The Green Bond

Your insight into sustainable finance

03 February 2022

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Transition update

We have lift-off

The cost advantage of renewable energy over fossil alternatives continues to widen, and incoming data is starting to confirm a surge in energy investment which will also accelerate the transition for energy using sectors. 2022 is likely to be the first year where total transition investment exceeds USD 1tn, doubling in just four years. However, if we are to maintain hopes of completing the decarbonization by 2050, it will have to double again both in the first and the second half of the 2020s.

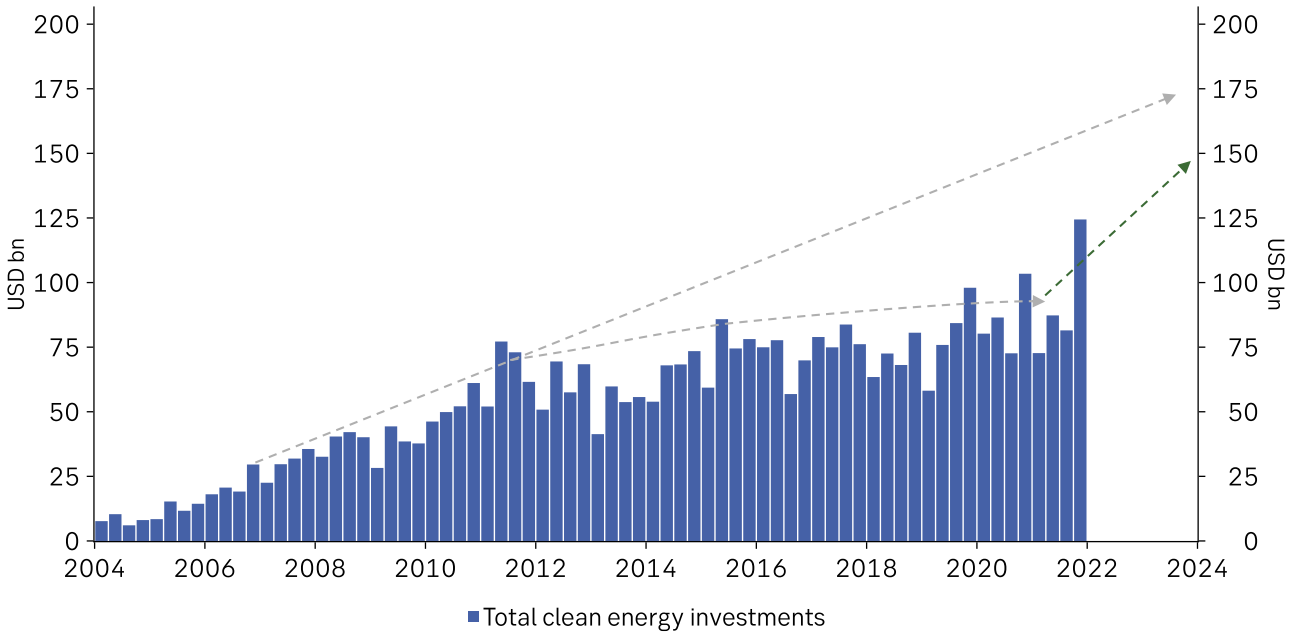
In the December issue of The Green Bond, we suggested that '2022 could be the year when the world finally breaks with a decade of stagnation in renewable energy investment and starts moving back to a more Paris-aligned transition path'.

This reason was that the long-term climate argument for investing got some potent short-term support from a huge cost advantage for renewables and a rising risk of energy supply shortages. The data has since started to confirm this hope, while the cost advantage has increased further.

According to Bloomberg New Energy Finance (BNEF), global clean energy investment jumped more than 50% to USD 125bn in Q4 2021, the highest quarterly spending on record. This took full-year investment to USD 350bn, also a new record, despite weakness in the first three quarters of the year.

The sudden surge may partly reflect pent-up demand from projects that were delayed during the Delta-wave of the pandemic last summer, but Q4 hardly constituted a major turn for the better in pandemic terms.

Figure 1 Global clean energy investments



Source: Bloomberg New Energy Finance

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In our view, the bulk of the increase reflects a front-loading of long-term investment plans to increase short-term energy supply, not least in China, and a sudden increase in the return on investment in new energy supplies. And while there may be some retracement in Q1, we therefore still expect another increase of more than 25% in 2022.

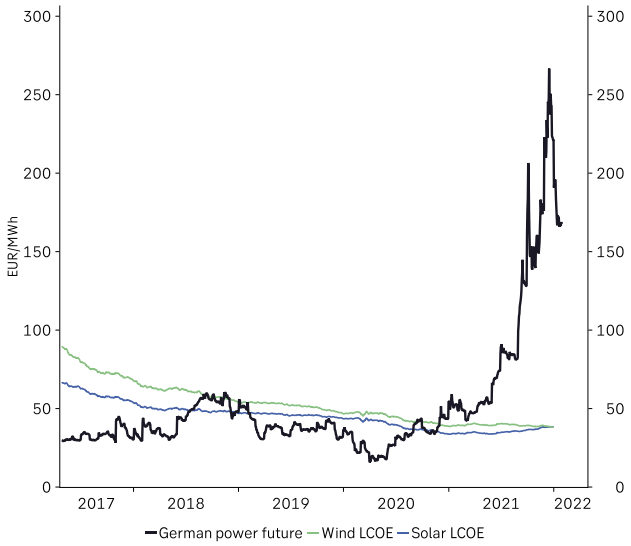
This is not enough to lift us on to a Paris-aligned pathway, but it is the first significant step in the right direction in almost a decade. Increasing the supply of cheap, zero-emission electricity is also crucial to the acceleration of the transition in energy-using sectors, where access to sufficient supplies of clean energy is now a bigger impediment to scaling than the cost.

Cost advantage drives investment

The main reason for the timing of this surge in investment is the energy crisis that swept the world in the last part of 2021. Like the other supply shocks in the wake of the pandemic, this was the result of a confluence of smaller shocks. OPEC+ had curtailed production of oil and gas during the pandemic and kept supplies low to support prices as the reopening increased demand.

At the same time, wind and hydropower supplies were lower than usual due to weather variations, and Europe had already reduced supplies of both nuclear power and natural gas for political reasons. To top it off, Russian supplies of gas to Europe started falling for reasons that remain unclear but appear to have been political.

Figure 2 Renewable power prices



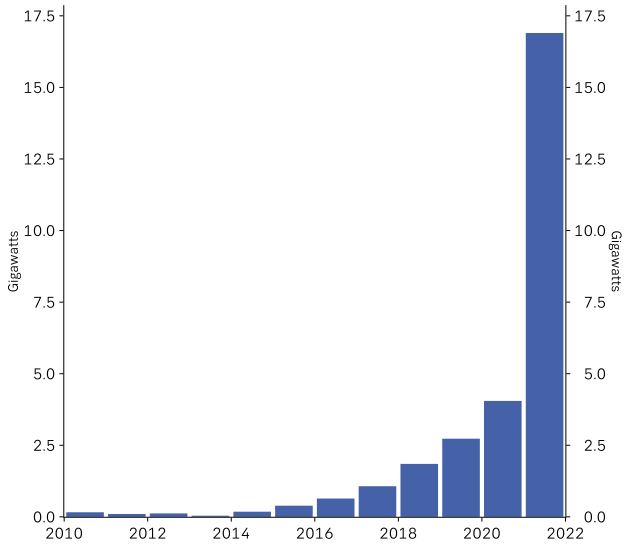
Source: Bloomberg New Energy Finance, Bloomberg

The result was a sudden shortfall in the supply of energy. By Q4, the risk of shortages had resulted in a spike in energy prices in Europe's market-based system, while China was forced to resort to rolling blackouts for corporate energy users to protect households from the impact. Since then, the crisis has eased in China due to powerful political intervention, but it has deteriorated in Europe due to rising political tensions.

The advantage of Europe's market-based system is that renewable energy now is extremely profitable both compared to fossil alternatives and in absolute terms.

Figure 2 compares the European market price for electric power with the BNEF estimate of the levelized cost (LCOE) of renewable energy, which means the total breakeven cost including the cost of the initial investment. Right now, you can produce renewable energy at a cost of around EUR 40/MWh. Following the explosion in European power prices, you can sell it at a price of EUR160bn, and even four to five years out you can lock in a price in the new normal range of EUR 80-100/MWh. The large cost advantage is likely to spur private sector investment in renewable energy to complement the public investment drive, with solar energy well suited for decentralized supply.

Figure 3 China annual offshore wind installations



Source: Bloomberg New Energy Finance, Nuclear Energy Agency

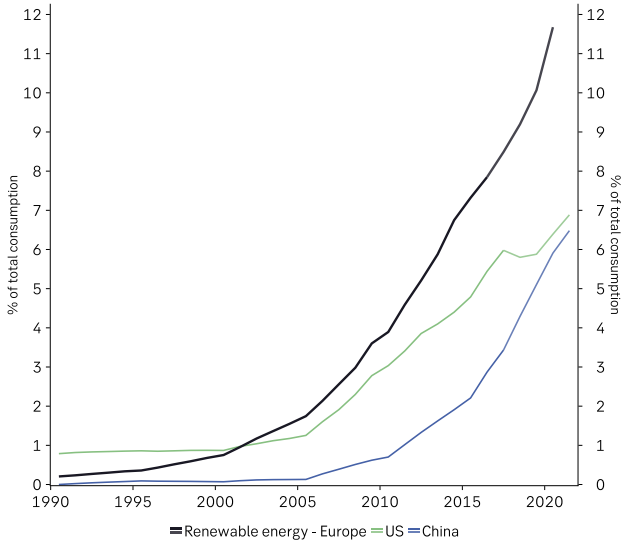
In China, the outcome was not left to market forces. The immediate shortage of energy was resolved by a significant increase in coal production and coal imports, which helped push power prices back down over the course of Q4. This was not aligned with the long-term plan to decarbonize China's economy, but it was the only available option within the timeframe required. However, China also took other significant steps to secure long-term supplies of zero-emission energy. As an example, see

Figure 3, China's offshore wind installations quadrupled in 2021, marking a complete trend break in China's ambitions in this area.

China's pragmatic approach is also reflected in its decision to order 150 nuclear power plants to form the stable backbone of a new zero-emission power system. The experience from 2021 has shown that renewable energy supply is too unpredictable to support the energy system unless it is supplemented with either a more stable alternative for off-times or significantly improved storage technology, and China appears to have singled out nuclear power to supply part of that stable backbone.

From this perspective, the EU's introspection over whether to put one label or another on gas and nuclear power for use in this role is of limited practical significance. When it comes to transition, the only real issue is how to make it happen the fastest. China will scale nuclear power and may singlehandedly revive the learning curve that was cut short in the 1980s. Based on current technologies, this is likely to offer a faster and less disruptive way to transition from one energy system to another, and if that is the case then the fast and massive investment will give China an economic advantage. Other regions will have to emulate China or come up with their own fast strategy.

Figure 4 Renewable share of total energy



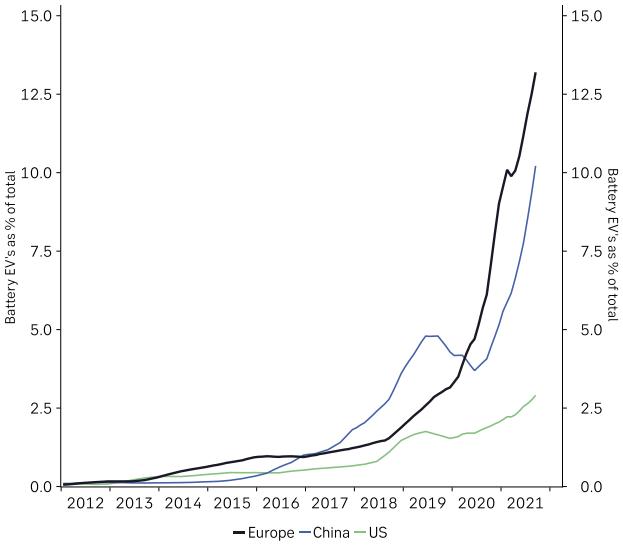
Source: BP

For now, however, Europe maintains a clear lead in the transition to renewable energy (Figure 4). The share of total energy consumption is almost twice as high as in both China and the US, and the EU Commission's green investment plan as well as the cost advantage provided by the rising price of emission rights is likely to maintain a growth rate fast enough to maintain that gap in the coming years.

The US may be more at risk of being left behind after a break with the rising trend under President Trump and with most of President Biden's green infrastructure plan held up in congress. However, if there is one country where market forces are likely to play a major role, it is the US. If renewable energy becomes as profitable in the US as it is in Europe, the US could start a rapid catch-up process. From a transition perspective, the real significance of a rapid ramp-up in the supply of cheap zero-emission electricity is that it transmits into a faster transition for energy-using sectors.

The automotive sector was the first sector to reach the cost-parity tipping point and embark on the exponential and disruptive part of the diffusion process and is likely to serve as a blueprint for the process in other sectors.

Figure 5 Battery EVs as % of total cars sold



Source: Bloomberg New Energy Finance, Macrobond

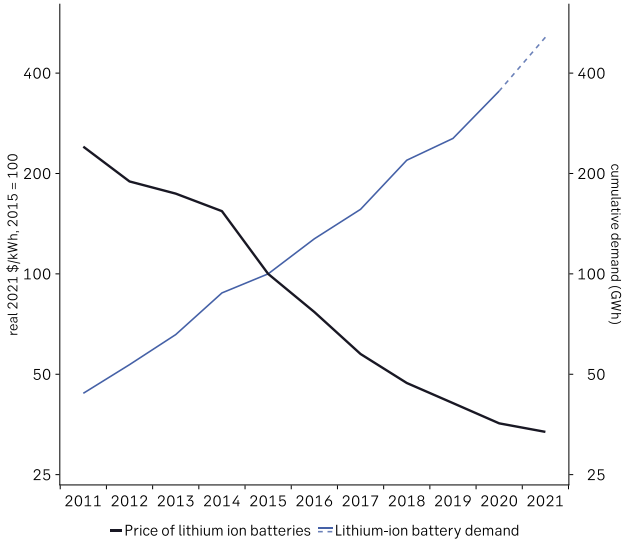
Modern-day EVs have had a long journey since the first prototypes emerged in the 1980s. The Toyota Prius (1997) and the Tesla Model S (2011) were major signposts, and by the late 2010s EVs had reached a combination of price, range and performance that was competitive without subsidies.

The development since then has been explosive, and again with Europe in the lead. As Figure 5 shows, the EV share of all auto sales was less than 2% in 2018 but has doubled three times in the three following years and is now above 12%. China has also reached double digits while the US remains far behind at less than 3%.

The technology/cost advantage of EVs is likely to continue widening as the production scales up. The learning curve in batteries continues to deliver longer range at lower cost every year, and this process is likely to continue for most of the coming decade (Figure 6). The rising cost of fossil energy alternatives will only accelerate this process.

At the current pace, the transition to 100% of all new cars being EVs is likely to be completed within a decade in Europe and China, which is at least twice as fast as most auto producers expected three years ago.

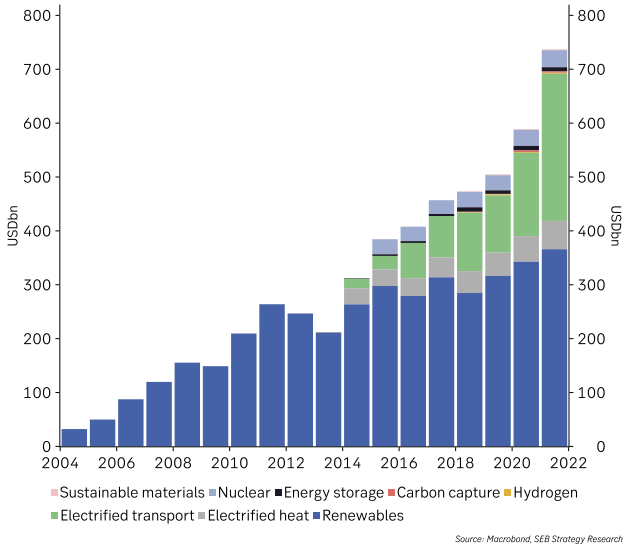
Figure 6 Price and demand of lithium-ion batteries



Source: Bloomberg New Energy Finance

However, there is a problem: neither electricity supplies, grids or networks of chargers are ready to accommodate such a rapid diffusion. This is why the acceleration has to start with the primary energy supply and the problem does not stop with autos: other technologies that are further from cost parity with fossil alternatives need to be assured not only that the cost is right but also that supply is sufficient to justify early adoption of new technologies.

Figure 7 Investments in transition technologies



Source: Bloomberg New Energy Finance

The exponential pace of EV diffusion is evident in the surge in total transition investment. According to BNEF, total investment increased by USD140bn to USD 730bn, mostly driven by investment in electrified transportation, which jumped from USD150bn to USD 275bn. In 2022, both renewable energy and electric vehicle investment is likely to surge, while other sectors are lining up to follow their lead. Shipping, steel and heavy trucks are likely to be next in line; the technologies are reaching cost parity faster due to the rising cost of fossil energy and the main constraint on the speed of the transition is the infrastructure required to scale.

2022 is thus likely to be the first year where total transition investment exceeds USD 1tn, doubling in just four years (Figure 7). True, if we are to maintain hopes of completing the decarbonization by 2050, it will have to double again both in the first and the second half of the 2020s. It would thus be wrong to say that we are on the pathway to Paris, but nonetheless, for the first time in a decade, we are moving in that direction

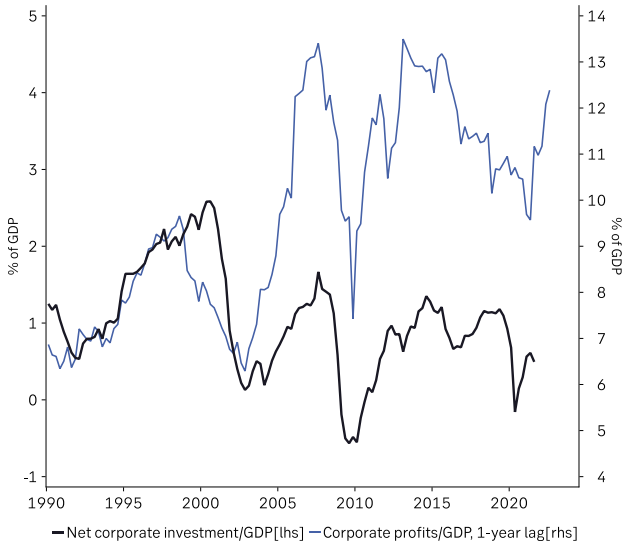
Increased competition for capital

While the technology and economic arguments for transition have strengthened, there is still one big question: how are we going to pay for all this investment and how will it impact capital markets?

From an economic perspective, the resources required are not insurmountable. We estimate that around 5% of world GDP will be required to pay for all aspects of the transition including adaptation and damages from climate risks that have now become unavoidable.

Nonetheless, if this happens while the rest of the economic system continues to function, and it is required to function to provide the input for the new infrastructure, then the result is likely to be a secular shift in the balance between saving and investment after a decade where investment has declined despite high profits (Figure 8).

Figure 8 US corporate profits and investment



Source: Macrobond

Governments have underinvested in infrastructure for decades and also face challenges from under-funded pension systems and unfavorable demographics.

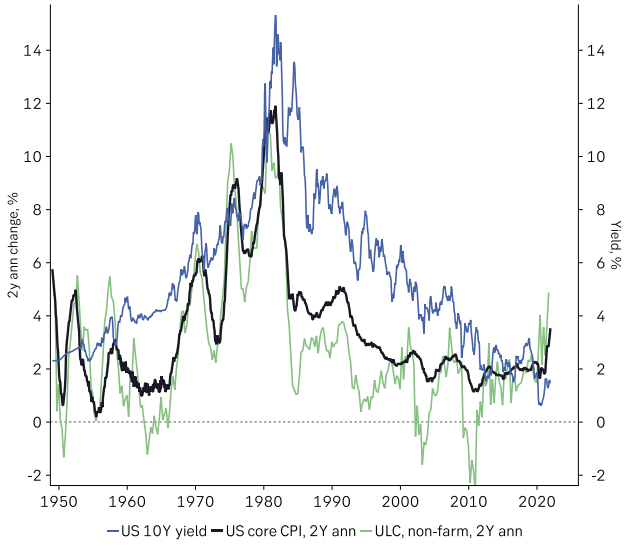
However, they will now be required to fund the new energy infrastructure either by separating it from the usual budget restrictions or by assuming the risk in public-private partnerships.

Energy-using sectors are likely to share the experience of the energy and auto sectors; once the new technology gains a cost advantage, scale is the name of the game and capital requirements in the early stages will likely turn out to be much higher than anticipated.

And the sectors providing inputs for the transition will also need to expand supply of copper, steel, rare minerals and all the other stuff that goes inside a brand-new capital stock. Higher prices and increased profitability are the market's way of making sure such supply is available.

A secular investment boom is also likely to mean full employment, which means companies in general will have to rely on adding capital rather than labor if they want to increase production. This is likely to lead to a more general increase in investment as a share of corporate profits and a sustained increase in real wages.

Figure 9 Bond yields, inflation and unit labor cost



Source: Macrobond

This is likely to result in a sustained shift in the investment-savings balance and a turning point in the 40-year declining trend for inflation and interest rates (Figure 9). For the first time in decades, there will be competition for capital, and the cost of capital will be rising.

There will accordingly be some crowding out of activities, and the role of sustainable financing is likely to take on added significance to ensure that transition investment is provided preferential access to capital due to the high social return of avoiding a climate disaster.

