Asset owners can turbocharge China's journey to carbon neutrality

Oliver Bäte and Ludovic Subran[1]

Executive Summary

China has made remarkable progress in its green transformation. China has seen the fastest decline in emission intensity over the past decade, in part by far outpacing the European Union and the United States when it comes to greening its energy supply. In fact, China's installed capacity for renewable energy grew by over +800% to 695GW at the end of 2018, from a mere 76GW in 2000. As a result, installed capacity in the US is now around one third of that in China, while the EU stands at two thirds. China is also racing ahead when it comes to electrifying its transport system and prioritizing forest policy to remove carbon dioxide from the atmosphere. But current policy projections suggest that greenhouse gas emissions in 2030 will still be more than double the level needed to comply with the Paris agreement (14,242 mega tonnes vs 6,452 mega tonnes).

The financial sector needs to step up to turbocharge the green transformation. China's green finance sector is growing fast: outstanding green loans stand at over RMB10.6trn (USD1.5tn), more than double the amount at the end of 2013; outstanding green bonds amount to RMB977bn (USD140bn), averaging +30% yearly growth since their introduction in 2016. Separately, China has also established hundreds of green funds, as well as opportunities for green stock indices and insurance. In total, an average RMB2.1tn was deployed per year on average in climate-related investments over 2017-2018. However, estimates of investment needs for China to reach its green targets in the coming decade(s) range from RMB3.33tn to RMB9.55tn on average per year. Green finance will thus need to step up significantly to bridge the funding gap.

Asset owners are instrumental to China's ambition of achieving carbon neutrality before 2060. Asset owners, as the ultimate responsible person for the investment portfolios, sometimes representative of the global / regional capital markets, have several levers to support carbon neutrality target while ensuring real world impact. Firstly, asset owners could engage with high-carbon companies on their decarbonization pathways. Secondly, they could advocate backing efforts to reduce the overall emissions intensity of high priority hard-to-decarbonize sectors. Thirdly, asset owners could ramp up financing for climate-positive investments such as renewables, green buildings, sustainable forestry, and green hydrogen.

How could China's policymakers accommodate the growing appetite of international investors? International investors are willing to support China to succeed with its goal of carbon neutrality by 2060. Of

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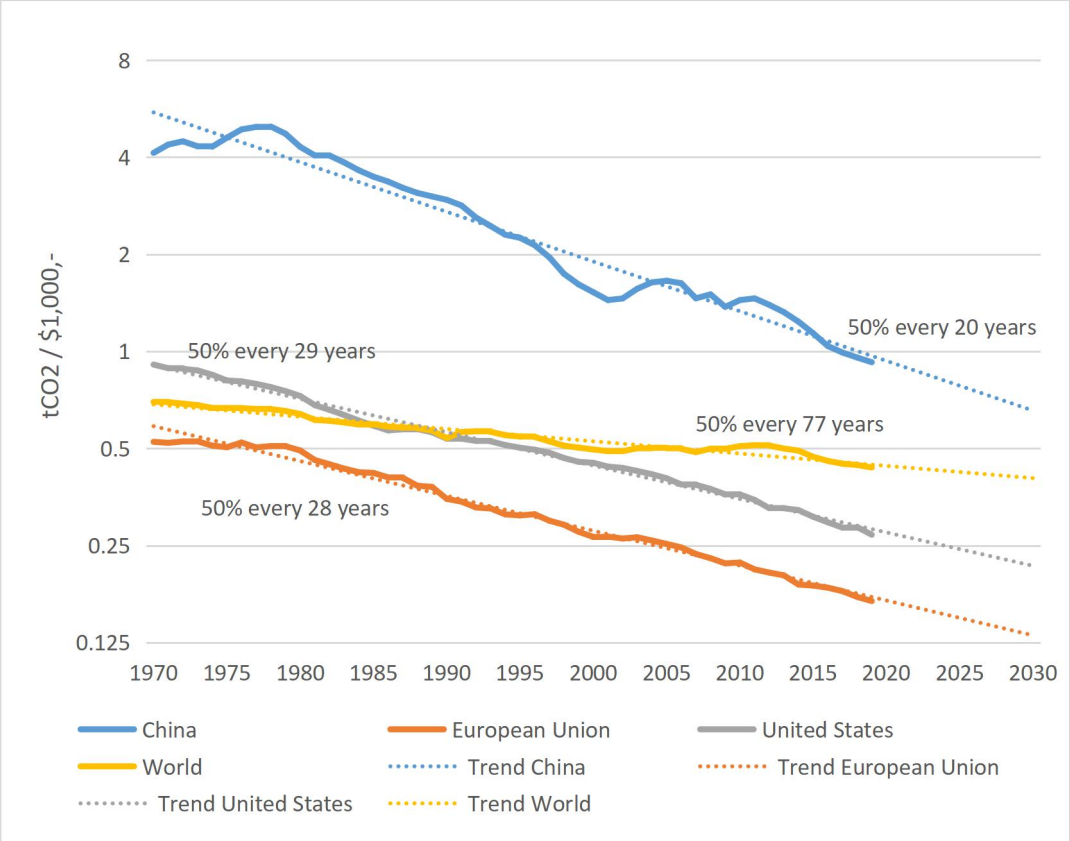
[1] This paper was prepared by Oliver Bäte, CEO of Allianz SE, and Ludovic Subran, Chief economist of Allianz SE, together with Françoise Huang, Senior Economist for Asia, and Markus Zimmer, Senior ESG Economist. Maria Thomas provided excellent editorial assistance, and EC Innovations, Inc for the stellar translation. We would like to thank Anqi Dang (GIZ), Uwe Michel, Helen Deng, Simon Hennen and Xiaotai Zhou for their valuable feedback on this paper.

particular importance to investors are the following aspects: 1) A level-playing field, otherwise early movers get punished and incentives are wrong. Policy must put a stringent price on carbon and the phase-out of fossil fuel subsidies, including support for those who cannot bear the costs. 2) Mandatory climate reporting: regulators should develop unified guidelines and converge on a set of the most material indicators as today's practice of investors using their engagement with companies to get such information is not scalable and non-public information is not allowed to be used for investment decisions. 3) Gradual financial liberalization. Recent relaxation or cancellation of foreign ownership limits in financial sector firms based in China is supporting global cooperation in green finance, and helps attract foreign investors to support China's net-zero economy journey. Moreover, the UN convened Net-Zero Asset Owner Alliance – which combines 34 institutional investors, pension funds, insurers and state-owned funds, with asset under management of $5.5 trillion delivering on a bold commitment to transition their investment portfolios to net-zero GHG emissions by 2050 – is a good example of how institutional investors can work together to enhance climate protection and finance the net-zero transition, which could also contribute to China's climate target with the participation of Chinese asset owners.

1. China's remarkable progress in its green transformation

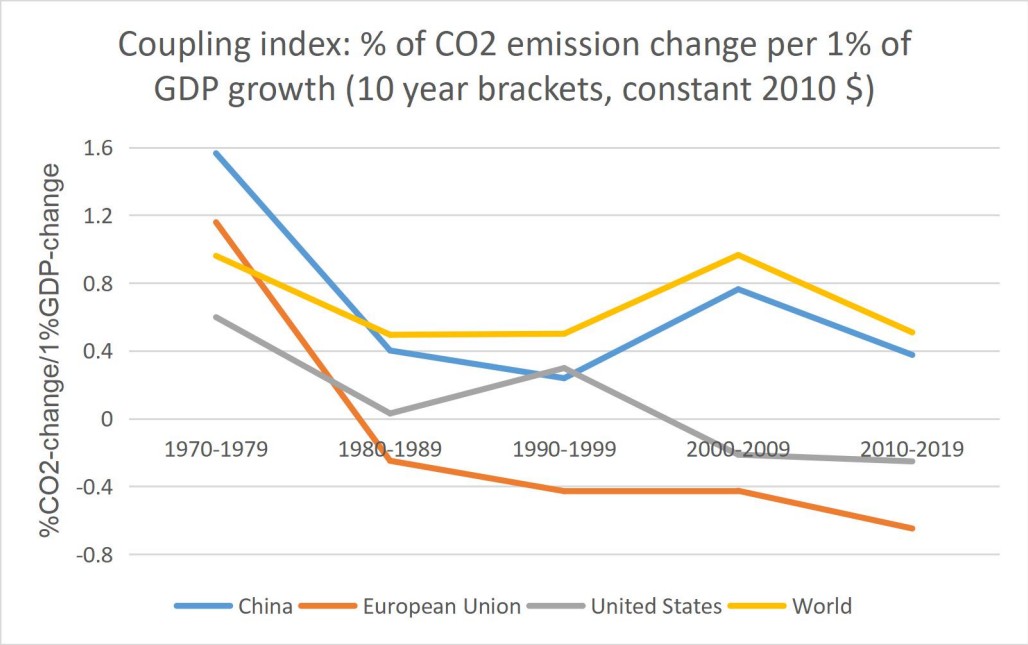
China, the EU (defined to include the UK) and the US accounted for almost half of all global greenhouse gas (GHG) emissions in 2018. However, over the past decade, all three have made considerable progress in decoupling economic growth from emission growth. Figure 1 shows that the CO2 emissions required to generate a dollar of GDP has been steadily falling in all three economies, with China recording the fastest decline. While China started higher due to an economic structure tilted more towards manufacturing, it is now below 1 kg of emissions per dollar (in 2010 inflation adjusted value). The CO2 emissions per dollar have halved every 20 years in China, though it required almost 30 years, or a generation, in the US and the EU. Keeping all trends constant, China will still need until 2140 to catch up with the US and until 2200 to catch up with the EU, though it would already catch up with the world average in 2050.

Figure 1: Emission intensity: CO2 emissions per unit of GDP (kgCO2/$1,-GDP, logarithmic scale, in constant 2010 $)



Source: Allianz, Data: World Bank (WDI) European Commission (EDGAR)

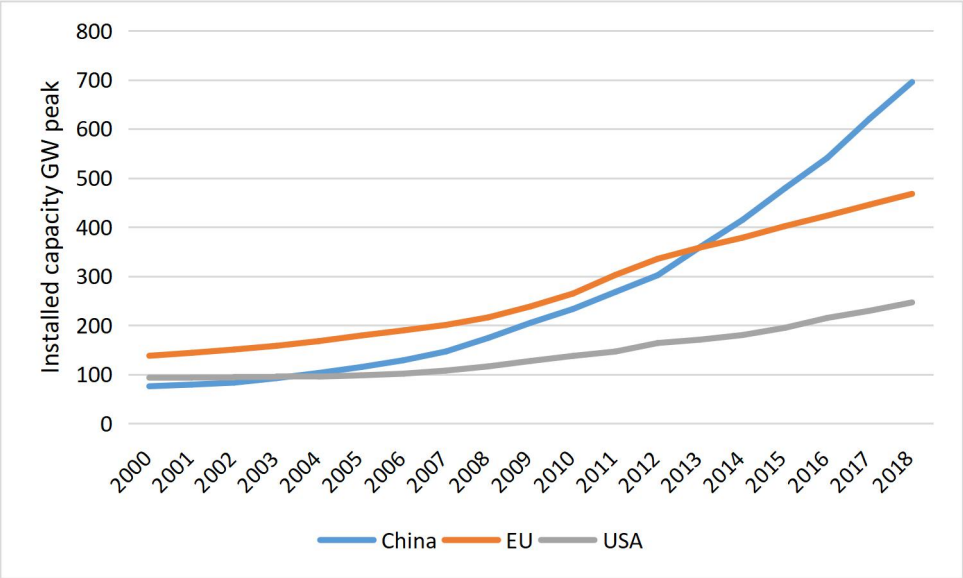
Figure 2: 'Coupling index' percentage change of emissions per one percent growth of GDP (10-year brackets, constant 2010 $)



Source: European Commission Edgar, World Bank WDI

Besides the changing structure of the economies – from manufacturing to services – one decisive factor behind this decoupling is the greening of energy supply, and China is far outpacing the EU and the US in this regard. China's installed capacity for renewable energy grew by over +800% to 695GW at the end of 2018, from a mere 76GW in 2000. Over the same period, the EU and the US observed growth of "only" +230% and +160%, respectively. As a result, installed capacity in the US is now around one third of that in China, while the EU stands at two thirds. Back in 2000, all three economies were more or less at the same level (see Figure 3).

