



# **Building a Greener Future: How China Can Reach Its Dual Climate Goals**

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# Executive Summary

We stand at a historical turning point. Climate change poses an existential threat to mankind. Without intervention, the global temperature would rise by more than 5°C by the end of the century, food production would be reduced to half of current levels, and 75% of species could be brought to the brink of extinction. As a fast-growing economy and a major global emitter, China has pledged to reach carbon neutrality by 2060 to keep climate change in check. To achieve this goal, China will need to commit to a sustainable development path to keep the global temperature rise to under 1.5°C, or reduce carbon emissions by 75-85% by 2050. In addition to fulfilling its responsibilities as a global superpower, China will boost its sustainable development, stimulate economic growth, and improve its energy security through active climate action.

The Chinese government should play a leading role in global climate efforts and promote the development of green energy and green finance, while accelerating infrastructure building and financial innovation to catalyze the transformation of key sectors. Businesses should also play a part in reducing emissions by developing green growth strategies and building sustainable supply chains. Meanwhile, financial institutions should build green financing capabilities and specialized operations to support green industries.

Most of China's carbon emissions come from energy and industry, and these emissions have remained flat since 2013. To fulfill its net-zero pledge, China must take decisive initiatives under the 1.5°C pathway, accelerating emissions reductions in the sectors of energy, industry, transport, buildings, and agriculture and LULUCF (land use, land use change, and forestry). Following this pathway, China will need to invest RMB90-100 trillion (USD14-15 trillion) on climate initiatives before 2050, equivalent to about 2% of its cumulative GDP from 2020-2050. The largest investments will need to come from the transport sector. Major initiatives should include promotion of new energy vehicle (NEV), synthetic fuels, and public transportation. The energy sector will also require major investments to expand the use of renewable energy, nuclear power generation, and Carbon Capture and Storage (CCS) technology. Meanwhile, process innovation in industry, as well as the use of heat pumps in buildings and waste incineration in the agriculture and LULUCF sectors, will also contribute significantly to emission reduction.

- **Government.** Efforts in the public sector should concentrate on developing green energy and finance. To develop green energy, China needs to accelerate its energy transition on both the supply and demand sides. In green finance, the Chinese government should introduce stricter emissions regulations, provide incentive policies, and build enabling infrastructure.
- **Businesses.** Businesses are the rising force in China's green economy, and they are already highly active in the green economy. We recommend that companies set more ambitious carbon reduction targets. They should start with assessing the current state, and subsequently set new targets and develop carbon reduction initiatives to meet these targets. Electricity and fuel consumption account for most of carbon emissions from businesses. To reduce their own carbon footprint, businesses have introduced more than 200 measures, including

transformation of energy structure, upgrades to business model, improvements in energy efficiency, and capturing of carbon emission. Businesses should take an integrated approach by setting emission reduction curves, designing cost-effective and feasible emission reduction pathways, and enabling their organizations to optimize their green development strategies.

- **Financial institutions.** As key players in emissions reduction efforts, Chinese financial institutions should strive to increase green value creation so that industries can achieve their visions and goals. Financial institutions should strengthen their green financing capabilities by clarifying key support areas, promoting product and business model innovation, and supporting operations.

As a major carbon emitter, China is also a model for green energy technology and green land development. The steps that China takes in the future will undoubtedly have a remarkable impact on our world. The government, businesses, and individuals must stay wary of climate change and take cohesive action immediately.

# **1. Climate Action Will Require Concerted Efforts from All Stakeholders**

## **1.1 Mankind's Survival Is Dependent on Controlling Climate Change. However, Not Enough Global Action Has Been Taken Thus Far**

In the past few years, the concentration of carbon dioxide in the atmosphere has reached its highest level in 25 million years. In a speech on climate change at the UN headquarters in New York, Secretary-General António Guterres said that climate change has “brought us to an existential crossroad.” Without intervention, global temperatures are expected to rise by 5°C by 2100, an increase that would have a devastating impact: 75% of species are on the verge of extinction and food production could fall by 50%. Throughout history, the famines, migration, and conflicts resulting from food shortages have caused countless wars and even the collapse of whole civilizations.

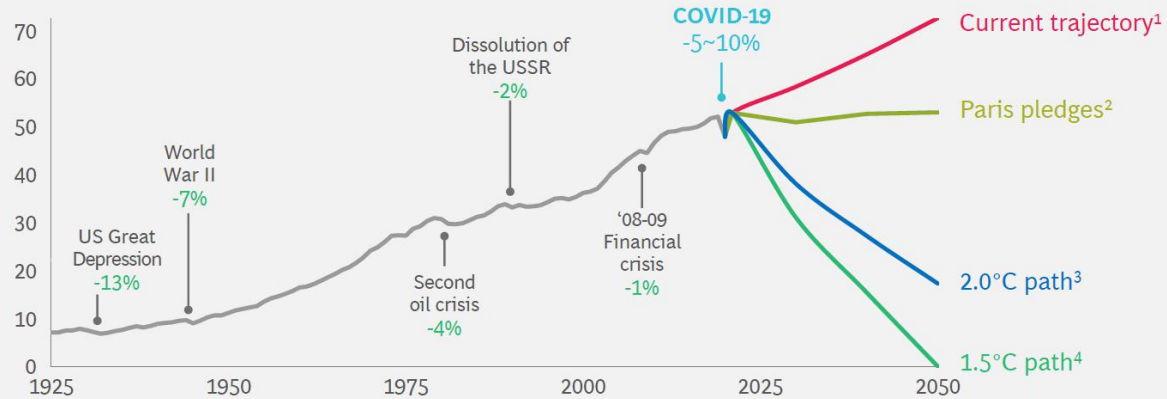
In the 2015 Paris Agreement, 196 countries committed to keeping the global temperature rise within 2°C. Following this pathway, global actors would make it possible to achieve global net zero by the end of the century. The concentration of carbon in the atmosphere would remain within 430-480 ppm, and the rise in the sea level rise would be kept within 0.6m. However, most of the signatories to the Paris Agreement have not yet taken decisive action.