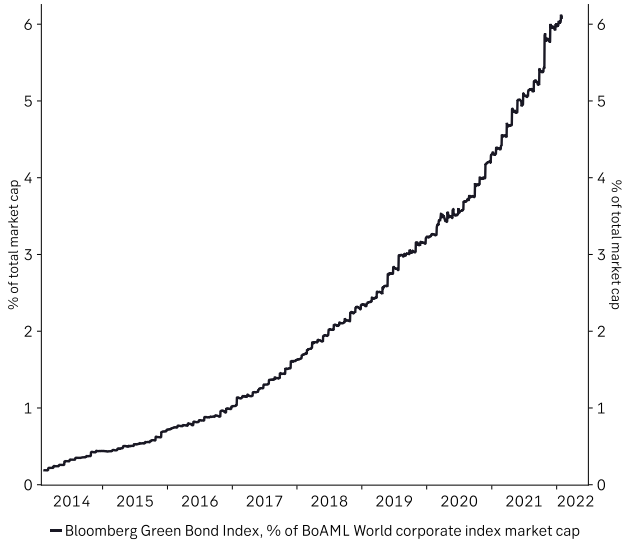
How will we fund it?

When it comes to ramping up the supply of zero-emission power, there are already encouraging signs that bond markets are ready to fund the investment either by buying green government bonds or by funding private-public joint ventures, provided that governments can assume the bulk of the risk (Figure 10).

Last year saw total sustainable debt issuance of USD 1.64tn, more than twice as much as the total global transition investment. And the premium for green and other labelled bonds appears to be rising, suggesting investors will forego a bit of their return to achieve a more favorable outcome for the planet.

The task in this area is to establish an even closer link from sustainable debt to changes in investment to ensure that capital is allocated where it has the highest social return, but there does not seem to be any shortage of funds.

Figure 10 Bloomberg Green Bond Index share of total

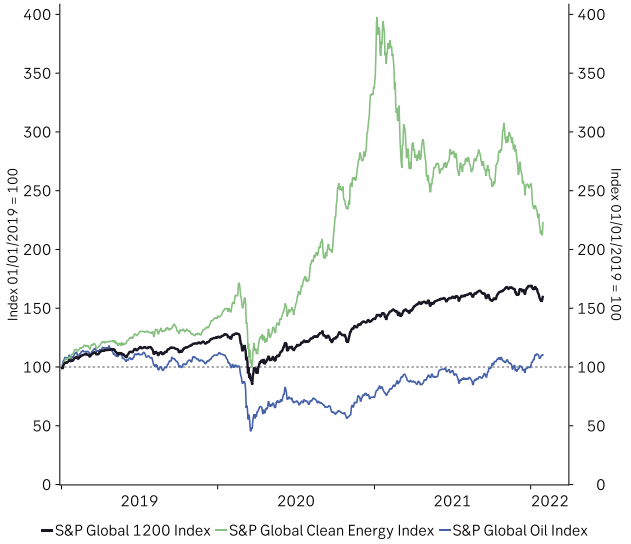


Source: Bloomberg

Things are more complicated when it comes to the private sector participants in the transition, as both energy producers and users face a substantial risk in the transition with limited assurance of profitability. And in stock markets, profitability is crucial.

ESG and low emission strategies are running into trouble as rising real yields put pressure on growth stock multiples, which is the factor exposure typically offered by such strategies. At the same time as the MSCI Growth Index relative performance broke its rising trend, the same thing happened to the MSCI ESG Index' relative performance.

Figure 11 Investments in transition technologies



Source: Bloomberg

The past year has also seen a huge reversal for the winners in the first wave of transition-driven equity themes: buy green energy producers and sell fossil-based energy producers.

The S&P global clean energy index did outperform the oil index by 400% after the pandemic, but since the start of 2021 the same trade has resulted in a 55% loss in part because oil companies are moving into renewable energy projects and squeezing the margins for everyone involved.

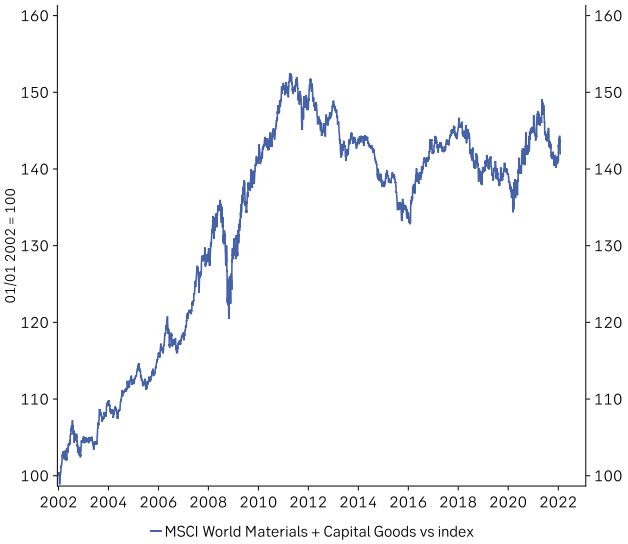
This is obviously good for society, since it means we get more renewable energy for the same money, but it also highlights how oversimplified investment narratives can go wrong in the stock market. What looked like a repricing of future growth prospects and risks eventually turned out to be unfounded when real yields rose, and margins started to compress in green energy and go up in fossil production.

This also suggests that similar green vs brown strategies are is likely to be too simplistic. It is not enough to identify companies that are likely to have a faster decline in emissions than their peers, you must also make sure that this is a profitable long-term strategy in the sector. Fortunately, this is unlikely to be a major issue once sectors reach the tipping point and it is clear which technology that will dominate and scale.

There will be a widening production cost advantage for zero-emission products, and they may also command a premium initially due to the low level of aggregate supply.

The relative cost of SSAB's zero-emission steel, for instance, has declined significantly in the past year and now appears to match the traditional steel, but the limited supply means buyers are willing to pay a premium to secure low Scope-3 emissions.

Figure 12 MSCI World Materials and Cap goods vs. Index



Source: Bloomberg

The biggest challenge here is to open the door for funding from the same investor segments that provide transition capital in the bond market. Traditionally, equity investors have seen shipping, steel, mining, and similar sectors as mature sectors where profits are taken out and redistributed to sectors with more growth potential. They are not convinced that they can rejuvenate themselves and embark on a new secular growth story. Sustainability-oriented investors are more likely to be willing to reward companies for long-term investment but may struggle with the high reported emissions in transition companies.

However, if you just want to focus on where the highest return is likely to be found, As you can see in Figure 12, capital goods and materials have been underperforming for a decade during which governments have under-invested in energy and broader infrastructure and companies have reduced capital expenditure as a share of profits. If we are embarking on a secular investment boom, we will have to increase the supply of physical inputs to the transition, and this suggests that there is underappreciated potential for a long-term positive earnings surprise.

Sustainable Debt Market Update

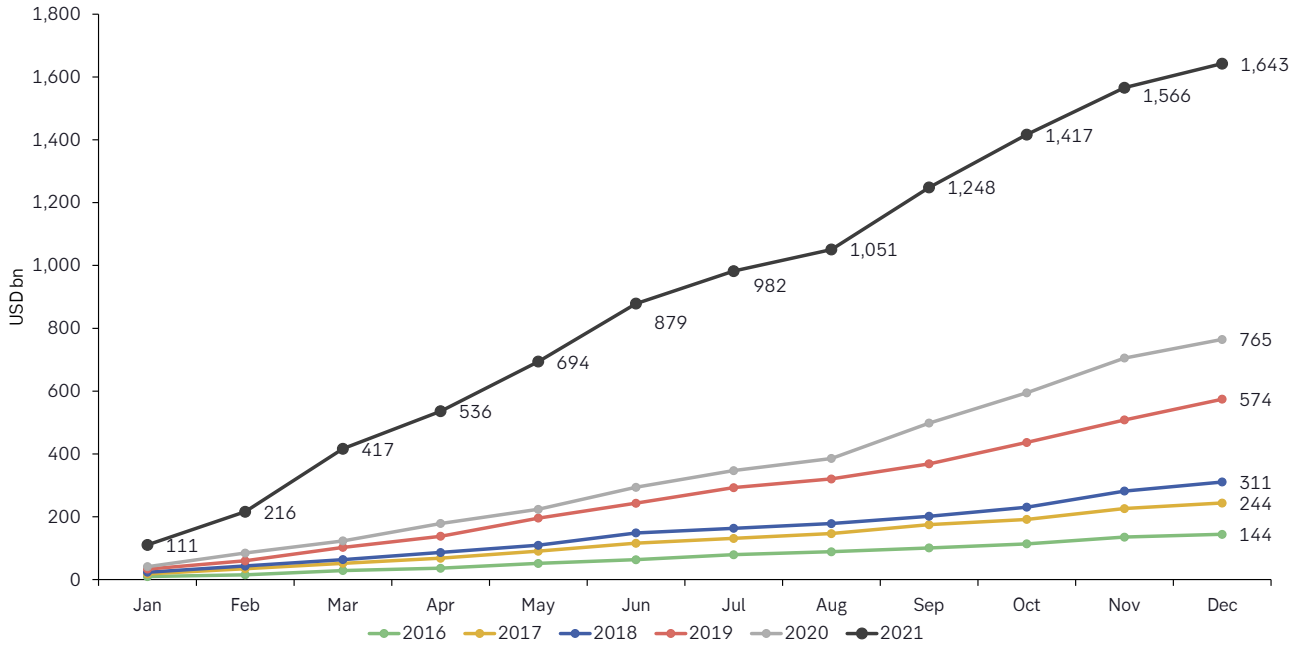
Record-breaking 2021 sign of what to expect from this year

The market for sustainable debt grew an impressive 114% last year- compared to an average 52% annual growth between 2014 and 2020. This makes 2021 the fastest growing year for sustainable bonds and loans since 2014. Green bonds doubled in 2021, while sustainability-linked bonds grew almost nine-fold. Corporates stood behind the growth in performance-based bonds and loans.

As stated in our outlook report from last month, we expect that sustainability-themed bonds to reach USD 1.5bn in our Baseline Scenario and USD 1.7bn in our Green Growth Scenario – compared to 1.15bn in 2021. Adding loans would bring the total market size to between USD 2.3bn to 2.6bn. Risks from rate hikes, macro-economic uncertainty and political tensions in Europe have only increased since we published our forecast a little over a month ago.

However, we are still confident that our growth expectations for sustainable bonds and loans will be met – and maybe even exceeded – this year. For this to happen, both old and new market segments need to grow of at least pre-pandemic levels – something that we believe is very likely given the momentum we have seen in the market last year.

Figure 13 Cumulative sustainable debt transactions



Source: Bloomberg New Energy Finance 31 December 2021

Product update

Looking at yearly records, we have seen USD 1.13tn in new sustainability-themed bond issuance in 2021 – more than double the amount of 2020. Green bonds took the leadership position again in 2021 with 37% of the sustainable debt marked. Social bonds remained in second place when it comes to market share in 2021 even though it declined from 20% in 2020 to 13%. Sustainability Bonds retained their market share of around 10% last year. Sustainability-linked Bonds saw the largest YOY increase in terms of market share, growing from just 1.5% in 2020 to 6.6% in 2021.

On the loan side, sustainability-linked loans accounted for 26% of the total sustainable debt market in 2021, up from

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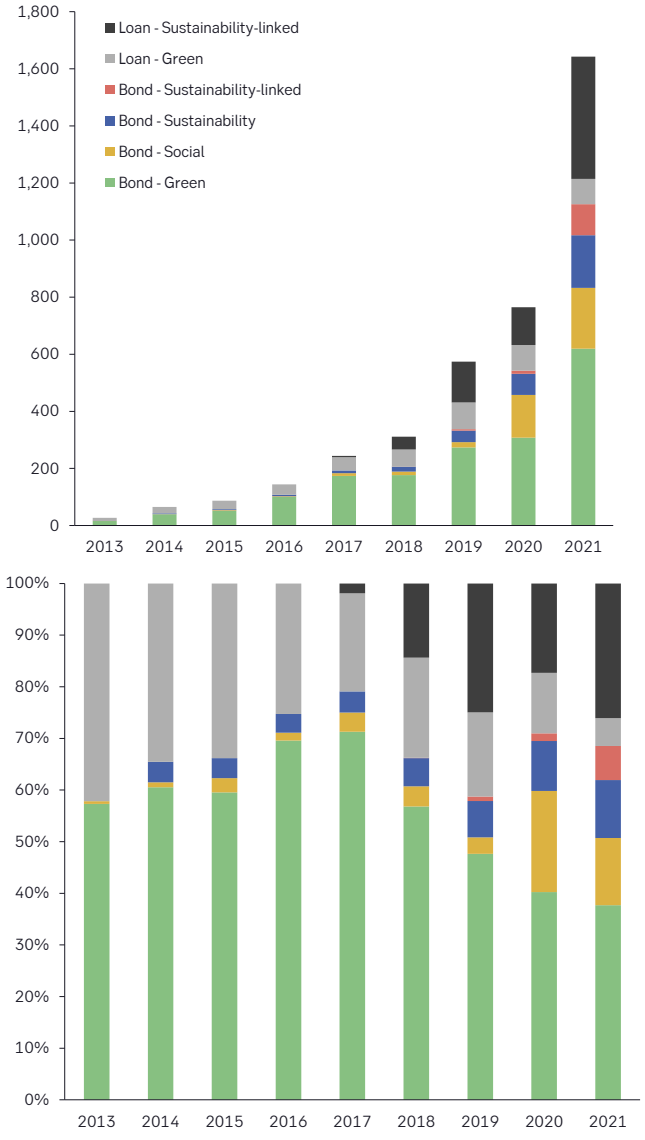
17% market share the year before. On the other hand, the market share of green loans more than halved last year down to 5%.

Figure 14 Sustainable debt market by product type



Source: Bloomberg New Energy Finance 31 December 2021

Regional update

Europe excluding the Nordics retained its market leadership with total new transactions of USD 640.4bn of sustainability-themed debt in 2021. This is an increase of 80% compared to 2020. The Nordics saw new sustainable bonds and loans worth USD 87.1bn last year (+64% YOY). Overall, Europe including the Nordics accounted for 44% of the global sustainable debt market last year – an almost 10% decrease compared to 2020.

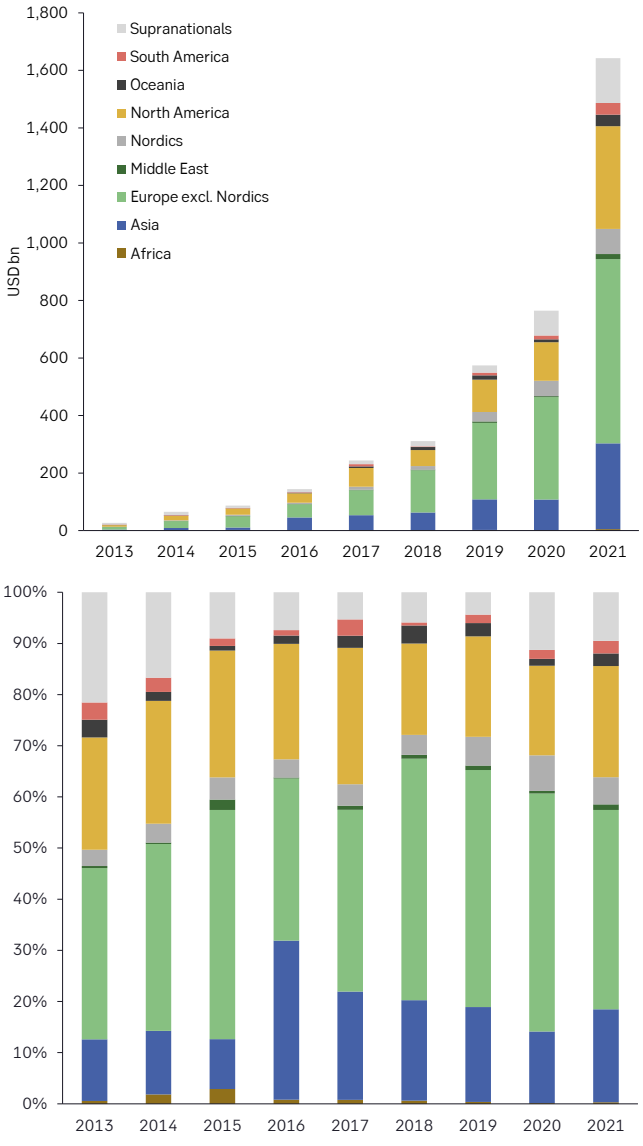
Rapid growth in other markets explain the relative decline in Europe's market share. Geographic diversification of the sustainable debt market was driven in 2021 by Asia and North America, which grew by 178% to USD 298.8bn and by 166% to USD 357.0bn in new transactions, respectively.

Even stronger YOY growth was recorded in less developed markets. Oceania's sustainable debt transactions increased by 292% to USD 40.25bn, South America recorded growth of 204% to USD 40.5bn, the Middle East's sustainable debt market increased by 375% to USD 18.1bn and Africa saw similar growth of 355% and USD 4.9bn in new use of proceeds and performance-based debt transactions.

Finally, Supranationals accounted for USD 156bn of new sustainability-themed debt in 2021, up 81% compared to 2020. Multilateral financial institutions retained their market share of around 10% last year, showing that these institutions continue to play an important part in the sustainable debt market.

As mentioned in our 2022 outlook, we expect Europe including the Nordics to remain the market leader. However, Asia and the US will likely see faster growth and larger market share at the end of this year.

Figure 15 Sustainable debt market by region

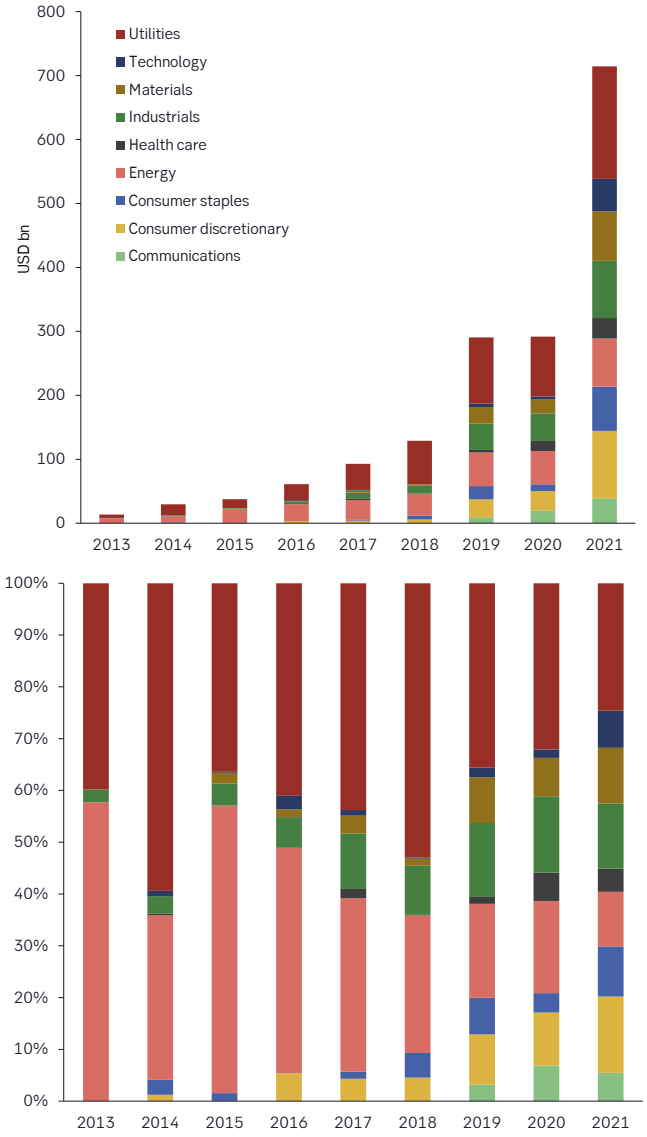


Source: Bloomberg New Energy Finance 31 December 2021

Corporate sector update

Sustainable debt transactions by corporations outperformed the general market growth rate and increased by 144% in 2021. In total, corporations raised more than USD 714bn in sustainable bonds and loans last year.

Figure 16 Corporate sustainable debt market by industry



Source: Bloomberg New Energy Finance 31 December 2021

The utility sector continued to take the largest share of the corporate sustainable debt market with 24%, reaching USD 175bn in new transactions (+88% YOY). Sustainability-linked loans by Enel, Dominion Energy and Evergy worth USD 11.9bn, USD 6bn and USD 2.5bn, respectively, made up the top three in this segment. Furthermore, energy and industrials, two other sectors which have historically been responsible for major share of sustainable debt also increased last year to USD 89.7bn (+109%) and USD 75.2bn (45%).

