

The Green Bond



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[SEB Green Bonds Website](#)

Letter to the Reader

On a number of occasions we have reflected on regulatory developments and involvement in the green bond market.

In this edition we highlight recent examples of how regulators from the EU and from Sweden are examining various options to boost green and sustainable investments - with green bonds being cited as a central tool to achieving their stated objectives.

The way we interpret this is that we now have more concrete reference points which in some cases will open up the discussion on a "greenium". If you buy green assets at equal prices to regular assets, one could argue that you are essentially getting a regulatory option for free.

The white papers make for good reading and most recommendations are likely to be debated over the next months, which should give an even stronger underlying bid for green bonds.

Christopher Flensburg

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Executive Summary

In the first months of 2018, green bond issuance continued with the momentum that carried the 2017 total to **USD 163 bn**. By the end of February, green bond issuance stood at **USD 21.5 bn**, slightly up from the record levels seen last year.

The locus of market activity clearly shifted in the direction of **Europe** (taking 58% market share, up from 33% in 2017) alongside increasing policy attention; as the European Commission adopts a sweeping [Action Plan on Sustainable Finance](#), with green bonds a central feature.

Notably and additionally, **social/sustainability bond** issuance surged to USD 5.5 billion by February (with Europe again accounting for 68% of issuance) building on a record USD 17.8 billion of issuance in 2017 (see [market snapshot](#)).

A generous pipeline of announced green, social and sustainability bond deals remains for March, or later in 2018 ([section 2](#)).

Supranationals and agencies led issuance in January followed by corporates, with large scale EUR issuance from Enel and Engie. The market subsequently moved on to corporate financials, as well as sukuk, covered bonds, ABS/RMBS and project bonds.

February was an extraordinary month; with **USD 12.1 bn** of issuance up 77% Year-over-Year (YoY) and reversing the down-month historical trend by rising 28% from January levels. It was also the month where the much-awaited entrance of new sovereign issuers materialised. On the back of **Poland** tapping its sovereign (EUR 1 bn), **Belgium** became the third EU nation to bring forth a green sovereign (EUR 4.5 bn).

This followed **Indonesia's** USD 1.25 bn inaugural sovereign, which came in the form of a green sukuk. This theme looks to have bright prospects for the rest of the year as **Hong Kong's** Fiscal Budget proposed the launch of a green bond programme with a ceiling of HKD 100 billion (USD 12.8 bn) and at least seven other countries were publicly disclosed to be considering a green sovereign.

In terms of currencies, a very active **corporate and sovereign EUR** market continued to dominate. **USD** returned to the stage with the Indonesian sovereign, but also large trades from MidAmerican Energy, Swire Properties and six U.S. municipalities. **CAD**, **AUD**, and **SEK** also proved popular currencies to target for supranational issuers raising green capital in 2018.

SEK was so green that a new record was set by non-Swedish SSA issuers, using green bonds for **53%** of SEK 20.6 bn of issuance through to February. 5.1% of all SEK issuance was green in 2017.

Updated SEB green bond [relative value and pricing analysis](#) available via Research Portal

SEB Climate & Sustainable Finance Review

Guest contributors welcomed in this edition:

[Swedish Government](#) Inquiry to Promote the Green Bond Market: Summary Report

The [OECD](#) on how governments should make better use of energy taxation to address climate change, and insights from [SEB](#) on Stranded Assets in an age of disruption.



1. Green Bond Market Review and 2018 Outlook

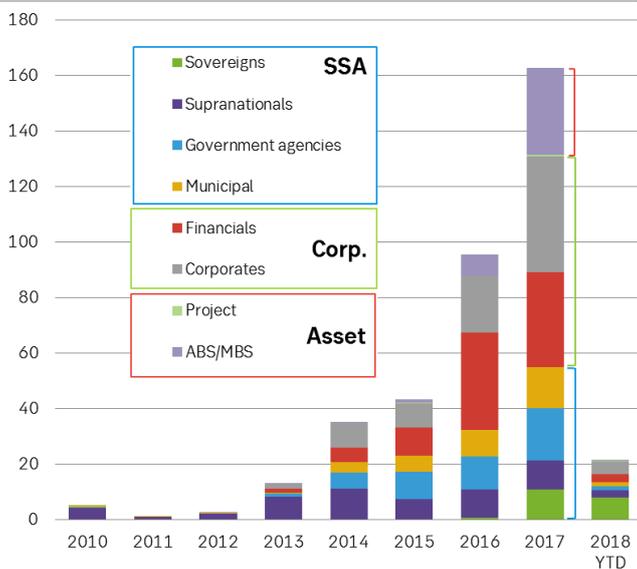
With spring just around the corner, the green bond market continued to grow organically through a rather frenetic winter. The locus of market activity clearly shifted towards **Europe** in the first months of 2018 (from 33% of 2017 issuance to 58% in 2018 YTD); alongside increasing policy attention, as the European Commission adopted its sweeping [Action Plan on Sustainable Finance](#). By the end of February, **green bond** issuance stood at **USD 21.5 billion**, up by 2% Year-over-Year (YoY). Notably and additionally, **social/sustainable bond** issuance surged to USD 5.5 billion by February (with Europe accounting for 68% of issuance). A generous pipeline of announced deals remains for the 1Q, or later in 2018 (see [Section 2](#)).

As expected, the full year tally for 2017 kept on rising as further green securitisations (ABS/MBS) and other elusive bonds were tracked down, now up **68% YoY to USD 163 billion** (Figure 1).¹ The revised total reflected green securitisations in 2017 increasing to **USD 31.3 billion**, largely due to Fannie Mae's green MBS from November and December as well as USD 2.2 billion of Chinese green ABS, which only became discoverable in recent weeks. In 2018, we see the potential for **USD 34-46 billion** of new securitisations. Figure 2 illustrates how this magnitude of securitised issuance, combined with surging **corporate** issuance to **USD 76 billion** and the advent of sovereigns, distorted the sectoral composition of the green bond market.

SEB's annual regional analysis (described in previous editions) suggests that 2018 will be a year of consolidation with more modest growth. This is reflected in our base-case scenario showing the market having the potential to grow to **USD 175 billion in 2018**, with the possibility to surprise to the upside once again and cross to **USD 210 billion**.

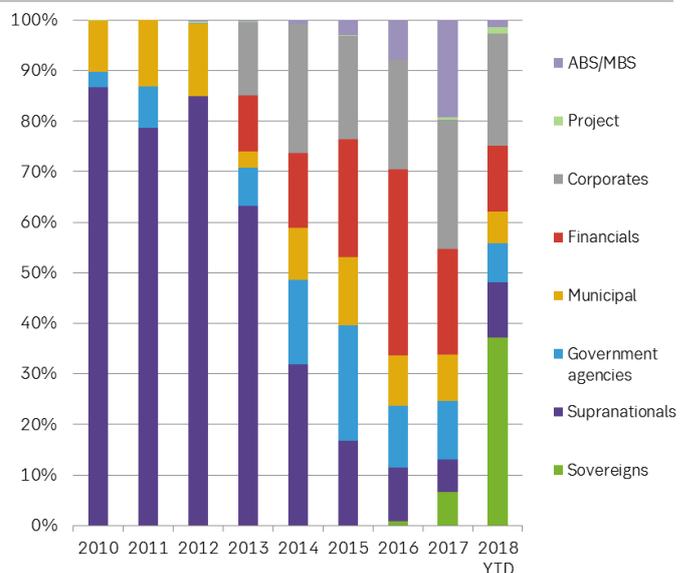
A formidable constitution of underlying green infrastructure investment dynamics on both risk and opportunity sides of the equation (see for instance our new analysis on [stranded asset risk](#)) as well as new policy attention stands ready to continue to support the momentum from 2017 and further elevate green bond issuance in 2018.

Figure 1. Green bond market growth (USD Bn) by sector



Source: SEB analysis based on Bloomberg and SEB data. SSA: Sovereign, sub-sovereign (municipal/regional), Supranational and Agency.

Figure 2. Sectoral evolution (% share of annual issuance)



Source: SEB analysis based on Bloomberg and SEB data

January 2018 may have appeared quieter historically (down -34% YoY), but was in fact quite busy with **USD 9.4 billion** of issuance. When adjusting for the USD 7.5 billion French green sovereign OAT issued last January, issuance in fact stands 40% higher YoY (Figure 3). **Supranationals and agencies** led issuance in January; steady throughout with multicurrency trades from China Ex-IM, EIB, KfW and NWB. The European theme was apparent in corporate issuance by domicile as well as currency (Figures 7&8), with large scale EUR issuance from

¹ SEB's revised 2017 year-end figure, which now matches BNEF/Bloomberg figures, may still be further expanded as work to inventory all of the securitisations and Chinese issuance continues into March.

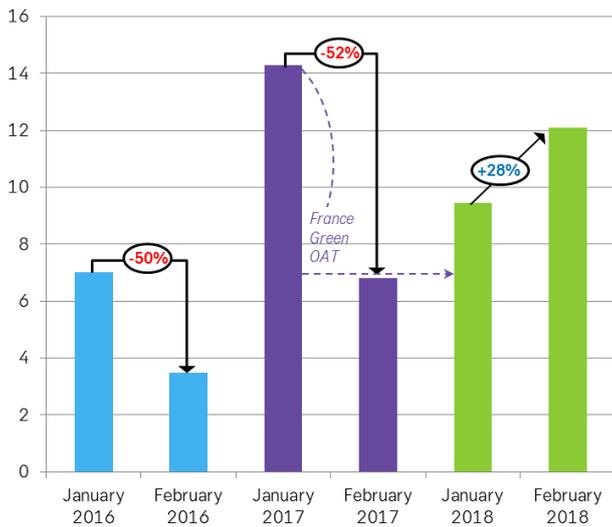
Enel and Engie, moving in to corporate financials with EUR 1 billion green covered bond from SpareBank 1 Boligkreditt.

February 2018 was an extraordinary month; with USD 12.1 billion issuance (up 77% YoY) and promptly reversing the down-month historical trend by rising 28% from January levels (see Figure 3).² It was also the month where the much-awaited entrance of new sovereign issuers materialised. On the back of Poland tapping its sovereign (EUR 1 billion), Belgium became the third EU nation to bring forth a green sovereign with a EUR 4.5 billion 15-year OLO that was also the second-largest of its kind. This followed Indonesia's USD 1.25 billion inaugural sovereign, which came in the form of a green sukuk.