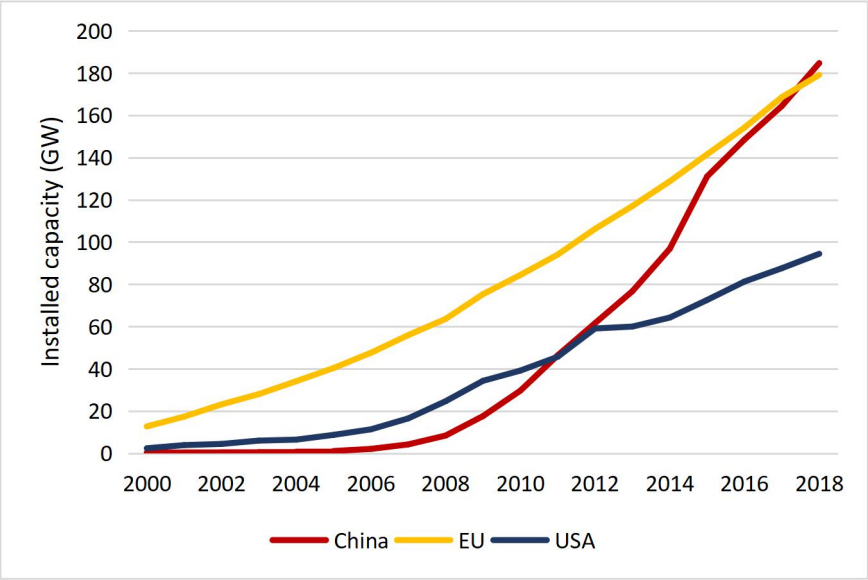
Figure 3: Total renewable energy: installed capacity



Source: Allianz Research, Data: OECD

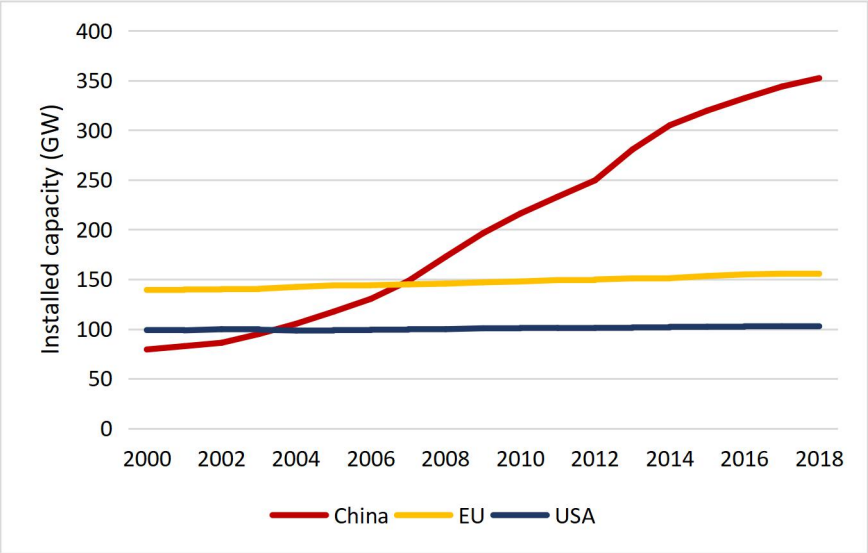
Looking at the subsectors, we can see that China overtook the EU in installed capacity for wind energy in 2017 (see Figure 4). Its hydro energy capacity has also risen by a whopping 300% to 352GW since 2000, while the EU and the US only recorded marginal increases (see Figure 5). And China also dwarfs the EU and the US in solar power capacity, with 175GW, compared to 117GW and 53GW, respectively (see Figure 6).

Figure 4: Wind energy: installed capacity



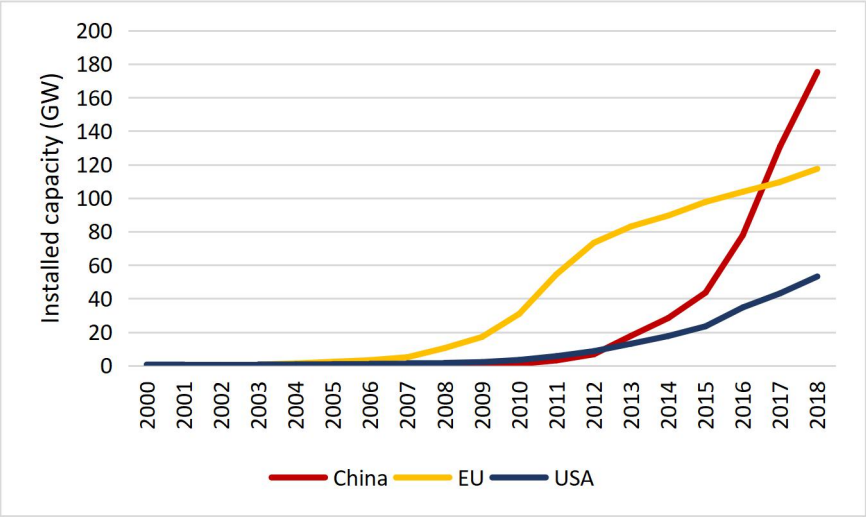
Source: Allianz Research, Data: IRENA

Figure 5: Hydro energy: installed capacity



Source: Allianz Research, Data: IRENA

Figure 6: Solar energy: installed capacity

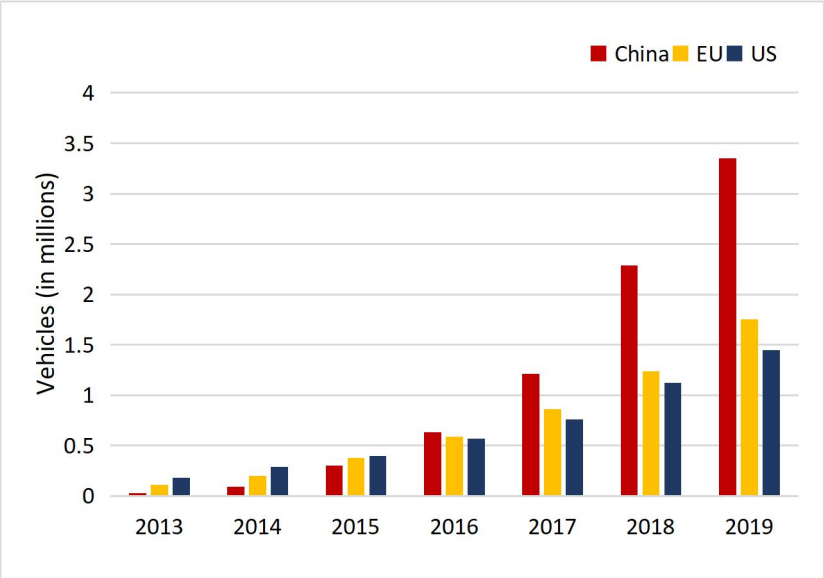


Source: Allianz Research, Data: IRENA

As transportation accounts for one fourth to one fifth of all GHG emissions (based on well-to-wheel emissions), the shift to electric vehicles is especially important for reaching the Paris climate goals. In this

regard, China is also racing ahead when it comes to **electrifying its transport system**: At the end of 2019, China had an EV stock of 3.35mn, a more than +50% increase from 2018 (2.29mn). In comparison, the EU and the US recorded 1.75mn and 1.45mn EVs in 2019, respectively (see Figure 7).

Figure 7: EV Stock



Source: Allianz Research, Data: IEA

Specific and ambitious policies that explicitly address the **removal of carbon dioxide** from the atmosphere will also play an important role in achieving the Paris Climate goals. Negative emissions technologies and solutions such as afforestation/reforestation and bioenergy with carbon capture and storage (BECCS) are prominent means to remove carbon emissions from the atmosphere. Out of the three countries, China has by far the most ambitious forest policy, despite having the lowest forest coverage (22% vs 34% in the US and 40% in the EU (2016)). China's Natural Forest Conservation Program is the largest forest conservation program in the world and includes massive tree-planting programs, an expansion of forest reserves and a ban on logging in primary forests. The Chinese government spends heavily on these forest programs—more than either the US or the EU and more than three times the global average per hectare[2]. After planting more than 7 million hectares of forest per year between 2016-2018[3], the country has set a 2035 forest coverage target of 26%.

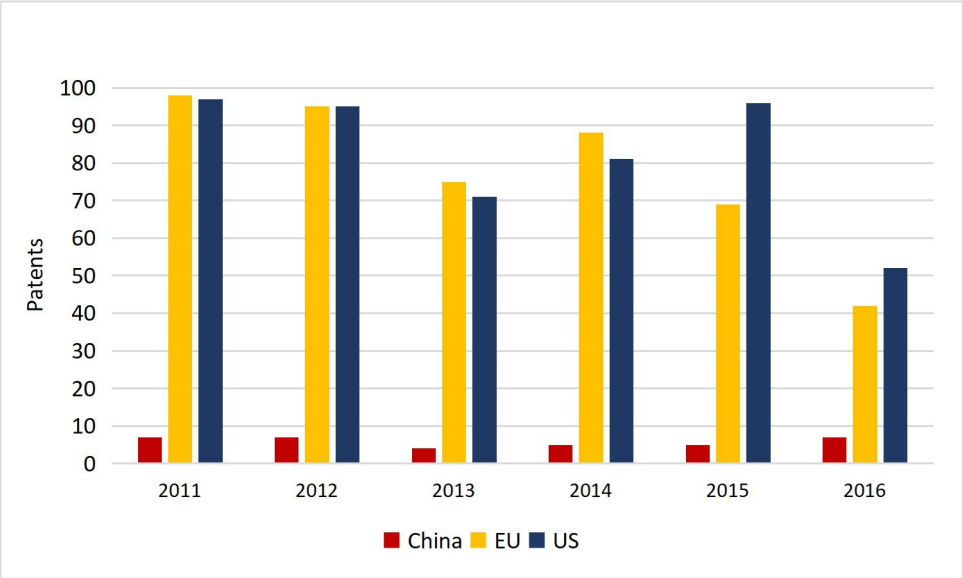
Carbon Capture with Storage technology (CCS) seems to be the one field in which the EU and the US appear to be leading. These technologies involve capturing carbon emissions and storing them, rather than releasing them back into the atmosphere. A comparative analysis of the reserve capacity of CCS is rather

[2] Sandalow, 2019

[3] NDRC, *China's Policies and Actions for Addressing Climate Change* (October 2016) at p.20; NDRC, *China's Policies and Actions for Addressing Climate Change* (October 2017) at p.15; NDRC, *China's Policies and Actions for Addressing Climate Change* (November 2018) at p.16. See also National Bureau of Statistics, *Statistical Bulletin on National Economic and Social Development in 2018* (February 28, 2019) at Part XII; National Bureau of Statistics, *Statistical Bulletin on National Economic and Social Development in 2017* (February 28, 2018) at Part XII.

difficult due to the lack of adequate data and a standardised measure for comparison. However, the development of CCS-related patents are suggestive of the potential. Figure 8 shows that the EU and the US have significantly higher CCS patent issuances than China.