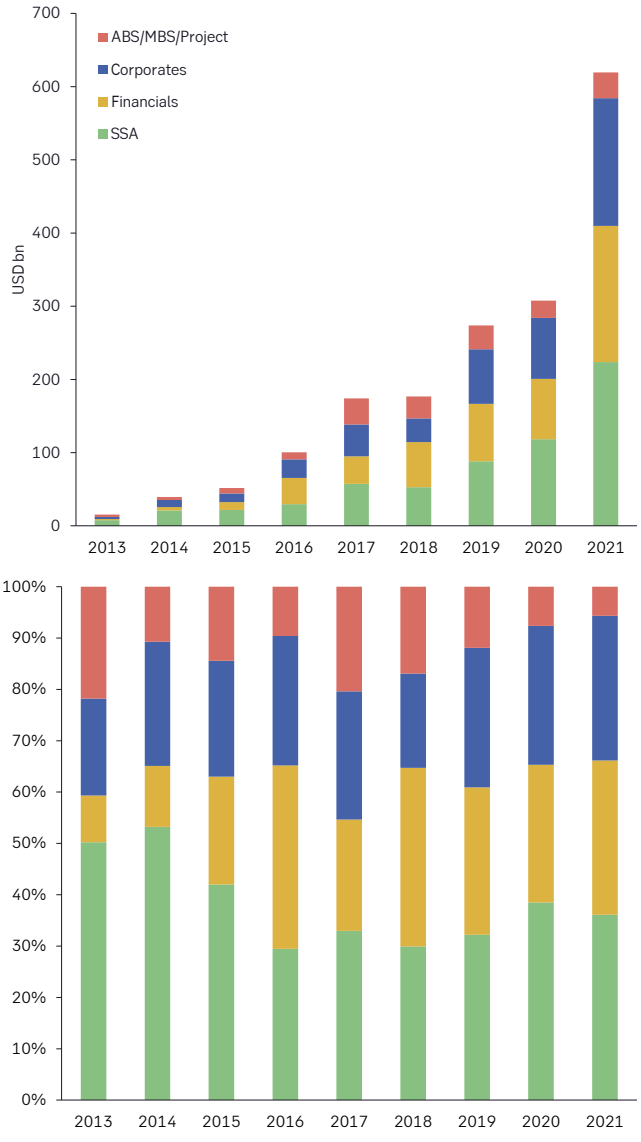
However, data for 2021 suggests that future growth will be driven by other market segments. The strongest annual growth last year was recorded in technology reaching USD 51bn (+998% YOY), consumer staples with USD 69.1bn (+538% YOY), materials with USD 76.9bn (+255% YOY) and consumer discretionary achieving USD 69-1bn in sustainable bonds and loans (+253% YOY). Notable transactions in these sectors include a sustainability-linked loan of USD 5bn by HP, a USD 1.75bn performance-based loan by Mexican construction company Cemex, and Walmart inaugural green bond of USD 2bn.

Use of proceeds

Green Bonds

Green bonds recorded another record-breaking year with USD 619.45bn in new issuance in 2021. This means that the green bond segment retained its traditional role as the locomotive of the sustainable debt market last year.

Figure 17 Green bond market by sector



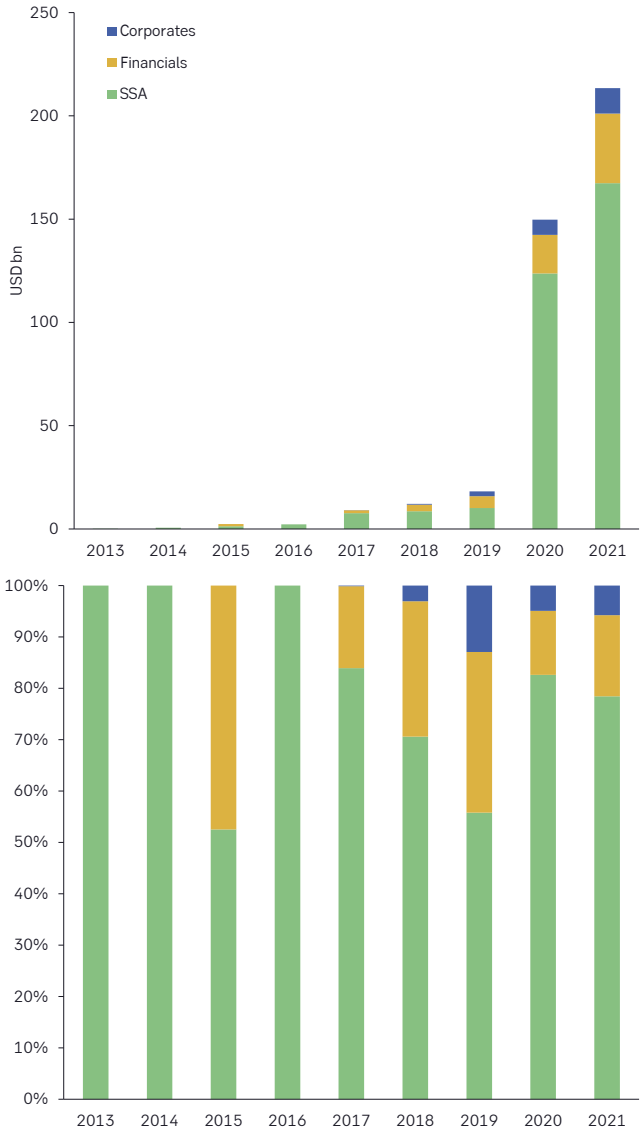
Source: Bloomberg New Energy Finance 31 December 2021

The largest single issuance of green bonds came from sovereign issuers. In October last year, the European Union issued its first and the world's largest green bond ever worth EUR 12bn (USD 13.8bn). This bond, received more than 135 billion euros of demand, was issued to fund the EU's Covid-19 recovery program Next Generation Europe. Thirty percent of the EU's up to EUR 800bn pandemic recovery scheme will go climate and environmental action. This will make the EU the largest green bond issuers for the foreseeable future.

Social Bonds

Social bonds had witnessed a sudden explosion in 2020 as governments and supranational financial institutions scrambled to deal with the economic fallout of lockdowns and to spur development and production of vaccines.

Figure 18 Social bond market by sector



Source: Bloomberg New Energy Finance 31 December 2021

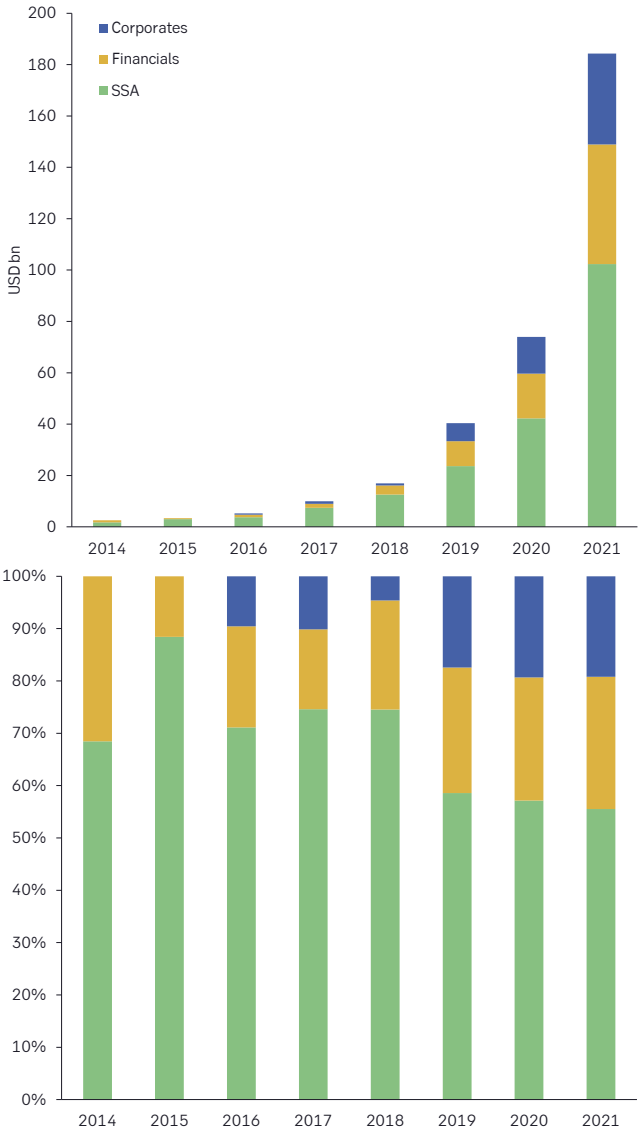
Surprisingly, the market for social bonds continued to grow strongly in 2021, reaching USD 213.4bn which is 42% more than in 2020. Like in the first year of the Covid-19 pandemic, sovereigns and supranational continue to lead this market. The EU alone issued a total of USD 60.4bn in social bonds last year, followed by France's social security debt reimbursement fund Caisse d'Amortissement de la Dette Sociale (CADES) with USD 43.1bn.

As the world slowly emerges from the pandemic, sovereign issuances of social bonds are likely to stagnate in 2022. It remains to be seen if corporates can fill the gap.

Sustainability Bonds

Sustainability bonds saw USD 184bn of new issuance in 2021, up 149% from the year before. Similar to the social bond segment, this market is dominated by sovereign issuers which take 56%, followed by financial institutions claiming 25% and corporates taking the remaining 19%. The World Bank was the largest of issuers with cumulative USD 39bn in new issuance of sustainability bonds in 2021.

Figure 19 Sustainability bond market by sector



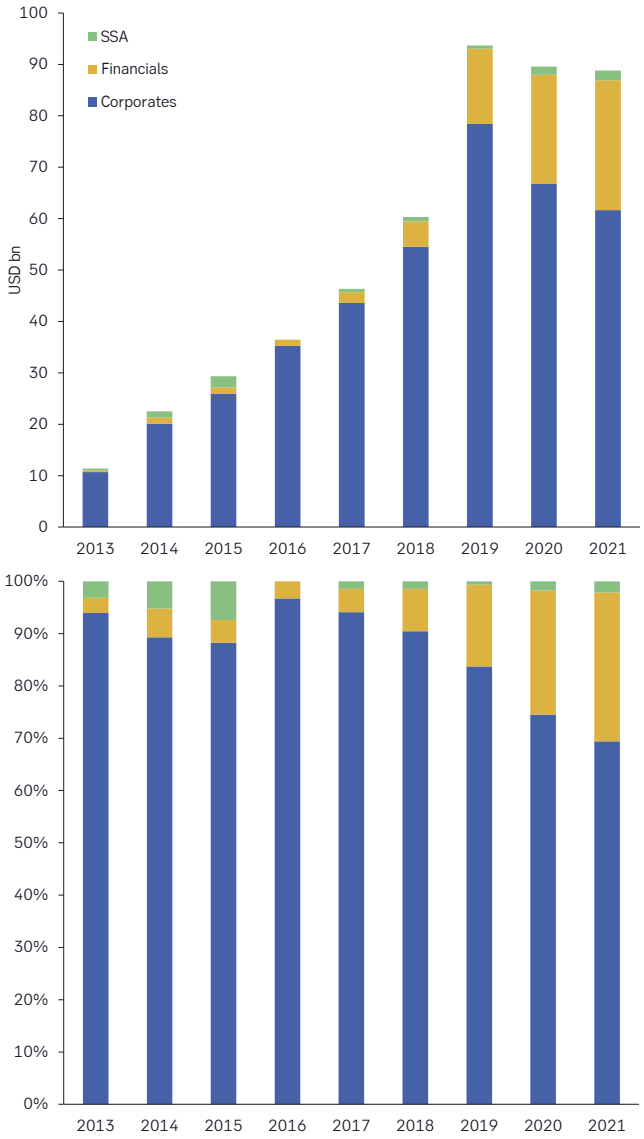
Source: Bloomberg New Energy Finance 31 December 2021

Green Loans

Note on data: The green loan market is a private market with limited access to information. We use the loans listed in Bloomberg New Energy Finance which we think provides a good reflection of the overall market.

Green loans have been the problem child of the sustainable debt market. While the overall sustainable market more than doubled last year, green loans remained at almost the same level as 2020 with USD 88.8bn in new transactions. Notably, figures for 2021 and 2020 are both below the record of USD 93.7bn set in 2019. Furthermore, the market for sustainable loans increased by 133% in 2021, with growth coming exclusively from sustainability-linked loans. Together, this suggests that green loans, at least for the moment, have reached a plateau and that new borrowers from increasingly hard-to-abate sectors prefer performance-based borrowing over pure-play green loans.

Figure 20 Green loan market by sector



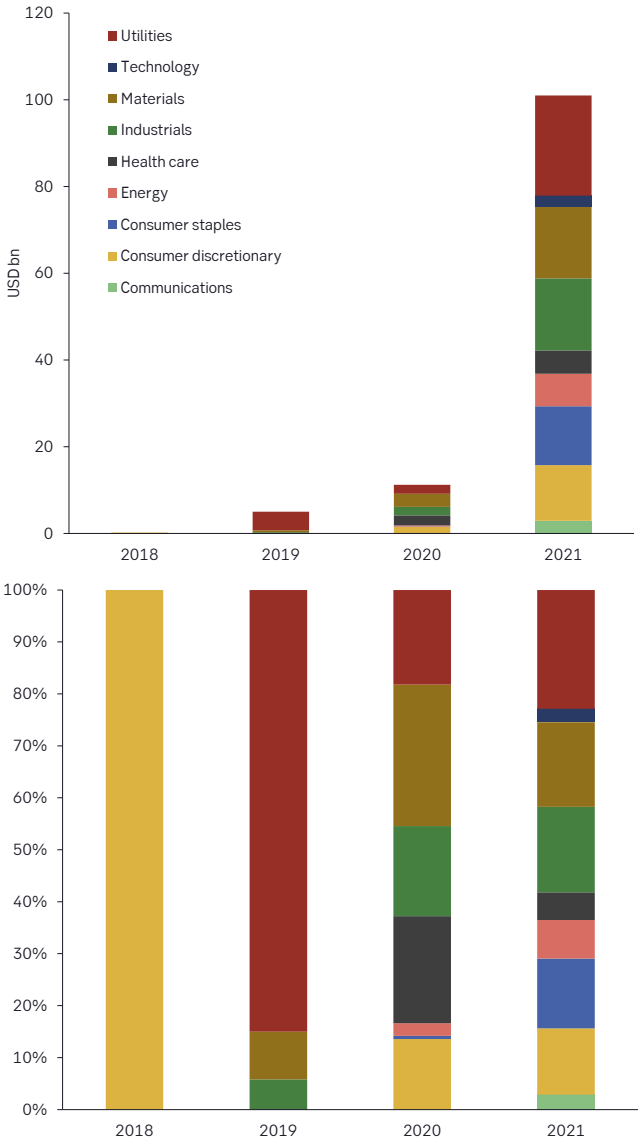
Source: Bloomberg New Energy Finance 31 December 2021

Performance-based

Sustainability-linked bonds (SLBs)

2021 has without a doubt been the year of sustainability-linked bonds. Last year saw a total of USD 108.6bn in performance-based bonds – almost nine times the amount issued in 2020. Since corporates account for almost 90% of this market, we focus our analysis on this segment

Figure 21 Corporate sustainability-linked bond market



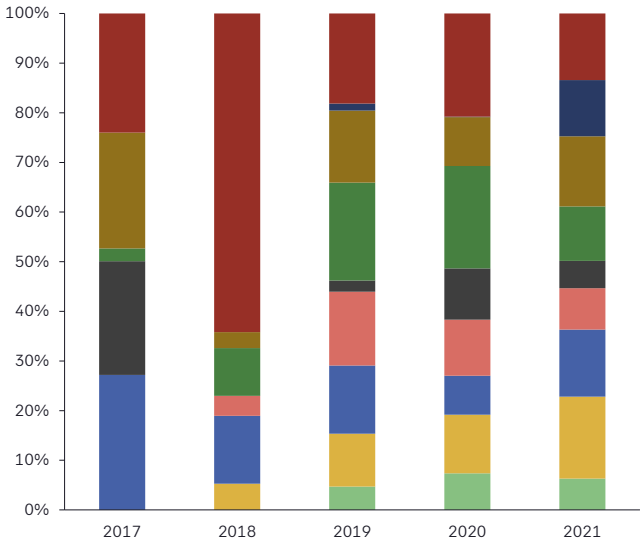
Source: Bloomberg New Energy Finance 31 December 2021

Utilities raised USD 23.1bn in new capital through sustainability-linked bonds in 2021, taking more than a fifth of the total market. Notable transactions included a total of ten performance-based bonds by utility company Enel worth USD, 12.1bn and the first sustainability-linked bond in India's energy sector by Adani Transmission's Entity Adani Electricity Mumbai worth USD 0.3bn.SLBs also appeared to be particularly popular among companies in materials (USD 20bn), industrials (USD 16.6bn, technology (USD 2.6bn), healthcare (USD 5.4bn), consumer discretionary (USD 12.9bn and consumer staples (USD 13.6bn).

Sustainability-linked loans (SLLs)

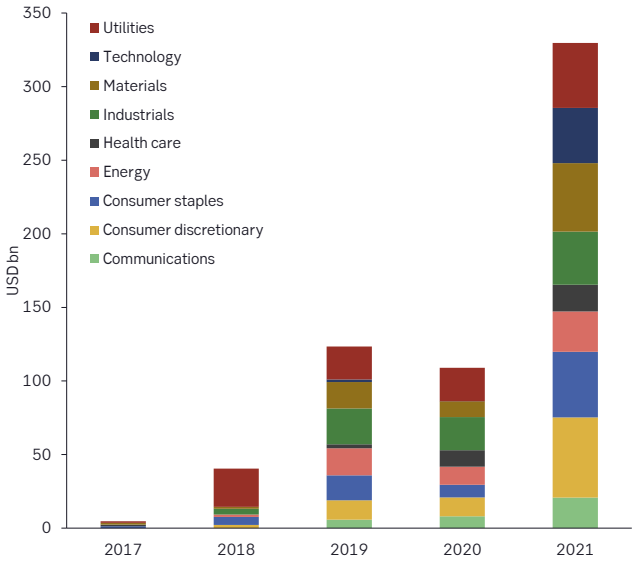
2021 has also been a breakout-year for sustainability-linked loans which recorded USD 329.65bn in new transactions and more than 203% in YOY growth. Utilities, industrials, and energy companies claimed more than 50% market share in 2020, but the performance-based loan market diversified considerably last year.

In 2021, companies in the consumer discretionary sector led the market with USD 54.5bn of transactions, followed by consumer staples with USD 44.3bn, materials with USD 46.55bn and utilities with USD 13.4bn. Notable transactions include a EUR 1.3bn sustainability-linked revolving credit facility by Volvo Cars and an amendment to ArcelorMitall's USD 5.5bn revolving credit facility.



Source: Bloomberg New Energy Finance 31 December 2021

Figure 22 Corporate sustainability-linked loan market

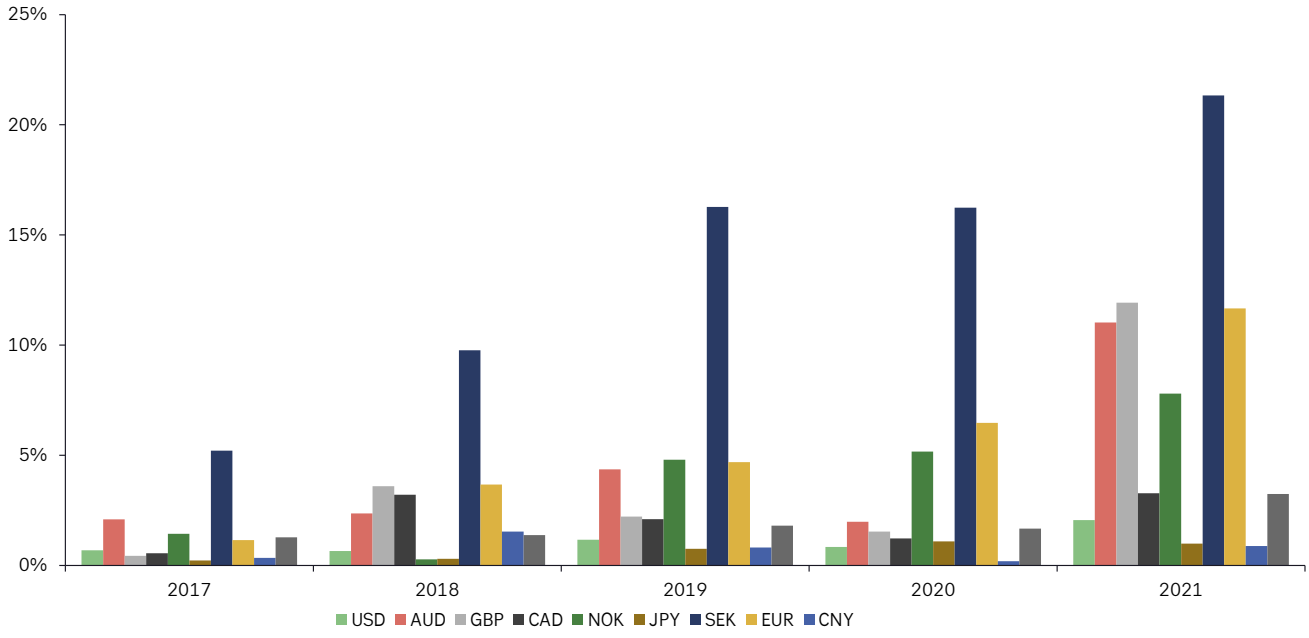


Currency analysis

Last year provided clear evidence that sustainable debt has become mainstream. Taken together, sustainability-themed bonds claimed 11.7% of the EUR-denominated debt in 2021 up from 6.5% in 2020, 11.9%of the GBP market up from 1.5%, 11% of the AUD market up from 2%, and 21.3% of the SEK market up from 16.2%.

The share of sustainable bonds of the total market also increased in the USD denominated market from 0.8% in 2020 to 2.1 in 2021, and from 0.2% to 0.9% in the CNY market.