This cumulative USD 8 billion torrent of green sovereign issuance skewed the sectoral and geographic patterns of activity (compare Figures 2, 4 and 9) with the 2018 total coming within striking distance of 2017's full year total (of USD 10.7 from France, Fiji and Nigeria) already by February. This theme looks to have bright prospects for the rest of the year as Hong Kong's Fiscal Budget (2018-2019) proposed the launch of a green bond programme with a ceiling of HKD 100 billion (USD 12.8 bn) and at least seven other countries were publicly rumored to be considering a green sovereign.

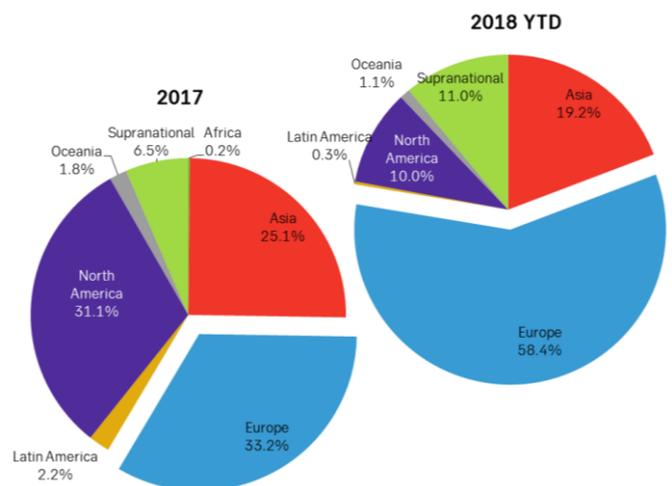
Following in the footsteps of the so-called "Singapore model" (as described in the [Report of the Inquiry into the Swedish Green Bond market](#)), both Hong Kong and Japan have also now proposed slightly different market support mechanisms in the form of grant schemes targeted at defraying any incremental costs of issuing green bonds, domestically.

Figure 3. Periodic green bond issuance compared (USD Bn)



Source: SEB analysis based on Bloomberg and SEB data

Figure 4. Regional distribution of green bond issuance



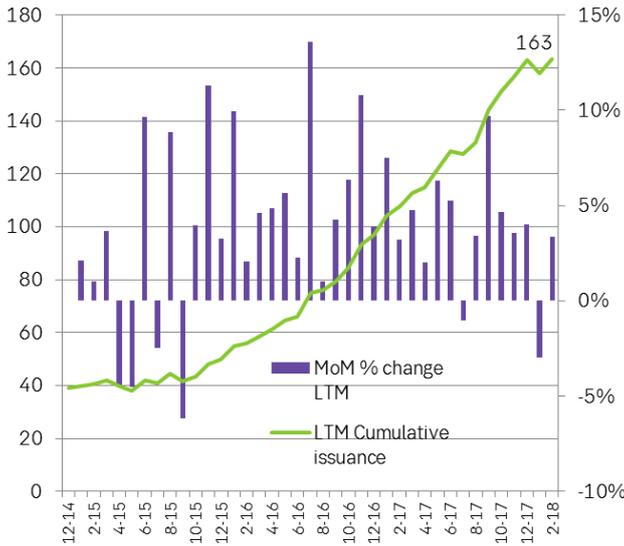
Source: SEB analysis based on Bloomberg and SEB data

An analysis of moving Last Twelve Months (LTM) of green bond issuance shown in Figure 5 visualises how that cumulative LTM figures surpassed USD 100 billion in January 2017 and plateaued between USD 156 – 163 billion over the last three months. A 2-month moving average of percentage change in LTM showed a downward trend for most of 2017 that was suddenly reversed in September.

In terms of country rank, Belgium overtook Supranationals in February due to its sovereign green bond; with Indonesia and Poland also making the board thanks to their own sovereigns. Italy and France rounded out the top five with active corporate sectors, and China had yet to arrive back on scene thus far (or at least domestic activity had yet to be translated and uploaded to databases). The Canadian provinces of Ontario and Quebec helped Canada to place eighth. The United States, the focus of the subsequent section, had held first rank throughout most of 2017, sat just outside the top 10 with a few municipal issues but levels may be revised if and when securitisations are catalogued.

² SEB uses deal effective date to determine month of transaction.

Figure 5. Last Twelve Months Analysis / % change (USD Bn)



Source: SEB analysis based on Bloomberg and SEB data

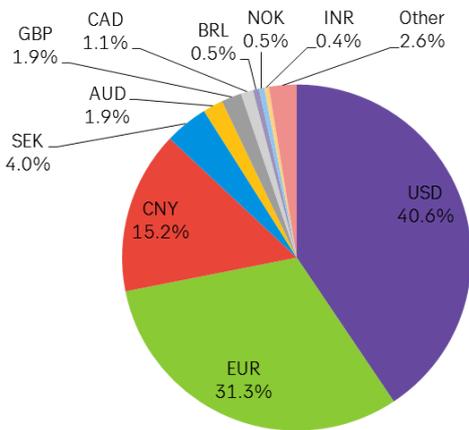
Figure 6. Top 10 countries 2017-2018, incl. Supranational (USDbn)

2018 Rank	Domicile	Issuance	2017 Rank
1	BELGIUM	5.54	n/a
2	SNAT	2.37	4
3	ITALY	1.53	11
4	FRANCE	1.31	3
5	INDONESIA	1.25	n/a
6	NORWAY	1.24	22
7	POLAND	1.23	33
8	CANADA	1.20	13
9	GERMANY	1.16	5
10	CHINA	1.07	2

Source: SEB analysis based on Bloomberg and SEB data. SNAT: Supranational

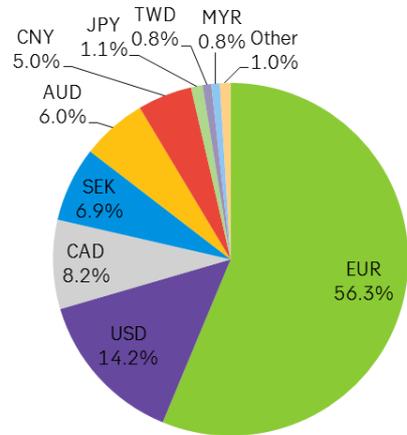
In terms of currencies (Figures 7-8), the key takeaway from 2017 was that the market began a shift towards Euros, driven by a very active corporate EUR market (with non-financial corporates such as utilities favouring EUR). The magnitude of the French and then Belgian sovereigns pushed the EUR trend into 2018 as described above. The USD green bond market made its return to the stage with the Indonesian sovereign sukuk, but also large trades from MidAmerican Energy, Swire Properties and six U.S. municipalities. CAD, AUD, and SEK also proved popular currencies to target for supranational issuers raising green capital in 2018.

Figure 7. Outstanding green bonds by currency 2010-2017



Source: SEB analysis based on Bloomberg and SEB data

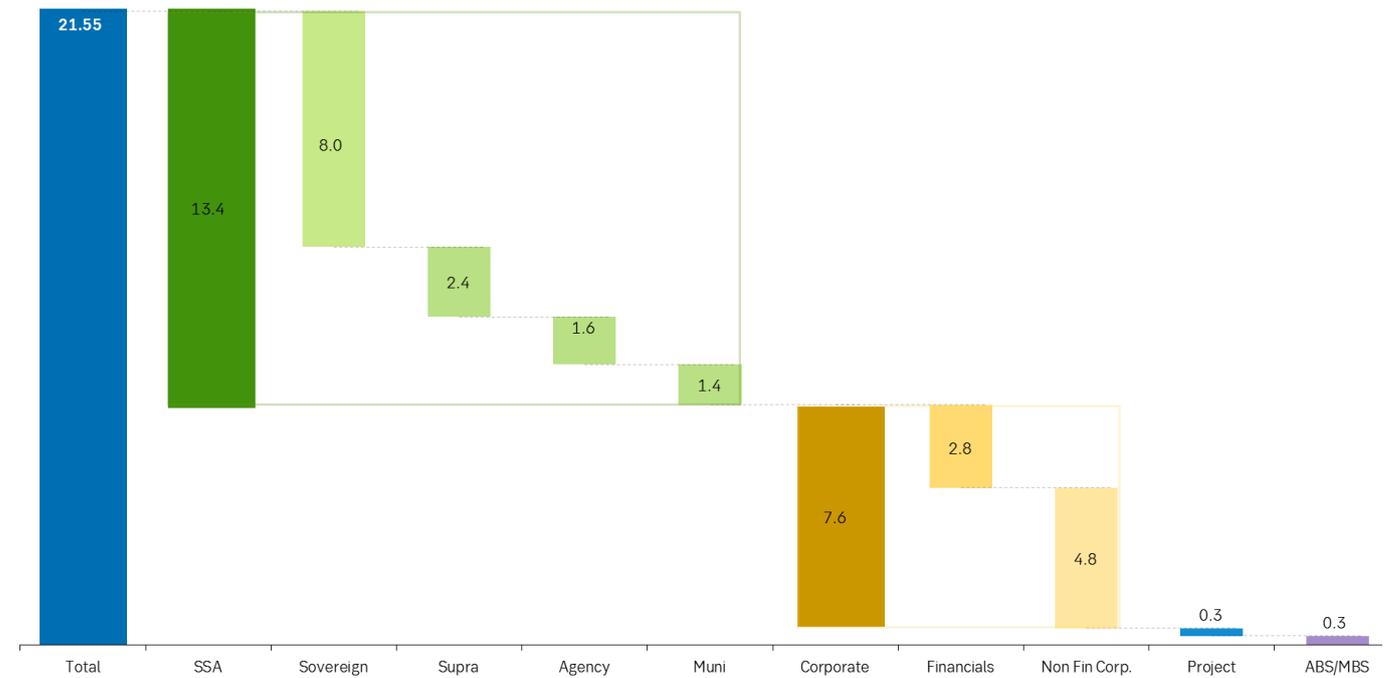
Figure 8. 2018 YTD green bond issuance by currency



Source: SEB analysis based on Bloomberg and SEB data. SNAT: Supranational

With regards to other types of green bond issuers (see Figure 9), several securitisations and project bonds also occurred in the first months of the year. National Australia Bank (NAB) issued the world's second green Residential Mortgage-Backed Security (RMBS) carving out a green tranche of AUD 300 million from a larger AUD 2 billion securitisation. The green RMBS also attracted a cornerstone investment from the public Clean Energy Financing Authority. Invenergy issued a USD 65 million 24.5-year investment-grade green project bond for its La Jacinta Solar project in Uruguay in the U.S. Private Placement Market.