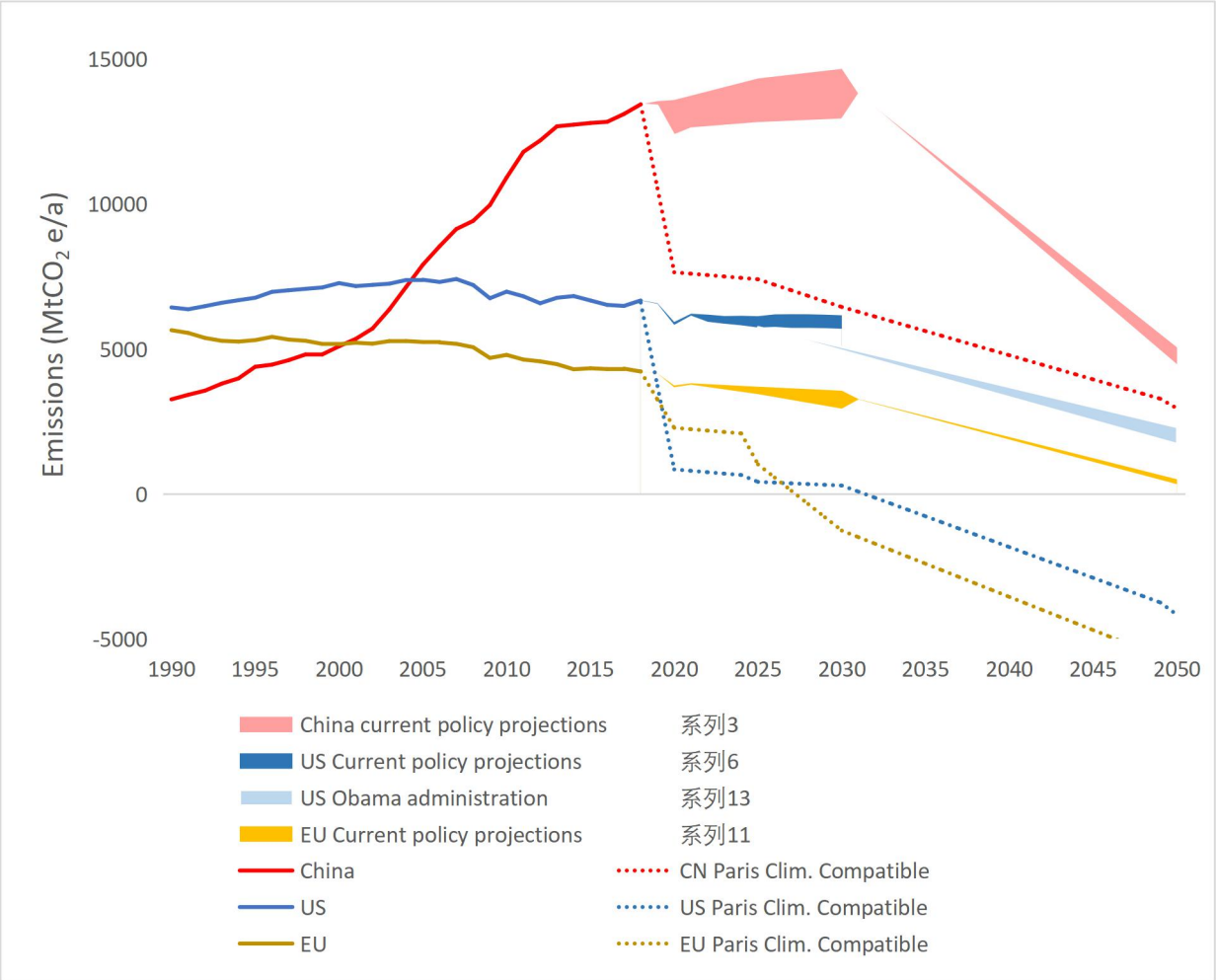
Figure 8: New CCS Patents



Source: Allianz Research, Data: OECD

Despite their progress, all three countries are still far from the path required to limit the rise in global temperature to 1.5°C. According to current policy projections (not including the forthcoming Five-Year Plan), China's greenhouse gas emissions in 2030 will be more than double its the level needed to comply with the Paris agreement (14,242 mega tonnes vs 6,452 mega tonnes). In this context, there is thus a clear need for the financial sector to bridge gaps in green financing to take China's "green transformation" to the next level.

Figure 9: Greenhouse gas emission projections: 2.8°C current policies vs. 1.5°C Paris ambitions



Source: Allianz Research, Data: Climate Action Tracker[4]

2. The financial sector needs to step up to turbo-charge the green transformation

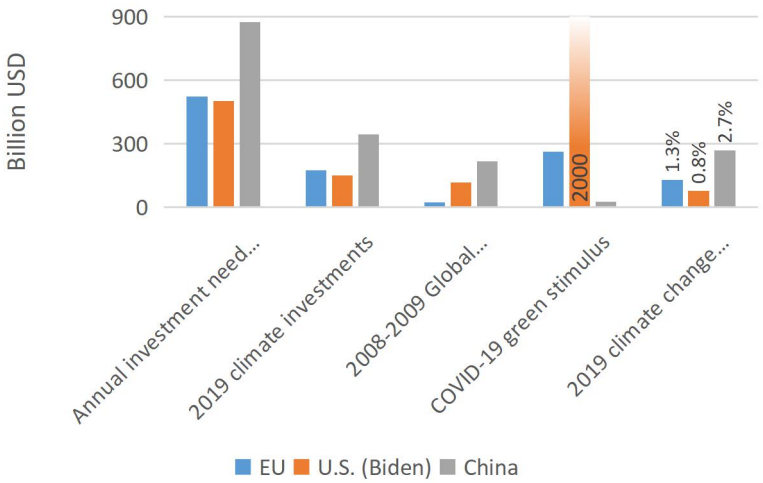
a. Green investments face a large funding gap

Though already relatively large, investments in climate change mitigation will still need to triple to achieve a level that is compatible with the Paris ambitions of limiting global warming to well below 2°C (see Figure 10). These investments need to be concentrated in the next 10 to 15 years to be compatible with the available carbon budgets and capture important re-investment cycles. In relative terms, the 2019 investments already accounted for 1.3%, 0.8% and 2.7% of GDP in the EU, US and China, respectively. Figure 10 also illustrates that green commitments in the current Covid-19 stimulus packages have multiplied compared to the

[4] For the policy projections and NDC, the Climate Action Tracker website focuses on emissions from energy consumption, industry, agriculture, and waste sources – representing about 93% of global GHG (Greenhouse gases) emissions. It does not consider GHG emissions from land-use, land-use change, and forestry (LULUCF) in current policy projections and NDCs. GHG emissions from LULUCF source are excluded from the consideration because a decrease in LULUCF emissions may distort the true state of decarbonisation by masking an increase in emissions from energy and industry sector.

sizeable commitments seen in the stimulus during the global financial crisis. Still, they can only complement private investment as they are far from sufficient to achieve climate neutrality on their own. According to an analysis by Cambridge Econometrics a strict orientation of the recovery towards climate goals would produce an additional growth impulse of close to 5% of GDP as is detailed in the Appendix "How green is the global recovery?" as well as some further details on the stimulus packages.

Figure 10 – Investments in climate change mitigation



Source: Allianz Research. Own calculations based on WRI (2020), Jaeger et al. (2020), EIB (2021), IRENA (2020). IRENA regional investment requirements are allocated proportional to TPES shares in non-renewable energy (China 78% of East Asian and U.S. 82% of North American NRE-TPES).

Research[5] shows that green finance remains far below the level needed to achieve the Paris goals. The IPCC[6] estimates that at least USD1.6-3.8trn in new climate investment is required for the supply side of the global energy system until 2050. This is significantly above the trend of climate finance in the past years (see Figure 11). Even greater collaboration among different economic actors will be needed to achieve climate goals.

For China, estimates of green investment needs vary, but all point to an important funding gap. According to research by the CCICED[7], as much as RMB9.55tn in annual investment over 2021-2030 will be needed to meet the green targets and standards that were established in 2015. The NCSC (2019)[8] finds that annual demand for funds to address climate change will rise to RMB4.15tn per year on average over 2021-2030, from RMB2.9tn over 2016-2020[9]. The ICCSD (2020)[10] estimates that for China to achieve the 2°C transition

[5] https://www.greenfinanceplatform.org/page/explore-green-finance

[6] IPCC Special Report on Global Warming of 1.5°C

[7] "Green finance reform and green transformation", China Council for International Cooperation on Environment and Development (2015)

[8] "Financial needs in implementing China's nationally determined contribution to address climate change by 2030", NCSC (2019)

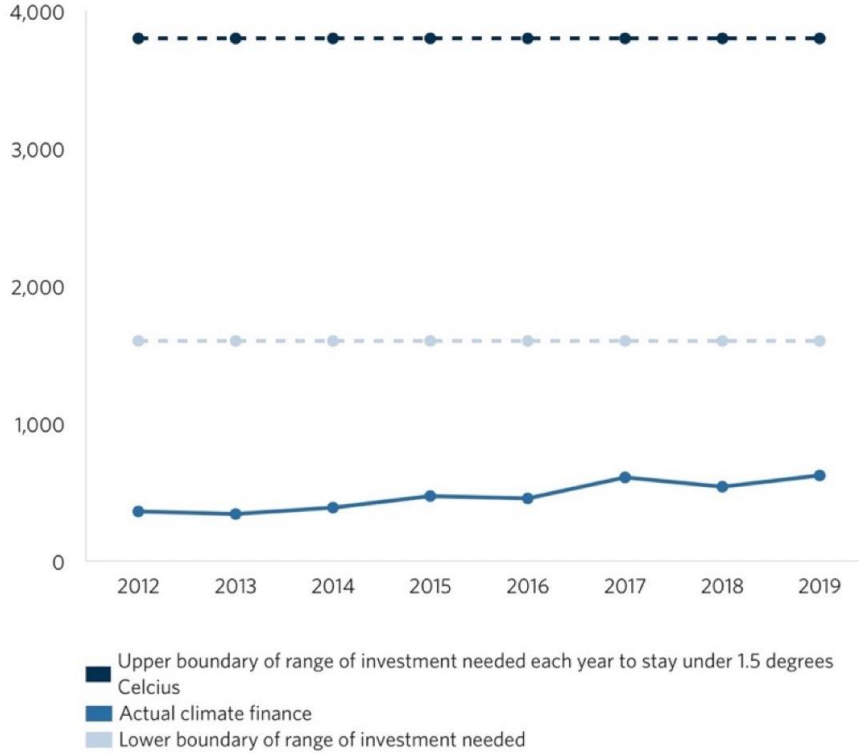
[9] More precisely, the estimates find an average annual demand for funds of RMB2.9tn in the 13th five-year plan (2016-2020), RMB3.8tn in the 14th five-year plan (2021-2025) and RMB4.5tn in the 15th five-year plan (2026-2030).

[10] "Study on China's long-term low carbon development strategy and transition pathway", ICCSD (2020)

pathway, the energy system will need new investment of around RMB3.33tn per year on average over 2020-2050. To achieve the 1.5°C transition pathway, new investment needs amount to around RMB4.60tn per year on average over 2020-2050.

In comparison, the Climate Policy Initiative (2021)[11] estimates that overall green finance averaged RMB2.1tn per year in 2017-2018. The NCSC (2019) finds that China will face an annual funding gap of around RMB1.4tn.