## **1.2 The COVID-19 Pandemic Was a “Black Swan” Event that Catalyzed New Climate Change Efforts**

According to statistics from the European Environment Agency (EEA) and the United Nations Environment Programme (UNEP) (See Exhibit 1), greenhouse gas emissions fell by 5-10% during the pandemic due to the impact of global lockdowns and restrictions, the biggest drop since World War II. Reduction in global carbon emissions is expected to be 2.4 billion tons in 2020, a reduction significantly higher than previous records, such as the 900 million tons at the end of World War II and the 500 million tons at the height of the financial crisis in 2009.

## Exhibit 1 | COVID-19 Resulted in a 5~10% CO<sub>2</sub> Drop, Which Is a Great Opportunity to Accelerate Green Initiatives

Global annual greenhouse gas emissions (billion tons of CO<sub>2</sub> equivalent)



Sources: EDGAR 5.0; FAO; PRIMAP-hist v2.1; Global Carbon Project; IPCC; UNEP Emissions Gap Report; WRI; BCG analysis.  
 Note: These figures exclude land use, land-use change, and forestry.  
 1. Assumes GHG emissions grow from 2018 at the same rate as the "current policies" scenario in UNEP 2019 Gap report to 2050 (1.1% CAGR).  
 2. Assumes countries decarbonize at the same annual rate that was required to achieve their intended nationally determined contributions from 2020-2030.  
 3. Assumes 25% reduction by 2030 and net zero by 2070.  
 4. Assumes 45% reduction by 2030 and net zero by 2050.

In its 2020 assessment, the Global Carbon Project found that the emission reductions due to COVID-19 were the highest in the US (12%) and the EU (11%). However, due to China's strong economic recovery, its carbon emissions may have only fallen by around 1.7%.

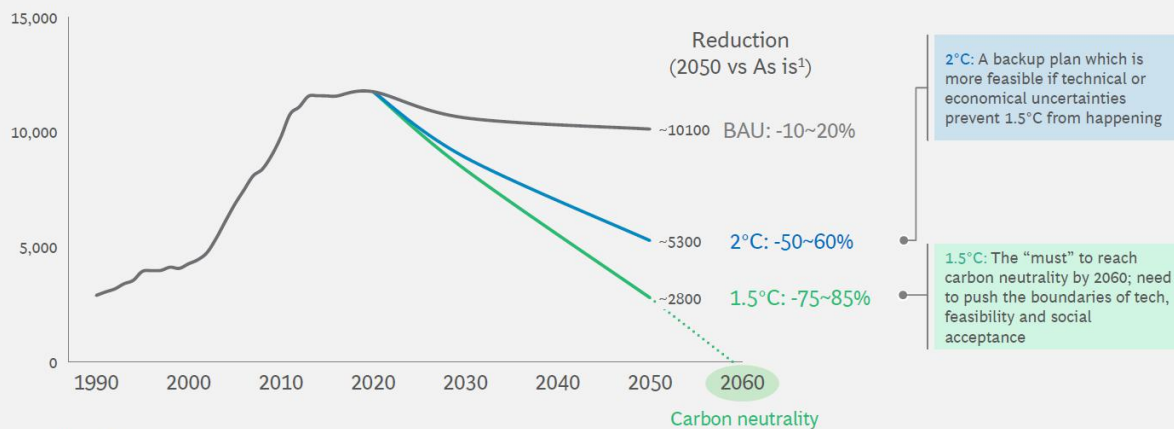
### 1.3 China Has Acted as a Responsible Superpower in Global Climate Action

In September 2020, in his speech at the 75th United Nations General Assembly, Chinese President Xi Jinping pledged that China's carbon emissions would peak by 2030 and the country would reach carbon neutrality by 2060. Mankind can no longer afford to ignore the repeated warnings of nature. Concerted international efforts are necessary to bring about a green economic recovery in the post-pandemic world. China's commitment to reach carbon neutrality by 2060 is closely aligned with the 1.5°C target set in the Paris Agreement.

President Xi's pledge also reflects China's long-term vision for collective global climate action and the country's unflinching determination in investing in this vision. Our analysis shows that in order to achieve net zero by 2060, China needs to take immediate action, go beyond the 1.5°C target, and work towards a 75-85% greenhouse gas (GHG) reduction by 2050. (See Exhibit 2.) The country must invest significantly more than planned under the current carbon reduction approach, continue to push the boundaries of technologies, and increase public awareness of climate issues.

## Exhibit 2 | To Reduce Carbon Emission by 75~85% Before 2050, China Needs to Start Down a 1.5°C Pathway Today

Greenhouse gas (GHG) emissions in China  
Mt CO<sub>2</sub>e



### 1.4 Taking Active Steps to Reduce Emissions Would Benefit China in Three Aspects

In addition to fulfilling its responsibilities as a global superpower, China will boost its sustainable development, stimulate economic growth, and improve its energy security through active climate action. Under the 2°C pathway, China would need to reduce its emissions by 50-60%, whereas under the 1.5°C pathway, it would need to achieve a 75-85% reduction.