Figure 9. Green bond issuance in 2018 by sector and sub-sector (USD Billion)



Notes: ABS/MBS = Asset Backed Securities/Mortgage Backed Securities; SSA = Sovereign, Supranational, Agency and Municipal, Regional and other sub-sovereign; Financials include Real Estate and Insurance; N-F Corp. = Non-Financial Corporates. SEB uses the BICS sector classification system with some adjustments using Bloomberg/MSCI green bond sector classifications. Bloomberg (see Guide to Green Bonds on the Bloomberg Terminal) methodologies used to qualify green bonds, including Schuldscheine and private placements, and excluding pure plays.

Source: SEB analysis based on Bloomberg/BNEF and SEB data.

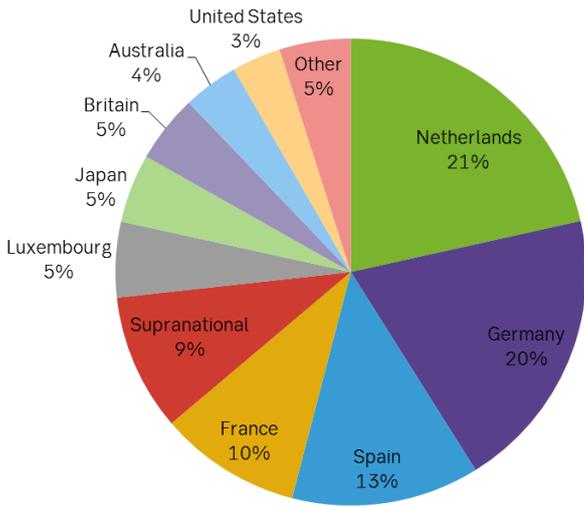
Social and Sustainability Bond Market Update

As noted above, growth prospects can be expected to be balanced by issuers and investors taking time to absorb the impressive acceleration that has occurred in the market to date, while calibrating their strategies and also considering opportunities via **emergent social and sustainability bond** financing channels.

Following the release of the UN Sustainable Development Goals, and the subsequent elaboration of the Social Bond Principles and Sustainability Bond Guidelines, this trend is already clearly visible in the market (Figure 11) with issuance peaking at USD 17.8 billion in 2017.

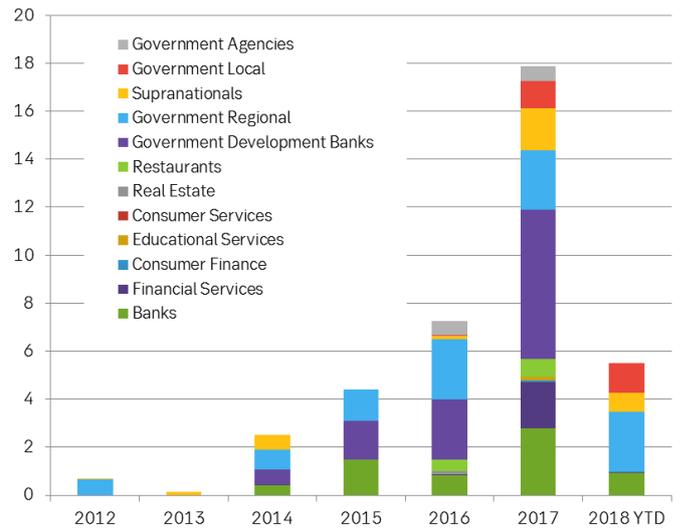
The market started off the year with vigour, reaching USD 5.5 billion by February with corporate issuance from ANZ, municipal issuance from North-Rhine Westphalia and Madrid, as well as from the World Bank (IBRD). Cumulative social/sustainability bond issuance stands at USD 39 billion since 2010; its geography dominated by European issuers and supranationals, and its sectoral issuer composition split 74% SSA and 26% corporate (Figures 10 and 11).

Figure 10. Geography of Social/Sustainability Bond Market



Source: SEB analysis based on Bloomberg and SEB data. Cumulative outstanding issuance. Social & Sustainability bonds qualified as per the Social Bond Principles and Sustainability Bond Guidelines.

Figure 11. Social/Sustainability bond market (USD Bn) by sub-sector



Source: SEB analysis based on Bloomberg and SEB data (BICS Level 4). Social & Sustainability bonds qualified as per the Social Bond Principles and Sustainability Bond Guidelines.

2. Publicly Announced Green, Social & Sustainability Bond Pipeline³

- Al Omrane (Dirham)
- Arise (SEK)
- Auckland Council (NZD)
- Banco Nacion Argentina
- Brookfield Renewable Partners
- California Infrastructure & Economic Development Bank
- Credit Suisse (EUR)
- City of Barcelona
- Council of Europe Development Bank (EUR)
- Export-Import Bank of Korea
- Growthpoint Properties
- Henang Yuguang (RMB)
- IREDA (Green Masala)
- Jacinta Solar Farm (USD)
- KfW (Benchmark)
- Mexico City (MXN)
- Midpeninsula ROSD
- New Development Bank (Green Panda)
- New York State Energy Research and Development Authority (USD)
- Nigeria Green Sovereign (Tap)
- Prologis European Logistics Fund
- State Bank of India (USD)
- Tianjin Rail Transit Group (EUR)

³ As of 8 March 2018

3. Summary of findings from the Swedish government's inquiry to promote the market for green bonds

The green bond market is relatively young. Although it has, within the space of a decade, grown exponentially (from being non-existent to having a global value of around USD 300 billion at the end of 2017), it can still be considered a niche product. The value of green bonds equates to less than one per cent of the total value of all issued bonds.

At the same time, we know that the prevailing financing need to meet the target from the Climate Summit in Paris – to keep the temperature increase to well below 2 degrees – is tremendous. Some reports claim that the need is USD 93,000 billion for the period until 2030. Green bonds have been indicated, on numerous occasions and by various institutions, as an important source of financing to manage the transition. To enable this, the conclusion is that measures must be taken to make green bonds more attractive to both investors and issuers.

To date, the value in owning or issuing green bonds has mainly had a signalling nature. A party issuing or buying a green bond wants to convey its desire to be part of the transition towards a more sustainable world. In financial terms, however, that value has been limited, or even negative.

A green bond has characteristics that differ from those of a traditional bond, however. A green bond features an element of influence that is absent in a traditional bond, in that the issuer has to report back to the investor on how the issue amount was used, hence paving the way for a dialogue. Conditions are thus created for an ongoing dialogue between the issuer and investors. A number of issuers have also described how introducing a green bond has opened the door for an internal dialogue between different entities at the issuer, mainly between the environmental side and the finance side. These new dialogues have, in themselves, brought up sustainability issues in a positive way.

At the same time, thus far green bonds have not entailed a lower financing cost for the issuer, or lower risk for the investor. It can even be said that, due to extra costs for certification and reporting back, green bonds are a more expensive financing source than regular bonds from the same issuer (albeit only marginally, seen in relation to the sizes of issues). Also, liquidity on the secondary market has been poorer for green bonds so far.

Besides the signalling value, it is difficult to find purely financial reasons for issuing or owning green bonds. It can also be added that regulations in the form of definitions and measurability are sometimes perceived as ambiguous.

The overarching remit of the inquiry has been to identify ways in which a green bond market could be promoted. It has thus not been the remit of the inquiry to judge whether green bonds are an effective financial instrument, or assess whether or not the green bond market should be promoted.

If the objective is to increase growth in green bonds and hence make them an important source of financing for a decided sustainable transition, measures are needed. These can be divided into three categories.



- Improving the existing market based on existing green bonds. The green bond market has nonetheless grown from being non-existent to amounting to around USD 300 billion in the space of ten years.
- Attempting to create green bonds that have partially new characteristics, mainly a lower credit risk, and hence offer a lower financing cost.

English summary of inquiry to promote the market for green bonds, SOU 207:115

10 January 2018

Mats Andersson

Inquiry Chair appointed by the Government to identify ways to promote the market for green bonds

Note that this text is provided by the contributing party and constitutes the opinion of the party and not necessarily that of SEB. SEB plays a role in enabling its stakeholders to benefit from a broad overview of initiatives by allowing key market participants to contribute through The Green Bond.

- Attempting, in different ways, to eliminate some of the additional expenses and obstacles that undoubtedly prevent a number of issuers from issuing green bonds, even if they fulfil the set requirements.

In the opinion of the inquiry, there is not one single solution to all the challenges; rather, it is a matter of assessing an extensive arsenal of areas in which the green bond market could be promoted.

All proposals will, in one way or another, require changes to regulations and mandates in order to be implemented.

At the same time, the ambition is for it to be practically feasible to implement the proposals presented by the inquiry in the relatively near future.

Limitation

The inquiry has chosen to make frequent references to the climate risk. The reason is that there is a clear link between Sweden's commitment in the Climate Agreement and the stipulations of the climate policy framework – that Sweden shall reduce emissions of greenhouse gases into the atmosphere by 85% by 2045, compared to emissions in 1990. Green bonds have also been explicitly indicated as an important source for financing the commitments in place under the 2015 Paris Climate Agreement. The benefit is also that climate impact is relatively easier to measure compared with other sustainability areas. Furthermore, there is reason to believe that a model for how the climate transition is to occur can most probably be duplicated for other areas of sustainability.

It is also essential that the proposals submitted do not require subsidies. When subsidies are used, all systems run a risk of exposure to short-term changes. Besides the shocks and imperfections subsidies can have on the functioning of a market, in some cases they can also contravene EU rules regarding prohibited state aid. Driving developments towards greater sustainability requires the game rules, like the issue itself, to be long-term. This applies not least to the field of bonds, which in themselves constitute a long-term commitment by both investors and issuers.

Some of the commissioner's proposals for promotion

Below are some proposals in the area that could contribute to creating a larger green bond market in Sweden, thus contributing to financing a transition towards a more sustainable society. The proposals are motivated by a conviction that, over time, sustainable investments have a lower credit risk and hence a lower financing cost, which could also help achieve more effective capital allocation in the longer term.