Figure 11: Climate finance vs. Investment needed, at the global level (USD bn)



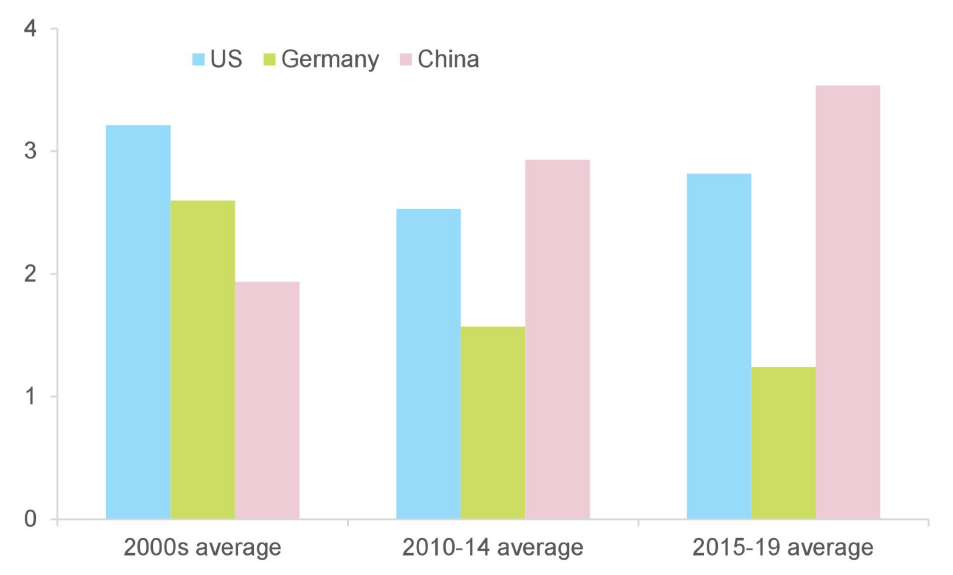
Source: Green Growth Knowledge Partnership

The need for a significant scaling-up in green financing comes at a time where China's credit efficiency has been declining. Our credit intensity index for China has been on a rising trend, indicating that an increasing amount of credit is needed to create 1 unit of GDP. In fact, the index had been declining between 2016-2018 (roughly in line with the deleveraging campaign), before rising again recently (with accommodative policies in the context of trade tensions and Covid-19). As authorities aim for a sustainable and balanced growth

[11] "The potential for scaling climate finance in China", Climate Policy Initiative (2021)

model in the long run, it is all the more important to prioritize financing of the right areas of the economy. The positive correlation between labor intensity and a green recovery[12] is an additional incentive for policymakers to direct the financial system and funding in favor of the green transformation.

Figure 12: Credit intensity



Sources: BIS, IMF, Allianz Research

b. China's financial sector could play a bigger role

i. The current landscape of green finance

China introduced green finance as a major topic for the 2016 G20 summit and endorsed a nationwide blueprint for establishing a green financial system in the same year. So far, China's green financial reform has yielded quick results. Research[13] shows that outstanding green loans stand at over RMB10.6trn (USD1.5tn), more than double the amount at the end of 2013. Outstanding green bonds amount to RMB977bn (USD140bn), averaging +30% yearly growth since their introduction in 2016. In comparison, at the global level, the cumulative issuance of green bonds over 2007-2019 amounted to USD754bn. Separately, China has also established hundreds of green funds, as well as opportunities for green stock indices and insurance. In total, an average USD202bn was deployed per year in climate-related investments and an additional USD118bn in other environmental sectors over 2017-2018.

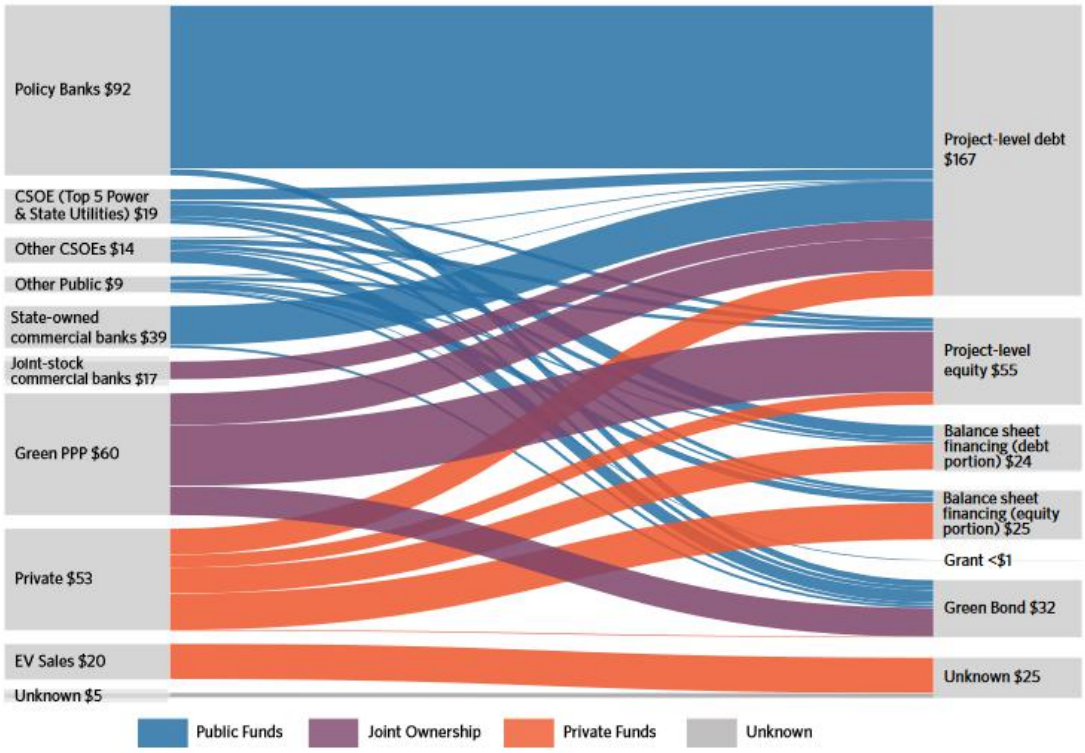
Figure 13 provides a breakdown of green finance by financing actor and instrument. An important point to note is that public sources accounted for 51% of total green finance, taking into account policy banks (44%), some central and provincial state-owned enterprises, state-owned banks and joint-stock banks; 21% of total

[12] "How a post-pandemic stimulus can both create jobs and help the climate" McKinsey & Company, May 2020.

[13] "The potential for scaling climate finance in China", Climate Policy Initiative (2021)

green finance consists of public-private partnership projects and 24% are from private sources. There is thus large room for action to mobilize private capital in China's green transformation.

Figure 13: Estimated Instrument breakdown by financing actor (USD bn, yearly average over 2017-2018)



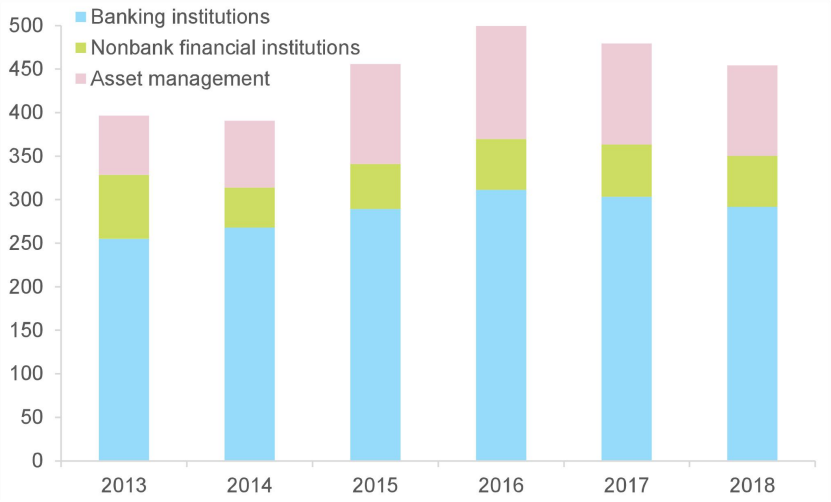
Source: Climate Policy Initiative

ii. Growth potential of green finance in China

There are two sources of growth for green finance in China: 1/ the overall financial sector is set to continue growing in the coming years and 2/ policies could be designed to further gear the sector in support of the green transformation.

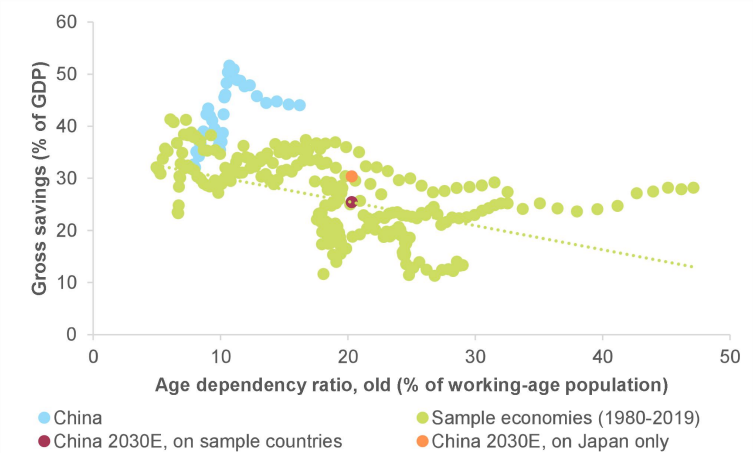
China's financial sector is growing quickly (see Figure 14), and is set to continue to do so as the economy ages and savings are unleashed (see Figure 15). Gross national savings stood at 45% of GDP in 2020 but they are set to decline as the population ages. The IMF already forecasts a decline to 40% of GDP in 2025.

Figure 14: Size of China's financial institutions (% GDP)



Sources: IMF-Financial Stability Assessment, December 2017, Allianz Research

Figure 15: Savings rate vs. old age dependency ratio, with forecasts for 2030 based on past experiences



Note: sample economies include Japan, South Korea, Taiwan, Russia, the Eurozone, the UK and the US. We estimated where China's savings rate could stand in 2030, based on the experience of all sample countries, and based on Japan's experience only.

Sources: IMF, World Bank, UN, Allianz Research

Second, the financial sector could be further focused on the green transformation. Research[14] shows that the current green penetration of China's financial system stands at just c.4% (see Figure 16). As China's capital market continues to evolve and actors become more familiar with green financial instruments, uptake in the market will grow.

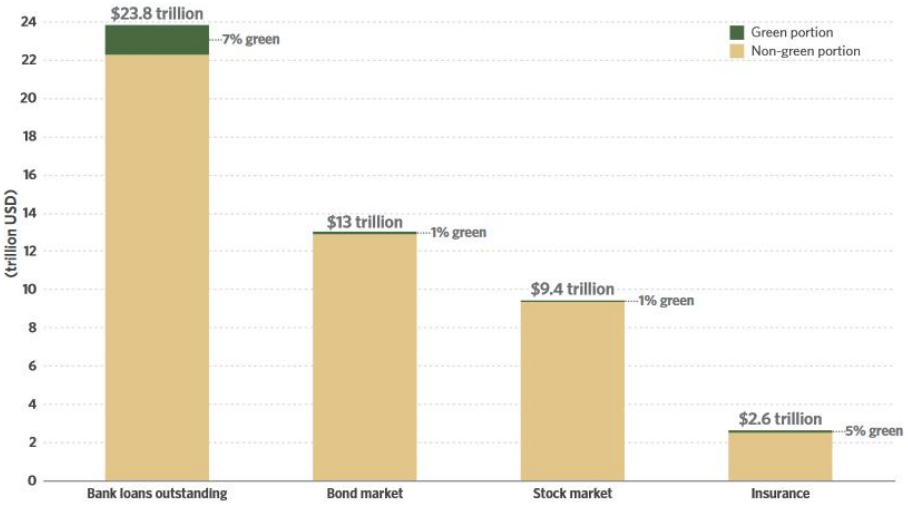
In fact, research[15] suggests that allocating more green loans in banks' total loan portfolios reduces the overall non-performing loan ratio. Indeed, data show that green loans delivered better financial performance, with an average non-performing ratio of 0.48% over 2017-2018, 1.81pp lower than that of corporate loans. Looking at green bonds, a total of USD124bn (RMB865.5bn) will reach maturity in the next five years, representing 88% of the total outstanding. Thus suggests a significant opportunity for green bond refinancing.

[14] "The potential for scaling climate finance in China", Climate Policy Initiative (2021)

[15] "The impact of green lending on credit risk in China", Cui et al. (2018)

As for green stocks, discussions are underway to launch an expedited listing processes for green company IPOs, and multiple green indices and funds have been established. There has also been a spate of ESG-themed financial products made available to investors in China. Out of the 19 indices constructed based on comprehensive ESG scores, half were released in 2020. Similarly, total asset under management for ESG-themed funds in China grew by 50% this year compared to 2019.

