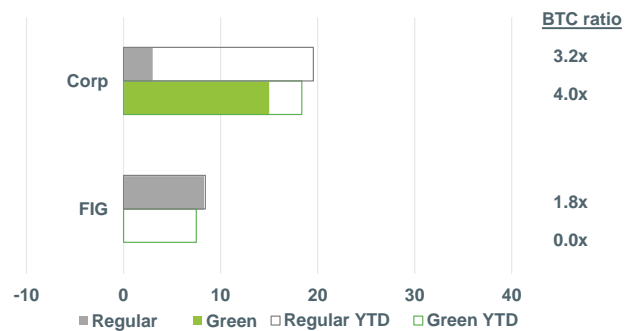
Delta (green I-spread – regular I-spread)



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

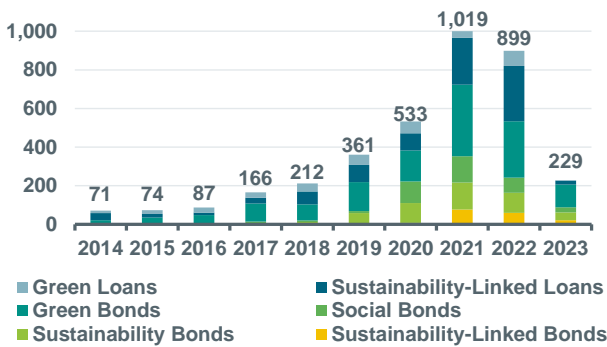
NIP in bps



Note: Data until 14-04-23. BTC = Bid-to-cover orderbook ratio. Source: Bloomberg, ABN AMRO Group Economics

Sustainable debt market overview

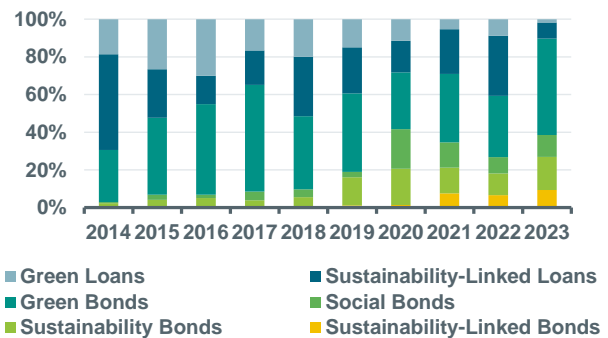
EUR bn



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of sustainable debt by type

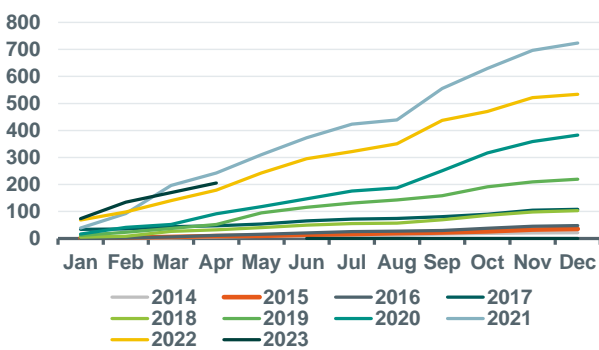
% of total



Source: Bloomberg, ABN AMRO Group Economics

YTD ESG bond issuance

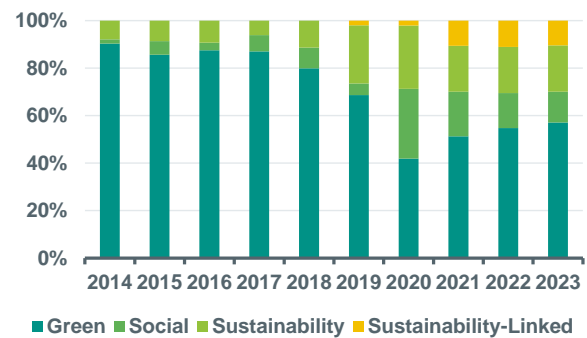
EUR bn (cumulative)



Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by type

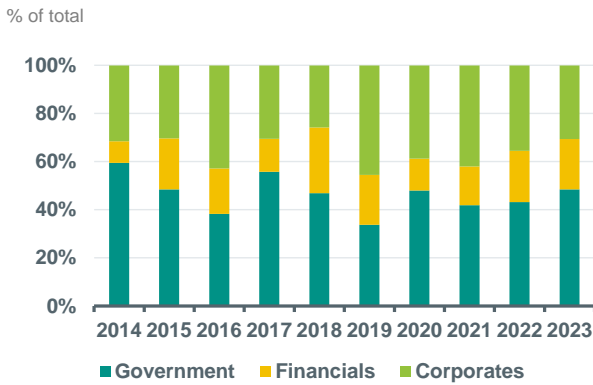
% of total



Source: Bloomberg, ABN AMRO Group Economics

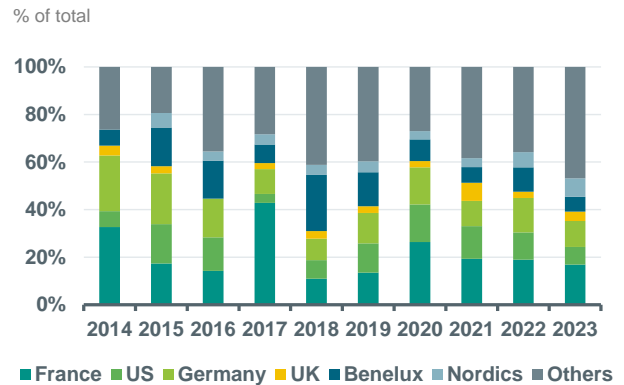
Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Breakdown of ESG bond issuance by sector



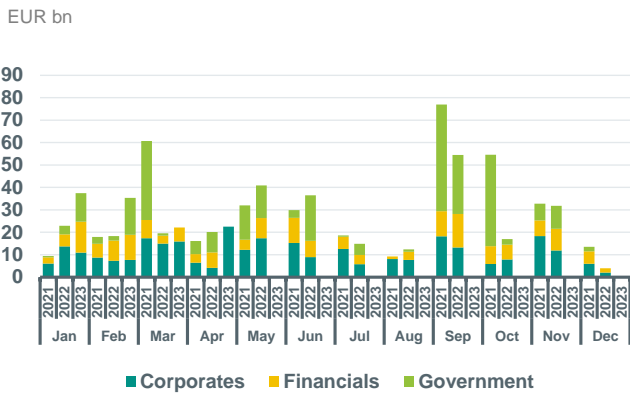
Source: Bloomberg, ABN AMRO Group Economics

Breakdown of ESG bond issuance by country



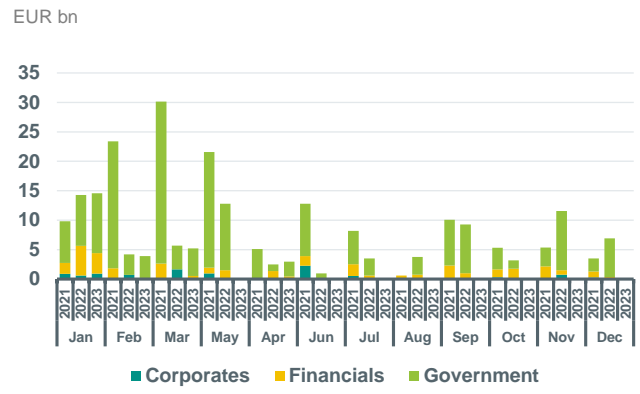
Source: Bloomberg, ABN AMRO Group Economics

Monthly Green Bonds issuance by sector



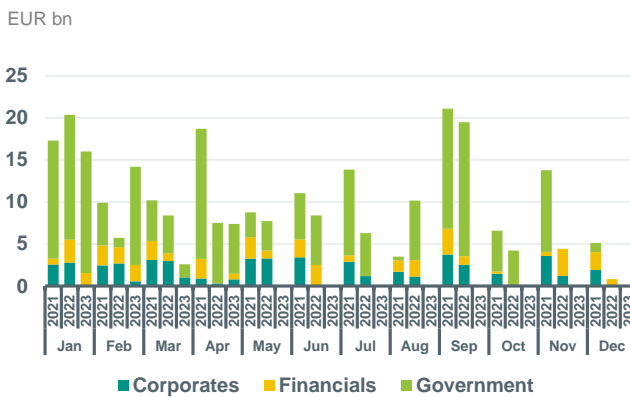
Source: Bloomberg, ABN AMRO Group Economics

Monthly Social Bonds issuance by sector



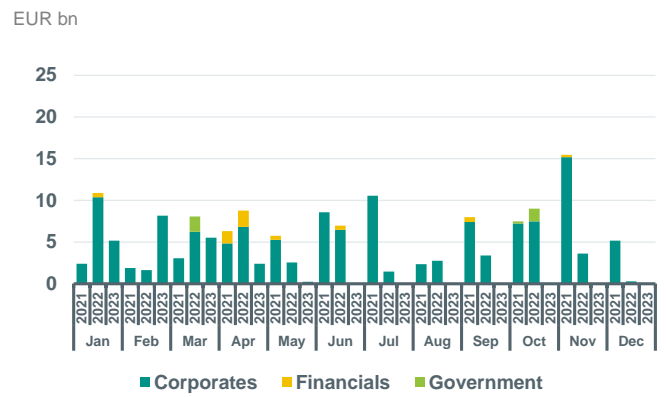
Source: Bloomberg, ABN AMRO Group Economics