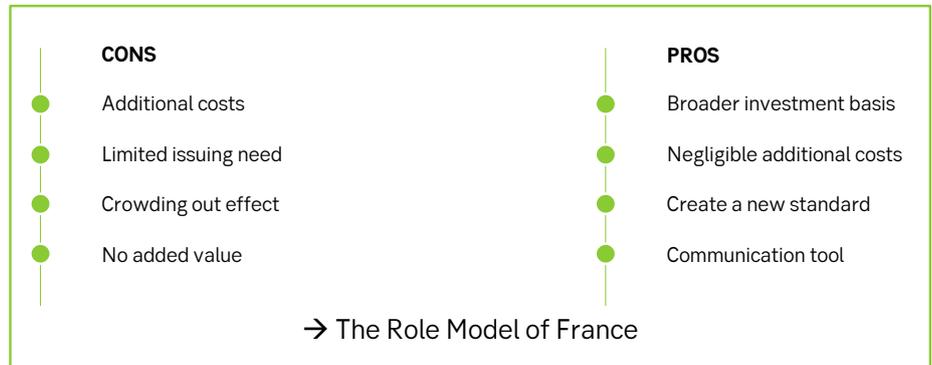
The first two proposals in this context concern extending the green bond market without altering the bond itself. They are discussed in [Chapter 8](#). Another category of promotion focuses on attempting to create a green bond which has a lower credit risk, and which would hence entail a lower financing cost for the issuer. Some of these proposals, which are discussed in [Chapter 6](#), are summarised here. [Chapter 6](#) also contains a third area of promotion that concerns the need to reduce thresholds, improve information and training, and contribute to a better-functioning secondary market. As is the case for all new phenomena, not least in the financial sector, there is reason to create clear regulations in a broad sense.

Issuing a Swedish green sovereign bond

Although, at the end of 2016, Poland was the first state to issue a green bond, it was only when France issued a green bond at the beginning of 2017 of a full EUR 7 billion that the discussion and desire for states to issue green bonds took off.

The desire to see states issuing green bonds should be seen in light of, for instance, the fact that sovereign bonds generally have better liquidity and represent around 20% of the total value of issued bonds worldwide.

The single most important promotive action, and that which would have the greatest impact, would be if the Swedish state were to issue green bonds.



At the same time, several countries, including Sweden, have restrictions on state borrowing, which complicates the issuance of green bonds. Commonly, under the law, borrowing must always occur at the lowest possible cost. Because issuing a green bond is associated with “extra costs” in the form of certification and back-reporting, it is easy to dismiss green bonds as a source of financing solely on those grounds. Furthermore, many claim that it is difficult, if not impossible, to earmark money for certain projects.

As mentioned above, the green bond market is also smaller, which is a drawback in that the secondary market is poorer than for traditional bonds.

The conclusion is that it is easy to argue on a number of points that issuing a Swedish green sovereign bond is not feasible, or even desirable, given current regulations and the requirement for the cost of central government debt management to be minimised in the long term with due consideration for risk. On the other hand, France basically has the same regulations as Sweden, and a green bond was issued there that was oversubscribed threefold.

Therefore, the inquiry cannot see why this would not be possible in Sweden too. However, a number of questions and circumstances must be analysed in more detail, including the budgetary framework and the fact that the borrowing need in Sweden currently differs from that in France.

Issuing a green sovereign bond must, in all likelihood, be based on the following:

- In time, green bonds will account for a substantial share of the bond market, and the extra costs associated with an issue today must be seen as an investment in the learning curve towards eventually obtaining a new source of financing. In this context, it can be mentioned that the additional cost of issuing the French sovereign bond equals 0.0004% of the issued amount.
- A green sovereign bond could be a means of communicating Sweden’s target to reduce emissions of greenhouse gases by 85% by 2045. That bond could, quite simply, be linked to a number of investments that have the purpose of realising the set targets.
- From the point of view of society, it is also important that the state plays an active role in facilitating financing a sustainable transition. Looking at the longer-term perspective, there is reason to believe that the marginal expenses arising in the short term are offset many times over by the long-term benefits reaped by society. The dilemma with today’s stock and bond market is that it tends to look to the short-term perspective, and in that perspective sustainability is more by chance than the effect of conscious choice. If the time horizon is changed, the conclusion could be completely different.
- Issuing a green bond would also broaden the future investor base for Swedish sovereign bonds, considering that demand for the green bond in France had a partially different spread in terms of both geography and investor categories. There are therefore strong market-related reasons for the state to engage in the green bond market.

At the same time, most agree that, without manifest state commitment, it will probably not be possible for green bonds to be the financing source that many desire and indeed demand. The opinion of the inquiry is – at least in the short-term perspective – that it is only states that can supply markets with the volumes needed.

It ought to be possible to use the structure of the French green bond as a model for a Swedish equivalent. If that were done, the arguments about it not being possible to earmark money in a budget would not hold water, and indeed neither would the argument that a green bond would hold investors back from traditional bonds.

State-owned companies

If a government and parliament wish to develop the Swedish green bond market, encouraging the state-owned companies to issue green bonds ought to be a reasonable option. Sustainability has long been high on the ownership agenda of such companies – quite simply, pioneering and setting a good example. It is set forth in the state's ownership policy that “Companies with state ownership shall act in an exemplary manner within the area of sustainable enterprise and otherwise act in such a way as to enjoy the confidence of the general public.” Adding to this is the fact that the state, e.g. through board nominations for such companies and, in some cases, the possibility of issuing owners' instructions, has a relatively good opportunity to influence how the companies act in this respect.

A number of the state-owned companies are active on the corporate bond market. Here too, however, the conditions must be such that green bonds stand out as the most attractive financing option in the long term.

NEW GREEN BONDS

Green bonds =

Lower risk over time, meaning lower capital costs

Real estate financing and covered bonds

One way of relating the risk in a green bond would be to link the bond to specific objects or holdings. One example of this is green commercial real estate. It is clear today that an absolute condition of a growing number of tenants is that they would only consider moving into a certified green building. One effect of this is that the vacancy level of green buildings is lower, and hence so too the financial risk. Investors who hold a green real estate bond backed by green real estate can thus reduce their required return. In turn, this gives a lower financing cost for the owner of the property. There is thus an incentive for property owners, when constructing new buildings, to focus more on green properties because, all else equal, they will give a more favourable cost of financing.

At 30 June 2017, the total value of bond financing of commercial real estate amounted to around SEK 230 billion.

Equivalent rationale can be applied to financing homes. Market participants have already defined the criteria for a “green home”. In order to stimulate the issuance of green covered bonds, issuers must have access to the information they need to be able to identify the objects that fulfil their criteria. The Swedish covered bond market amounts to around SEK 2,100 billion and is an important market in many respects.

Here too, there is an opportunity to steer the future production of homes and real estate in a more sustainable direction. Estimations show that around half of the climate impact occurs during the production of a property – a factor that goes unnoticed in the current certification systems for green properties.

ASSET BACKED GREEN BONDS

- Commercial properties
- Residential buildings



Pay for delivery

Sweden's greenhouse gas emissions shall, under Swedish law, decrease by 85% by 2045 compared with the emission level in 1990. Sweden emits just over 53 million tonnes a year today. At the same time, there is a carbon dioxide tax of around SEK 1,040 per tonne. Put simply, it could be said that society has estimated the cost of our annual emissions at around SEK 62 billion. If the emissions cease, the cost for society would be reduced by an equivalent amount, i.e. reduced emissions create a gain for society in relation to the situation today.

It is often said that measuring sustainability is difficult. For carbon dioxide, however, the task is much simpler.

Considering how very small incentives can steer a capital market, and primarily a bond market, it would be an interesting model to have a system in which a small part of the gain for society is paid back to the issuer of a green bond, provided that the bond was delivered as promised.

If a company carries out an investment with the purpose of permanently reducing CO₂ emissions, and finances it by issuing a green bond, and can subsequently demonstrate that emissions have been reduced, it ought to be possible for the state to give back part of the gain to society that this achieved.

Such a system would lead to increasing interest in green bond issuance, because it gives a lower financing cost. The buyer of a green bond can also point out what the effect of the investment has been from a climate perspective.

Bonds are highly suited to this type of structure because small incentives have a leverage effect through the fundamental characteristics of the bond. This is particularly the case in the current situation of record-low interest rates.

PAY FOR PERFORMANCE

- "Profit sharing"
- Small input → Great impact



Copy the Singapore model

As mentioned above, green bonds are associated with certain additional costs in connection with issues and back-reporting. However, in this context it is not a case of large amounts considering issue volumes, around SEK 120,000–400,000 in external costs, although marginal issuers could be pushed out. To resolve this, in Singapore it has been decided to let the state cover the extra cost involved in issuing a green bond. The gain for society if several investments are rendered sustainable would probably exceed this cost to the state many times over. An equivalent structure in Sweden would, given the current issue volume, be well below

SEK 100 million. Put simply, it is a well-justified expense in light of the positive, albeit sometimes difficult to measure, effects for society. It would be a matter of an initiative that is limited in time until the green bond market has reached a predetermined size compared with the current level of just over SEK 100 billion.



Functioning secondary market with clear rules

One of several shortcomings of green bonds is said to be the lack of clear rules regarding what a green bond is, and the absence of a well-functioning secondary market. It is of course important that investors, large- and small-scale, 'know' that the capital generated by the green bond is used as intended. In order for the green bond market to grow and hence become an important financing source for a sustainable transition, there must also be an advanced and well-functioning secondary market for such bonds. Because green bonds are still a niche product, trading volumes in these bonds are much smaller than in traditional bonds.

On the stock market, it is the trading venue that formulates the requirements that must be fulfilled for a company's shares to be admitted to trading. Similarly, it would be natural for a stock exchange to set clear requirements in terms of what defines a green bond. It would ease the sometimes confused discussion about what a green bond is and is not, hence improving the conditions for effective self-regulation. In the past, self-regulation has also proven favourable when the game rules for a trading venue are developed. Changes occur rapidly, placing great demands on flexibility and adaptability, and in the view of the inquiry self-regulation is usually better apt to deal with this than legislation. On a trading venue there are also sanctioning possibilities if an issuer fails to fulfil the regulations.