Figure 23 Green, social, sustainability and sustainability-linked issuances as % of total bond issuance



Source: Bloomberg New Energy Finance 31 December 2021

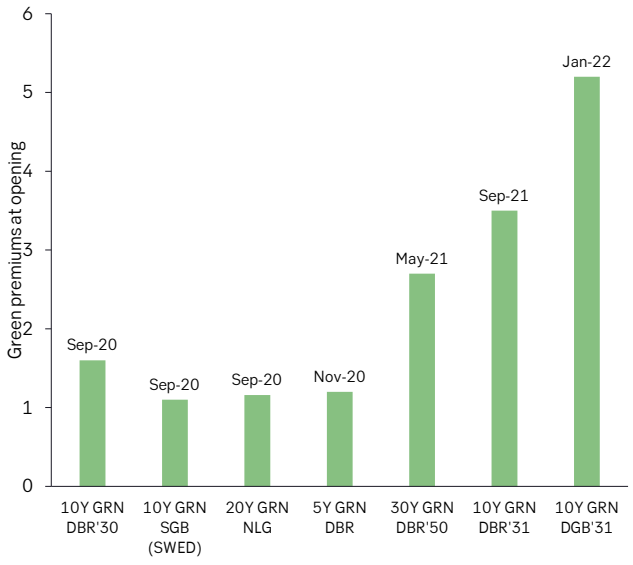
Denmark's green government bond gets large 'greenium'

Written by Claus Hvidegaard, Head of FI Research Denmark at SEB, claus.hvidegaard@seb.dk and Henrik Arp from Fixed Income Research Denmark at SEB, henrik.arp@seb.dk

On Wednesday 19 January 2022, the first Danish green government bond was introduced at auction in shape of the green Twin-bond-edition 0% DGB'31 GRN (992437) of the existing "conventional" 0% DGB'31 (992419). As stated in the comprehensive presentation material behind the first Danish green government bond, the bond is issued according to the government bond's Green Bond Framework which is classified ad as Dark Green shading and in accordance with the EU-taxonomy. At the same time, the framework is expected to be in accordance with proposals for EU's coming Green Bond Standard. The issuance volume is determined in the Finance Act with the amount of qualified green expenses being an upper ceiling and due consideration of the general issuance strategy.

The Danish issuance follows the "Twin Bond"-concept which means that the green bond on all core data matches an equivalent conventional bond, here DGB'31, like Germany's green program. And like the German setup, Nationalbanken will offer a switch of the green bond to a conventional bond in the scale of 1:1 which in reality puts a floor under the green premium of 0bps like the German concept. But in practice, the switch activity will hardly be attractive for the coming investors in DGB'31 GRN who are expected to pay a green premium unless other conditions warrant the need for switching DGB'31 GRN to the more liquid conventional DGB'31.

Figure 24 The green opening premium in DKK, EUR and SEK govies over the last couple of years

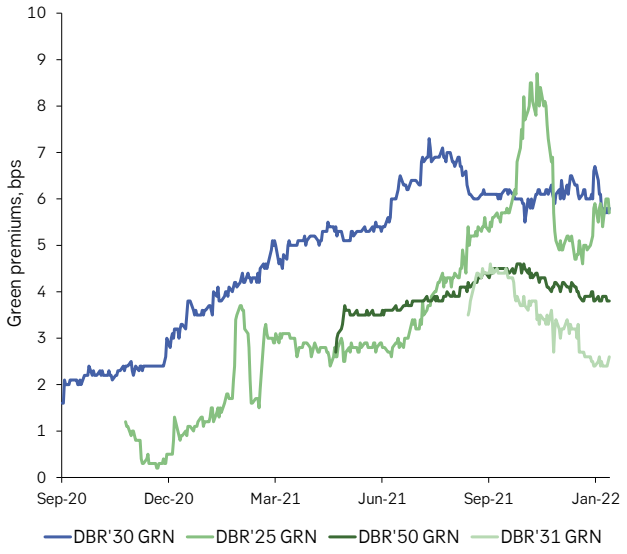


Source: SEB Fixed Income Research

The trade and liquidity in the green bond is furthermore supported by existing initiatives established for conventional government bonds which includes participation in the government's asset lending-arrangement like the government's other government bonds. In addition, Nationalbanken must always ensure that the total outstanding of green bonds, including security lending does not exceed the amount of green expenses.

At the opening-auction, the green DGB'31 sold with a greenium of 5.2bps against its twin bond. This was larger than earlier experiences had suggested.

Figure 25 The development in Green premium in German green DBR vs twin-government bonds

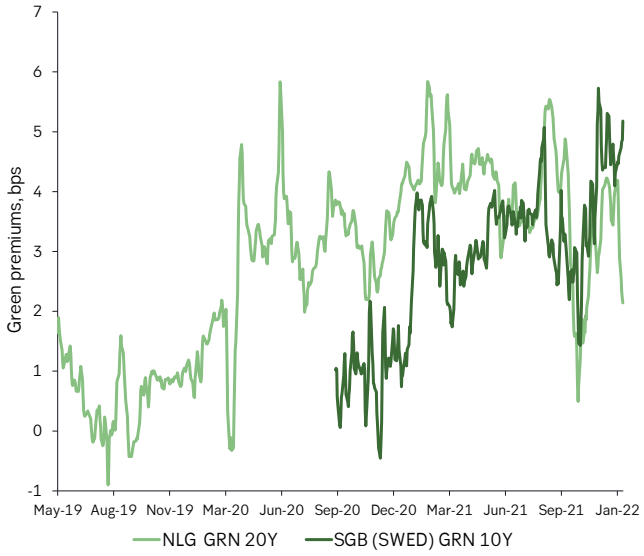


Source: SEB Fixed Income Research

An obvious comparison is the experience from the German green government issuance which looks like the Danish green setup especially with the twin-bond-concept. Here, the green government bonds were introduced during Q3 2020 where the first 10-year green twin-bond DBR'30 GRN opened on a premium of 1.6bps (lower yield) vs the conventional DGB'30. However, in the secondary market, the 10-year German green bond is successively indicated around 5-7bps more expensive in terms of lower yield than the conventional bond and is currently traded in the secondary market in approx. 5-6bps in green premium. Subsequently, the 5-year GRN 2025 Twin-bond opened in November 2020 on an initially green premium around 1.2bps. In May 2021, the 30-year green government bond DBR-50 GRN opened on an initial YTM equivalent to 2.7bps below the conventional twin-bond DBR'50 and in September 2021, the green version of DBR'31 opened on a green premium of approx. 3.5bps in order to clear around 2.5bps recently in the secondary market.

In the issuance strategy for 2022, the German Finanz agency has announced a total sale of green German government bonds for 12-5bn EUR this year like the volume in 2021, which will be distributed on 4.5bn EUR in the two respective 10-year GRN DBR 30/31 at auction, a syndicated sale of 3bn EUR in DBR'50 GRN in Q2 2022 and the opening of a new 5-year GRN 2027 in Q3 2022 as twin bond to BOBL 10/27.

Figure 26 Green premiums in the 20-year Dutch and 10-year Swedish government issuance



Source: SEB Fixed Income Research, Bloomberg

In the Netherlands, where they do not use the twin-bond-concept, already in the spring of 2019 there was an issuance of the first green EUR-denominated government bond 0.5% Nether 01/40 Green which cleared 2bps tighter than the interpolated yield in the duration point from the other conventional Dutch government bonds. As in the other markets, the green premium has been more expensive throughout the last year in the secondary market but has recently declined a few points to approx. 2-3bps currently in the secondary market. This year, there is a prospect of further issuance in the existing 20Y NLG 2040 of 5bn EUR in the Dutch government debt strategy.

In the Nordic markets, Sweden began with their first green government bond issuance already in September 2020 where there was an issuance of SEK 20bn 1 September 2020 in 0.125% 2030 (XS2226974504). The syndicated issuance (with conditions approved by Riksbanken) was opened with a clearing equivalent to approx. 1bps below the conventional SGB-curve with bit-to-cover of 2.4, distributed over 72 investors. The bond is a part of the purchase-range at Riksbanken included in the Swedish QE-program.

Since the opening, Riksbanken has purchased SEK 1.95bn (equivalent to 9.8% of outstanding) and have paid the 4-5bps below the benchmark-curve. This is still the applicable level in the price indications in the secondary market. NDO in Sweden have not issued since the fall of 2020 but in their guidelines for this year, it looks like there might be an issuance of green government bonds.

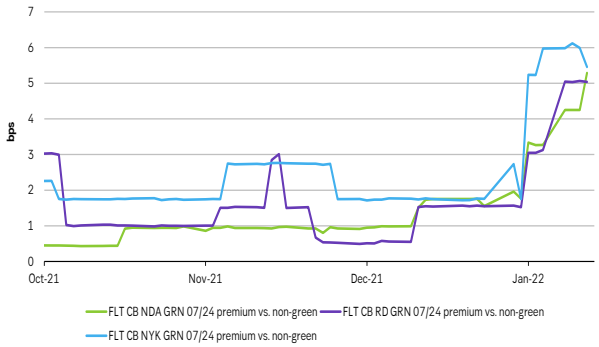
Also, in France, Belgium and Spain there has been an issuance of green government bonds like Ireland and Austria and possibly more countries are expected to introduce green government bonds during this year.

DKK market especially hungry for green assets?

While the initial green premium on DGB'31 GRN was higher than in other government bond issuance, it was in line with other developments on the Danish bond market, suggesting the DKK market has a particular appetite for green assets.

In Danish mortgage bonds, where the autumn has seen issuance of especially green floaters take off and reach almost DKK 25bn since September 2021, the secondary pricing versus non-GRN floaters from the same capital center and with same maturity have shown rising green premiums from 1-2bps to most recently 4-6bps. The interest in ESG-compliant assets is present in the market, but probably also supplemented by other investment objectives in the current market for short investment mandates

Figure 27 The green premiums in the floater-market (vs non-GRN) have been strongly increasing



Source: SEB Fixed Income Research

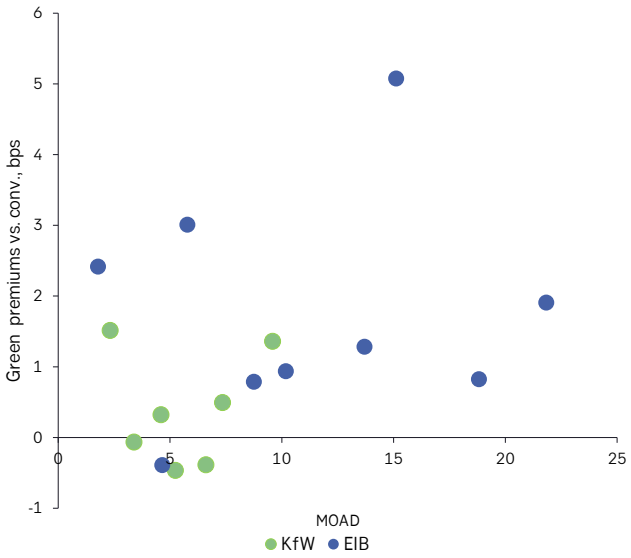
It is rare that foreign investors issue bonds in DKK but in January, two international SSA-issuers have issued bonds in DKK for a total of DKK 3bn: But what is the background for issuers issuing in DKK? And should we expect a larger supply of this kind of issuances?

In January 2022, the Nordic Investment Bank issued an 8-year DKK-bond and KfW have issued a bond matching the maturity of DGB'24. Both issuances have been green bonds. The green stamp seems to be an important factor in regard to the demand for DKK-bonds.

If we also look at where EUR-denominated SSAs typically are cleared in the secondary market right now the price indications seem to be a green-premium structure of approx. 0-3bps vs non-Green.

This has caused the SSAs with further green issuance-opportunities to having an opportunity to issue in DKK. Since matching of issuer- and investor-interest currently seems to require a green issuance, we don't expect that the first issuances will indicate a greater wave of highly rated issuers issuing in DKK.

Figure 28 EUR SSA indicative greeniums in the secondary market



Source: SEB Fixed Income Research

Moving beyond climate – Nature and biodiversity come into the spotlight in 2022

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Sustainability is more than climate. Experts have stressed that conservation and restoration of natural carbon sinks is vital to achieving the Paris Agreement[1]. But while the understanding of how corporates and investors can manage climate risks has matured, awareness about the necessity of protecting and restoring nature and biodiversity is still low. This is about to change as industry-driven initiatives and corporate action on nature-related risks and opportunities are gaining momentum.

Nature and biodiversity loss pose increasing and systemic risk for investors and companies

A pathbreaking review of the economics of biodiversity released last year found that natural capital has declined by 40% between 1992 and 2014[2]. According to the World Wildlife Funds (WWF) we have seen a 68% decline from 1970 to 2016 of different species such as mammals, birds and reptiles[3] – leading experts to believe that we are at the precipice of the worlds "Sixth extinction" [4].

According to World Economic Forum (WEF), the loss of biodiversity is one of the largest financial risks, topping the list together with climate risk and natural disasters. Half of global GDP – USD 44tn – consists of companies that are moderately to highly dependent on nature and its services to produce their goods[5]. Thus, they are also highly exposed to the financial impact of biodiversity loss, reduction in natural capital and weakening of ecosystem services.

There is also increasing concern about the macro-economic impacts of nature and biodiversity loss and the systemic-risk companies and investors face. IPBES (an intergovernmental research body similar to IPCC for climate research) has estimated that land degradation currently costs more than 10% of global GDP each year[6]. Furthermore, the Dutch Central Bank has concluded that financial institutions in the country have EUR 510bn in exposure to biodiversity risks.

Figure 29 Top 10 global risks severity the next 10 years

Source: World Economic Forum Global Risks Report 2022

[1] Paris climate goals unattainable without rich biodiversity and ecosystems - Stockholm Resilience Centre
[2] Final Report - The Economics of Biodiversity: The Dasgupta Review - GOV.UK (www.gov.uk)
[3] Living Planet Report 2020 | Official Site | WWF (panda.org)
[4] The Sixth Extinction: An Unnatural History, by Elizabeth Kolbert (Henry Holt) - The Pulitzer Prizes
[5] WEF_New_Nature_Economy_Report_2020.pdf (weforum.org)
[6] IPBES secretariat

The double materiality of nature-related risks and opportunities

Companies can both cause and suffer from the loss of biodiversity and nature. For instance, the food sector has been the primary driver of nature and biodiversity loss over at the least the past 50 years according to the UN[7]. At the same time, food companies are highly dependent on pollination for the sourcing of raw materials, and they are hence vulnerable to the loss of pollinators as more than 75% of crops globally are dependent on pollination[8]. Corporates' impact and dependency on nature and biodiversity can result in nature-related risks. These risks can be classified as[9]:

Physical risk arising from damage to infrastructure and disruption of operations that can be either acute (e.g. flooding) or "chronic" (e.g. drought)

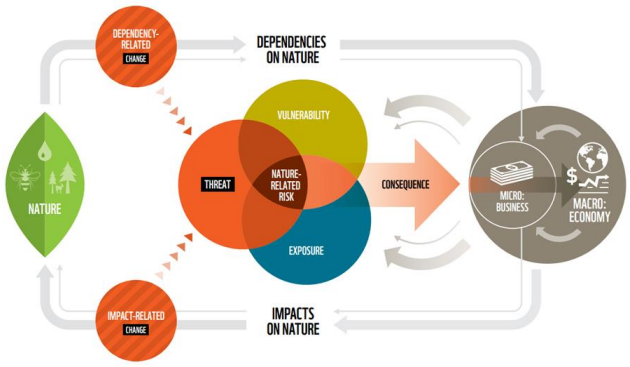
Regulatory and legal risk relate to laws, policies, regulations, and court actions lead to unexpected costs of (non-)compliance and stranded assets

Market risk emerge from changing customer preferences, purchaser requirements and financing conditions that increase the cost and availability of resources and capital

Reputational risk relates to the public image of a company and could result in a loss of sales

Financial risk is an outcome of nature-related risks and affects business (e.g. increased cost of financing) and financial institutions (e.g. loss of investment value)

Figure 30 High level framework illustrating nature related risk to business



Source: WWF

A large share of the global economy is either directly or indirectly impacted by nature and biodiversity[10]. Aside from the food and agriculture, other sectors that are exposed to nature-related risks – due to their dependence and impact on nature – include forestry, fishery, aquaculture, hydropower, biomass-based heating, health sector, mining, oil and gas, real-estate or the textile industry[11]. Financial institutions are indirectly exposed to the impacts on e.g. deforestation caused by their investees[12].

Like the climate crisis, this is not only a story about risk. Large global sustainability challenges also represent large business and investment opportunities. Protecting and restoring nature is no exception. According to WEF, transactions enabling a "nature positive economy" could generate up to USD 10.1tn in annual business value and create 395 million jobs by 2030. For example, circular business models and products – which only stand for 8.6% of the global economy[13] – represent large opportunities for companies.

Action on nature and biodiversity is gaining momentum

Despite – or because of – the glooming state of the global environment, we see an increased focus from the business and investor community regarding the need to halt and reverse nature and biodiversity loss. This is exemplified by a range of industry-driven initiatives and coalitions, such as "We are Nature" and "Finance for Biodiversity Pledge" or the Taskforce for Nature-related Financial Disclosure (TNFD)[14]. The TNFD will provide companies and investors with a framework to assess, manage and report on nature-related financial risks and opportunities. Furthermore, CDP will request information on forests and water security from financial institutions from this year.

Together these collaborations and standards will support companies and investors in their efforts to measure and manage their exposure to nature and biodiversity risks and in their development of new business ideas.

At the political stage, countries are expected to reach an agreement on new goals for the protection and restoration of biodiversity at the Fifteenth Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP15) which will conclude in May this year.

[7] Our global food system is the primary driver of biodiversity loss (unep.org)
[8] Why bees matter (fao.org)
[9] The Nature of Risk | WWF (panda.org)
[10] Nature is too big to fail | WWF (panda.org)
[11] Nature is too big to fail | WWF (panda.org)
[12] Trase Insights - Storebrand Asset Management deforestation risk assessment
[13] CGR 2021 (circularity-gap.world)
[14] TNFD – Taskforce on Nature-related Financial Disclosures

Already in 2020, the EU published its biodiversity strategy, aiming to be the most ambitious region accelerating the efforts of reversing nature and biodiversity loss and achieving over time restoration[15].

New international targets for nature and biodiversity protection and restoration alongside better frameworks to understand and manage nature-related risks will increase expectations for companies and investors to set their own targets – like we have seen with the array net-zero targets following the Paris agreement. The Science Based Targets for Nature (SBTN) will offer companies a methodology to set such targets[16] – and companies have started to set targets.

Ørsted and Equinor for example, have come out with so-called "net nature positive targets", moving beyond only reducing their negative impact on nature but also restoring nature and biodiversity. During COP26, we also saw 95 large UK companies coming out stating they have committed to net nature positive targets. On the asset owner side, the Norwegian Pension Fund has set expectations how investee companies should take biodiversity and sustainable use of ecosystems into account in their business activities[17].

Tying action on nature and biodiversity to financing

As more and more companies set nature and biodiversity targets, one can expect several of these targets to be tied to companies' financing. This expectation is based on the rapid expansion of performance-based financing over the last few years. Incorporating environmental targets into sustainability-linked bonds and loans is a way for companies to bolster their commitment to these targets and to share this commitment publicly with investors and other stakeholders.

Investors will also increasingly address the systemic financial risk associated with nature and biodiversity loss in their portfolios. Asset owners and managers may act on these issues through active ownership, voting, and by integrating nature and biodiversity risk and opportunities in investment analysis, valuations, and investment decisions. These actions will be informed by the ever-improving access to data on investee's exposure and management of nature and biodiversity-related risk and opportunities[18].

During the Covid-19 pandemic financial markets have played a crucial role in making sure capital for vaccine research and production was front-loaded and made readily available. Similarly, financial institutions have the capacity to support innovators and corporations in protecting and restoring nature and biodiversity and in taking advantage of new business opportunities.

Figure 31 Key terms

Biodiversity - The variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems"

Ecosystem – A natural unit consisting of all the plants, animals, and microorganisms (biotic) factors in a given area, interacting with all of the non-living physical and chemical (abiotic) factors of this environment.

Ecosystem services and functions – The contributions that ecosystems make to human well-being, including provisioning services, regulating and maintenance services, and cultural services. Ecosystem services result from ecosystem functions like biomass production, nutrient cycling, or water dynamics.

Nature – The natural world with all naturally occurring living and non-living entities that together comprise ecosystems and deliver ecosystem services.

Natural capital – The stock of renewable and non-renewable natural assets (e.g. ecosystems) that yield a flow of benefits to people (i.e. ecosystem services).

Source: Final Report - The Economics of Biodiversity: The Dasgupta Review - GOV.UK (www.gov.uk)

[15] Biodiversity strategy for 2030 (europa.eu)
[16] Guidance highlights – Science Based Targets for Nature
[17] New expectation document on biodiversity and ecosystems (nbim.no)
[18] E.g. the Trase Platform offers data-driven insights into the exposure of financial institutions to deforestation risks

Taskforce on Nature-related Financial Disclosure: A framework for nature-related risks

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Financial institutions are increasingly seeing the commercial imperative and opportunity to take action to measure and manage nature related risks. More than half of the world's economic output – USD 44tn of economic value generation – is moderately or highly dependent on nature. Increasing nature loss therefore presents a threat to the long-term sustainability of businesses, and in turn their investors and creditors. Biodiversity loss now ranks in the top three of the most severe risks to the world in the next decade, along with failure to solve the climate crisis and extreme weather, reports the World Economic Forum.

A growing number of finance sector players are realizing the extent and urgency of tackling the risks associated with nature loss. The interlinkages between halting nature loss and managing climate risks are also becoming clear to the market. Nature-based solutions could contribute over one-third of the cost-effective cuts in greenhouse gas emissions. Similarly, unabated climate change escalates nature loss. Coral reef ecosystems struggle as the oceans heat up. Forest fires that wipe out trees, other plants and animals become more frequent

Missing information

Awareness of the escalating nature- and climate-related risks is growing amongst financial institutions and companies. Many now want to translate that awareness into action, but they do not yet have the information they need to understand how their organization depends on and impacts nature, affecting their organization's immediate financial performance, and longer-term financial risks. Better information is necessary to enable financial institutions, and the companies they finance, to incorporate nature-related risks and opportunities into their strategic planning, risk management and asset allocation decisions.