Figure 16: Comparison of the green share in financial assets in Q1 2020



Note: the size of each asset class is based on CBIRC and CSRC data for Q1 2020. The green portion is estimated in research by the Climate Policy Institute.

Source: Climate Policy Initiative

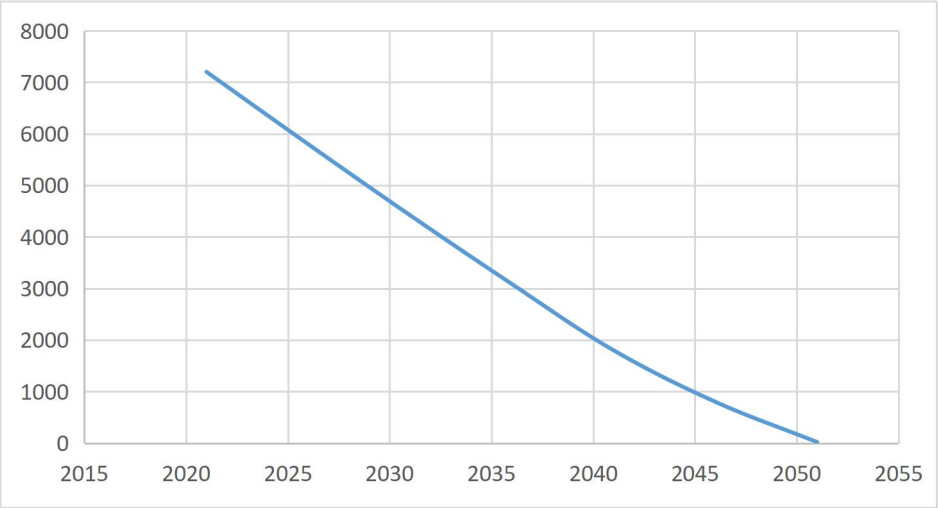
c. Asset owners can bring transformative changes to the real economy

i. Enable an orderly transition by preventing and managing the climate-related transition risks

Domestic coal activities remain of concern in China, which lifted a previous construction ban on new coal plants in 2018 and has been adding capacity since. By mid-2020, China had permitted more new coal plants than in 2018 and 2019 combined.

As attractiveness for investors increases with progressing towards more sustainability, the associated structural change will necessarily require a strict cut in fossil fuel usage and particularly in electricity generation by coal. Cutbacks in the fossil fuel sectors will be more than offset by economic gains to growth and employment in other sectors, with even greater gains in biodiversity and health. Unfortunately, to materialize these gains, some existing assets linked to fossil energy are at risk of becoming stranded. This is most likely the case for coal power plants.

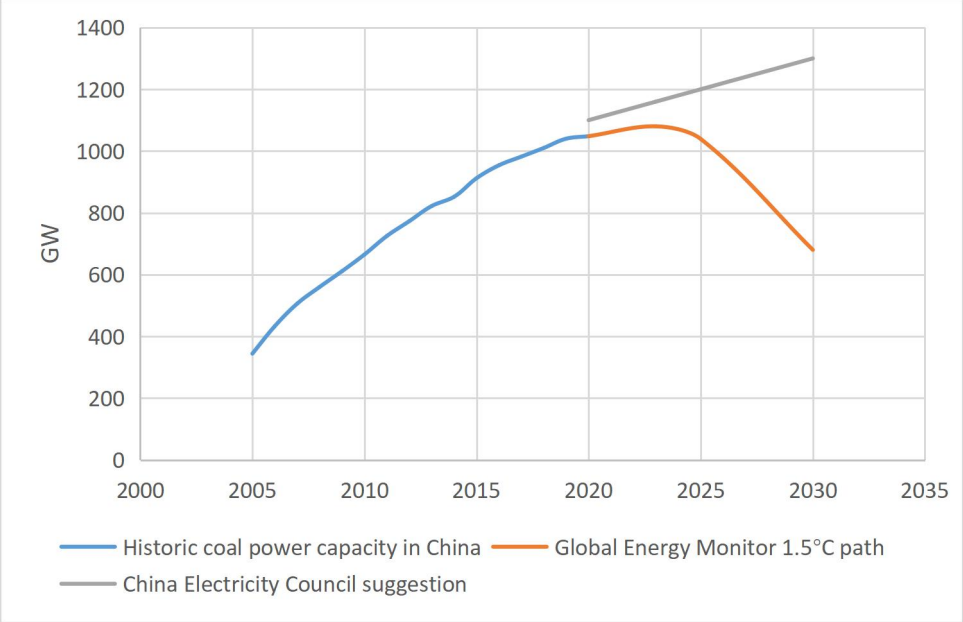
Figure 17: Coal power plans – estimated asset value at risk (RMB bn)



Source : Allianz based on Caldecott et al. (2016)

Figure 18 shows the value of the currently existing Chinese coal power plants that are at risk of getting stranded. The value will increase with more power plants to be added and it declines over time in the figure as old power plants are decommissioned due to age. Additional assets that can get stranded are the ones linked to coal extraction. Their value is not assessed here. Part of the value of the coal power plants can already be considered as stranded, as overcapacities already cause an underutilization of the existing plants that results in investment costs not being recovered.

Figure 18: Coal power capacity in China for 1.5°C

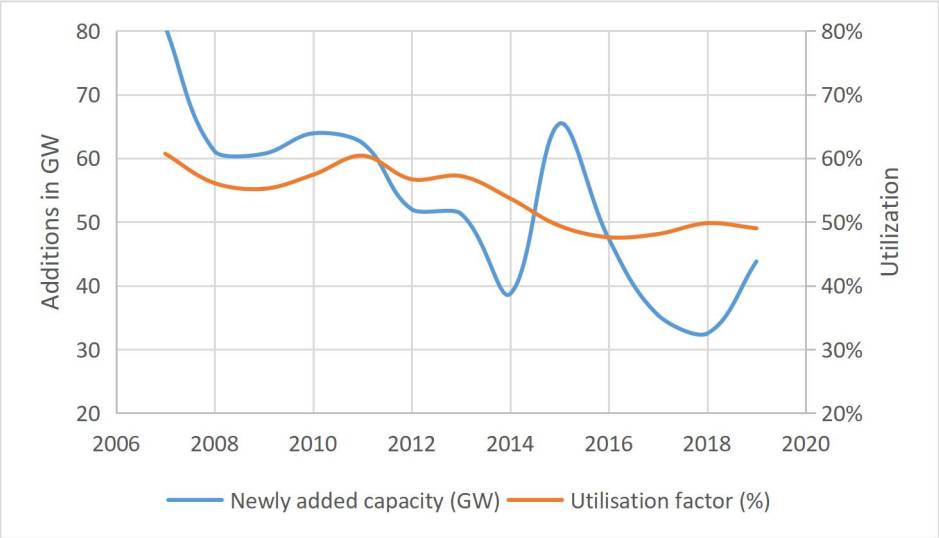


Source: Allianz based on Myllyvirta et al. (2020)

More than half of coal-power firms are already loss-making and, as seen in Figure 19, typical plants are already running below 50% of their capacity with a clear downward trend. This will, as mentioned before, create a brown zombification problem that is expected to accelerate with increasing climate ambitions. The network operator state grid and the industry body China Electricity Council have been promoting targets that would result in hundreds of new coal-fired power stations being built. This contradicts the already

existing overcapacities in the sector. As seen in Figure 18, to stay within a 1.5°C path, the utilized coal capacity needs to peak in 2023, and in 2030 only 63% of this capacity should be in use.

Figure 19: Coal power plants capacity additions and utilization rate



Source: Allianz based on Myllyvirta et al. (2020)

The development of China's coal-power overcapacity originates in the 12th Five Year Plan (2011-2015), which was a stimulus response to the global financial crisis. It targeted a huge expansion in coal mining and coal-fired power generation, a policy response that should not be repeated in light of the current crisis. Implementing a green recovery path from Covid-19 will be the key to materialize the potential economic gains of a green transition.

So far, green financial reforms have not impacted China's support for fossil fuels in a significant way. Green definitions in China have been contested for their inclusion of clean coal and other efficiency-related improvements for fossil fuels. Furthermore, exclusionary lists for fossil fuels have not been developed and China's key financial institutions have not made any public commitments to reduce investments in fossil fuels. Ensuring that progress is made on both climate-friendly and climate-harmful investments will be a key step forward for China's climate action in the coming years. Most recently in October 2020, high-level policy guidance for promoting climate investment and finance was jointly issued by five government and regulatory bodies, the first time "climate" finance and Paris Agreement targets were explicitly mentioned as policy objectives.

Asset owners can have an important role in supporting the Chinese administration to avoid assets from getting stranded by actively engaging with carbon intensive companies and work with them on transition strategies that induce a shift towards a low-carbon business model. Asset owners can be a major source to strengthen the technical capacities to address regulatory requirements (by conducting portfolio carbon footprinting, stress testing, etc). These assessments help to understand climate induced transition risks and physical risks in order to adjust portfolios and to ensure financial stability.

ii. Finance for tomorrow

Asset owners can finance the transition via climate-positive investments (including renewable energy in emerging markets, green buildings, sustainable forests, green hydrogen). In China, different areas of the financial sector along with local policymakers are exploring innovative climate finance tools (see Box below).

Box: Innovative climate finance in China

Three types of more innovative green financing channels are visible in China:

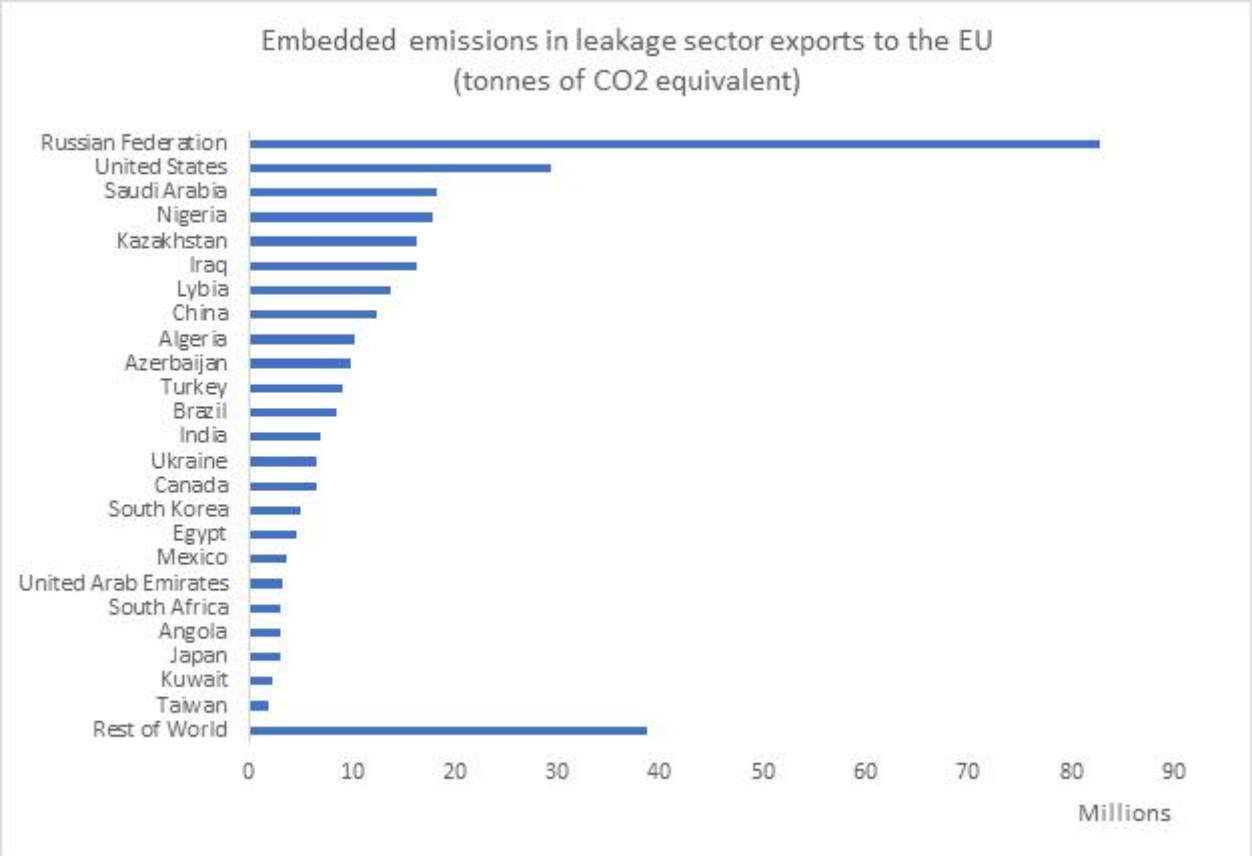
- **Consumer channels**: Digital retail consumer finance channels such as Alipay and WeBank are innovating new ways to encourage consumers, retail investors and SMEs to adopt green practices through their mobile payment platforms. In 2019, mobile payment transaction volumes reached RMB347.11trn (USD51trn) in China, an increase of more than 28 times from six years ago. Ant Forest was initiated in August 2016 on Alibaba's Alipay platform, incentivizing users to reduce their carbon footprint in exchange for a physical tree planted. In order to plant a tree, each individual has to grow a virtual tree through earning "green energy" on an individual carbon account from activities such as walking or taking public transportation, using online payment or avoiding plastic bags. By August 2019, over 500 million people across China were participating in Ant Forest, resulting in over 7.92 million tons of cumulative carbon avoided and over 122 million trees planted in arid regions in Inner Mongolia, as well as the Gansu, Qinghai, and Shanxi provinces.
- **Matchmaking platforms for SMEs**: One of the green finance pilot cities, Huzhou, is pioneering new approaches for matching local SMEs with green financing opportunities. To support the green growth of local SMEs, the municipal government launched a Green Finance One-Stop Service Platform in 2018. Since its launch, the platform has attracted over 16,000 SMEs, over 30 financial institutions and nearly 80 investors. In terms of green lending, over 13,000 SMEs have successfully received more than RMB160bn (USD23bn) in credit from banks. The platform provides three primary financial services for SMEs. First, it connects businesses with banks, facilitating the green lending process. The platform also compiles information on businesses nationwide, including commercial operations, tax and environmental performance, which makes data-sharing across provinces possible. Second, the platform directly connects businesses with investors, lowering administrative costs and increasing transparency. Investors may review detailed information and compare all available enterprises and projects; businesses can also attract more investors and expand their financing sources through the platform. Third, the platform establishes a green credit rating system to identify qualified green projects and businesses. The government plans to issue subsidies for those rated as "green."

3. Policy recommendation on enhancing the green finance system and attracting international investors

a. Carbon tariffs: a possible way to build a global level-playing field

International actors in the private sector as well as governments are emphasizing the need of a level-playing field for moving the green transition forward. Otherwise, early movers would get punished and counterproductive behavior, such as carbon leakage, would be incentivized. Climate policies are expected to put a stringent price on carbon emissions, no matter where they occur, and to phase out fossil fuel subsidies. Carbon border adjustment mechanisms (CBAM), for instance in the form of carbon tariffs are expected to play an important role in this context, but a fair transition implies support for those who cannot bear the costs. Figure 20 gives an estimate of the emissions embedded in exports from various regions to the EU, revealing that China ranks 8, with its top three emission imports originating from chemicals, pharmaceuticals and aluminum.

Figure 20: Carbon embedded in exports to the EU by country or region (evaluated at EU sectoral emission intensities)



Source: Allianz Research

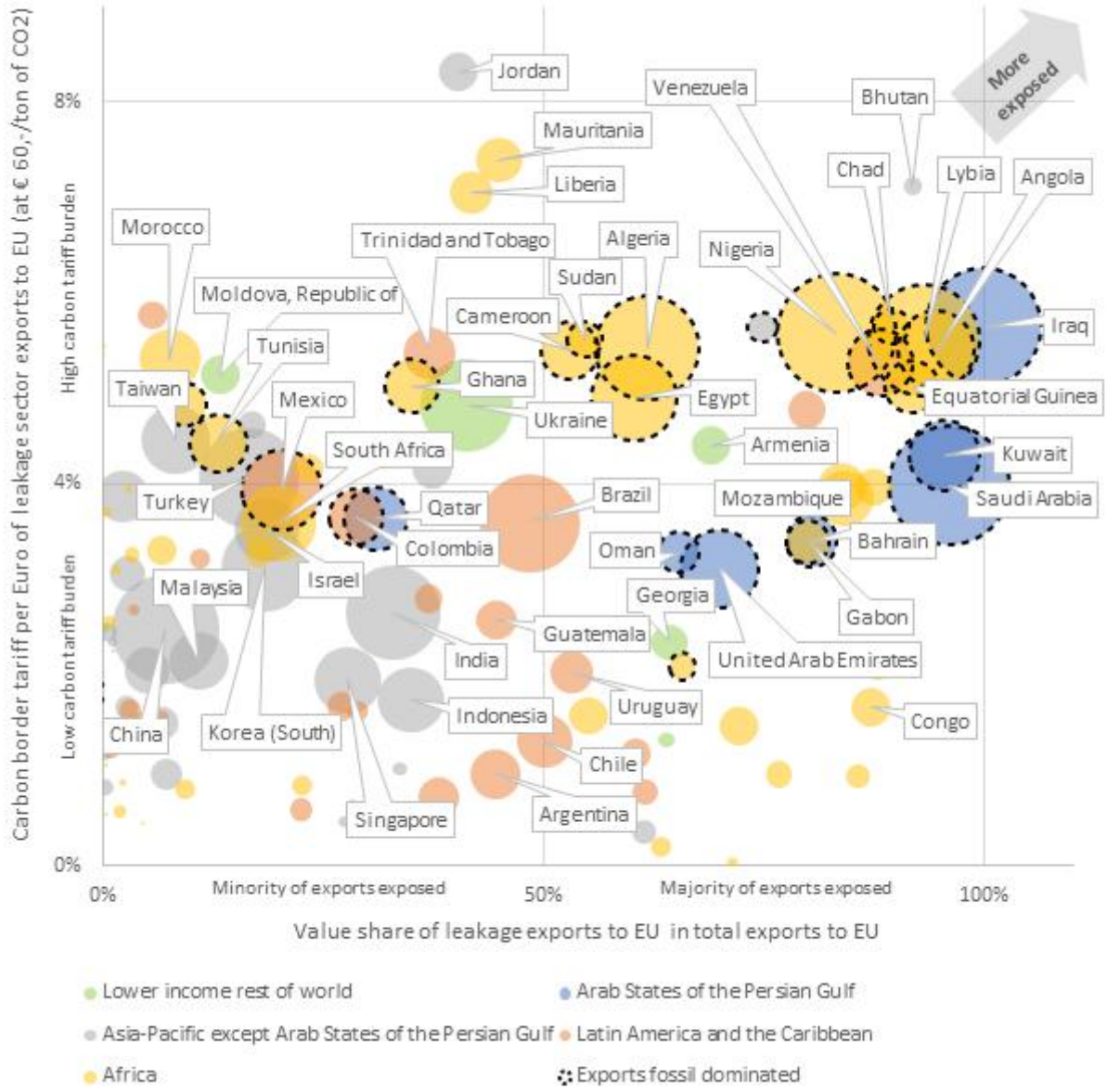
When it comes to relative exposure, the ranking is very different, as seen in Figure 21. Regions in the upper half will potentially face high carbon tariffs on the carbon leakage or 'brown' sector exports. The bubble sizes indicate the relative embedded absolute carbon content of exports to the EU. In the left half of the figure,

only a small share of the respective regions' exports to the EU are exposed to carbon tariffs, while in the right half the majority of export value is generated in a 'brown' sector.

Statements within the European Commission consultation process with regard to the EU CBAM emphasized that bilateral CO2 pricing commitments and mechanisms could act as a substitute to tariffs related to an European carbon border adjustment mechanism[16]. This clearly indicated, that countries with sufficient climate policy stringency could eliminate carbon tariffs for its exports to the EU through bilateral agreements.

Figure 21 – Exposure of exports of developing and least-developed regions to the EU with emissions evaluated at €60,-/tCO2 and at EU sectoral emission intensities as used for the carbon leakage list (bubble size proportional to square root of CO2 emissions embedded in exports to EU)

[16] Using the possibility to substitute EU CBAM related tariffs by bilateral CO2 pricing commitments and mechanisms has been highlighted on various occasions by different stakeholders in the EU CBAM consultation process. For additional details check the EU CBAM initiative website, particularly the response of the Autorités Françaises in the feedback round: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12228-Carbon-Border-Adjustment-Mechanism



Source: Allianz Research

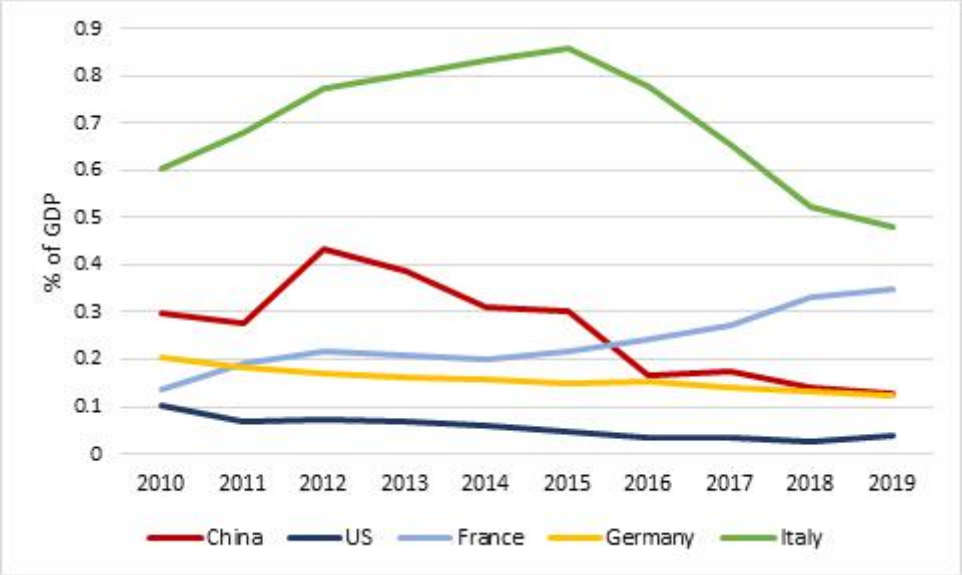
b. The right regulatory framework to attract international investors

i. Ending fossil fuel subsidies

Ending fossil fuel subsidies is the flip side of subsidizing green technologies – and often overlooked. Fossil fuel subsidies can inhibit sustainable economic development and climate action progress by inefficiently allocating resources, distorting relative prices of energy and adversely affecting the price competitiveness of low-carbon energy businesses. At worst they lead to a brown zombification of the economy. A cross-country comparison of fossil fuel subsidies is not straightforward because there is no agreed upon unique definition of subsidies amongst countries. We use the OECD's definition of fossil fuel subsidies, considering both direct budgetary transfers and tax expenditures based on an inventory approach. Figure 22 shows the development of fossil fuel subsidies as a percentage of annual GDP for China, the US and three big EU

countries (Germany, France and Italy). In the case of both China and the US, the magnitude of fossil fuels as a percentage of GDP has been decreasing since 2010. However, at the end of 2019, China's relative fossil fuel subsidies were still higher than that of the US. The development in the EU is less encouraging: Not only is the relative level of subsidies significantly higher, but the trend is also worrying, at least in France, where fossil fuel subsidies have increased threefold as a percentage of GDP.