At the same time, it should be emphasised that the current definitions of a green bond appear to have worked satisfactorily to date.

Measure and report

The old saying 'what gets measured gets done' often holds up. It also has a bearing for green bonds.

The pressure on investors to report their climate risk has increased markedly in recent years. The idea is of course for savers and investors to be given insight into how the capital is invested, and to provide the opportunity to make selections from a sustainability point of view.

In France, a law regarding energy transition has been adopted. Article 173 thereof makes it compulsory for pension funds and asset managers, as of the 2017 financial year, to report the climate risk and how it is managed. The law itself will undoubtedly lead to sustainability issues attracting greater attention, and being reported more relevantly. Article 173 is based on the concept of 'comply or explain'.

In Sweden, there are no overarching regulations regarding how climate risk and other sustainability matters are to be reported in asset management. Parts of the market have prepared guidelines, but there are no overarching, comprehensive regulations like in France.

The requirements regarding and desire for reporting are understandable. The more comprehensive they are, the better.

This also creates a desire among investors to have access to information that enables relevant reporting. In light thereof it would be desirable if a green bond issue also reports, as far as possible, the concrete effects of the stated investments.

No Swedish law on green bonds

The inquiry has a mandate to propose the legislative amendments that are deemed necessary, but has arrived at the conclusion that the self-regulation of the market functions well, and that there is no immediate legislative need to promote green bonds. It is possible that Swedish national statutory provisions would even serve as an obstacle on a global market. If a statutory provision is to be introduced at all, it should in that case be at minimum EU level.

Adding to this conclusion is that an array of EU-based regulations prepared in the wake of financial crises around 2010 are under national implementation in the member states, starting to apply during 2017–2019. A number of the issues pointed out by the inquiry will be addressed through such entry into force.

Another reason to wait with proposals for legislative reforms is that the European Commission has announced a reform package, an initiative, to promote investments within the framework of the capital markets union in March 2018. The package is planned to include proposals regarding green bonds.

The inquiry has therefore found, in its contacts with the European Commission, that now is not the right time to put Swedish legislative bills forward. It is therefore the opinion of the inquiry that the analytical work performed and the conclusions drawn by the inquiry can constitute a solid basis for Swedish standpoints in the forthcoming negotiations in the European Council.

In the event of any change in circumstances, the inquiry has appended an outline of the legislative approach that would be preferable for a Swedish green bonds act ([Chapter 6](#)).

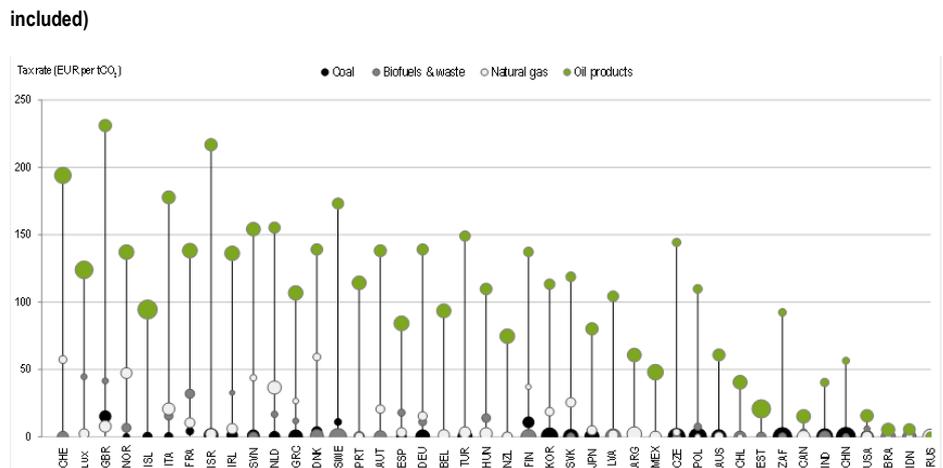
4. Governments should make better use of energy taxation to address climate change

Taxes are effective at cutting harmful emissions from energy use, but governments could make better use of them. Greater reliance on energy taxation is needed to strengthen efforts to tackle the principal source of both greenhouse gas emissions and air pollution, according to a new OECD report.

[Taxing Energy Use 2018](#) describes patterns of energy taxation in 42 OECD and G20 countries (representing approximately 80% of global energy use), by fuels and sectors over the 2012-2015 period.

New data shows that energy taxes remain poorly aligned with the negative side effects of energy use. Taxes provide only limited incentives to reduce energy use, improve energy efficiency and drive a shift towards less harmful forms of energy. Emissions trading systems, which are not discussed in this publication, but are included in the OECD's [Effective Carbon Rates](#), are having little impact on this broad picture.

Figure 4.1 Effective tax rates on carbon emissions from energy use on each fuel in 2015 (biomass emissions included)



Note that this text is provided by the contributing party and constitutes the opinion of the party and not necessarily that of SEB. SEB plays a role in enabling its stakeholders to benefit from a broad overview of initiatives by allowing key market participants to contribute through The Green Bond.

Figure 4.1 indicates that fuels are not taxed in line with their carbon content, and that the tax rates on different fuels vary widely. In particular, coal is taxed at the lowest rates, despite its high external cost. While this figure focusses exclusively on comparing tax rates in terms of carbon content, the external cost of coal also exceeds that of other fuels in terms of its impact on air pollution. Oil products are taxed relatively highly, also, but not only, because of high taxes on road transport fuels.

“Comparing taxes between 2012 and 2015 yields a disconcerting result,” said OECD Secretary-General Angel Gurría. “Efforts have been made, or are underway, in several jurisdictions to apply the ‘polluter-pays’ principle, but on the whole progress towards the more effective use of taxes to cut harmful emissions is slow and piecemeal. Governments should do more and better.”

In 2015, outside of road transport, 81% of emissions were untaxed, according to the report. Tax rates were below the low-end estimate of climate costs (EUR 30/tCO₂) for 97% of emissions.

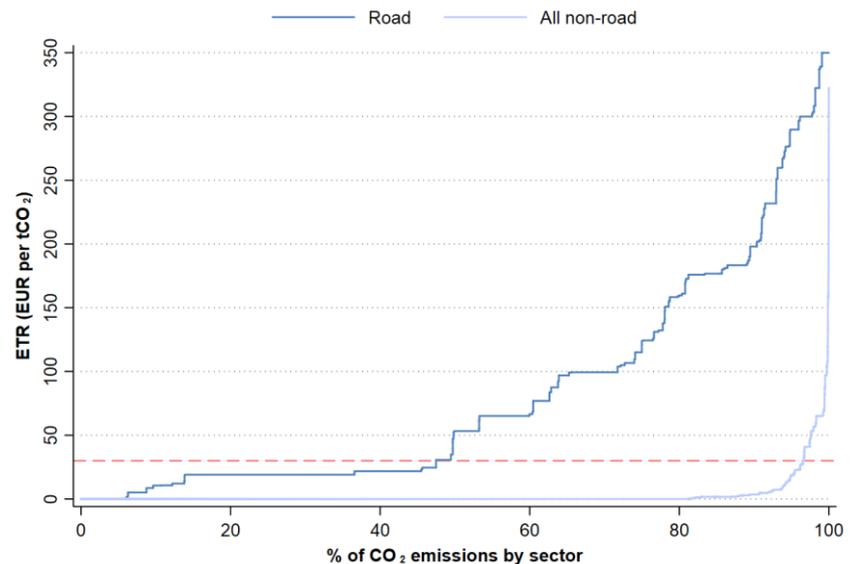
Meaningful tax rate increases have largely been limited to the road sector. Fuel tax reforms in some large low-to-middle income economies have increased the share of emissions taxed above climate costs from 46% in 2012 to 50% in 2015. Encouragingly, some countries are removing lower tax rates on diesel compared to gasoline. However, fuel tax rates remain well below the levels needed to cover non-climate external costs in nearly all countries.

Figure 4.2 Proportion of carbon emissions from energy use subject to different levels of effective tax rates in the road and non-road sectors (excluding taxes on electricity output, including carbon emissions from biomass)

Figure 4.2 indicates that carbon emissions from road transport are almost fully taxed, while emissions from outside of road transport are almost fully untaxed. In 2015, 50% of carbon emissions from road transport were taxed above a minimum estimate of climate costs (EUR 30 per tCO₂), but just 3% of the carbon emissions from outside of road transport were taxed above climate costs.

For details about the selection of the minimum estimate of climate costs, please refer to chapter 1 of Effective Carbon Rates.

Do high taxes on road transport mean that taxed on road transport are sufficiently high or even too high? No, because of the wide range of external costs that arise from fuel use in road transport (e.g. local air pollution, congestion and accidents), not included in Figure 4.2. Taking account of other externalities from road transport suggests that taxes on road transport fuels are still too low in almost all countries. Box 1 in OECD (2018) elaborates on this point.



Coal, characterised by high levels of harmful emissions and accounting for almost half of carbon emissions from energy use in the 42 countries, is taxed at the lowest rates or fully untaxed in almost all countries.

While the intense debate on carbon taxation has sparked action in some countries, actual carbon tax rates remain low. Carbon tax coverage increased from 1% to 6% in 2015, but carbon taxes reflect climate costs for just 0.3% of emissions. Excise taxes dominate overall tax rates by far.

“The damage to climate and air quality resulting from fossil fuel combustion can be contained, but the longer action is delayed the more difficult and expensive it becomes to tackle this challenge,” Mr Gurria said. “Aligning energy prices with the costs of climate change and air pollution is a core element of cost-effective policy, and vast improvements are urgently needed. While in some cases compensation for higher energy costs faced by households or firms may be deemed necessary, especially to those more vulnerable, lower tax rates or exemptions are not the way to provide it – targeted transfers should be favoured.”

Further information on Taxing Energy Use, including graphical profiles of energy use and taxation in the 42 countries is available at: <http://oe.cd/TEU2018>.

An [embeddable version of the report](#) is available, together with information about downloadable and print versions of the report.