A market-led approach

Launched in June 2021, the market-led Taskforce on Nature-related Financial Disclosures (TNFD) aims to address the information gap by developing and delivering a risk management and disclosure framework for organizations to report and act on evolving nature-related risks, which aims to support a shift in global financial flows away from nature-negative outcomes and toward nature-positive outcomes.

The TNFD consists of various groups, which together make up the TNFD Alliance. At the center sits the Taskforce, a group of 34 Taskforce Members with a market capitalization of over USD 3.1tn, over USD 18.3tn in assets and a footprint in over 180 countries. This Taskforce is supported by the TNFD Forum, a consultative grouping of over 275 institutional supporters. The Taskforce and Forum are managed and coordinated by the TNFD Secretariat, which also convenes and directs a TNFD Knowledge Hub. The Knowledge Hub is a globally distributed network of subject matter experts and advisory partners with best-in-class scientific knowledge and insights on biodiversity, natural capital, market standards and reporting practice. Finally, the Alliance includes a Stewardship Council representing the founders and funders of the TNFD.

This collaborative and market-led structure is enabling TNFD to design a framework that is both scientifically rigorous and readily implementable for businesses and financial institutions. The first beta version of the framework will be released in March 2022. It will then be tested by market players and other stakeholders, and their feedback will inform subsequent iterations of the framework before a final version is released in 2023.

Building on existing standards and guidance

The TNFD will not create a new standard for risk management and disclosure. TNFD's aim is to establish and promote the adoption of an integrated risk management and disclosure framework that aggregates the best tools and materials that already exist. The framework will promote consistency for nature-related risk management and reporting.

In practice, TNFD will incorporate existing nature-relevant expertise, standards, and guidance by partnering with leading scientific experts, standard setters, and industry bodies through the TNFD Knowledge Hub. TNFD's initial group of core knowledge partners, announced in January 2022, include organizations like CDP, GRI, IUCN, SASB's Standards Research Team, the Science Based Targets Network and many more.

In terms of the framework itself, the TNFD will build upon the Task Force on Climate-related Financial Disclosures (TCFD). TNFD will harness synergies in framework design and stakeholder engagement to avoid repetition and maximize the prospects of accelerated market adoption. The aspiration is that the two frameworks will be comprehensive in their coverage of climate and nature-related financial risks, and complementary in their usability and adoption by market participants. Seeing the whole picture is important. The interrelationship of climate and nature remains fundamental, and the markets must address them in tandem.

Complex data challenges

The complexity of nature-related risks poses challenges, especially when it comes to data. Businesses use data to understand and measure their impacts, dependencies, risks and opportunities. When it comes to nature, a challenging aspect is that input data is mostly location specific, as the risks associated with nature impacts or dependencies vary significantly depending on where those impacts or dependencies occur. A company reliant on substantial amounts of water for mining will face different risks if their operations occur in a location exposed to drought or depleting levels of groundwater than if they occur in a water-rich area. Companies and financial institutions need location-specific data that they currently may not have – though nature-related data offerings specifically targeted at financial institutions and corporates are rapidly emerging now, with many integrating satellite data and other geo-specific data. In the coming years, continued technological progress will make it ever easier to access, and make sense of, location-specific and spatial data.

Analysis of this 'input' data produces 'output' data that can be used in disclosures and reporting, enabling investors and creditors can understand the risks of the companies they are looking to finance, and measure and compare across organizations when making investment decisions. Financial institutions also need access to this data on the risks of the companies they invest in to be able to report on their own nature-related risks. Similarly, regulators will rely on output data from organizations to make informed regulatory decisions for the economic and financial system. Several regulators and central banks have joined the TNFD Forum, and the Network of Central Bank and Supervisors for Greening the Financial System (NGFS), which counts 100 central banks and supervisors as members, is a TNFD knowledge partner.

Figure 32 Emily McKenzie, Technical Director at TNFD

Source: TNFD

Towards nature-positive

Disclosures is only one aspect of TNFD's work. Generating further reporting is only a steppingstone to action. A risk management and disclosure framework will enable businesses and financial institutions to take action to manage their exposure to nature-related risks, as well as realize new opportunities. Ultimately, addressing nature-related risks will mean halting and reversing nature loss globally. Corporates and financial institutions will need to shift capital away from riskier nature-negative activities and towards nature-positive ones. Shifting to nature-positive business models will generate more than USD 10tn in additional opportunities each year and support some 350 million jobs by 2030, according to the World Economic Forum. In the long-term, this shift towards nature-positive, alongside the shift to net zero, is what TNFD aims to achieve.

Storebrand: Our commitment to nature

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How is biodiversity/nature financially relevant for a large global investor such as Storebrand?
Apart from an absolute moral obligation to conserve nature, the loss of biodiversity and the related decline in ecosystem services are creating risks to business. From an investor perspective, this loss in biodiversity and degradation of ecosystems will affect the capacity of long-term economic growth and is likely to have implications for long-term asset returns. This has been highlighted through the Dasgupta Review on the Economics of Biodiversity, an independent review commissioned by the UK Treasury. Business risk may be related to the direct impacts of a company's operations on biodiversity, or to the dependence of a business on ecosystem services as inputs to production. All companies, regardless of sector, both impact on biodiversity and ecosystems and depend on ecosystem services. According to World Economic Forum, USD 44tn of economic value generation – more than half of the world's total GDP – is moderately or highly dependent on nature and its services and is therefore exposed to nature loss. At the same time, biodiversity and ecosystem services are also the basis of new business opportunities. This is most obvious in the case of companies selling goods and services that are directly associated with biodiversity and ecosystems.

The Dasgupta Review classified the financial risks into: *physical risks*, such as changes in ecosystem services due to degradation of natural assets; *litigation risks*, such as legislation and fines from damage to natural assets; and *transition risks*, such as policy changes and shifts in social norms as the economy adjusts to more sustainable approaches.

A recent scientific study published in Nature Communications in May 2021, looked at the relationship between deforestation and rainfall. The study shows that beef and soy industries in the Southern Amazon region of Brazil are at risk of almost USD 200bn of productivity losses due to deforestation.

How is Storebrand concretely working with biodiversity/nature in an investment context and when following up companies you have invested in?
We are in dialogue with a large number of companies each year, seeking to influence them to move in a more sustainable direction. Biodiversity has been part of our corporate engagement program for some time and particularly relevant to our engagement with the food and agriculture sector, specifically in soft commodities value chain such as palm, beef, soy and timber. Our ambition is to have an investment portfolio that does not contribute to deforestation by 2025. Storebrand will not knowingly finance operations that are illegal, fail to protect high conservation value forests/land or violate the rights of workers and local people.

Going forward, we will expand our approach beyond these sectors and also engage with other sectors with high impact or sectors that highly dependent on biodiversity. In general, companies depending on or impacting biodiversity and ecosystems should integrate relevant nature-related risks and opportunities into their corporate strategy, risk management and reporting. Reporting standards and principles in this area are still evolving, and once the Task Force on Nature-related Financial Disclosure (TNFD) has delivered a standardized reporting framework for biodiversity, we expect our investee companies to report in line with these recommendations.

What is the most challenging at this point working to address biodiversity, and how will this develop in the years onwards?
A key barrier is the lack of an agreed methodology to measure and quantify impacts and dependencies on biodiversity at the portfolio level. There are currently multiple parallel efforts underway to develop measurement approaches to measure biodiversity performance. It is highly likely that these biodiversity methodologies will contain a high degree of uncertainty and lack granularity. Measurement tools alone would not be a silver bullet.

There are also a number of frameworks being developed to enable companies and investors to report their performance and efforts to manage their biodiversity impacts and dependencies. We are in particular encouraged by recent developments such as the Taskforce for Nature-related Financial Disclosure (TNFD) and The Science-based Targets Network (SBTN).

How do you cooperate with other investors globally in the theme?
Storebrand is collaborating with other investors through various initiatives such as Finance for Biodiversity Foundation, SBTN and TNFD to 1) engage systematically with companies 2) improve data and methodologies for impact assessment and 3) public policy advocacy. One particular initiative to highlight in this regard is the Investors Policy Dialogue on Deforestation (IPDD). The Investor Policy Dialogue on Deforestation (IPDD) is co-led by Storebrand and currently supported by 55 financial institutions with approximately USD 7tn in assets under management. Collectively, the group engages with government related authorities and associations, as well as other stakeholders in countries with significant forest assets that are threatened by escalating deforestation rates. The first sovereign engagement initiated by the IPDD was in June 2020 with Brazil, and since October 2020 has expanded to Indonesia.

You visited COP26, when Storebrand also launched the initiative on no deforestation by 2025. Any reflections from COP26 and the increased focus on protection nature during COP26 and we will not reach the Paris agreement goals if we do not also focus on protecting nature?
Nature loss was high on the climate agenda. Without investment in nature, there will be no net zero. Climate change is the third largest direct driver of biodiversity loss, it has shifted species distribution, undermined ecosystem function, and is already impacting agriculture, aquaculture, and fisheries. In turn, the loss of biodiversity and the vital services it provides also reduces our natural world's ability to help limit climate change and mitigate its negative impact. Degraded ecosystems are less able to maintain the regulatory services needed to manage climate change, such as carbon sequestration or the ability to act as a buffer to extreme weather events.

With the interest in the topic, we also saw commitments from governments, financial institutions and corporates. This included leaders from more than 100 world countries, representing about 85% of the world's forests, promised to stop deforestation by 2030, which was backed up by 33 major financial institutions with USD 8.7tn in assets under management committed to phase deforestation driven by agricultural commodities out of their portfolios by 2025. But as we have seen in the past, pledges will only get us so far. For example, the New York Declaration on Forests was signed by many governments and companies in 2014 with the aim to "cut natural forest loss in half by 2020 and strive to end it by 2030". Not one company achieved this high-profile 2020 goal. 2022 should be the year where we turn good intentions into actions and set a clear path to deliver on both climate and biodiversity commitments.

What needs to happen globally, if we are to achieve the protection and restoration of biodiversity and nature?
The Paris agreement was an important milestone for the financial sector. Article 2.1.c gave financial institutions the signal, loud and clear, that we need to align our business models with the goals of the Paris Agreement. Since then, we have come a long way. The core of the financial system is now publicly committed to deliver on net-zero. At COP26 in Glasgow, USD 130tn of private capital committed to transforming the economy for net zero (450 firms across 45 countries). Analysis shows that private sector could deliver 70% of total investments needed to meet net zero goals.

A similar process and structure are now needed for nature, with the Convention on Biological Diversity's (CBD) Global Biodiversity Framework providing the cornerstone on which the financial sector can build a systematic approach to address nature-related risks and opportunities.

The new Global Biodiversity Framework which we expect to be adopted at CBD COP 15, should include an explicit expectation for financial institutions and businesses to align financial flows to global biodiversity goals and targets. This global goal should be supported by appropriate regulatory measures and financial incentives at all levels. The real test of such goal will be if it is well taken into account when governments develop their national biodiversity strategies and action plans.

Corporates' biodiversity action: Interview with Stora Enso, Vattenfall, and NCC

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Over the course of the past year, nature and biodiversity made their way into the spotlight of sustainable finance, which has, until recently, been occupied predominantly by carbon emissions. These new areas of focus will undoubtedly continue being one of the main topics of conversation when we discuss the future of this field, and of corporate finance in general. And while for many companies, nature and biodiversity have not yet become anything more than just a new sustainability-related topic of conversation, others have already made this area a solid part of their sustainability work.

In this article, we look at three companies: NCC (construction), Vattenfall (energy), and Stora Enso (forestry and forest product manufacture), to see how they are already today assessing and addressing their impacts on biodiversity. We asked them to answer three questions: 1) Why do you consider biodiversity an important/material subject? 2) How are you working to assess and address your biodiversity impact today? And 3) What kinds of developments do you expect to see in regard to this subject in the future? Here is what they said:

NCC

Why do you consider biodiversity an important/material subject?
NCC is a company driven by facts and data and it's a fact that our international community is in the midst of a biodiversity crisis. By creating pockets of biotopes, we hope the ecosystems become more robust as the new sites can function as steppingstones for a variety of organisms.

When NCC operates a quarry or gravel pit there is an environmental impact. Working with biodiversity is a way to return a site in as good a state as possible to nature and to the local community.

How are you working to assess and address your biodiversity impact today?
In a quarry or gravel pit, we will initially map which biotopes and species are present at the site and in the local environment and whether there are populations of endangered organisms in the area we can help. Specifically, we have worked with dormice, natterjack toads, great crested newt, and a large number of plants. For some species it is important that there is a known local donor population, others find the biotope once it is there.

NCC Kielo® – Our living site – is a concept where we have plans with an identified set of criteria for conducting structured work to enhance biodiversity in our pits and quarries. We focus on investigation, targets, measures, follow-up and results. When necessary, we revise and adapt the plans. When it's time to record how we are doing, we estimate the costs, potential savings and earnings, as well as summarize the biological result at the site. What is unique about NCC Kielo is its comprehensive approach. We support, develop and enhance biodiversity both during operations and afterwards, in the rehabilitating phase.

In connection with our restoration of quarries and gravel pits, NCC has many options for adding biotopes that are missing locally and that can support species that are pressured or endangered.

We can shape the landscape so that the important biotopes arise. We create environments for insects and frogs through various measures during operation, e.g., creating small bodies of water and so-called bio depots in the form of dead wood and rock cairns. We can choose which trees to plant, make sure they are indigenous.

We often leave areas without topsoil which favours many plants and organisms that are under pressure in e.g., an intensively farmed landscape. Areas can be of various size but often we leave behind substantial new elements in the landscape. For example, in Sofiedal (Sweden) a 33 hectares lake is planned, and in Siem (Denmark) 75 hectares are left with a mosaic of deciduous woodland bogs, small permanent and temporary ponds and open space without topsoil.

A very important element in the work on biodiversity is documentation and follow-up, many biodiversity projects get a lot of attention year one and then they are forgotten. At NCC, we monitor and follow up on our efforts every two or three years. At some sites we have been monitoring for more than 15 years.

Figure 33 NCC works with biodiversity

Source: NCC

What kinds of developments do you expect to see in regard to this subject in the future?
Since the EU Biodiversity strategy for 2030 is now in place, we expect to see increasing concern regarding for example the possible impact of our business on Natura 2000 areas. That is because one action in the strategy is to enlarge existing Natura 2000 areas, with strict protection for areas of very high biodiversity and climate value. It is also possible that there will come legally binding targets for restoration of degraded ecosystems in the future. If that is the case, it is likely they will affect us.

One of the six goals in the EU taxonomy is "The protection and restoration of biodiversity and ecosystems" and NCC will disclose the share of our economic activity that supports this goal every year from now. Therefore, we see that we will need to have an increased focus on our work with biodiversity within the coming years, and also further improve the data collection on our performance in the area in order to disclose it publicly.

***Kristine Ek**, Head of Sustainability, NCC Industry*

***Katarina Van Berlekom**, Raw Material Supply Coordinator, NCC Industry*

***Christian Hans Abildtrup**, Chief Geologist Cand. Scientist, NCC Industry*

***Johan Kvickström**, Communication Partner, NCC Industry*

Vattenfall

Why do you consider biodiversity an important/material subject?
Vattenfall is determined to enable a fossil free living within one generation. To reach this goal, we are reducing our emissions along the 1.5-degree trajectory of the Paris Agreement and aim to reach net zero in 2040. However, we have wider ambitions than net zero. Since our work with infrastructure and renewable energy will require land use in the future, we focus also a lot on reducing our impact on nature and options to enhance biodiversity. In fact, we want to strive towards a net positive impact on biodiversity by 2030. To deliver on our ambition we work in three main areas: We conduct a broad range of biodiversity enhancing projects, we measure our biodiversity footprint and we invest in long-term biodiversity research to contribute to more evidence-based knowledge and technology development.

How are you working to assess and address your biodiversity impact today?
Climate change is one of the major threats to biodiversity, which means that our investments in a fossil free future is a very important contribution to mitigate impacts. But we do much more to further safeguard biodiversity. Targets and ambitions are important to define, but it is concrete measures in nature that makes the real difference. We have, as an example, mapped over 8,600 km of power line corridors for "biodiversity hotspots" to further protect species like the red-listed butterfly marsh fritillary. Within our hydro power we deploy new technologies to improve fish migration, for example by using face recognition and artificial intelligence (AI).

By implementing nature inclusive design, we enable species to co-exist with our renewable energy projects. With this, we have for example enhanced conditions for the Atlantic cod and other fish species by creating artificial reeves on offshore wind sites. And we are improving habitats for capercaillies through ecological forest management practices in onshore wind projects.

Figure 34 Butterfly march fritillary

Source: Vattenfall

What kinds of developments do you expect to see in regard to this subject in the future?
It is evident that there has been more attention on biodiversity and nature protection during the last years and we expect this to continue. It is crucial that we see climate and biodiversity as two challenges that needs to be treated as one and promote the solutions that incorporates both perspectives. Good "best practice" exists but we need to scale up and increase acceptance so that we can continue to decarbonize society and protect nature simultaneously.

Biodiversity is complex and it will be increasingly important to implement robust ways to measure impacts and progress. Vattenfall is a member of the Corporate Engagement Program within The Science Based Target for Nature (SBTN) to learn more about how we can set biodiversity targets that can be defined in line with science and how we can measure our baseline. In 2021 we initiated a Biodiversity Footprint Assessment (BFA) to assess our impact in the full value chain scope. Understanding that biodiversity impacts the whole value chain will be necessary going forward, hence, there will be more focus on supply chain data and transparency.

***Josefin Blanck**, Strategic Environmental Advisor, Vattenfall*

Stora Enso

Why do you consider biodiversity an important/material subject?
Biodiversity is a prerequisite for functioning ecosystems that supply clean air, water and food, and global biodiversity is now under pressure. Preserving nature values and enhancing biodiversity are at the heart of Stora Enso's business and forestry practices. We believe that active biodiversity management is the best way to protect and enhance biodiversity, while at the same time using forests for commercial purposes. Naturally, biodiversity is on top of many investors' sustainability dialogue with companies and an increasingly important theme for sustainable credits.

How are you working to assess and address your biodiversity impact today?
Stora Enso has had a solid track record in safeguarding forest biodiversity since the 1990s, e.g. by pioneering forest certification and restoration. Our biodiversity activities cover the whole lifecycle of forests, from planting to harvesting. All our forestry operations are planned according to approved biodiversity management practices.

In 2021, we set a new biodiversity ambition to achieve a net-positive impact on biodiversity in our own forests and plantations by 2050. We have initiated a set of actions, such as increasing the share of both deciduous trees and the amount of dead wood. Recognizing regional and local perspectives is important as "one-size fits all" solutions cannot be used in improving biodiversity; biodiversity management must always be adapted to the conditions of each forest site.

Stora Enso has initiated a holistic, science-based monitoring program with academia to track progress and enable us to further develop our practices. We have developed more than 15 biodiversity indicators to measure both the state of biodiversity in our forests, the quality of our forestry operations and their impact on biodiversity. During 2022, we will start to share data on our progress through a new online reporting tool and provide forest owners with enhanced biodiversity services.

We are active in developing global biodiversity standards by sharing our experience and knowledge, including how to capture CO_2 in forests while preserving biodiversity. We believe that the collected data, coupled with our experience and science-based approach, will provide a strong basis for broader biodiversity reporting and useful information for our stakeholders.

What kinds of developments do you expect to see in regard to this subject in the future?
Continuous R&D is needed to increase our knowledge and understanding of biodiversity. Collaboration is in place between academia and businesses, e.g. in creating both new forestry practices to enhance biodiversity and indicators for monitoring. There are currently no jointly agreed indicators supporting investors to assess and compare companies' biodiversity performance. To connect biodiversity to financial instruments and markets, indicators and regulation should be based on science and deep knowledge on forest ecosystems. Investors are increasingly expecting issuers to contribute to the harmonization of KPIs to develop reporting frameworks. We see that companies, academia, policy makers and financial institutions should work together to establish shared standards on how to assess companies' nature impact and biodiversity risks. This has now started to happen, and we are actively participating, sharing our knowledge to support this development.

***Kaarlo Hoysniemi**, Group Treasurer, Stora Enso*

Orkla: Assessing nature-related risks and addressing impacts

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How are biodiversity and nature financially relevant for a food company such as Orkla?
Nature and biodiversity encompass several topics and problems with financial implications for food companies. Climate change, water scarcity, tropical deforestation and biodiversity loss are closely connected, and all affect the food value chain. As a food company we have a responsibility to contribute to reducing the environmental impact linked to our own value chain, in addition to which we are commercially affected. Orkla's work to preserve biodiversity revolves around preventing deforestation, promoting sustainable agriculture and fishing, and ensuring that plastic packaging is reused in a circular economy. By collaborating with suppliers of tropical commodities and certification organizations to ensure deforestation-free production, we contribute to preserving precious forest ecosystems. By collaborating with the agricultural sector and expert organizations to meet recognized standards for sustainable agriculture we contribute to improved soil health and better conditions for insects and other species in agricultural areas. By engaging with companies and organizations in all parts of the packaging to increase plastic waste recycling, we prevent plastic waste from ending up in nature.