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

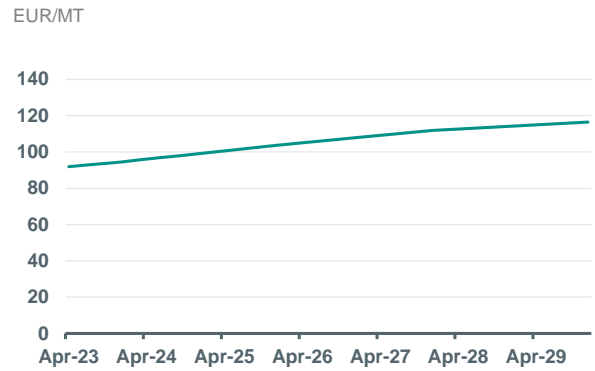
Figures hereby presented take into account only issuances larger than EUR 250m and in the following currencies: EUR, USD and GBP.

Carbon contract current prices (EU Allowance)



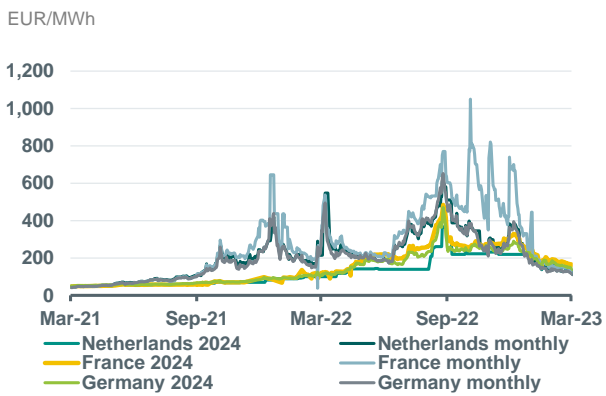
Source: Bloomberg, ABN AMRO Group Economics

Carbon contract futures curve (EU Allowance)



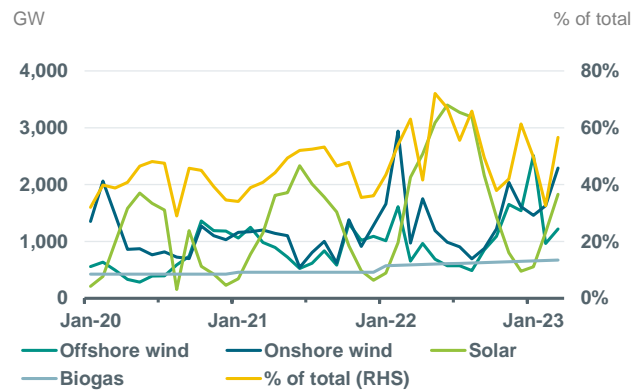
Source: Bloomberg, ABN AMRO Group Economics

Electricity power prices (monthly & cal+1 contracts)



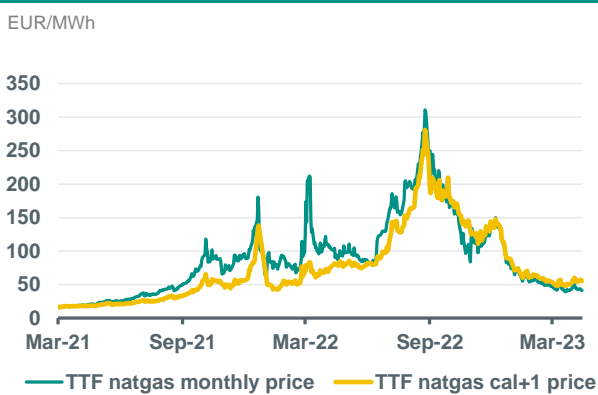
Source: Bloomberg, ABN AMRO Group Economics. Note: 2024 contracts refer to cal+1

Electricity generation from renewable sources (NL)



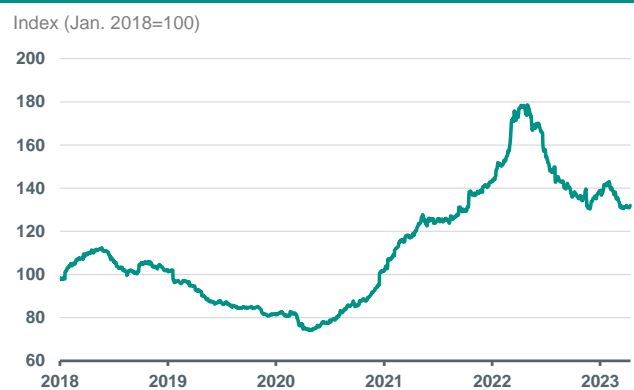
Source: Energieopwek (Klimaat-akkoord), ABN AMRO Group Economics

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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