5. Sustainable finance: Commission's Action Plan for a greener and cleaner economy

Sustainable finance: Commission's Action Plan for a greener and cleaner economy

Brussels, 8 March 2018

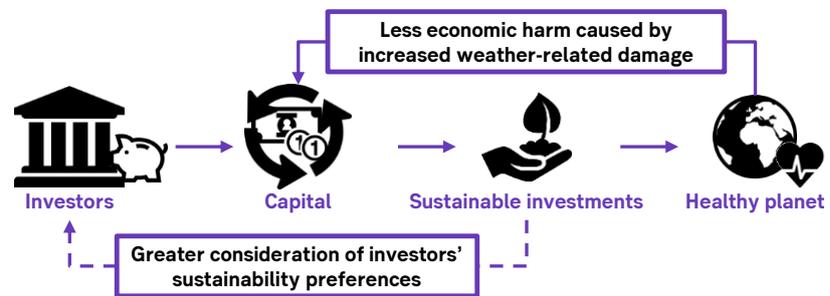
Note that this text is provided by the contributing party and constitutes the opinion of the party and not necessarily that of SEB. SEB plays a role in enabling its stakeholders to benefit from a broad overview of initiatives by allowing key market participants to contribute through The Green Bond.

The European Commission is today unveiling its strategy for a financial system that supports the EU's climate and sustainable development agenda.

As our planet increasingly faces the unpredictable consequences of climate change and resource depletion, urgent action is needed to adapt to a more sustainable model. Around €180 billion of additional investments a year are needed to achieve the EU's 2030 targets agreed in [Paris](#), including a 40% cut in greenhouse gas emissions. This is why, on the basis of the recommendations set out by the High-Level Expert Group on sustainable finance (HLEG), the Commission is today setting out a roadmap to boost the role of finance in achieving a well-performing economy that delivers on environmental and social goals as well.

Today's Action Plan on sustainable finance is part of the Capital Markets Union's (CMU) efforts to connect finance with the specific needs of the European economy to the benefit of the planet and our society. It is also one of the key steps towards implementing the historic [Paris Agreement](#) and the [EU's agenda for sustainable development](#).

Figure 5.1 Sustainable finance



First Vice-President Frans **Timmermans** said: "Moving to a greener and more sustainable economy is good for job creation, good for people, and good for the planet. Today we are making sure that the financial system works towards this goal. Our proposals will allow investors and individual citizens to make a positive choice so that their money is used more responsibly and supports sustainability."

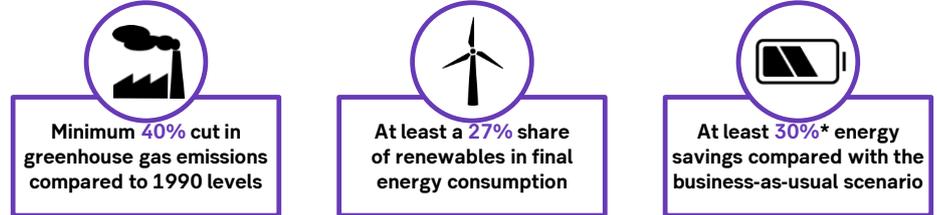
Valdis **Dombrovskis**, Vice-President responsible for Financial Stability, Financial Services and Capital Markets Union said: "Inspired by the work of the High-Level Expert Group, we are today presenting our plans for a far-reaching reform that could set the global benchmark for sustainable finance. Only with the help of the financial sector can we fill the annual €180 billion funding gap to reach our climate and energy targets. This will help to support a sustainable future for generations to come."

Jyrki **Katainen**, Vice-President responsible for Jobs, Growth, Investment and Competitiveness said: "The EU is already at the forefront of investing in resource efficiency and social infrastructure through the European Fund for Strategic Investments. At least 40% of EFSI infrastructure investments will be directed to projects that contribute to reaching the Paris Agreement goals to fight climate change. At the same time, creating the conditions for private investors to invest sustainably is crucial to achieve the transition to a cleaner, more resource-efficient, circular economy."

Miguel Arias Cañete, Commissioner for Climate Action and Energy said: "Global investments hold the key to fighting climate change, with trillions already invested in solutions such as renewables and energy efficiency. The Paris Agreement is a massive investment opportunity. How can we unlock it? Today's action plan will help Europe's financial sector position itself as a leading global destination for investments in green technologies."

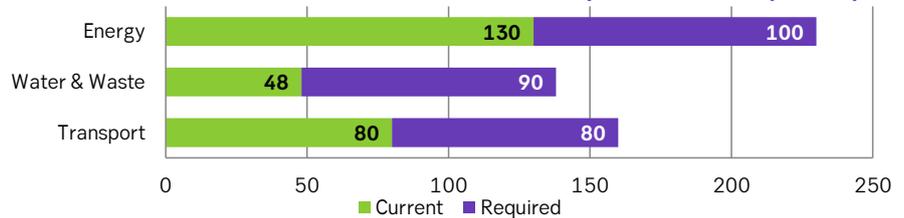
Figure 5.2 Finance can make a difference

The EU has committed to three ambitious climate and energy targets by 2030:



To reach these energy and climate goals an additional funding of **EUR 180bn** per year is needed. According to data by the European Investment Bank, when we look at the goals for the energy, transport, water and waste sector as a whole, this number rises to **EUR 270bn**.

Annual investment needs for sustainable development in the EU (EURbn)



With over **EUR 100 trillion in assets**, the financial sector has huge potential for green investments. The financial sector must be part of the solution and can play a critical role in achieving the EU's sustainability goals. However, engaging private finance in a systematic way requires systemic changes to the EU financial eco-system.

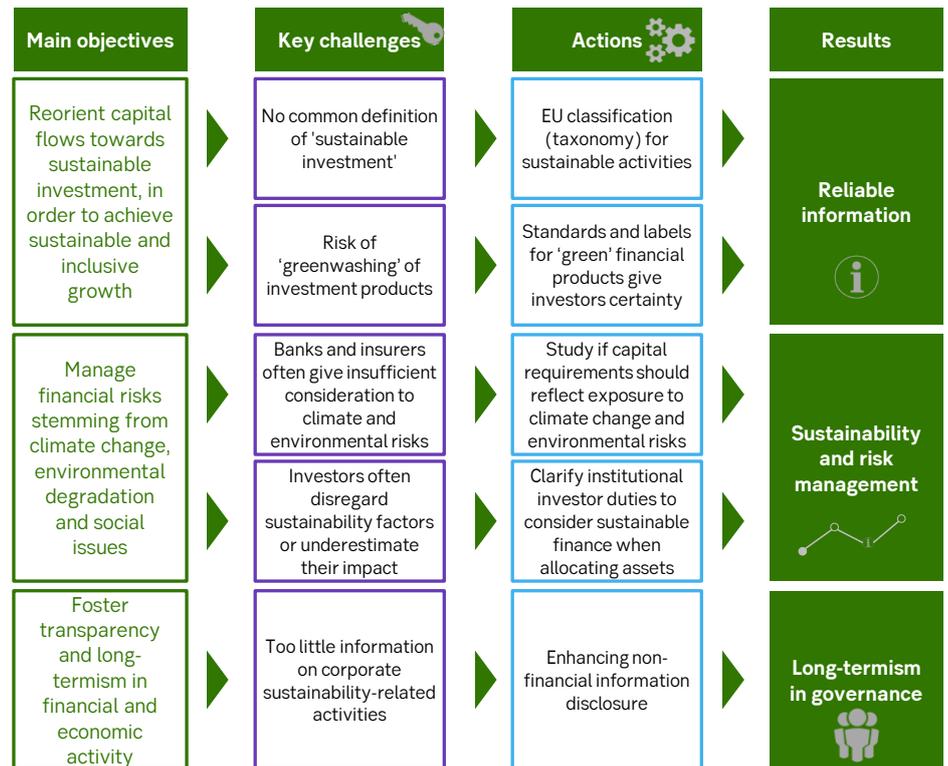
*Pending finalisation of co-decision procedure

Key features of the Action Plan

A year ago, the Commission appointed a High-Level Expert Group on sustainable finance to elaborate a comprehensive set of recommendations for the financial sector to support the transition to the low-carbon economy. Inspired by their final [report](#), the Commission is today proposing an EU strategy on sustainable finance setting out a roadmap for further work and upcoming actions covering all relevant actors in the financial system. These include:

- Establishing a common language for sustainable finance, i.e. a unified **EU classification system – or taxonomy** – to define what is sustainable and identify areas where sustainable investment can make the biggest impact.
- Creating **EU labels** for green financial products on the basis of this EU classification system: this will allow investors to easily identify investments that comply with green or low-carbon criteria.
- Clarifying the **duty of asset managers and institutional investors** to take sustainability into account in the investment process and enhance disclosure requirements.
- Requiring insurance and investment firms to advise clients on the basis of their preferences on sustainability.
- Incorporating **sustainability in prudential requirements**: banks and insurance companies are an important source of external finance for the European economy. The Commission will explore the feasibility of recalibrating capital requirements for banks (the so-called green supporting factor) for sustainable investments, when it is justified from a risk perspective, while ensuring that financial stability is safeguarded.
- Enhancing transparency in **corporate reporting**: we propose to revise the guidelines on non-financial information to further align them with the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD).

Figure 5.3 What challenges does the action plan address?



Background

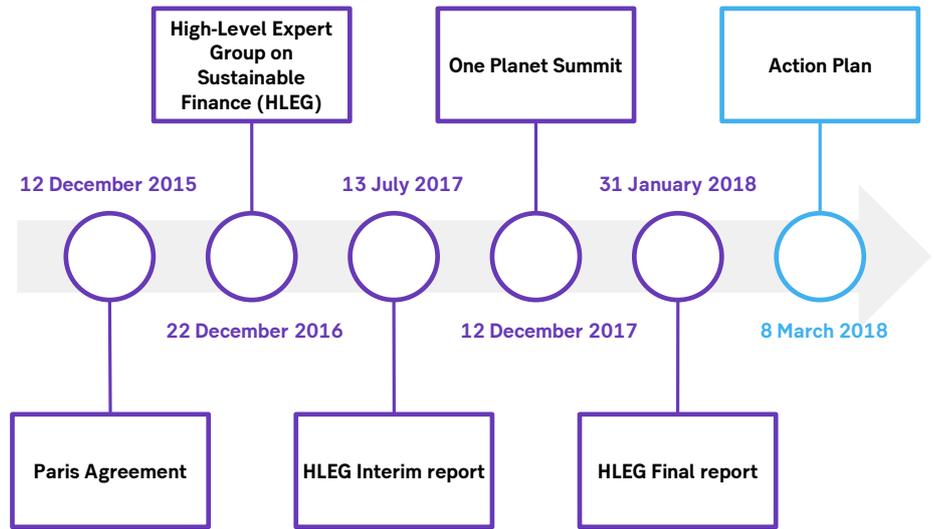
The EU and governments around the world committed to the objective of a more sustainable economy and society when they adopted the [Paris Agreement](#) on climate change and the UN 2030 Agenda for Sustainable Development. The EU is already making a difference thanks to the [EU 2030 Energy and Climate framework](#), the [Energy Union](#), the [Circular Economy Action Plan](#), and the [EU implementation of the 2030 Agenda for Sustainable Development](#).