How can it impact you financially? Do you have any concrete examples?
In the same way as other food companies, we can be affected indirectly through the raw materials we purchase. Agricultural practices that cause soil degradation and inadequate pollination due to reduced insect populations can – in combination with extreme weather and increasing water scarcity in many areas – affect access to and prices of food raw materials. We must therefore ensure that the raw materials we use are produced in a sustainable way. In specific terms, this means promoting good agricultural practices, preventing deforestation, contributing to sustainable fish stocks and ensuring that packaging is recycled and does not end up in the natural environment.

In addition to the risk related to volatile prices and reduced supply of raw materials, Orkla is also affected by increased operational costs related to a number of factors. The increased costs can be related to: securing verified sustainably produced raw materials, development of recyclable packaging solutions, as well as new regulatory requirements, such as, for example, increased waste handling fees. However, we believe that good management of climate and nature risk is important to build trust in our brands, and we therefore see the costs as an investment in our ability to succeed in the long run.

Moreover, the need to protect nature and biodiversity holds opportunities for Orkla, such as growth opportunities from investment in seaweed or plant-based food. In addition to absorbing carbon emissions, seaweed may also have a positive effect on local ecosystems. Plant-based food requires significantly less farmland than meat and dairy-products, reducing the need to convert natural areas into farmland.

How do you assess and minimize risk associated with biodiversity and nature?
We have internal teams for marine resources, vegetable oils, cocoa, nuts & seeds, fruit & berries, and other important raw materials which assess sustainability-related risks on a regular basis and suggest solutions to various environmental and social challenges.

In 2021 we carried out a broad assessment of Orkla's impact across the value chain and climate and nature-related risks. The assessment is used as the basis for identifying areas in with room for improvement.

We have ambitious long-term sustainability targets which are well embedded in business plans, and our companies have been working for many years to

- Ensure deforestation-free supply chains through certification and other measures
- Prevent plastic pollution and contribute to circular packaging value chains
- Contribute to sustainable agriculture, sustainable fishing and animal welfare by engaging in collaboration projects and promoting better industry practices

What are the main challenges for Orkla to address the theme of biodiversity, and how do expect this to develop?
The challenge lies mainly in the complexity of the problems and solutions. No company can solve these challenges alone; we need to collaborate within and across industries, stakeholder groups and countries. For example, we have been actively engaged in several collaboration initiatives to develop roadmaps and recommendations for how to increase plastic waste recycling. We are also participating in the work of SAI Platform (Sustainable Agriculture Initiative) to develop common principles for regenerative agriculture. Another issue is availability of data and a common framework and guidelines on how to measure status, activities and performance in the value chain.

Figure 35 Naturli' – plant-based products

Source: Orkla

There are upcoming Science Based Targets for Nature (SBTN), are you planning on setting such targets?
It is important that targets and measures are based on knowledge. We already report on science-based targets for climate, and we wish to set similar targets for biodiversity. We are therefore participating in the development of a method and framework for this process under the auspices of the Science Based Targets Network. We have committed to this work by joining the SBTN Corporate Engagement Program.

Do you experience that investors are asking questions and focus in biodiversity and nature, and have you experienced increased attention?
Expectations regarding the management and reporting of climate risk have definitely increased, but biodiversity is also becoming an important topic for many investors. We have reported on climate impact and associated measures to the investor initiative CDP for several years, as well as to the CDP water and forest programs. This is important for building trust in our work, but also for our future strategy plans. The Task-Force for Nature Related Financial Disclosures is currently being established, and the new EU directive on corporate sustainability reporting will also include requirements for reporting impacts on nature and biodiversity.

Do you see any opportunities associated with biodiversity and nature for a company such as yourself?
An example of growth opportunities is plant-based food. One of the three corporate values at Orkla is "Trustworthy" and we see opportunities for building trust in our branded goods by addressing challenges in the value chain in a good way. We want to play a driving role and contribute actively to switching to sustainable value chains for food. Setting science-based biodiversity targets and reporting on them is important to promote trust in our work.

How do you collaborate with other companies or organizations on this theme?
Orkla's work to preserve biodiversity revolves around preventing deforestation, promoting sustainable agriculture and fishing, and ensuring that plastic packaging is reused in a circular economy. These are areas in which we have worked for many years, and in which a concerted effort is crucial. We are therefore engaged in a number of joint industry projects and initiatives. To contribute actively to the process of switching to sustainable value chains for food, we are participating in several pilot projects focused on regenerative agriculture. As far as possible, we buy certified raw materials, collaborate with local farmers, monitor our suppliers' sustainability performance and participate in improvement projects. Orkla was also one of the first companies to sign the EU's new Code of Conduct on Responsible Food Business and Marketing.

The EU Commission's Complementary Delegated Act on Gas and Nuclear

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The EU Commission proposal on a Complementary Delegated Act (CDA)[19] including gas and nuclear into the Taxonomy Regulation has become a contentious matter. Gaseous fossil fuels had earlier been taken out from the first delegated act on climate mitigation, while nuclear had never been part of the EU Taxonomy proposals on climate mitigation.

With its energy system approach, the CDA is more a reflection of energy activities that are part of an energy system in transition, which is relevant but not the defined role of the EU Taxonomy, i.e. a classification of environmentally sustainable activities. The impact of the CDA on access to capital for gas and nuclear remains to be seen. Some financial market participants[20] have already communicated clear views on whether to include gas and nuclear as green irrespective of the CDA.

The success of the Taxonomy will be determined by financial market uptake of the taxonomy in investment decisions, and in communication with stakeholders. The political nature of the CDA process for gas and nuclear establishes a fundamentally new way of developing Taxonomy criteria, which some argue may undermine the credibility of the Taxonomy.

What is in the Commission's proposal?

For gas, the Commission's proposal sets a sunset date for gas related investments to be called sustainable if the construction permit is granted before 31 December 2030. The proposal also defines the criteria under which gas fired power generation could be considered environmentally sustainable during this transition period.

First, gas power generation is eligible if lifecycle emissions are lower than 100gCO_2e/kWh. In practice, this would only be achievable combined with CCS technology. Second, the Commission proposes to consider gas power generation as sustainable if, among other conditions, the following apply:

For combined heat and power facilities, direct GHG emissions are lower than 270g CO_2e/kWh while for electricity generation, direct GHG emissions cannot not exceed an average of 550kgCO_2e/kW of the facility's capacity over 20 years. The latter implies that a facility can have high emissions the first years and low emissions in the last years, through fewer operating hours or use of low carbon fuels, without exceeding total allowed emissions (20 years x 550 kg = 11 000 kg CO_2e/kW)

The facility replaces a coal fired power plant, cannot be replaced by renewable energy sources, blends in 100% low carbon gases by 2035 and the replacement leads to a reduction in GHG emissions of at least 55% over the lifetime of the facility.

Similar to gas, nuclear activities also have a sunset date by 2045 except for closed fuel cycle technologies. The Commission's proposal focuses on the safe operation of nuclear power plants and disposal of nuclear waste through several requirements on member state ratification of key nuclear treaties, financial resources to cover radioactive waste management and decommissioning, operational final disposal facility for very low to

[19] draft-CDA-31-12-2021.pdf (euractiv.com)
[20] For example EIB and Net Zero Asset Owners' Alliance

intermediate-level radioactive waste and a plan to have an operational disposal facility by 2050 for high-level radioactive waste.

Response to the proposal by the EU Platform on Sustainable Finance

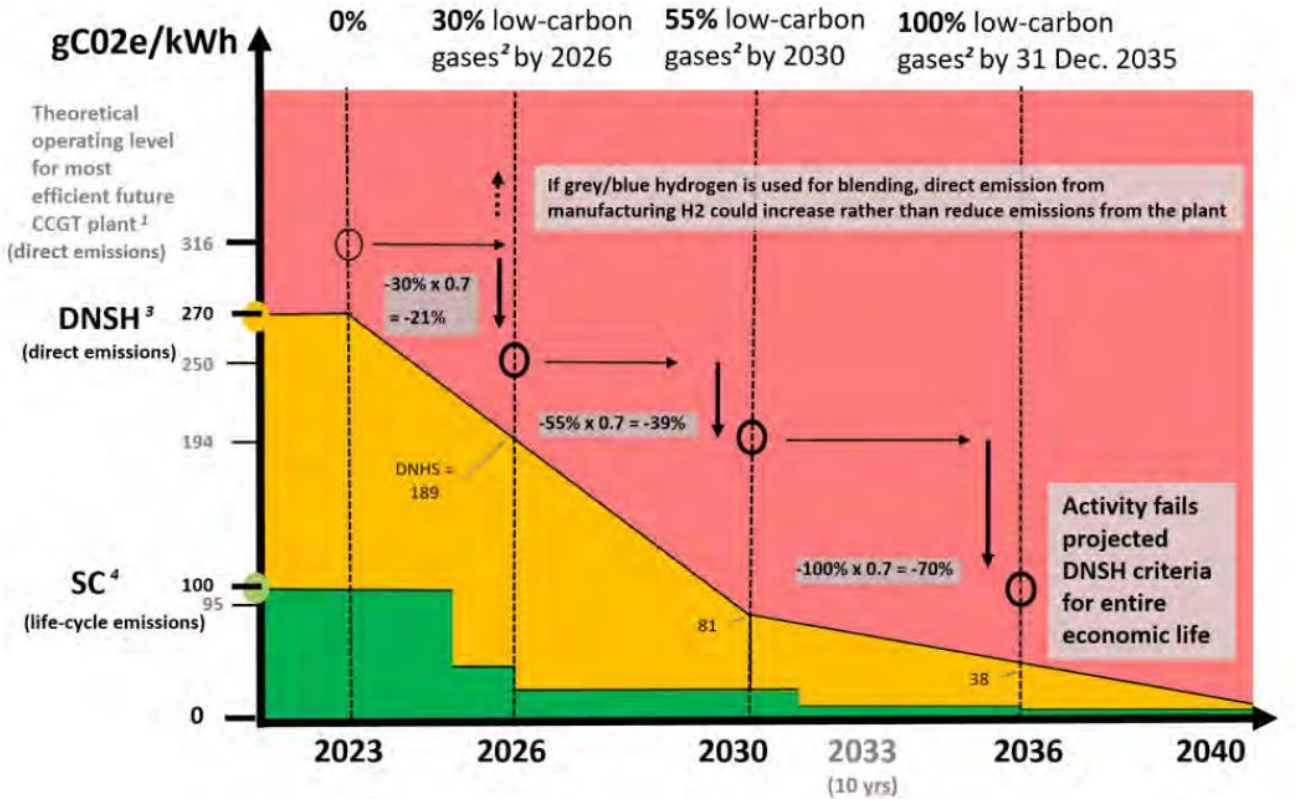
The EU Platform on Sustainable Finance has been established to advice the EU Commission on the contents and development of the EU Taxonomy. Normal procedure is that the Platform proposes the Technical Screening Criteria (TSCs) and Do No Significant Harm (DNSH) thresholds for an economic activity. The Commission uses the proposal as a basis for turning it into a delegated act. This time the Platform was not involved in the criteria development. In its response to the proposal[21], the Platform opines that the Commission has fundamentally changed their methodology from looking at the environmental performance of individual economic activities as defined in the Taxonomy Regulation to defining Taxonomy alignment through energy activities that are part of an energy system in transition. From this the Platform makes four main arguments:

First, the Platform argues that the TSCs are not consistent with the Taxonomy Regulation defining transitional activities, article 10.2, and DNSH, article 19. The effect is that the draft CDA activities could not be considered sustainable within the meaning of the Taxonomy Regulation.

Second, the Platform criticizes that the proposed CDA would allow GHG emissions from gas fired electricity generation to be above the DNSH level. The Platform presents modelling showing that the current TSC for gas fired electricity generation may stay at a significant harm level for the lifetime of the investment taking into account the tightening of the TSCs and DNSH criteria for power generation in line with the energy transition targets of the EU (Figure 36). Furthermore, the Platform refers to its draft proposal for an extended taxonomy where significant improvements that do not reach the green performance space, as in the case for gas, could be labelled intermediate transition.

Third, the Platform concludes that for nuclear, the criteria are not robust enough to ensure no significant harm to water and marine resources, circular economy, pollution prevention, or biodiversity, and would require substantial changes to do so in line with the requirements set out in the Taxonomy Regulation.

Figure 36 Modelling of the CDA on gas



Source: Presented in the EU Platform on Sustainable Finance response to the EU Commission

[21] EU Platform on Sustainable Finance response to complementary Delegated Act (europa.eu)

Fourth, and relevant to financial markets, the Platform argues that the draft disclosure arrangements are unsuitable for financial markets as they do not sufficiently distinguish the gas and nuclear activities from other Taxonomy aligned disclosures. The Platform also believes that the verification requirements are insufficient and not aligned in timing with financial instruments such as loans and bonds, which in practice could mean that a loan is called green based on a plan that the facility would improve significantly after the repayment of the loan or bond.

Enduring political disagreements about the purpose and scope of the taxonomy are behind the ongoing debate about including gas and nuclear

In March 2018, the Commission presented its Action Plan on Financing Sustainable Growth, aiming to mobilize the private sector for the transition towards a low-carbon, more resource-efficient and more sustainable economy[22]. The plan pointed out that the lack of a clear definition of what is 'environmentally sustainable' was one of the biggest obstacles for scaling up green investment. This motivated the introduction of a green taxonomy as a cornerstone of the plan.

According the Commission's plan from 2018, the Taxonomy should translate the best sustainability practices in different sectors into an easy to use list for financial institutions. The plan highlighted that the taxonomy criteria need to be clear and certain, while the uses of the taxonomy need to be flexible to allow various investment strategies to build on this taxonomy. The Commission also established the Technical Expert Group (TEG) to advice the Commission on how to outline TSCs for how to assess how an activity would qualify as sustainable in the Taxonomy[23].

When the Council formally adopted the Taxonomy Regulation in April 2020, all member states voted in favour, except for Austria, Bulgaria, Hungary and Poland that abstained and Sweden voting against. Voting statements by member states mirror central issues in the negotiations and has reoccurred during the process of adopting the delegated acts:

How much decision power should be delegated to the Commission? Poland argued that the legislative text leaves too much room for interpretation on key issues and emphasizes the importance for gas in their transition journey. Germany and Sweden are critical to the delegation of power to the Commission to decide on forestry issues on an EU level as this is regarded as a national competence.

Should nuclear be part of a green taxonomy or not? Austria and Luxembourg state concerns that the regulation leaves a door open for inclusion while Czech Republic, Hungary, Slovakia and Slovenia have the opposite view.

The regulation explicitly excludes solid fossil fuels but delegates to the Commission to decide upon the technical screening criteria in delegated acts for all other activities, including gas and nuclear. Based on the TEG final report, the Commission publishes a draft proposal on a Climate Delegated Act for consultation in November 2020. Mindful of the potential controversies, the inclusion of gas and nuclear was decided to be treated in a separate act.

The Commission adopted the final Climate Delegated Act on the 21 April 2022. To improve the odds of passing the delegated act through the scrutiny period, the Commission accommodated a sufficient share of the critique received before and during the consultation[24]. After a prolonged scrutiny period, the Council accepted the act in December 2021, although 13 out of 27 member states objected, among them Sweden and Finland.

With the current Complementing Delegated Act, the discussion on the Taxonomy has come full circle. The politically sensitive questions of how to deal with nuclear and gas which the Commission had delegated to independent experts is now back on the negotiating table of politicians.

Some reflections from the sidelines

The Taxonomy Regulation has grown more complex than vas envisaged by many from the start, due to features in the regulation itself but also due to more widespread references to the taxonomy outside the direct scope of the regulation:

The initial Commission proposal aimed at institutional investors, not credit institutions. The disclosure requirements for companies affected by the Non-Financial Reporting Directive (NFDR) including the Green Asse Ratio for banks in the final Taxonomy Regulation adds a layer of complexity when classifying banks credit portfolio.

The introduction of the subcategories enabling activities and transition activities into what is classified as green

[22] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0097

[23] EU seals deal on green finance in breakthrough for climate goals – EURACTIV.com

[24] The agricultural sector was temporarily removed to get aligned with the revision of the EU Common Agricultural Program (CAP), bioenergy was revised and no longer categorised as a transition activity, some criteria was also revised with regards to forestry and hydropower.

according to the Taxonomy adds complexity to the disclosure and communication of the taxonomy, partly because the term transition is widely used with different meanings.

The Taxonomy was supposed to extract legislation, principles and best practice of top tier sustainable activities. In light of sector legislation revisions following the Fit for 55, potential spill-over effects are a concern among sector experts, fearing that a taxonomy threshold, developed in a financial market context would be regarded as sector standards.

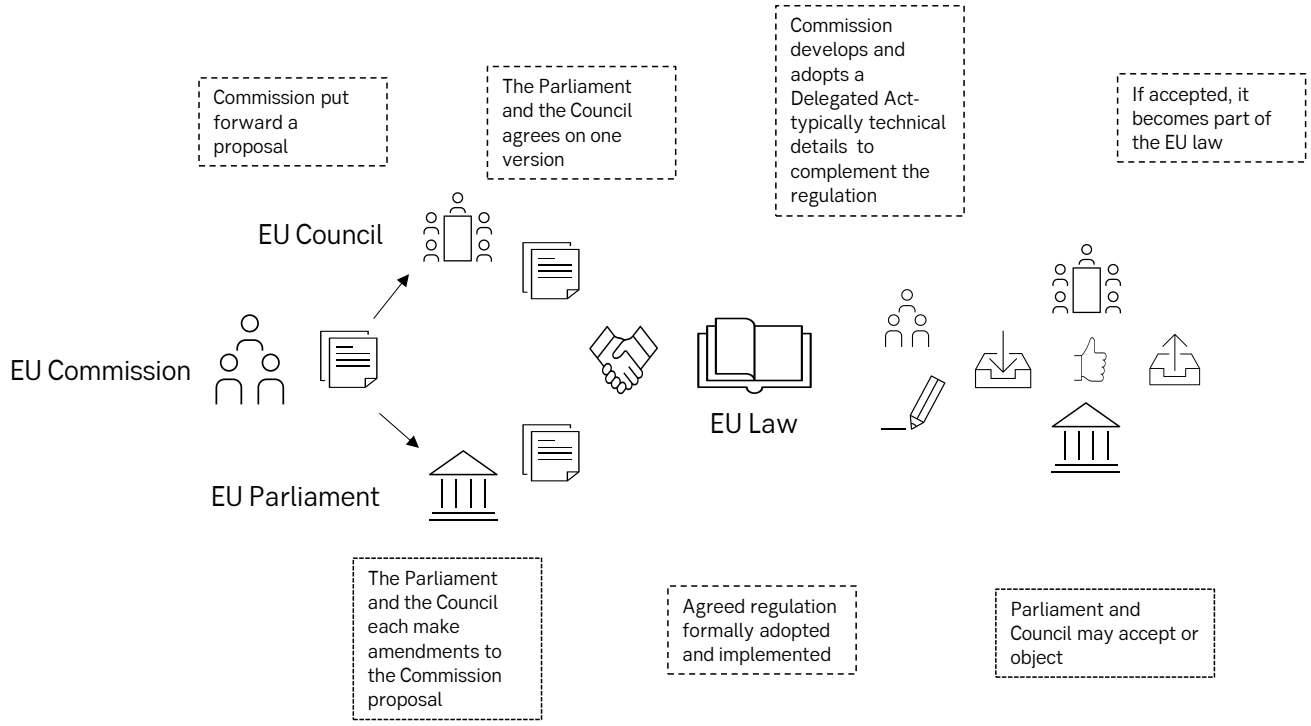
Taxonomy features have become part of public spending when integrated into Next Generation EU. This is the EU's Covid-19 recovery instrument which can raise up to €800 billion through bond issuance between mid-2021 and 2026. The main bulk of these funds goes to the Recovery and Resilience Facility (RRF) - offering grants and loans to support reforms and investments in the EU Member States.

At least 37 percent of member states' reform plans must go to measures that are specifically meant to support climate-change objectives using the taxonomy Do No Significant Harm principle (DNSH)[25].

A financial market regulation turning into big politics

So, what happens now? The Commission adopted the Act on 2 February after a quick consideration of the feedback from member states and the EU Platform. As for all delegated acts the Council and EU Parliament will have a four plus two months scrutiny period. The EU Parliament "only" needs simple majority to reject the proposal while it has been decided that in this case, the Council needs a reinforced qualified majority to object the delegated act. In the meanwhile, several countries, such as Austria and Luxembourg, have threatened to take the EU Commission to court on the CDA. In short, it will be politics defining the future role of gas and nuclear in the Taxonomy.

Figure 37 The EU regulatory decision process



Source: SEB

[25] Recovery and Resilience Facility | European Commission (europa.eu)

Commentary on the latest EU Taxonomy developments

°CICERO Shades of Green

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The EU Taxonomy aims to establish a common language on green. At a high level, it has done just that. But the controversial proposal to include nuclear energy and natural gas power plants as climate change mitigation activities has sparked a debate that illustrates the conflux of influences and opinions on what is green.

There will always be disagreements and regional or national preferences on what to call green. In part this is based on different development pathways, access to natural resources and political governance. Binary decisions of what is green or not become more difficult given these underlying differences.

Putting these differences aside, what matters most is the greenhouse gas emissions that are emitted into the atmosphere, and careful management of potential local environmental or social risks.