- **Sustainable development.** Committing to a higher GHG reduction target would help China avoid potential natural disasters in the future and improve the living conditions for its people. Conversely, not taking stricter measures could cause frequent natural disasters, diseases, and resource shortages. For example, heat waves in China could last up to 10 times longer by 2050, reaching 12 days a year. In addition, floods in China's economically developed and densely populated areas and coastal cities could cause GDP losses of RMB2 trillion by 2050.
- **Direct economic boost.** The development of the green economy could directly boost China's GDP and employment in the medium and long term. According to our calculations, under the 1.5°C pathway, green technology investments would account for more than 2-3% of China's GDP by 2050. In addition, according to the International Renewable Energy Agency (IRENA), even under the 2°C scenario, green industries such as renewable energy, green construction and transport would boost China's employment by about 0.3%.
- **National energy security.** Developing renewable energies and green technologies such as wind and solar power would significantly reduce China's dependence on imported and non-renewable energy sources while increasing its energy security. China is currently one of the world's biggest

investors in wind and solar power and holds a third of the world's renewable energy patents. According to our calculations, China could reduce its fossil energy demand by around 80% by 2050 under the 1.5°C pathway.

## **1.5 The Government, Businesses and Financial Institutions Must Unite to Achieve China's Climate Goals**

First, the Chinese government clearly sees developing the green economy and green technology as high priorities. The "14th Five-Year Plan" emphasized the development of green industries and the transformation of energy, industry, and other key sectors. To further decarbonize, China should actively reform its energy structure and develop a green finance system to attract private capital investments and stimulate green industries.

Second, despite the difficulties they currently face, businesses should work with the government to continue the positive trend that started during the COVID-19 pandemic and make a "green recovery." High-emitting businesses, such as electricity and heat generation companies, should accelerate their green energy transformation, while businesses in other sectors should leverage government incentives to go green. Responding to the "Made in China 2025" policies, companies should build environmentally friendly supply chains, starting from upstream suppliers. Furthermore, they should introduce resource-saving and environmentally friendly practices in their procurement, production, marketing, recycling, and logistics systems, and establish extended producer responsibility (EPR) systems.

Third, in terms of green finance, financial institutions should offer services to facilitate investment, funding, operations, and risk management in industries such as environmental protection, energy saving, clean energy, green transportation, and buildings. They should establish systematic green finance strategies and increase resource allocations for green projects. In addition, they should support transformations and upgrades in green industries, environmentally friendly advanced manufacturing, service industries, and emerging industries by improving their service offering. Financial institutions should develop innovative green financing models and boost industry development by offering green credit, bonds, stocks, and development funds.



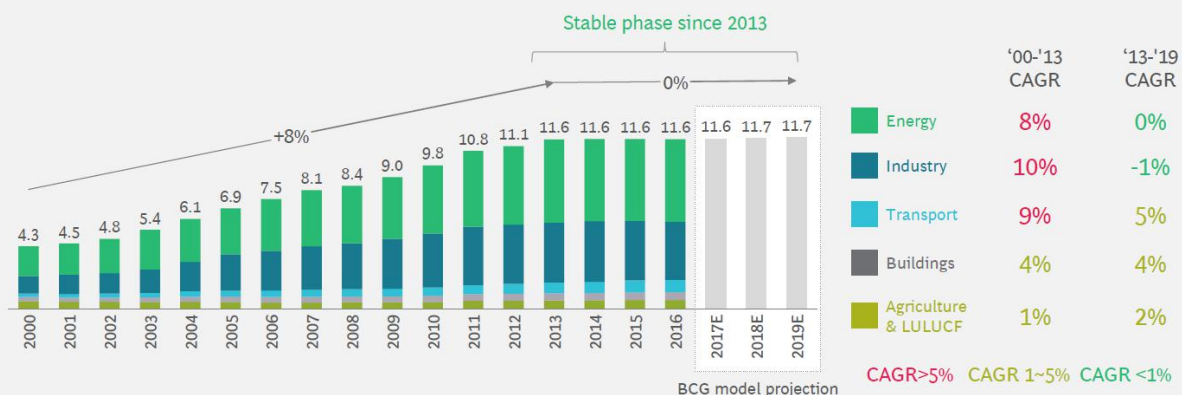
## 2. The Chinese Government Should Push Green Energy and Finance to Help Transform Key Industries

### 2.1 The Majority of China’s Carbon Emission Comes from Energy and Industry, but Emissions Have Plateaued Since 2013

In the last 20 years, we have witnessed not only China’s rapid economic development, but also its rise as a major emitter. Before 2013, annual growth in China’s carbon emissions had for a long time remained at around 8%. After 2013, as China’s economic growth slowed, and it introduced more energy saving and emissions reduction measures, its carbon emissions started to plateau. China’s greenhouse gas (GHG) emissions mainly come from five sectors: energy, industry, transport, buildings, agriculture and LULUCF. Of these sectors, energy and industry account for the largest share — more than 80% of China’s total. After 2013, growth of carbon emissions in these two sectors has remained flat, and we have even seen negative growth. (See Exhibit 3.) In addition, in transport, buildings, agriculture and LULUCF, which account for a much smaller share, growth of carbon emissions has also slowed, reaching around 3%. Despite the global economic slowdown, China is still the world’s largest GHG producer, accounting for more than 20% of global carbon emissions. Therefore, China still has the potential to reduce its carbon footprint and make a remarkable impact on the world.