To achieve more sustainable growth, everyone in society must play a role. The financial system is no exception. Re-orienting private capital to more sustainable investments requires a comprehensive rethinking of how our financial system works. This is necessary if the EU is to develop more sustainable economic growth, ensure the stability of the financial system, and foster more transparency and long-termism in the economy. This thinking is also at the core of the European Union's Capital Markets Union (CMU) project.

The Commission established a [High-Level Expert Group on sustainable finance](#) in 2016. It was made up of 20 senior experts from civil society, the finance sector, academia and observers from European and international institutions. The group published its final [report](#) in January 2018. It presented eight priority actions, which it considered to be the necessary building blocks for any meaningful action regarding sustainable finance. Today's action plan builds on the High-Level Expert Group's recommendations.

The work on a number of the report's key recommendations was discussed in the group's [interim report](#) of 13 July 2017. In response, the [Commission has already proposed the inclusion of environmental, social and governance \(ESG\) factors in the mandates of the European Supervisory Authorities](#). The Commission also conducted a [public consultation on institutional investors' and asset managers' duties regarding sustainability](#).

Figure 5.4 What have we done so far?



The Commission is organising a [high level conference](#) on 22 March 2018 to discuss the Action Plan presented today.

Figure 5.5 Next Commission initiatives

	Taxonomy	Standards/labels	Other actions
March 2018	Call for application for the Commission technical Expert Group		
May 2018	Proposal for a regulation with principles and scope for an EU taxonomy*		Proposal to clarify institutional investors' and asset managers' duties;* Initiative for harmonising benchmarks comprising low-carbon issuers
Q2 2018			Commission to amend MiFID II and Insurance Distribution Directive delegated acts to enhance consideration of sustainability assessment*
Q1 2019	Expert Group report on taxonomy on climate change mitigation activities	Expert Group report on green bond standards	Commission fitness check of EU legislation on public corporate reporting
Q2 2019	Expert Group report on taxonomy on climate change adaptation and other environmental activities	Commission to adopt a delegated act on the prospectus for green bond issuances*	Commission to amend non-binding guidelines on non-financial information
Q3 2019	Expected adoption of the regulation and delegated act(s) on a taxonomy for climate change activities.* Platform on sustainable finance to be operational	Creation of EU Ecolabel for financial products based on the EU taxonomy	Commission study on sustainability ratings and research
			Measures towards incorporating climate risks into prudential requirements in line with the EU taxonomy

*Legislative proposal

6. Framing stranded assets risk in an age of disruption

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During 2017 SEB participated in a project to develop a practical framework to identify and quantify stranded asset risks. The project was financed by Vinnova, and the partnership included Material Economics, Stockholm Environmental Institute, Ratos and Church of Sweden. Jukka Honkaniemi (Senior Banker, SEB Large Corporates & Financial Institutions) and Julian Beer (Head, ESG Financial Advisory, SEB Large Corporates & Financial Institutions) worked in the steering and project group throughout the year and the automotive, consumer goods and energy sector specialists also contributed their expertise to the study. The ensuing report was published February 2018. We append an executive summary of the findings of the report below. Please contact Christopher Kaminker, Head of Research, Climate & Sustainable Finance; Phone: +46850623095, christopher.kaminker@seb.se if you wish to receive a copy of the full report.

The study established methodology for initial consideration and quantification of stranded asset risk for legacy industries. It illustrated how the combined impact of several disruptions may have a major impact on the asset value of "old economy" industries, often with tipping points occurring earlier than conventional wisdom would predict. The suitability of scenario analysis for this kind of evaluation was also demonstrated.

SEB Large Corporates & Financial Institutions division continues to move forward with ESG integration across its entire financial analysis organisation, sharing sector expertise and developing methodologies together across business units. This Stranded Assets project has proved to be a useful in helping to design an internal process known as EMPATH – ESG Materiality Pathway. EMPATH considers discrete sectors, to identify the ESG and megatrend disruption issues that could have the most material impact on financial performance for companies within each sector. The results will be intended to guide and facilitate ESG integration into financial forecasting for both internal and advisory applications.

Executive summary: This project aims to understand which assets could become economically stranded as a result of the transition to a more sustainable economy and related disruptions. It also aims to develop a pragmatic framework for the financial industry to use when assessing stranded asset risks.

The key conclusions of the work are as follows:

1. Stranded assets are a major economic issue that deserves more attention. In the transition to a greener and more sustainable economy, the 'new' products, business models and markets get significant attention. While this is good, understanding what will happen to the 'old' industries and assets is also crucially important, as major economic values and employment opportunities are at stake. Economic history shows that such transitions often happen in waves of creative destruction, and in many cases it will not be incumbents adjusting to new market circumstances, but new entrants outcompeting incumbents. For some incumbent industries, the negative effects are obvious (e.g. in the coal and oil industries). But there are many other, less obvious industries that will also be hit: for example, electric vehicles do not have gearboxes and do not need fuel pumps, sustainable food production requires much less packaging and fertilizer, and so on.

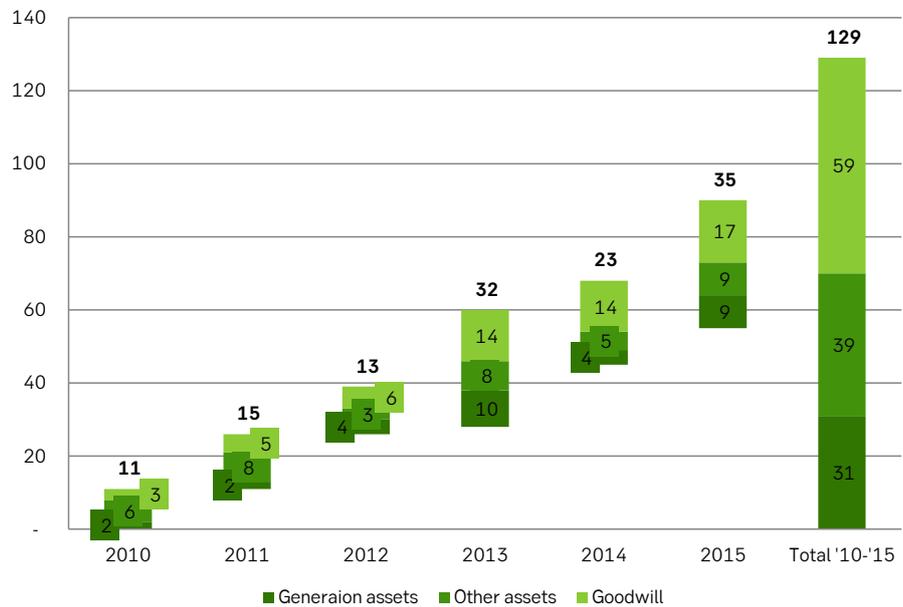
2. The timeline of the sustainability transition makes it highly relevant for the financial industry to look carefully at stranded asset risk now. A key question in the project was whether the stranded asset risk is relevant to financial industry decisions today, or whether it lies further into the future. Our conclusion is that assessing these risks is already highly relevant. Credit decisions are routinely taken with a timeline of 5-10 years. Equity analysts typically consider the market at least 3-5 years into the future. And when private equity firms make an acquisition, they are often looking to hold the company for 6-9 years, and then sell to someone valuing cash-flows another 7-10 years into the future. In all of the industries assessed during this project, significant asset stranding might well happen within such timelines.

3. The European electricity industry has suffered impairments of €130 billion in the last 6 years alone, and has many insights to offer on how fast and non-linear the change can be also in capital-intensive process industries. The dramatic developments of the electricity industry since 2010 was used as a historic case study of asset stranding as a result of disruptive sustainability-related change. Mirroring the impairments, during the same

time period, 7 out of the top 10 power utilities in Europe lost on average 65% of their share price 2010-2016. This is very surprising in an industry that ‘on paper’ should be very predictable: electricity demand is very stable and quite inelastic to price fluctuations, power plants have a 25-60 year lifetime, and electricity generation is an engineering-based B2B industry. So what explains such a dramatic turn of events, with massive stranded assets? The full explanation is given in chapter 2, but in a nutshell, what happened is that the growth of renewable technology and energy efficiency resulted in electricity demand growth for the incumbent technologies (gas, coal, nuclear) turning negative. This, in turn, led to a toxic mix of effects: run-hours decreased in the incumbent power plants, and in parallel, the contribution margin per run-hour also decreased as average and peak prices dropped. Perhaps most importantly, it became clear to financial analysts that wind and solar power were not merely marginal phenomena but could really eat into ‘base load’ production. Consequently, it became clear what was the ‘old’ and the ‘new’ of the industry, and analysts dramatically lowered growth expectations for the ‘old’. In many ways this was a textbook example of disruption and creative destruction. It also caught many financial actors off guard, and the equity and credit rating reports from the last 5-7 years are not a pretty read. While hindsight is of course a major advantage, one cannot escape the impression that both the industry itself and the financial community could have seen the disruption coming a few years earlier – there was plenty of writing on the wall – which would have put an early stop to many investment projects that are now written down.

Figure 6.1 Total impairments for the 10 largest companies in Europe was EUR 129bn 2010-2015, and accelerated at a rate of 24% per annum.

Figure 6.1 Impairments for the electric power sector in Europe 2010-2015 (EURbn)



One important insight is that what happened in electricity could also happen in many other fixed asset industries, not least those located in mature slow-growing economies such as Europe. The change dynamic is generic: a low underlying demand growth turns negative for incumbents due to a new technology or business model. This in turn reduces utilization, contribution margins, and growth expectations. A new consensus view is formed, and investors quickly want out of the old and into the new, with major implications for valuations and asset stranding.