Figure 22: Fossil fuel subsidies



Source: Allianz Research, Data: OECD

Reducing the fossil fuel subsidies not only lowers the brown zombification risk, but also allows financial resources to be used in the more productive green transition. This will result in the above-mentioned GDP growth prospects that will also be accompanied by the corresponding additional jobs and particularly in jobs that require higher qualifications.

ii. Mandatory and harmonized ESG reporting

A steep increase in information availability is required to ramp up green finance. Without robust tracking and impact reporting standards, it will be difficult to ensure that climate finance flows are being effectively allocated to projects that can generate the most impact. Currently, green finance policies only suggest some key metrics that actors can report at the aggregate level, using their own methodologies. Ensuring that reported climate impacts are ex-post and pro-rated to an actor's share of contributions to a project could be one way to improve impact tracking and avoid double counting. Mandatory climate reporting would also be key to attract investment flows from international capital markets.

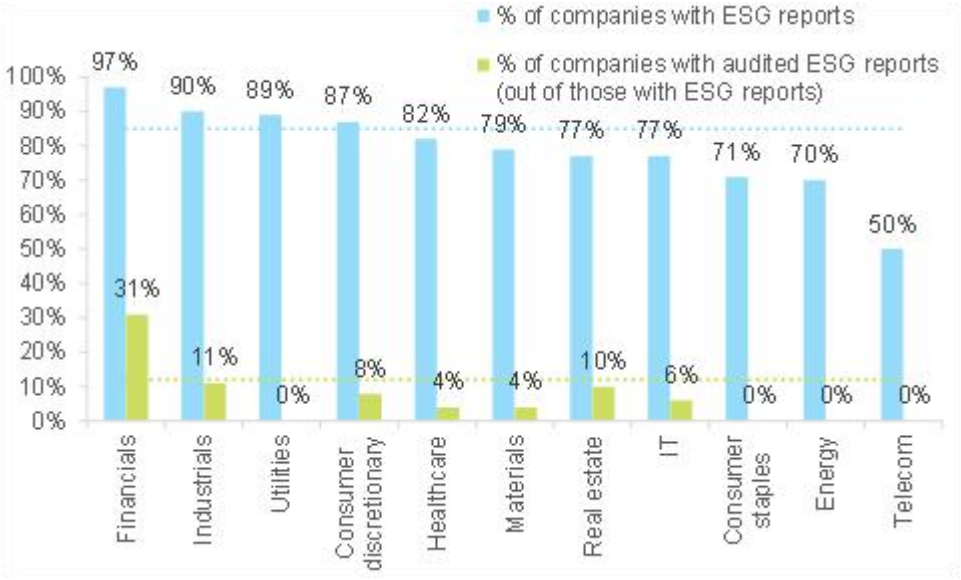
In China, an increasing share of listed companies now disclose data regarding their ESG performance, potentially making it easier to boost ESG-themed investments. However, among the companies that do disclose, a low share had audited reports, suggesting ample room for improving data quality. Furthermore, Chinese companies still lag behind their global peers in the scope and quality of their ESG disclosures. For

example, the average Bloomberg ESG disclosure score of CSI300 companies ranks the lowest among companies of major stock market indices (i.e. compared with ASX200, Hang Seng, Nikkei 225, S&P500, FTSE100 and KOSPI200).

Figure 23: ESG disclosure rate among CSI300 companies

Sources: Wind, Ping An Digital Economic Research Center

Figure 24: ESG disclosure rate among CSI300 companies by industry, 2019



Sources: Wind, Ping An Digital Economic Research Center

Chinese regulators had set a goal for mandatory ESG disclosures for listed companies by the end of 2020, but it was delayed to 2021 due to the pandemic. Separately, foreign investors who invest in Chinese assets have to meet their fund domicile standards on ESG when investing in China, driving improved reporting by Chinese firms. The China Securities Regulatory Commission's forthcoming mandatory environmental information disclosure for listed companies is an opportunity to strengthen tracking and the monitoring of progress. The measure will ask companies to report on their climate finance and are currently taking suggestions on which metrics to include.

To better guide companies in higher quality disclosures and data comparability, regulators should develop unified guidelines and converge on a set of the most material indicators. Regulators should build on guidelines from international organizations such as the Global Reporting Initiative (GRI) and "Stakeholder Capitalism Metrics" from the World Economic Forum, and integrate considerations specific to Chinese companies. Regulators should also encourage companies to audit their ESG disclosures. Better ESG disclosures and performance can help improve the credibility and value of Chinese companies for global investors.

With the EU Taxonomy, the Non-Financial Reporting Directive (NFRD), and the integration of sustainability in the financial sector disclosure regulation (SFDR), in the financial market regulation (MiFID II) and the insurance market regulation (Solvency II), the EU is far more mature with regard to the necessary amount of disclosure. The reporting of essential KPIs for performance evaluation started in March 2021 and will continuously extend and deepen over the coming years, leading to an ongoing ramp-up in reporting infrastructure within EU companies and a boom of ESG data and service providers.

On 25 February 2020, the Sustainable Finance Advisory Council (Sustainable Finance Beirat) of the German Government published its recommendations for the inclusion of sustainability criteria in finance products. It aims at transparently disclosing the ESG performance of financial investments, with the aim of diverging

investment flows from ESG underperformers to overperformers. Financial market trends indicated that this idea might materialize strongly in the near future, even though it has been of limited relevance in the past. The German Sustainable Finance Advisory Council suggests the following key performance indicators for all finance products (not only sustainable finance products), which should be presented in simple adequate summary metrics, e.g. color codes for finance retail products.

Figure 25: ESG key performance indicators for financial products

Dimension	Category	Possible KPIs*
Environment	Climate Change	Global scope 1, 2 and 3 GHG emissions
	Energy Management	Total energy consumed broken down by non-renewable and renewable sources (including, electricity, heat, and primary energy use)
	Water Management	Total freshwater withdrawal and consumption, percentage of each in regions with high or extremely high baseline water stress
	Waste and Pollution	Total waste, percentage recycled Air emissions of pollutants (NOx, SOx, and particulate matter (PM))
	Ecological Impacts/Biodiversity	List of operational sites owned, leased, managed in, or adjacent to protected areas and areas of high biodiversity value outside protected areas
	Circular Economy	Percentage of recycled input materials used to manufacture the organization's primary products and services.
	Environmental Supply Chain Management	Number of suppliers assessed for environmental impacts Percentage of suppliers assessed for environmental impacts Percentage of purchasing volume covered with assessment for environmental impacts
Social	Labor Practices	Percentage of active workforce covered under collective bargaining agreements Turnover rate Ratios of standard entry level wage by gender compared to local minimum wage Average hours of training per person by gender and employee category Breakdown of employess with permanent (indefinite) and fixed-term (temporary) contract Breakdown of directly employed work-force and not directly employed work-force (incl. temp agency workers, on-site contractors, freelancers)
	Employee Health & Safety	Total number and rate of work-related fatalities and incidents
	Diversity and Equal Opportunity	Percentage of employees per employee category, by age group, gender and other indicators of diversity
	Human Rigths	Total number and percentage of operations that have been subject to human rights reviews or human rights impact assessments, by country
	Social Supply Chain Management	Number of suppliers assessed for social impacts Percentage of suppliers assessed for social impacts Percentage of purchasing volume covered with assessment for social impacts
	Taxes	Total tax paid by country
	Customer Privacy & Cyber	Number of data breaches and number of affected persons

	Security	
	Additional categories could include community relations, public policy, product safety, responsible marketing…	
Governance	Business Ethics	Total number and percentage of employees that have received training on anti-corruption
	Sustainability Governance	List of committees responsible for decision-making on economic environmental, and social topics and percentage of independent committee members per committee
	Remuneration	Remuneration policies for the highest governance body and senior executives including the consideration of ESG performance criteria and how they impact different types of remuneration
	Additional categories could include competitive behavior, opportunities in responsible investment…	
*The KPIs mentioned represent possible suggestions for mapping the categories mentioned. Alternative ways of representation are possible.		

Source: Sustainable Finance Advisory Board of the German Government

Particularly in the ESG-risk assessment, as well as in the ESG-evaluation of the delivery chains of the assets included in finance products and investments, the country ESG ratings play a prominent role. A peek into the competitive position for attracting investments can thus be gained from existing indices. While the environmental dimension is well explored, finding good proxies for the social and the governance dimensions is less straight forward. The components of the widely used Social Progress Index are informative in this respect. It uses 51 social and environmental indicators to determine the social progress of a country across three broad dimensions: basic human needs[17], foundations of wellbeing[18], and opportunity[19]. China has made important progress in the past few years in the first two areas, and its index scores better than the global average. Conversely, in terms of opportunity, there is still room to improve in order to further attract international investment flows.

iii. Capital markets deepening and financial liberalization

The "Guidance on Promoting Investment and Financing to Address Climate Change" issued in October 2020 seeks to strengthen cooperation with foreign financial institutions in the field of climate finance, and to support the cross-border transfer of eligible green financial assets in China, allowing them to trade in offshore markets. Domestic financial institutions will also be able to engage in climate finance overseas, including through the establishment of yuan-denominated green investment funds and green loan funds overseas. Foreign financial institutions will be encouraged to issue green bonds in China, and to increase investments in domestic green assets, using the yuan as the cross-border settlement currency.

Foreign private capital only accounted for RMB9bn (USD1.34bn) of inbound climate finance flows in 2017-2018[20] – compared with RMB2.1trn (USD320bn) of domestic climate finance flows. Such a small amount

[17] Nutrition, basic medical care, water, sanitation, shelter, and personal safety.

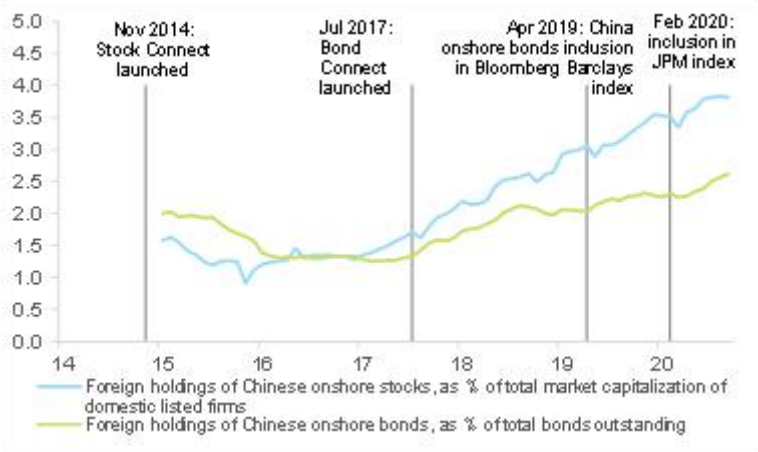
[18] Access to basic knowledge and to information and communications, health, wellness, and environmental quality.

[19] Personal rights, personal freedom and choice, inclusiveness, and access to advanced education.

[20] "The potential for scaling climate finance in China", Climate Policy Initiative (2021)

comparatively can be seen through the lens of China's gradually opening but still relatively closed capital account. Indeed, foreign ownership of Chinese onshore stocks and bonds stood at respectively c.4.0% and c.2.5% (see Figure 26). These numbers had been gradually rising since 2017, in the aftermath of the 2015-2016 RMB and Chinese market concerns, and as a result of measures liberalizing foreign access to China's capital markets. China is set to keep on easing access restrictions, with a cautious and sequenced approach.