### Exhibit 3 | China’s Emissions Mainly Come from Energy and Industry, but Have Stabilized Since 2013

China GHG emissions 2000-2019E<sup>1</sup> (Gt CO<sub>2</sub>e)

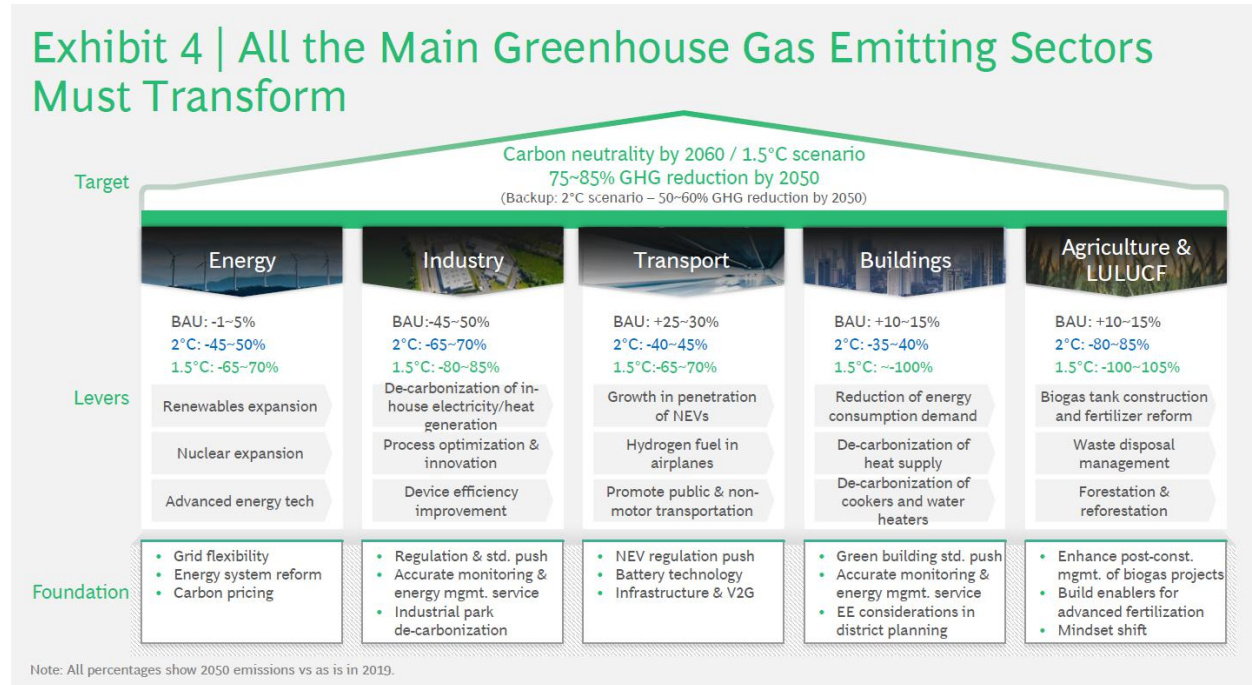


Sources: CAIT; World Resources Institute (WRI); BCG analysis.

1. The data up to 2016 is from CAIT, data of 2017 and beyond is projected by BCG model. Although there is no official census, the common view is that China’s emissions will remain stable for the moment.

## 2.2 To Reach Net Zero, China Must Transform Key Industries Rapidly

China must step up its efforts to transform the energy, industry, transport, buildings, and agriculture and LULUCF sectors to keep up with its climate targets. Based on the 1.5°C pathway, the buildings and agriculture and LULUCF sectors would need to take the strictest measures, to achieve cuts of emissions of more than 100%. The next largest reduction would need to be in industry, which is required to reduce emissions by about 80-85%, while a 65-70% reduction would be necessary in the energy and transport sectors. (See Exhibit 4.)



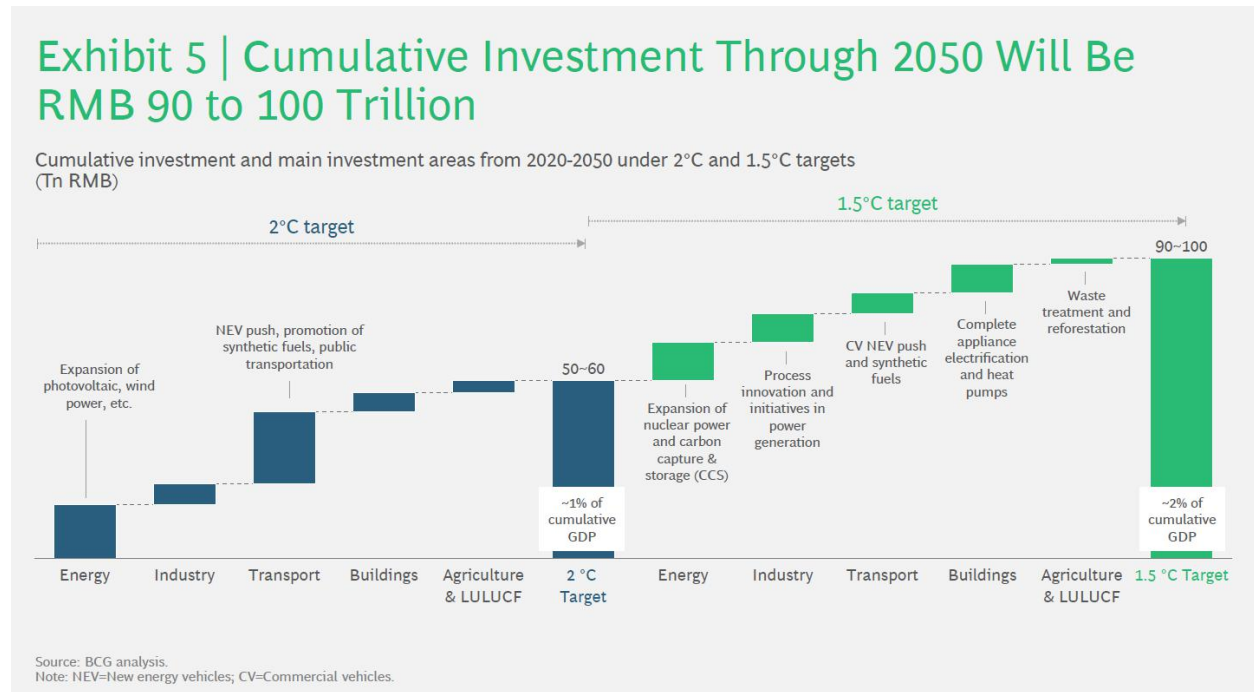
China needs to take immediate action and push for the more ambitious 1.5°C target to fulfill its pledge to reach net zero:

- Energy.** Achieving required reduction means a major transition to the use of renewable energy, such as onshore or offshore wind power, centralized or decentralized solar power. For nuclear power to gain popularity, further cost reduction, safety measures, and societal acceptance are all crucial factors. Besides electricity generation, the energy sector should gradually phase out fossil fuels and replace them with natural gas. It will also be necessary to explore decarbonization in energy product manufacturing (including coking, oil refining and mining processes), broaden the adoption and efficacy of CCS technology, and pursue CCS penetration of more than 90%. Enabling infrastructure requires grid flexibility and both further research and scalable application of technologies such as ultra-high voltage (UHV) and electrochemical energy storage. Lastly, facilitating energy transition demands localized enabling mechanisms for carbon pricing, such as carbon trading and carbon tax.

- **Industry.** As with the energy sector, the industry also needs to promote clean power and adaption of combined heat and power (CHP) and CCS technology at scale. In addition, unlocking further decarbonization potential demands innovation in the process flow of chemical and steel industries (such as short-process steelmaking and energy-saving technologies in the steel industry and methanol-to-olefin (MTO) process in the chemical industry) and upgrade to more efficient equipment (such as advanced furnaces and high-efficiency motors). In terms of policy, the government should consider promoting more comprehensive emissions-reduction standards and create economic and tax incentives for energy-intensive industries to go green. Meanwhile, the sector should leverage China's large-scale industrial parks to develop eco-industrial parks and holistic environmental governance, unleashing the potential for industrial parks to reduce emission in a systematic manner.
- **Transport.** Reducing carbon emission in transportation demands the rapid electrification of public transport as well as passenger and commercial vehicles. Achieving this target requires stronger battery technology and scaling of charging infrastructure that allow for decreased total cost of ownership, reduced range anxiety, and improved driving experience, all factors making NEVs more attractive. The last mile will involve phasing out internal combustion engine vehicles on a large scale, leaving only a small number of fuel-efficient vehicles (less than 10%) while enhancing the efficiency of the remaining traditional vehicles. Moreover, it will also be necessary to encourage the technology development of hydrogen-powered aircrafts, targeting wide-scale commercialization by 2040.
- **Buildings.** Further enhancing technology and raising public awareness are important to promote energy efficiency innovation in buildings (such as improvement to the heating pipe network and wall insulation). To reduce emission from heat supply, key levers are investment in heat pump expansion, improvement in heating system efficiency especially in cold regions, and decarbonization in energy usage (such as increasing the use of electricity and heat from industrial low-grade waste instead of coal). In addition, breakthroughs in solar water heater industry are necessary to achieve greater market penetration and overcome the challenges of limited market reach and low and inconsistent quality. Complete carbon neutrality also requires electrification of cooking appliances, a measure that is effective yet challenging, and its implementation demands enhanced grid capability and wide public acceptance.
- **Agriculture and LULUCF.** The sector ought to scale up biogas projects and strength its service capability. Furthermore, excessive use of fertilizer is a key contributor to agricultural greenhouse gas emissions (e.g. nitrous oxide). Innovation in fertilizer will optimize its utilization and accelerate the popularization of scientific methods for fertilizer application. In waste management, the sector needs to advance research and development of waste incineration treatment to solve technological and high-cost challenges, ultimately reducing landfill of waste and incinerating over 80% of waste. To go the last mile, the sector must continue to explore the potential of carbon sinks in carbon removal through afforestation and reforestation.

We estimate that China will need to invest RMB90-100 trillion (USD14-15 trillion) on climate measures before 2050, equivalent to about 2% of its cumulative GDP from 2020-2050. (See Exhibit

5.) The largest investments will need to come from the transport sector. Major initiatives should include promotion of NEV, synthetic fuels, and public transportation. The energy sector will also require major investments to expand the use of renewable energy, nuclear power generation, and CCS technology. Meanwhile, process innovation in industry, as well as the use of heat pumps in buildings and waste incineration in the agriculture and LULUCF sectors, will also contribute significantly to emission reduction.



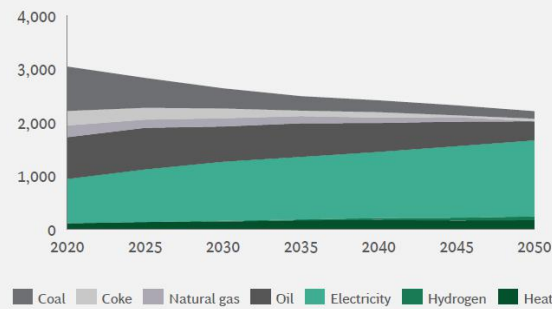
## 2.3 Powering the Green Transformation: Renewables and Green Finance

**Renewables.** China needs to roll out the adoption of clean energy in both the energy mix and electric power generation. Our analysis indicates that to stay on the 1.5°C pathway, fossil fuels must be limited to within 25-30% of China’s final energy demand, and to within 20% of electric power generation. (See Exhibit 6.)