4. The project has identified up to ~€750 billion of assets in Europe exposed to significant risk of becoming stranded over the coming 10 years, in three industries: automotive, apparel, and further electricity write-offs.

4A. Up to ~€240 billion, or 40% of the total Enterprise Value, at risk in the European automotive industry. The automotive industry is being rapidly reshaped by three simultaneous trends, each one impactful enough to be called a disruption: electric vehicles (‘EVs’), driverless vehicles, and car sharing services:

- **EVs.** Driven by very rapid improvements in battery technology (cost decrease of 77% during the last 5 years, with the improvement pace actually picking up), EVs are already cost competitive on a total-cost-of-ownership basis in many segments and are quickly approaching

cost competitiveness even on a pure sticker price basis. This raises a whole range of difficult questions for incumbents, who have focused heavily on the combustion engine and drivetrain over recent decades, while outsourcing many other components of the car. An electric engine is much simpler than a combustion engine (20 moving parts compared to 2 000), and EVs do not even have gearboxes, so the risk of physical and intellectual assets getting stranded is obvious.

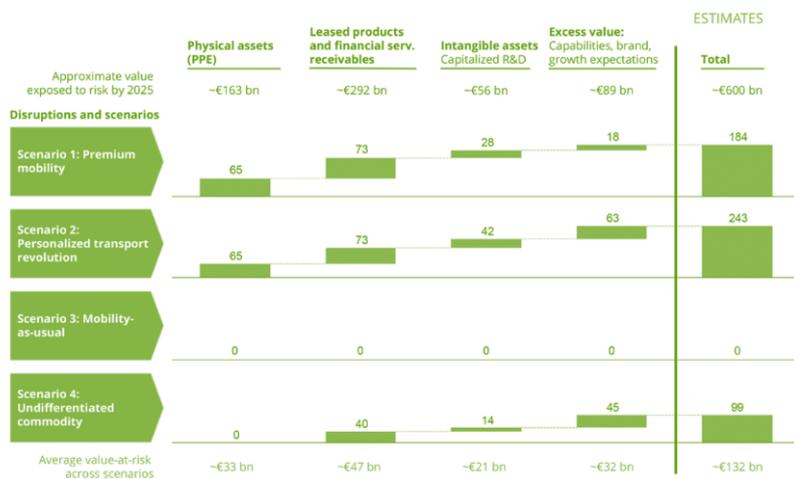
■ **Driverless vehicles** are also closer than many think. Google's Waymo self-driving cars have by now clocked more than 3 million miles with virtually no incidents, and Uber is already testing self-driving taxis in both Singapore and Pittsburgh. This is a massive technology shift, and driverless functionality might be one of the most important selection criteria over the next years and has the potential to completely revamp mobility as we know it.

■ **Car sharing.** European cars have a capital utilization of only 2% (they are parked 92% of the time and when driven, only 1.5 out of 5 seats are occupied)¹ and the value of the car capital stock is enormous (in Sweden alone, it is about 500 billion SEK or approximately 12% of GDP – 5 million cars with an average value of 100 000 SEK). Car sharing is an excellent way to better utilize this massive capital stock, and hence it is growing fast across the world. Since every shared car replaces 4 to 7 privately owned cars, sharing has the potential of driving a wedge into total car sales. Also, it will mean a different type of customer for car companies: fleet customers with higher demands and better negotiation abilities.

An assessment of which assets of the car manufacturers could become economically stranded as a result of these disruptions is presented in chapter 4. The overall conclusion is that property, plant and equipment ('PPE'), R&D capitalized into combustion technology and leased products are all at varying risk of stranding and have a combined worth of €134 billion for the European industry (22% of the enterprise value). But in addition to the asset-by-asset exposure, these combined trends also raise deep questions about the brand value and overall growth expectations of these companies. A test was made as to whether the same type of negative growth scenario that played out in the electricity industry could happen also in automotive, and the conclusion is that it is not at all difficult to create a similar scenario, with even much larger asset values at risk of stranding.

Figure 6.2 Economically stranded assets by 2025; risk of significant value-loss of up to EUR 243bn

Figure 6.2 Asset groups exposed to risk for the European automotive industry



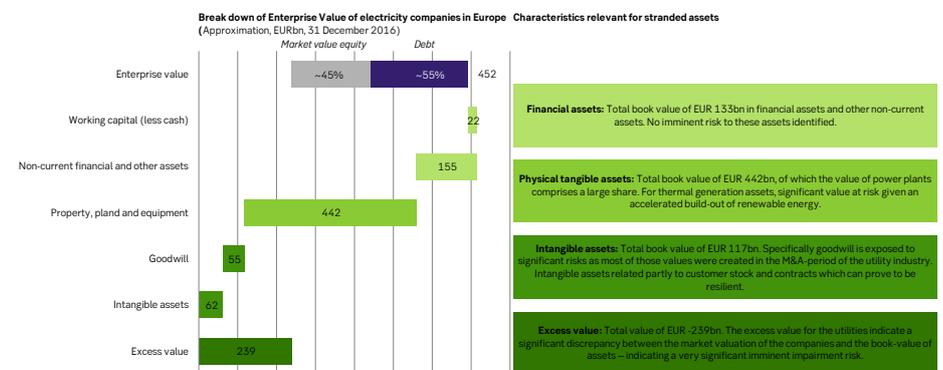
4B.Apparel. The European apparel industry's major ESG issues lie in its supply chain: water use, chemicals release, labor conditions and compensation, and CO2 emissions. Also, a particularity of the apparel industry compared to the other industries analyzed during this project is that balance sheet assets only make up for approximately 20% of the total enterprise value, while other capital market expectations (presumably growth and profit expectations from brand, design capabilities, customer loyalty) make up for the remaining 80%. The key question related to sustainability becomes: in the transparent age of pervasive social media, how big is the risk that the ESG issues highlighted above spill over to the apparel companies, and taint consumers' image of a specific company, and perhaps of the entire industry? What would this do to consumer spending? While some of the big apparel brands have high ambitions on sustainability in this supply chain, the research reviewed for this project also shows that they have a lot of work ahead of them on sustainability. The report analyzes this question together with the other megatrend for apparel companies – the ongoing, fast shift towards online sales –

and asks what these two trends in combination can do to the brands and growth of apparel companies. We have not put a number to the stranded asset risk in apparel, but it is clear that it could be a substantial share of the total €351 billion enterprise value of the top-10 European apparel companies.

4C. Electricity sector – up to another €500 billion at risk? As explained above, the European electricity sector has already suffered impairments of €130 billion 2010-2015. But the technology shift in electricity is far from over, and more assets are at risk of getting stranded. Wind and solar power are enjoying very fast growth globally (solar growing at a dramatic pace of 39% per year globally), and prices for these new technologies decrease fast. New solar and wind power projects internationally have a total cost of generating electricity (including capital payments) for new installations that are already below the running cost of incumbent coal and gas power plants. This means it is already economically rational in some situations to shut down existing assets with remaining technical lifetime and replace them with new-built renewable power plants, a very dramatic tipping point. The stock market seems to have accounted for such a development much more than company financial reports: the enterprise value of the top-12 listed European utilities are at only 65% of their book value, a discrepancy of €239 billion in absolute terms. In total, the book value of PPE (property, plant and equipment) and goodwill sum to €496 billion for the 12 largest utilities in Europe, and it is no exaggeration to say that €300-500 billion of these assets are exposed to the risk of getting economically stranded. So it looks like the European utility sector is far from through its transition.

Figure 6.3 The Enterprise Value of electricity companies at EUR ~452bn, with physical assets close to 98% and intangible assets close to 26%

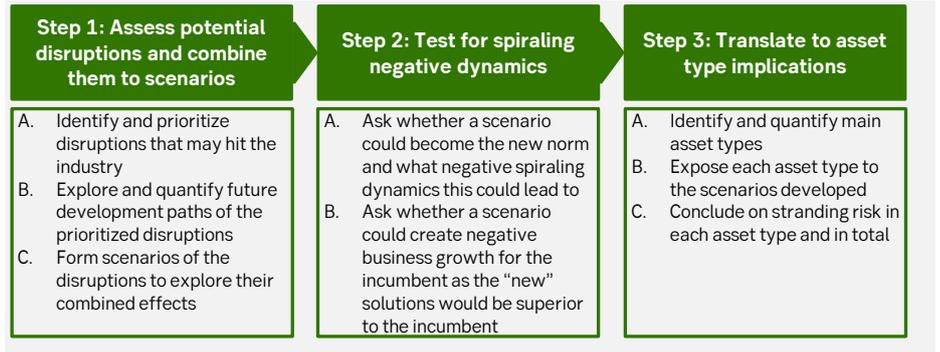
Figure 6.3 Enterprise value break down of European utility companies



Note: Market cap for 12 larger public electricity companies in Europe (including subsidiaries): CEZ Group, E.ON, EDF, Enel, Engie, Fortum, Iberdrola, Innogy, PPC, RWE, SSE and Uniper. Asset values latest available numbers, from 31 December 2016.

5. To frame and understand these risks, the financial industry needs to move well beyond current ESG approaches. A new methodology has been developed that we believe better captures the risks in the example industries studied. Methods of reflecting ESG impacts in investment analysis have developed fast over the last 10 years, and include methods such as norms-based exclusion, decarbonizing strategies, qualitative ESG ratings analyses, as well as other principles-based investment strategies (e.g. the approach and recommendations set by the Principles for Responsible Investment, PRI). Much current attention goes towards identifying ‘material’ sustainability issues and assessing those. While all this is certainly valuable, a key message from this study is the deep interlinkages between sustainability and other major technology and business model changes (e.g. driverless vehicles, sharing, e-commerce), and the spiraling negative growth dynamic that the combination of these can imply for the incumbent industry. Such risks are not systematically addressed in most legacy ESG analysis approaches, and therefore a major conclusion is that analysts who wish to understand the value implications of the sustainability transition need to integrate ESG analyses with traditional financial value assessments. The methodology created in this report consists of developing a quantitative understanding of the key disruptions hitting the industry (both sustainability-related and not), combining them to scenarios, testing whether there is a real risk that the growth of the incumbent industry could turn negative in any of these scenarios, and then quantifying the impact on the major asset types in the industry.

Figure 6.4 Overall methodology for framing stranded asset risks





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