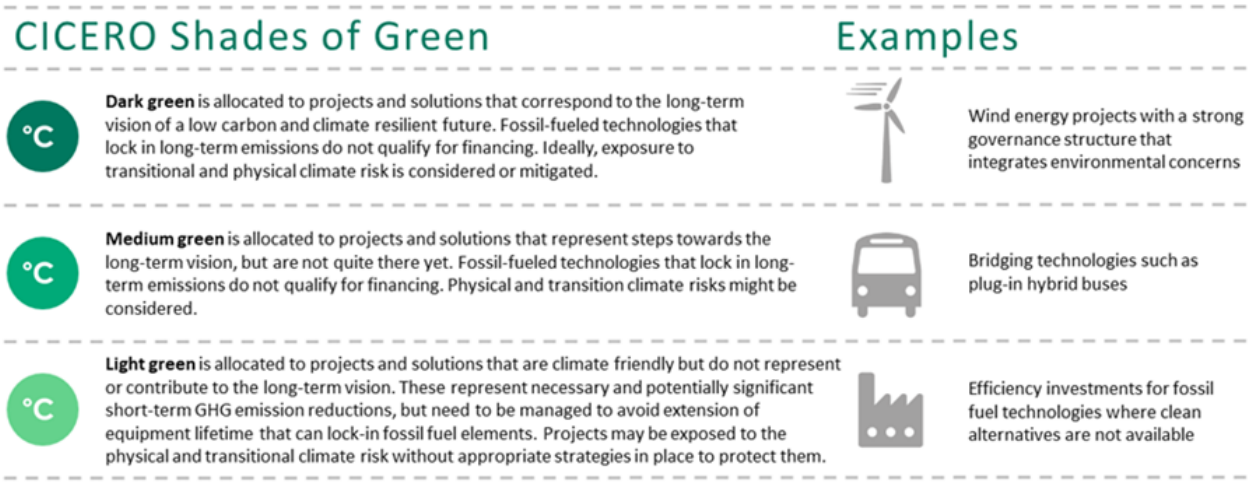
Nuclear energy and natural gas have different attributes that deserve separate consideration.

Using climate science as a guide

As one of the largest external reviewers in the global green bond market, CICERO Shades of Green assesses activities using a climate science framing to provide transparency on climate risk to investors. Incorporating the latest science and Intergovernmental Panel on Climate Change (IPCC) assessments, mitigation pathways are incorporated in our methodology to examine transition risk and the expected climate impacts to assess physical risk.

Underpinning our Shades of Green methodology is the understanding that all sectors need to transition to low carbon to avoid the most damaging climate impacts.

Figure 38 CICERO Shape of Green examples



Source: CICERO Shades of Green

We use three Shades of Green to indicate a spectrum of climate risk, encouraging early steps in the transition as well as rewarding the most ambitious actions. Our green rating system distinguishes between Dark Green solutions that are already in line with the Paris Agreement and plan for climate resiliency, Medium Green solutions that are well on the way towards low carbon, and Light Green solutions that are significant early contributions in transition that do not lock in fossil-based infrastructure. We also incorporate a governance assessment in our second party opinions (SPOs) to consider the ability of an issuer to manage the potential risks over time

Using this spectrum, we can examine the considerations for nuclear and natural gas and highlight specific examples of relevant SPOs we have provided.

Carefully managing DNSH for Nuclear

From the perspective of the atmosphere, operating nuclear power plants does not emit much greenhouse gasses and thus has a low climate transition risk. The energy sector needs a massive transformation to low carbon to reach the target of the Paris Agreement to limit global warming to 2°C or lower by the end of the century. From a climate perspective, nuclear power can play a role as part of the energy mix to meet demand and contribute to the low carbon transformation.

While nuclear energy may not be necessary to achieve the Paris Agreement targets, without it, other technologies in the low carbon energy mix such as carbon capture and storage need to be developed to scale and deployed rapidly. In the IPCC's special report on 1.5°C, the majority of pathways assessed to limit global warming to 1.5°C with no or limited overshoot include a strong increase in nuclear energy.

However, nuclear power is not without other risks. Key concerns include the lack of solution for final waste disposal, maximum credible accidental radiation, uranium mining conditions, and the potential for weapon proliferation. These concerns need to be carefully managed in the manner of the Do No Significant Harm (DNSH) principle established by the EU Taxonomy to avoid devastating regional consequences. The European Commission's Joint Research Centre (JRC) was tasked with assessing whether nuclear energy could be considered to 'do no significant harm' on the environmental objectives of the EU Taxonomy. The JRC assessment concluded that, in the context of EU regulations, "all potentially harmful impacts of the various nuclear energy lifecycle phases on human health and the environment can be duly prevented or avoided."

Given these serious risks, we do not think there should be an 'open door' for all nuclear power to be green. Rather, we consider nuclear power on a case-by-case basis to take into account the governing national safety regulations, progress towards a long-term waste storage solution, and supply chain considerations. The case for life extension of nuclear reactors is also an easier argument to make, given that it is a climate friendly power source that can make it easier to achieve the Paris target and the initial infrastructure already exists with a low land-use footprint.

CICERO Shades of Green recently provided a second opinion for Bruce Power to finance an extended lifetime of existing nuclear power units in Canada that also included ESG safeguards for their supply chain. This case highlights the considerations for managing the principle of DNSH.

Figure 39 Second party opinions for Bruce Power

Bruce Power is a Canadian nuclear power company. The proceeds from their green bond framework will extend the lifetime of existing nuclear power units with no direct greenhouse gas emissions. The power plant falls under Canadian regulations, and Uranium is sourced with safeguards in place to mitigate environmental and social risk in the supply chain.

While Bruce Power is not responsible for the storage of spent nuclear fuel, we consider all the implications and risk throughout the value chain. A Deep Geological Repository (DGR) is the scientifically accepted method for long-term storage of such waste approved in Canada, however a host site has yet to be selected.

Based on the overall assessment of the project types that will be financed as well as the corporate level governance, including transparency and supply chain considerations, Bruce Power's Green Finance framework received a CICERO Medium Green shading and a governance score of Excellent. The full text of the Bruce Power SPO describes our considerations in further detail.

Source: CICERO Shades of Green

Avoiding fossil fuel lock-in for natural gas

We need all sectors to contribute to the climate transition. Traditional 'dirty' sectors such as shipping, aviation, oil and gas have the possibility to contribute important emissions reductions and technological developments. However, the main climate risk is locking-in fossil fuel infrastructure.

Credible green transition in dirty sectors should realize significant emission reductions, but also guard against a cumulative increase in emissions associated with extended fossil fuel use in the long run. For a green bond issuer, this means having a good governance structure in place to

manage retrofits and new assets that reduce greenhouse gases over time.

Producing electricity via natural gas power plants emits greenhouse gases that make it more difficult to reach the most ambitious climate targets. Energy efficiency improvements in natural gas power plants have the potential to extend the lifetime of the asset and thereby result in higher cumulative emissions in the atmosphere.

However, there can be specific instances to consider transition away from natural gas as a fuel source. Our Light Green shading indicates substantial emission reductions and the potential for positive spillover effects that can accelerate adoption of lower emission technology.

CICERO Shades of Green provided an SPO for Teekay Shuttle Tankers (now Altera Infrastructure) which illustrates the potential for positive spillover effects to other sectors.

Figure 40 Second party opinions Teekay Shuttle Tankers

Teekay Shuttle Tankers (now Altera Infrastructure) is a globally operating owner and operator of shuttle tankers headquartered in Bermuda. The use of proceeds is directed towards the development of E-Shuttles powered by battery hybrid technology. Teekay primarily services oil majors and producers but the technology can transform shipping for other customers.

Battery-LNG based technology can play an important role as a viable short-term solution for transitioning sectors such as long-haul shipping. Switching to LNG alone is not enough to meet the target set by the International Maritime Organization (IMO) to reduce emissions from shipping by at least 50% from 2008 levels by 2050. Advanced battery technology could be a complementary solution, which the E-Shuttles combine with LNG today. Further, by allowing competitors to utilize these innovations, spill-over effects to the rest of the shipping sector are possible.

Teekay's green bond framework received a CICERO Light Green shading and governance score of Good. Teekay provides a short-term solution for important efficiency improvements and supports accelerating lower emission shipping but does not provide a long-term solution to a low-carbon and climate resilient future. The full text of the Teekay SPO describes our considerations in further detail.

Source: CICERO Shades of Green

External reviews provide necessary context in applying the EU Taxonomy

In short, our methodology is not an open door for either technology. We consider each issuer or company on a case-by-case basis and assess how they plan to avoid harmful impacts and lock-in effects, providing transparency to investors as they consider their own risk tolerance. Regardless of the outcome of the EU Taxonomy on each technology, a robust external review can enhance transparency to investors on the potential risks. Applying the DNSH principle of the EU Taxonomy requires in-depth knowledge from external reviewers to consider the potential for harm in other environmental and social aspects.

One foot in front of the other: Science-Based Targets and the march to net zero

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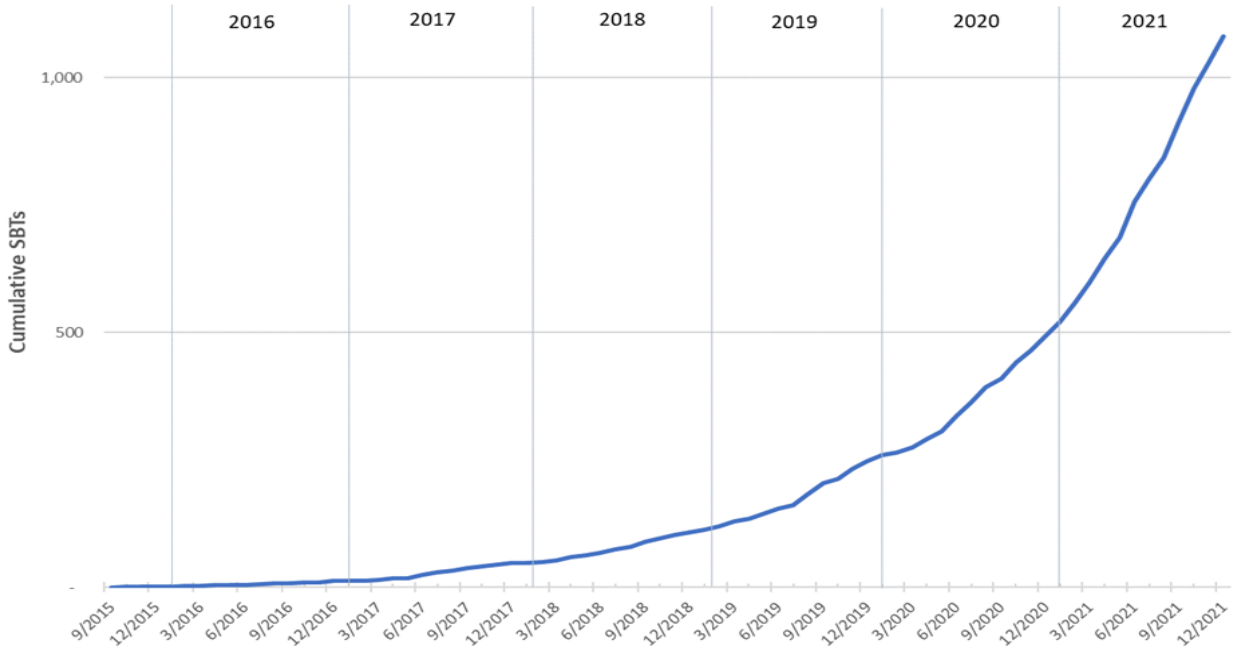
Since its inception in 2015, the Science Based Targets initiative (SBTi) has accelerated private sector climate mitigation action through transparent, quantitative, and robust targets. Building on Greenhouse Gas Protocol emissions accounting, the SBTi has created a new platform for climate collaboration through its requirement that companies and financial institutions quantify and address their scope three (value chain) emissions.

To support the growth of net-zero as a formulation for climate ambition, the SBTi published a Corporate Net-Zero Standard in October 2021. With governments engaged with the Covid-19 pandemic and other near-term challenges, the voluntary, private sector focus of the SBTi has propelled the initiative to fill a public need – the demand for which is reflected in its exponential growth.

Figure 41 Exponential growth of company and financial institution Science-Based Targets approved by the SBTi (2015-2021)



Source: Science Based Targets initiative (https://sciencebasedtargets.org/companies-taking-action/); note that in addition to the approved near-term SBTs displayed above, 1,280 other companies and financial institutions have publicly committed to setting SBTs, bringing the total number of approved and committed SBTs to more than 2,400 as of January 2022

While the SBTi began with an orientation toward companies and sectors in the real economy, we have expanded our resources for financial institutions in recognition of their central role in disseminating and achieving science-based targets at scale through engagement and capital allocation. In 2018, we began to develop target-setting methods covering financial institutions' investment and lending portfolios. The technical development was integrated with a stakeholder engagement process that included method road testing, public workshops, and the convening of an Expert Advisory Group. This process culminated in the publication of the SBTi Finance framework in October 2020, which included three target-setting methods, criteria for financial institution science-based targets, a finance target-setting tool, and a guidance document with case studies. Rather than covering all aspects of investment and lending portfolios, the SBTi Finance framework focuses on financial institutions' electricity generation project finance, commercial real estate, residential mortgages, and corporate debt and equity activities with established data and methodological climate scenario links. Financial institutions are using these resources to set science-based targets on their investment and lending portfolios.

To broaden our organizational coverage, the SBTi published Private Equity Guidance in November 2021. Following the launch of the SBTi Corporate Net-Zero Standard, we also published a draft SBTi Net-Zero Foundations for Financial Institutions draft for public comment during COP26, thereby commencing our Net-Zero Standard development process for financial institutions.

Whereas the SBTi is the sole global option for companies in the real economy to set science-based targets, the financial sector includes a broad and growing range of climate and ESG initiatives. The United Nations Environment Program Finance Initiative (UNEP FI) is an illustrious example of the numerous climate programs that predate the SBTi. During the tenure of the SBTi, additional initiatives have arisen focused on financed emissions accounting (e.g. PCAF), net-zero (e.g. the Net-Zero Asset Owners Alliance, GFANZ), and new product development (e.g. Climate Bonds Initiative, the Climate Warehouse), among other areas.

As the number of financial initiatives has grown, six characteristics differentiate the SBTi from its peers:

Quantitative, transparent, and robust targets. Science-based targets are greenhouse gas (GHG) reduction targets that align with 1.5°C (and well-below 2°C) climate scenarios from the IPCC and the IEA. They are exclusively focused on climate mitigation and do not cover other ESG metrics, technologies, or policy positions. Between 2015 and 2020, companies with science-based targets approved by SBTi reduced their GHG emissions by 25% on aggregate.

Independent assessment. All science-based targets are objectively verified by the Target Validation Team of the SBTi based on a public protocol and set of criteria. The SBTi is not a membership organization, industry association, or advocacy group.

Ambition anchored in climate science. SBTi methods and criteria follow the highest level of mitigation ambition, for example with no allowance for offsets or reliance on high-overshoot scenarios. This stringency is reflected in the SBTi Corporate Net-Zero Standard. As new scenarios and target-setting methods are developed, SBTi ensures consistency across time and sectors.

Integration with companies in the real economy. The SBTi is the only initiative with criteria for financial sector emissions reductions as well as established company level frameworks across more than 50 sectors in the real economy. This reflects our theory of change that financial institutions can most effectively support climate stabilization by engaging with clients and investees to reduce their GHG emissions.

Global coverage and participation. As of January 2022, 1,120 companies and financial institutions from 50 countries have approved science-based targets.

Harmonization with peer initiatives and reporting standards. The financial sector is undergoing a rapid innovation and growth phase when it comes to climate. The SBTi is harmonizing with the UNEP-convened net-zero initiatives, for example with our NZAOA comparison table, and is working toward further integration in 2022.

These characteristics differentiate the SBTi from its peers and help to explain the initiative's exponential growth. The SBTi's founding partners are four of the largest environmental organizations in the world (CDP, UN Global Compact, WRI, and WWF). This unique heritage enables the SBTi to lead climate ambition within the financial sector. The value of the SBTi is further defined by its extensive stakeholder engagement process for resource development and deployment. While the financial sector includes a broad range of issues and agendas, the SBTi's stakeholder engagement ensures the practicality and credibility of our resources.

Financial institutions have a range of rationale when it comes to setting SBTs and having them validated by the SBTi. The value of SBTi validation for financial institutions is rooted in the initiative's leading ambition, independent assessment, and established links with companies in the real economy. In explaining the business case for science-based targets, financial institutions have also attributed the need to build resilience and increase competitiveness, drive innovation, build credibility and reputation, influence and prepare for shifts in public policy and regulations, and demonstrate leadership.

To support the halving of GHG emissions by 2030 and continued exponential growth of science-based targets, the SBTi Finance team has developed a strategy for 2022 and 2025. In 2022 we aim to:

Update and expand the SBTi Finance framework. This will include updated criteria for financial institution science-based targets and additional target validation capacity. A related goal for 2022 is to reach 300 financial institution commitments to set science-based targets with 150 financial institution targets submitted and assessed by SBTi.

Publication of the revised SBTi Net-Zero Foundations for Financial Institutions paper and a draft **SBTi Net-Zero Standard for Financial Institutions.** The SBTi Financial Net-Zero standard follows the Corporate Net-Zero Standard and is similarly expected to provide a link between high-level commitments and institution-level near-term target setting.

SBTi Finance metacriteria for assessing alternate methods and resources. The metacriteria will be linked with our net-zero work. They will be published in the first half of 2022.

Integration with **SBTi sector method developments.** Starting with the Forest, Land and Agriculture (FLAG) consultation, Steel, Transport, and Buildings sector work, SBTi Finance will update its resources to leverage new developments.

PCAF Integration and Guidance. In collaboration with PCAF, the SBTi is developing guidance for financial institutions on using financed emissions assessment to set science-based targets. This includes recommendations on how PCAF can be used as a screening tool to identify areas of most material emissions and guidance for financial institutions on the most appropriate SBTi target setting method (SDA, Portfolio Coverage, or Temperature Rating) based on PCAF results.

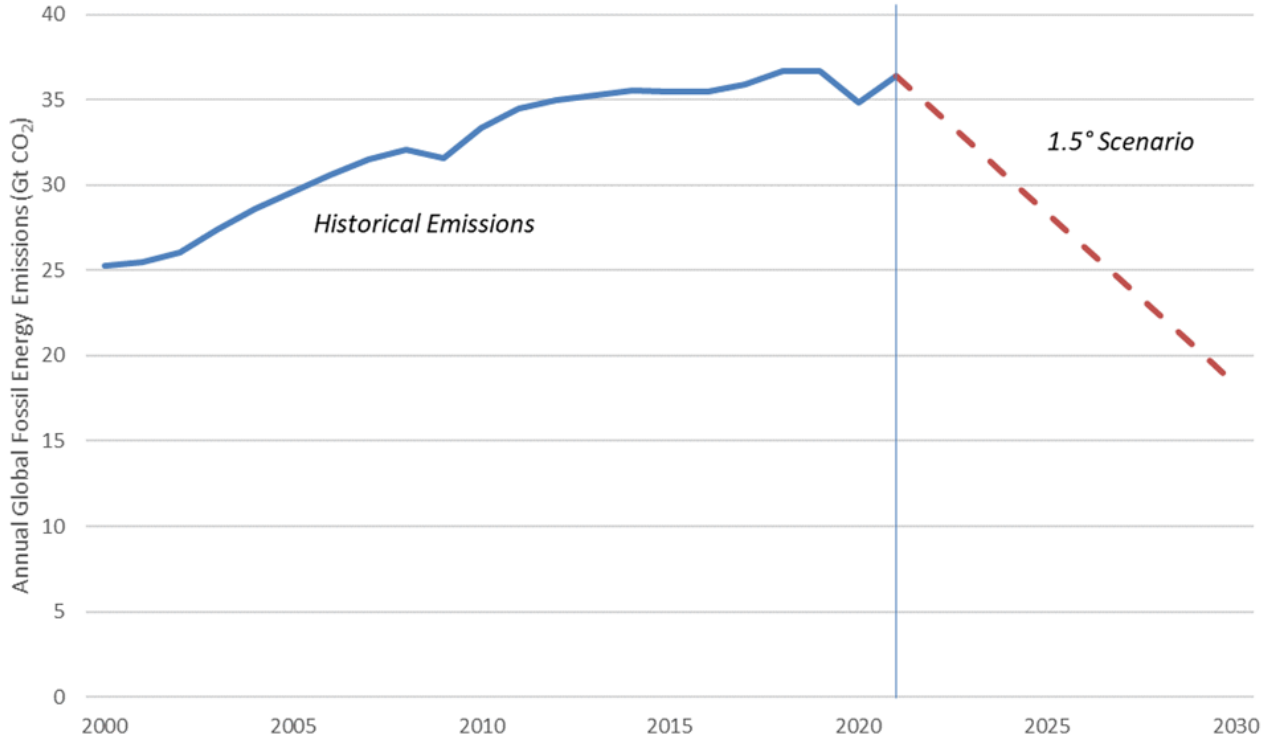
Aligning **TCFD reporting** with science-based targets. The SBTi is developing guidance for companies on how to develop a TCFD report that demonstrates a company's alignment with climate science. The guidance clarifies how science-based targets and net-zero target setting are tangible ways for companies to successfully assess and manage their climate risk and transition their business to thrive in a zero-carbon economy. The guidance also clarifies how portfolio level science-based targets, set by financial institutions, can be used within a TCFD report to demonstrate how they are managing climate asset risk and driving emissions reductions in the real economy.

Securities underwriting target setting methods and target validation criteria. This work explores both the adaption of existing target setting methods and the development of new target setting methods. The method and criteria development includes pilot testing by financial institutions and stakeholder review.

SBTi Progress Framework and Protocol. As the SBTi prepares to launch its Progress Framework in early 2023, the SBTi Finance team will provide a standardized and robust mechanism to track target-setting entities' progress against science-based targets.