Figure 26: Foreign ownership of Chinese onshore securities



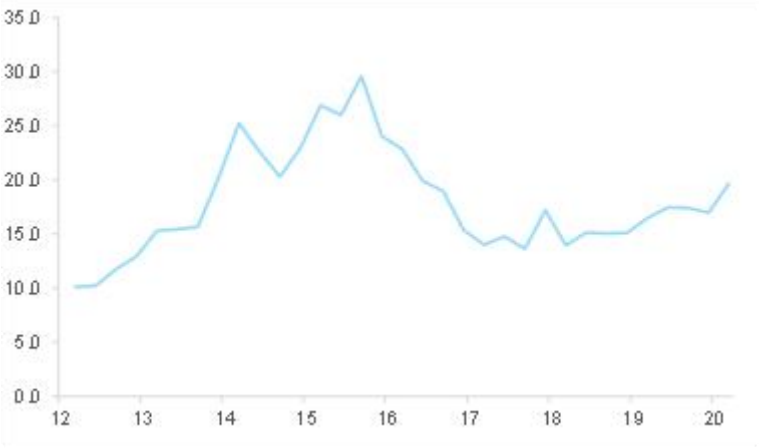
Sources: PBOC, CSRC, Allianz Research

Indeed, further financial liberalization and RMB internationalization are part of China's dual circulation strategy. These reforms are justified given the central role of China in the global economy and supply chains, the rising importance of Chinese consumers and the growing role of China in global financial stability[21], payment and monetary policies. The RMB's global market share in several metrics remains low, considering the size of the Chinese economy. In terms of international transactions, according to data from SWIFT, the share of transactions in RMB stood at only 1.97% in September 2020. In terms of global FX reserves, in Q3 2020, 2.1% consisted in RMB-denominated assets. The increase is noticeable, considering that RMB assets only consistently started to be included in FX reserves in Q4 2016 (with the currency's inclusion in the IMF

[21] In the past, gradual financial liberalization had already been associated with rising asset prices in high income markets such as Australia or Canada.

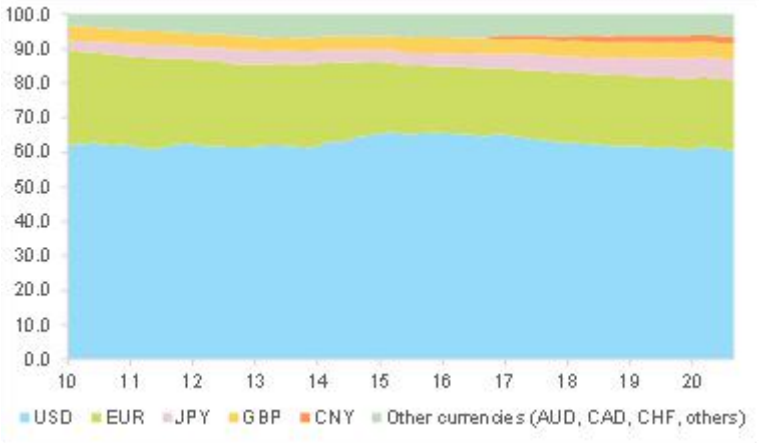
SDR basket). The RMB's inclusion is already higher than for the CAD, AUD and CHF (respectively 2.0%, 1.7% and 0.2%), but still far below the USD and EUR.

Figure 27: China's cross-border RMB trade settlement, as % of China's trade



Sources: PBOC, SAFE, Allianz Research

Figure 28: Distribution of global allocated FX reserves, by asset currency



Sources: IMF, Allianz Research

China has been pushing for financial liberalization in a gradual and sequenced way, and past experiences suggest that it should continue to do so. Strengthening the domestic financial environment – with strong financial institutions able to assess, monitor, regulate and prevent financial risks in a predictable

way; enhancing financial literacy; strengthening the role given to market forces in order to avoid moral hazard and improving asset-liability management are also a key foundation for financial liberalization. Finally, we think that to be sustainable, financial liberalization should hinge on a prudent openness to financial technical innovations, such as artificial intelligence and data analytics, as well as new lending and payment methods.

Recent financial liberalization measures include the relaxation or cancellation of foreign ownership limits in financial sector firms based in China. For example, the EU-China agreement on investment signed at the end of 2020 will gradually remove joint venture requirements for firms in financial services (putting the EU on the same footing as the US). Such actions could facilitate global cooperation in green finance, and attract foreign investors to support China's green transformation.

c. International initiative and global cooperation

Finance (especially asset owners) can be an accelerator of the green transformation. In a context of demographic change, financing renewable energies and other infrastructure projects presents a win-win situation: Institutional investors are looking for profitable, reliable, long-term investment opportunities for retirement provision at a time of low interest rates. At the same time, the transition to the green economy requires capital over the long-term. Combining the two would benefit both the climate and the world's population equally.

Global cooperation on sustainable finance is also key to mobilizing the enormous leverage that only private capital markets can provide. Cooperation can convert billions into trillions. In October 2019, the EU and China along with six other countries (Argentina, Canada, Chile, Kenya, India and Morocco) launched the International Platform for Sustainable Finance (IPSF), a prime example for future intensification of cooperation in sustainable finance. The ultimate objective of the IPSF is to scale up the mobilization of private capital towards environmentally sustainable investments. Since its launch, other countries – Indonesia, New Zealand, Norway, Senegal, Singapore and Switzerland – have joined the initiative. Present member countries represent 50% of GHG emissions, 50% of the world's population and 45% of global GDP. The IPSF therefore offers a multilateral forum of dialogue between policymakers that are in charge of developing sustainable finance regulatory measures to help investors identify and seize sustainable investment opportunities that truly contribute to climate and environmental objectives. Through the IPSF, members can exchange and disseminate information to promote best practices, compare their different initiatives and identify barriers and opportunities of sustainable finance, while respecting national and regional contexts.

Assets owners are the key to delivering on the net-zero economy

Similarly, institutional investors should work together to support environmental protection. The **UN-convened Net-Zero Asset Owner Alliance** was created in September 2019 by twelve founding members, including the world's largest insurance companies. The Alliance's asset under management doubled within a year, and now combines 34 of the world's largest pension funds, insurers and state-owned funds managing over USD5.5trn, establishing a good example of how institutional investors can work together to enhance

climate protection and finance the net-zero transition. It is the first group of private finance players to announce 2025 targets and has been described by UN General Secretary António Guterres as the "gold standard" for net zero commitments. More precisely, members of the Net-Zero Asset Owner Alliance commit to:

- Portfolio emission reduction targets: achieve net-zero GHG emissions in investment portfolio by 2050, complemented by interim targets in five-year steps. The *Inaugural 2025 Target Setting Protocol* defines a 2025 emissions reduction target of between 16% and 29%, based on a 2019 baseline.
- Sector targets that focus on hard-to-abate sectors which would make or break the transition.
- Finance the transition: the Alliance's collective mechanism makes it easier for like-minded investors to fund emerging technologies as well as setting-up blended finance and public-private partnership structures, which create positive spill-over and signal effect on the broader market.
- Asset owners of the Alliance actively engage with issuers, asset managers, and policymakers to work together in favor of the green transformation. The Alliance is fully in line with the best-available climate science from the IPCC, and working jointly with the civil society.
- The Alliance has published position papers on mandatory reporting, phase-out of thermal coal, green recovery from Covid-19, etc.

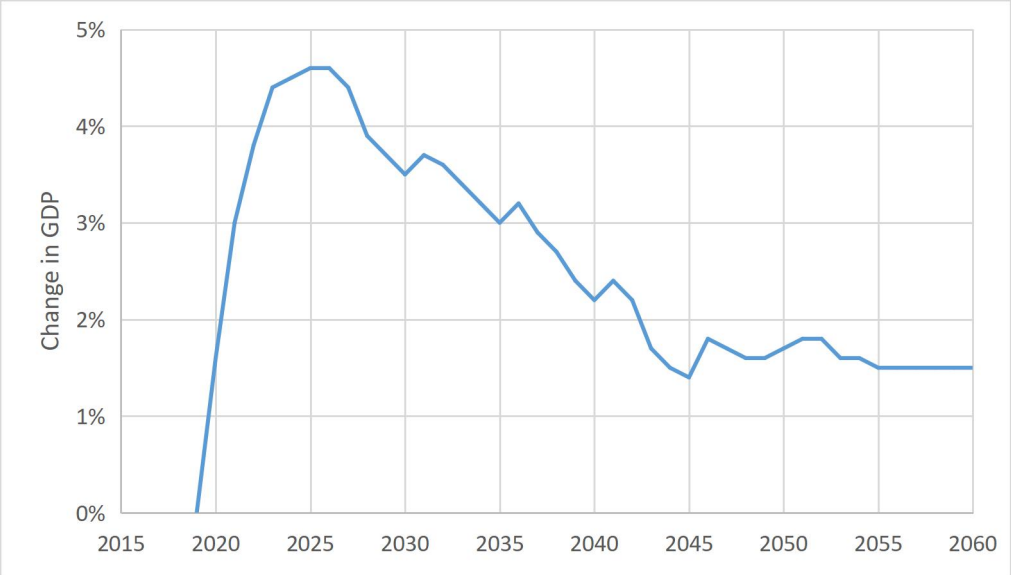
Such organizations have important offerings for participants in Chinese financial markets and Chinese asset owners, and could contribute to China's climate target. The Net-Zero Asset Owner Alliance would equip Chinese asset owners with the suitable analytical tools and methods to manage climate-related risks. It would invest in climate action, and eventually be the catalyst for mainstreaming green finance in China in support of the carbon neutrality target.

Appendix: How green is the global recovery?

The economic rebuilding after Covid-19 represents a historic window of opportunity to accelerate the global transition to a net zero emission society. Moving from short-term rescue to longer-term recovery packages, the focus should also shift to long-term climate benefits. China and the EU seem to be ready to prioritize climate-friendly investments that stimulate economic growth. However, this also puts assets relying on fossil energy at risk.

At the UN General Assembly on 22 September 2020, Chinese President Xi Jinping pledged that China's CO2 emissions will reach net-zero by 2060. This move may not only help the climate – it could lower the global mean temperature increase by around 0.25°C – and China's soft power, but may also pay off in pure economic terms. According to an analysis by Cambridge Econometrics[22], this will have a positive overall net impact on China's GDP, resulting from a combination of positive spillovers from the investment activities in other sectors, enhanced technological progress and leadership in green technologies, reductions of the fossil-fuel import bill and an increase in self-sufficiency and consequently a strengthening of the domestic market. As a result, in the Cambridge Econometrics analysis, China's GDP could increase by close to 5% in the net-zero scenario relative to the baseline, as shown in Figure 29. However, at this stage, there is (very) low visibility on the measures under the new climate target. In order to materialize the potential growth prospects, recovery policies have to adjust adequately to increase the existing ambitions in investing in the green transition.

Figure 29: Reaching net-zero by 2060 would raise China's GDP (Change in China's GDP in the net-zero pathway, relative to the baseline)



Source: Cambridge Econometrics modelling via www.carbonbrief.org

[22] https://www.carbonbrief.org/analysis-going-carbon-neutral-by-2060-will-make-china-richer

According to our research already previously displayed in Figure 10, the Covid-19 recovery stimuli are greener in the US and EU than in China. Compared to the total Covid-19 stimulus, the green stimulus share is around 20% in the EU. Pre-Biden green commitments were just around 1% of the US stimulus, but the current announcements aim at a green stimulus above USD 2trn, which would increase the green share of total US stimulus to above 30%. In comparison, in 2008-2009, the US spent 12% of its total economic stimulus on green measures. In China, the green share of total stimulus is less than 5% based on our assessment of the Covid-19 stimuli announced by the Chinese government.

Going forward, green elements will be indispensable to create a more balanced and inclusive economy. China has committed to a New Infrastructure Plan by 2025, focusing on cutting-edge technologies, digital infrastructure and electric mobility projects (e.g. charging infrastructure and public transit). The 14th Five-Year Plan does not increase mid-term climate ambitions relative to the previous Five-Year Plan. The announced reduction of the carbon intensity of GDP by 18% and energy intensity of GDP by 13.5% in the next five-year period is only consistent with the official roadmap to carbon neutrality by 2060 if a two speed approach is implemented. To limit global warming to below 1.5°C and reduce local environmental pollution impacts an early peak in emissions is desirable. A later emission peak might reduce transition costs as green technology prices are dramatically decreasing, but entering the market too late also poses the risk to miss the connection to the technology leaders. Additionally, the Five-Year Plan sets the target to basically eliminate heavy air pollution by 2025, cleaning up the nation's rivers, restoring wetlands, and boosting forest coverage to 24%.

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