## Exhibit 6 | China Needs to Roll Out Clean Energy in both Demand and Supply Sides

1.5°C: Fossil energy = 25-30% final energy demand

Final energy demand (Mt Ce)

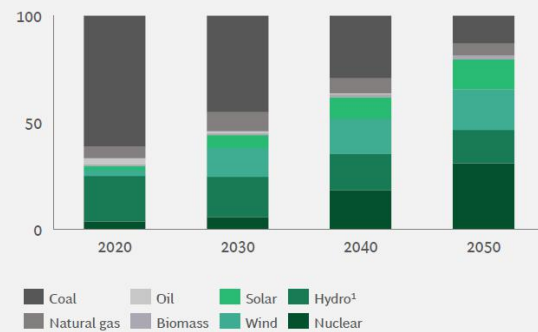


Source: BCG analysis.

1. Although the share of hydro power decreases in the 1.5°C target, the absolute amount of power generation is increasing due to overall increase in demand.

1.5°C: Fossil energy = ~20% of electric power generation

Distribution of electric power generation (%)



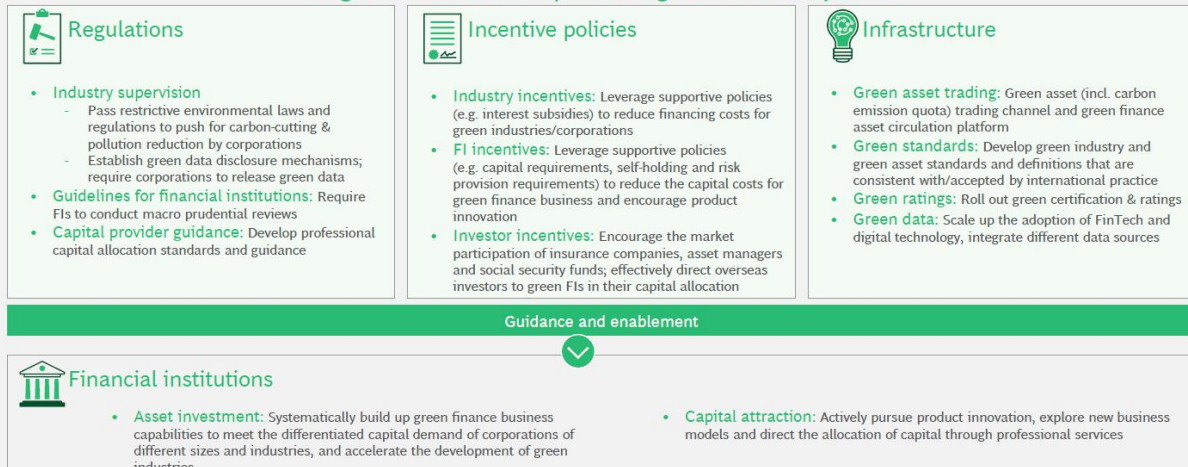
**Green finance.** Although China's green finance is developing rapidly and leads the world in terms of scale, there are structural deficiencies. In 2019, 21 of China's major banks had more than RMB11 trillion (USD1.7 trillion) in green loans outstanding, far more than other countries. In the same year, over RMB380 billion (USD58 billion) in green bonds was issued in China, accounting for over 20% of the global total issued that year and the largest of any individual country. There is still another RMB4-5 trillion (USD0.6-0.8 trillion) in unmet green financing and investment demand, and this continues to grow at approximately RMB1 trillion (USD0.15 trillion) every year. However, differences between Chinese and global green finance standards have meant that some international investors have avoided Chinese green bonds. In 2019, 43.9% of China-issued green bonds were not compliant with global standards. If China is to create an ecosystem for green finance (See Exhibit 7), the government needs to take the initiative and pull the following levers.

- **Regulation.** Regulators need to roll out restrictive environmental regulations that encourage corporations to cut carbon emissions and pollution and establish disclosure mechanisms to encourage corporations to release green data. The government must also require financial institutions to scrutinize the macro environment while establishing professional capital allocation standards and providing guidance to capital providers.
- **Incentive policies.** The government can leverage supportive policies (e.g. interest subsidies) to reduce the cost of financing for green industries/corporations. Financial Institutions can leverage supportive policies (e.g. capital requirements, self-holding and risk provision requirements) to reduce green finance capital costs and encourage product innovation. The government should encourage market participation from insurance companies, asset managers, and social security funds; in addition, the government needs to effectively guide Chinese and overseas investors in their capital allocation for green finance.

- **Infrastructure.** The government should establish a green asset trading channel and green finance asset circulation platform. (See Exhibit 8.) It should develop globally aligned and recognized green industry, asset standards, and definitions; roll out green certification and green ratings; and scale up the adoption of FinTech and digital technology.