Beyond these deliverables, the SBTi Finance team is exploring additional method development for new asset classes. By 2025, we aim to replicate our work with companies in the sense of establishing near- and long-term science-based targets as harmonized best practice for financial institutions.

Figure 42 Historical and 1.5° scenario fossil fuel energy-related emissions (2000-2030)



Source: Global Carbon Project (2021); note that the 2021 value of 36.4 Gt CO_2 is an initial estimate pending fully available data; the 1.5° pathway illustrates reductions required to halve emissions between 2020 and 2030.

Global GHG emissions largely plateaued over the last decade. While this is a welcome change from the rapid growth of the 2000s, the pandemic-induced drop of 2020 appears to have rebounded in 2021 and the trend is a far cry from the 50% reduction we need this decade. Financial institutions seeking to support climate stabilization will need to play a central role by allocating capital and supporting real-economy emissions reductions, starting with setting science-based targets on their investment and lending portfolios. Setting and achieving near-term science-based targets is a key step in the longer journey to net zero.

Science-based Targets initiative and its impact on capital flows

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We have observed increasing interest in the Science Based Targets initiative (SBTi) in our client dialogue across the Nordics. Setting robust emission reduction targets is gaining traction both among corporates and financial institutions. Commitments to net-zero emissions are becoming increasingly important means to communicate institutions' commitment to reach the goals aligned in the Paris Agreement and to disclose a quantifiable path towards sustainable future.

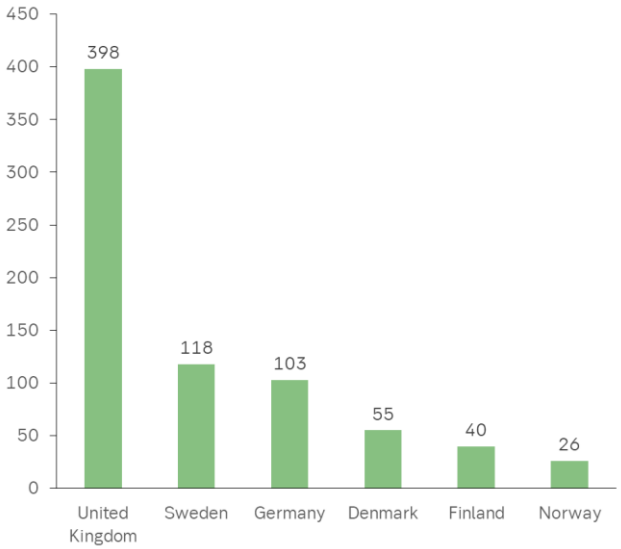
SBTi with its clear scientific approach has become a benchmark for private-sector climate action which is also evident in several cross references to investment-side initiatives such as the UN-convened Net-Zero Asset Owner Alliance, Paris Aligned Investment Initiative and Net Zero Asset Managers initiative. These initiatives push financial institutions to demand from their investees to adopt short- and long-term climate mitigation targets.

To assess and understand if and to what extent initiatives like SBTi have the power to move and reallocate capital we need to first understand what is captured by it. For this we assessed the publicly available Target dashboard database published and maintained by SBTi[26]. The following figures and analyses are based on data as at 16 December 2021 when the total number of STBi signatories was 2,221 out of which 1,054 had validated and published targets disclosed.

As shown in Figure 43, the total number of signatories domiciled in the UK, Sweden, Germany, Denmark, Finland, and Norway was 740 which represents roughly one third of total number of signatories.

Signatories domiciled in the Nordic countries are well-represented which to us signals that players acting in SEB's home markets are among the first adopters when it comes to corporate climate management and action.

Figure 43 Number of SBTi signatories in key markets



Source: Target dashboard database, SBTi, as of 16 December 2021

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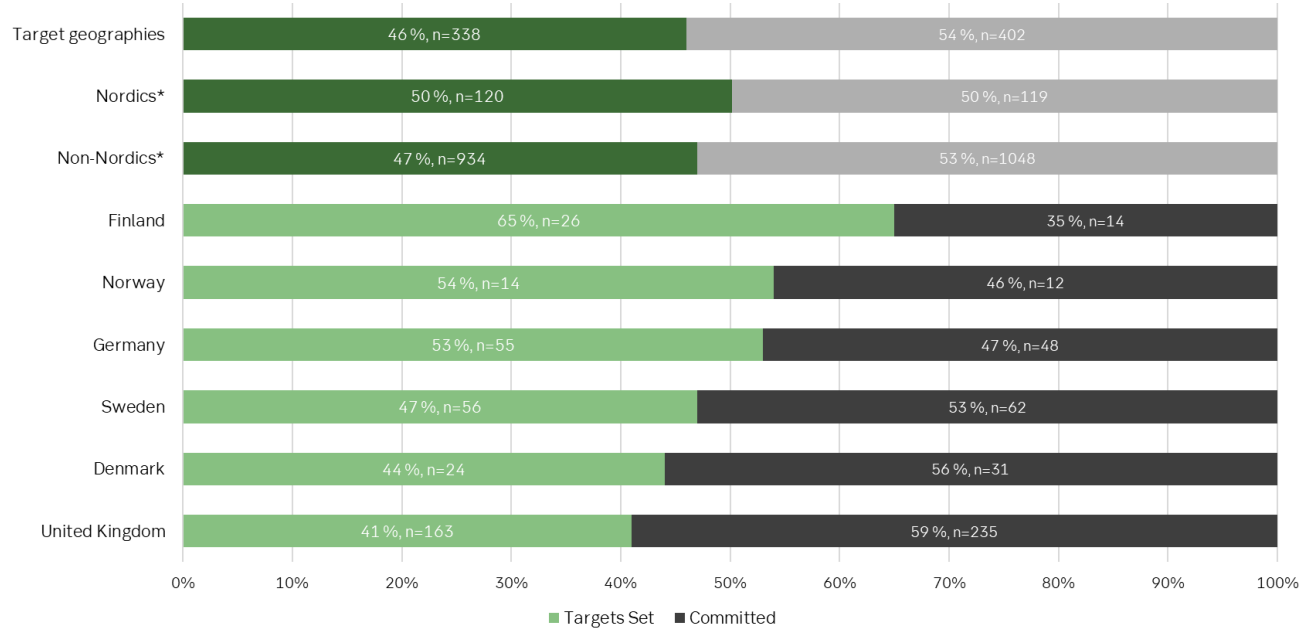
[26] https://sciencebasedtargets.org/companies-taking-action

Figure 44 Proportion of signatories with targets set

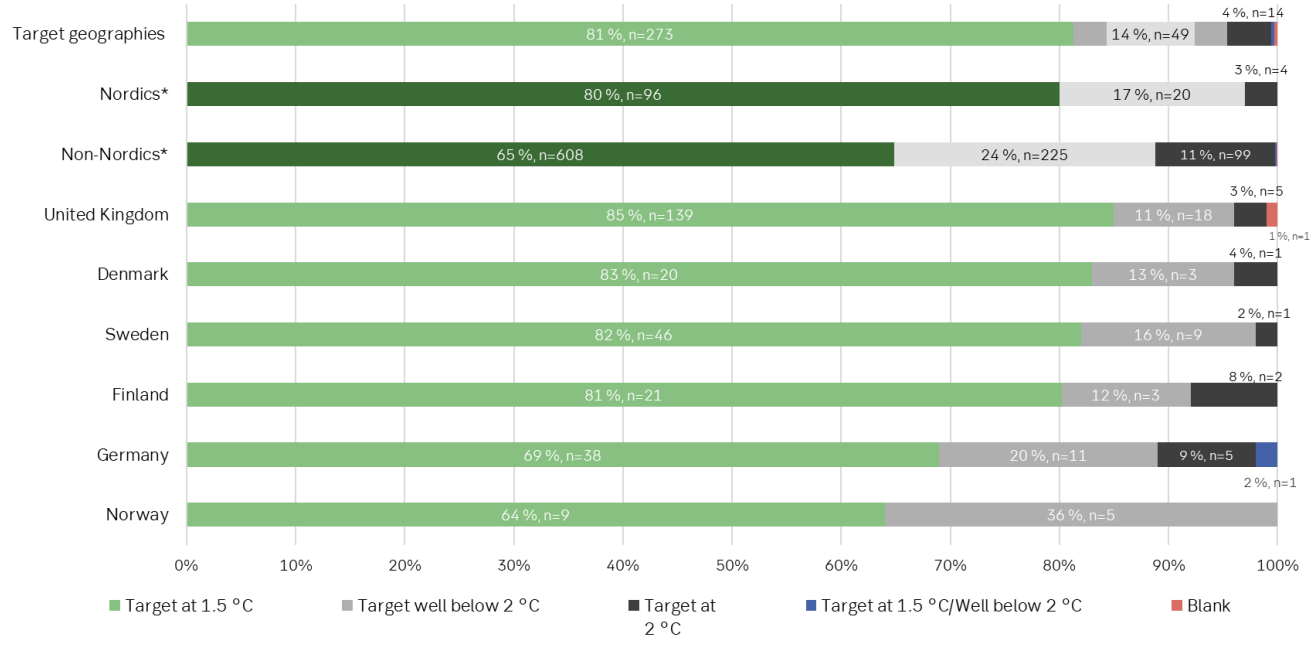


Source: Target dashboard database, SBTi, as of 16 December 2021

Figure 44 compares the number of signatories committed only to the framework against those who have already came out with validated targets. Interestingly, Finland tops the list with the largest proportion of signatory companies already having targets in place. More broadly, signatories domiciled in any of the Nordic countries outpace the rest slightly. All in all, roughly half of the signatories have targets in place which to us reflects the recent adaption of the initiative and the given timeline of 24 months to develop and publish the targets

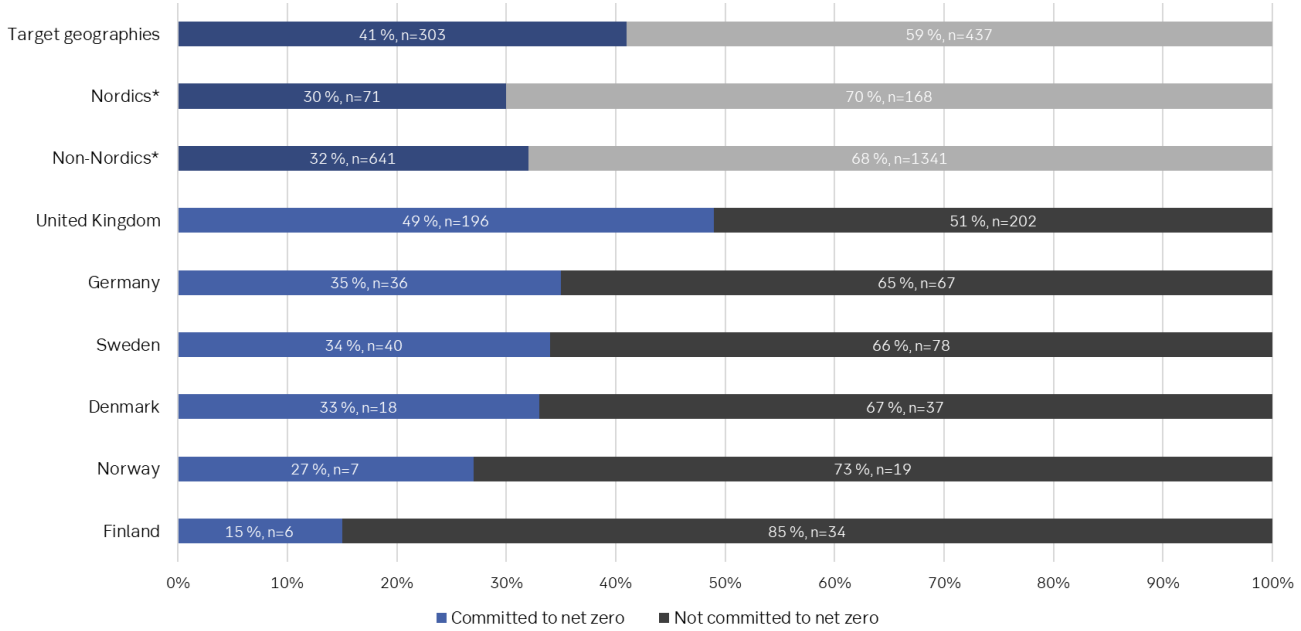
In Figure 45 we go into more granularity what comes to the targets already in place and observe that some 80% of the targets set by the companies domiciled in the UK, Denmark, Sweden, Finland, Germany or Norway have adapted the 1.5-degree scenario, i.e., being aligned with the goals set in the Paris Agreement.

Figure 45 Proportion of targets between the ambition levels



Source: Target dashboard database, SBTi, as of 16 December 2021

Figure 46 Proportion of signatories with commitment to net zero framework



Source: Target dashboard database, SBTi, as of 16 December 2021

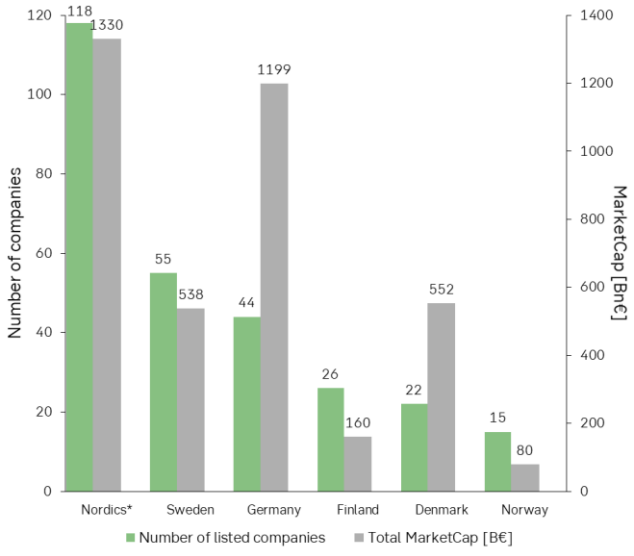
Starting mid-2022 SBTi will only accept and validate targets aligned with the 1.5-degree scenario. Organizations which have also set less ambitious targets will need to readjust and resubmit their commitments to remain in the initiative by 2025. Therefore, we believe the share of targets other than 1.5-degree will eventually be removed completely from SBTi.

In Figure 46 we change focus from short-term targets to long-term ambition and investigate net-zero commitments among the signatories. The number of commitments is reduced quite notably. Only some 300 players within our selected countries have made commitments to reach net-zero. We would argue the adoption of net-zero commitment will be logical next step for corporations to follow up on short-term targets.

SBTi signatory universe comprises both private and publicly listed companies. To understand the impact that SBTi could have in terms of moving capital and reallocating capital flows we assess at how much capital is held within the publicly listed company space. As a proxy for market capitalization by domicile country we use the list of companies included in the STOXX Europe Total Market index and retrieve the closing market capitalization as at 17 December 2021.

Figure 47 illustrates the number of listed SBTi signatories and their aggregate market value. Germany is by far the biggest domicile with aggregate market capitalization of EUR 1,199bn but signatories domiciled in Sweden (EUR 538bn) and Denmark (EUR 552bn) contribute also substantially. In proportion to the size of the local stock exchange Denmark seems to be the largest within our scope. From the UK market, we note that some 57% of the aggregate market capitalization of companies (number of signatories 61) included in the FTSE100 index belong to the SBTi.

Figure 47 Number of publicly listed companies among signatories by country



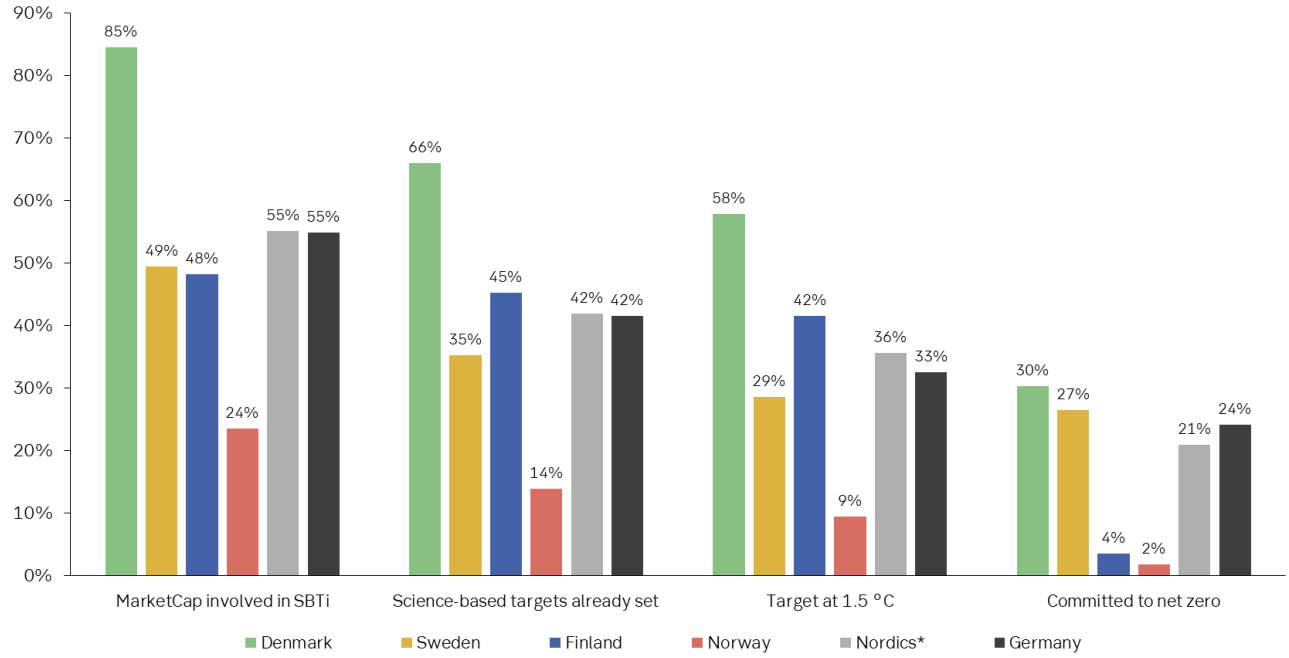
Source: Target dashboard database, SBTi, as of 16 December 2021

In Figure 48 we demonstrate how the market capitalization dilutes when more stringent conditions within the SBTi framework are applied. Despite this, we can draw the conclusion that already today a significant part of the market value traded in stock exchanges falls under the conditions set out in the SBTi framework.

Therefore, we consider it is becoming increasingly important to understand the implications on the underlying business and transformation needs that are needed to meet the outspoken sustainability targets.

In conclusion, our analysis shows that SBTi has already become a mainstream benchmark that corporations use to set ambitious emission reduction targets. Going forward, corporates and investors alike will face challenges and opportunities in raising commitments to SBTi into translating them into actions. Sustainability-themed financing solutions will play a key role in achieving ambitious climate targets.

Figure 48 Share of market capitalization being aligned with different target ambition levels



Source: Target dashboard database, SBTi, as of 16 December 2021

Sustainable finance engineering making a change - first follow-up of the Health Impact Bond shows a positive result

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In June 2020, Region Stockholm issued a Health Impact Bond of SEK 30mn to finance preventative measures for people at risk of developing type 2 diabetes. Skandia was the investor and SEB acted as advisor and financial arranger of the bond. The financial model for the bond was thought to be the first of its kind, even internationally.

Background

The majority of the healthcare system's resources globally is used to care for those who are already ill. It has proven to be difficult for healthcare providers to finance preventative care models. The Health Impact Bond is a pilot that will be used to test a scalable model for cooperation between the public and private sector, in which the investor gets somewhat higher returns if the preventative measures result in lower healthcare costs but also shares some of the financial risk if it fails. The issuance of the first Health Impact Bond was the result of close cooperation between Region Stockholm and Skandia, which invested in the bond, and with SEB, which acted as structural advisor and financial intermediary.

Promoting preventative measures while reducing human suffering and unnecessary costs of reactive care

The bond of SEK 30mn has a maturity of five years. The money will be used for preventative measures focusing on lifestyle habits for up to 925 individuals at risk of developing type 2 diabetes (showing long-term blood sugar values (Hb1Ac) between 42 mmol/mol and 47 mmol/mol). The participants are chosen through a health survey and tested to confirm they are at risk of the disease. A health coach thereafter develops a personal health plan and a so-called health balance gives the participants access to tailor-made services that help promote a healthier lifestyle, including areas such as exercise, food, sleep and stress.

Unique financing model for innovative solutions

If the project is successful and results in cost savings for Region Stockholm, the investor - Skandia - will get a return that is somewhat higher than Region Stockholm would have paid for regular financing. If the project fails to achieve the expected health effects, and thereby cost savings, Skandia will receive a negative return. The Health Impact Bonds is a unique financing model that offers risk sharing for Region Stockholm aiming to pave the way for preventive care on a larger scale which in the longer term can reduce human suffering and to free up expenditures for other, urgent needs for health care providers.

First follow-up shows positive results

Six months after entering the program, more than 40% of the participants have fallen out of the risk zone for developing type 2 diabetes. This is shown by the first follow-up of the health program linked to the Health Impact Bond. The initial follow-up has been done among the 221 people who have participated in the program for at least six months. According to a press release from Region Stockholm, the blood tests that have been taken show that 43% of the participants no longer are in the risk zone for type 2 diabetes (see press release in Swedish). They have reduced their long-term blood sugar to levels that are considered below the value of prediabetes. Region Stockholm believes that the biggest benefit of the initiative is the reduced suffering, but that there is also the potential to avoid healthcare costs of approximately SEK 1.4bn per year if the Region later chooses to scale up the intervention and offer it to all pre-diabetics in the county.

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