## Exhibit 7 | The Chinese Government Needs to Develop an Ecosystem for Green Finance

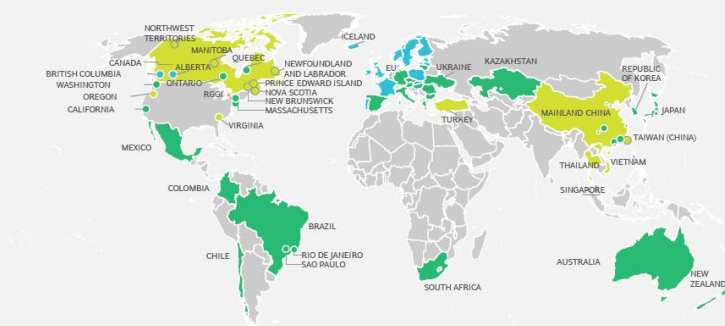
### A government-led & optimized green finance system



## Exhibit 8 | 67 Jurisdictions Are Putting a Price on Carbon and China Is also Building a Platform

67 Jurisdictions are putting a price on carbon in different forms

China is strengthening carbon regulation and building ETS



- Both ETS<sup>1</sup> and carbon tax implemented or scheduled
- Either ETS or carbon tax implemented or scheduled for implementation
- ETS or carbon tax under consideration

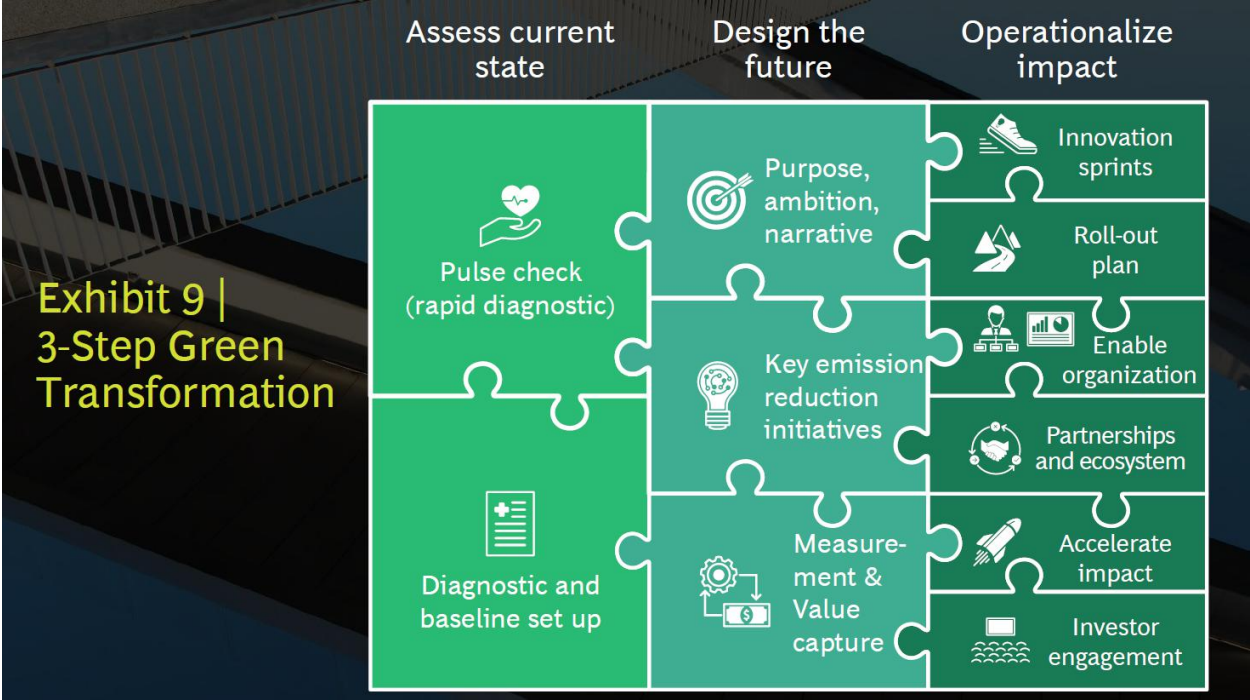
China will publish stricter regulations on carbon emissions in its "14th Five-Year Plan"

China proposed the ETS concept in 2013, and plans to develop & roll out in the future

Source: World Bank; BCG analysis.  
1. ETS=Emissions Trading System

# 3. Seizing Opportunities with Green Development Strategies and Sustainable Supply Chains

Businesses are the central pillar of China’s green economic development. They have begun their own pioneering experiments to explore a greener path forward. We suggest that corporations take three steps to reach more ambitious emissions reduction targets (See Exhibit 9): assess the current emissions state, design the future, and operationalize impact.



## 3.1 Assess the Current Emissions State

Developing pathways for decarbonization requires companies to first assess their current carbon emissions, main sources of emission, and types of energy consumed. Establishment of baseline and analysis of the root causes for carbon emissions are fundamental to the creation of sound initiatives and evaluation of the initiatives.

Assessing the current state of carbon emissions is equally important for companies in both upstream and downstream of energy usage. For upstream companies, such as electricity generation companies that account for 40% of the country’s carbon emissions, the primary task is to establish quantifiable "baselines" for the monitoring, reporting, and verification of carbon reduction, which set of capabilities also enable companies to participate in the national carbon emissions trading market. For downstream companies, assessing their own energy structure and usage is important. Meanwhile, as these downstream companies often play vital roles in guiding their respective value chains,

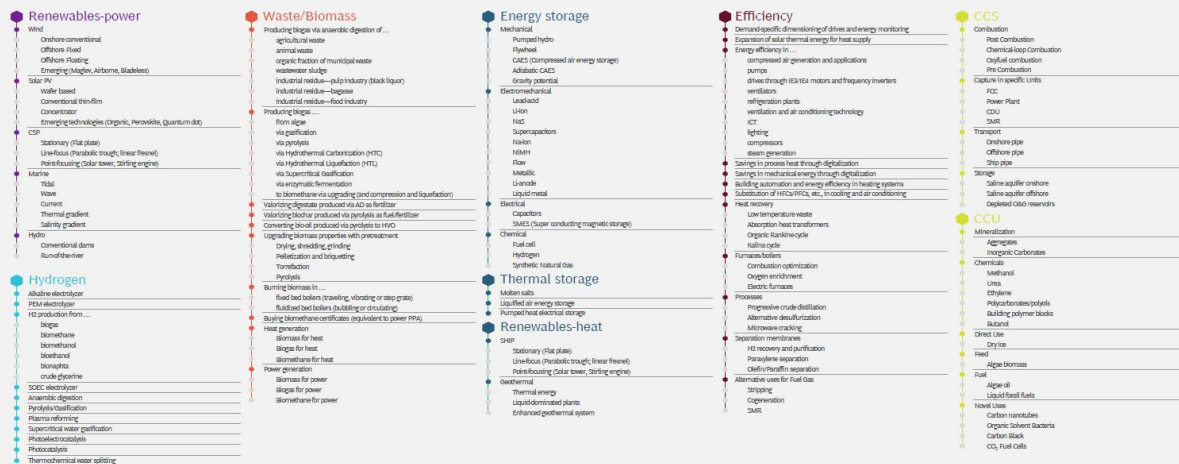
comprehensively assessing the carbon footprint throughout the value chain is crucial and necessary. For instance, in the apparel industry, its upstream dyeing and printing processes have high carbon footprint. Furthermore, the industry's operations from distribution, transportation, to physical stores all generate carbon emissions to varying degrees. All these factors need to be considered when assessing the current emission state of companies in the downstream of energy usage.

### 3.2 Design the Future

BCG analysis has identified over 200 emission reduction initiatives that businesses can take (See Exhibit 10), including changing energy sources, improving operation efficiency, improving energy efficiency, and capturing carbon. Transformation of the energy structure means supplanting fossil fuels such as coal and natural gas with clean energy sources such as renewables, nuclear, or biomass. Companies need to invest heavily in offshore and onshore wind energy, photovoltaic energy, conventional dam, and run-of-the-river hydro energy; leverage the potential of marine (tidal, wave, and current) energy; and produce biogas via anaerobic digestion of agricultural, municipal and animal waste.

## Exhibit 10 | Database with ~200 Vetted Emission Initiatives

Database includes technical data, maturity assessment, economics ...



Source: BCG

To improve operation efficiency, companies need to change how their devices and processes run in order to drive energy efficiency and emissions reductions, such as via innovating in transportation, designing new industrial processes, and applying heat pumps. Companies in China's power grid and research institutions have been researching application at scale of ultra-high voltage technology (UHV) and electrochemical energy storage. Process innovation will be an important lever in industry and could include shortening the steel-making process and integrating energy-saving technology, or integrating the methanol-to-olefin (MTO) process in chemical engineering.

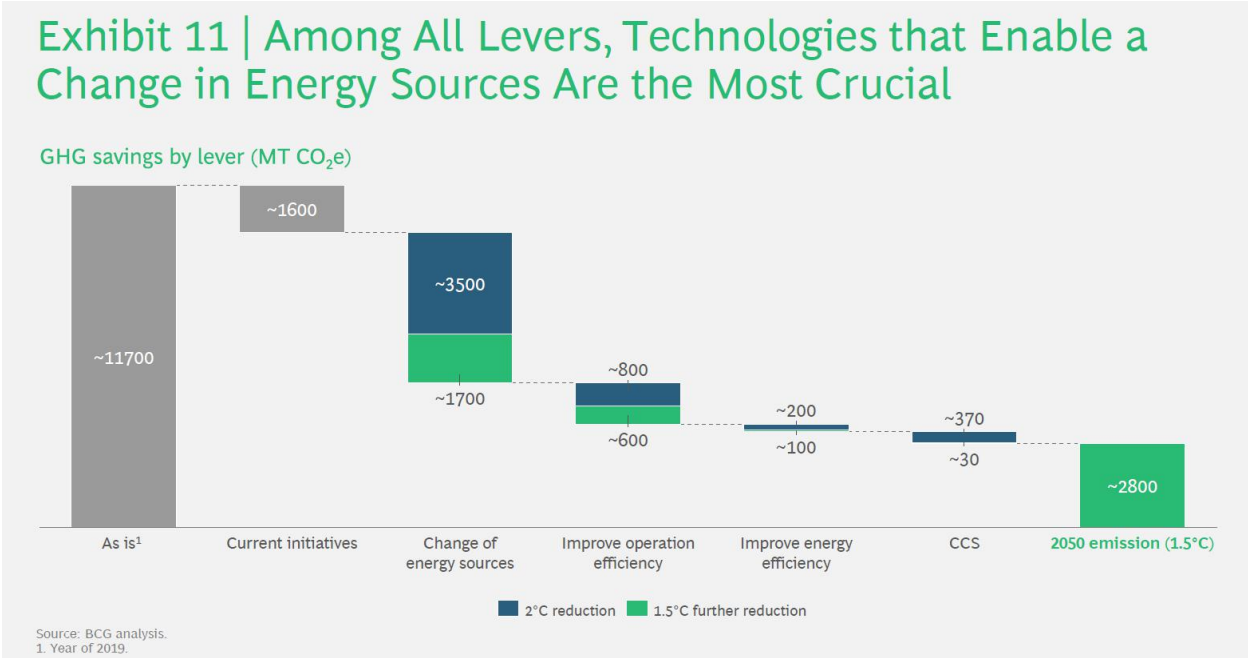


Businesses will need to focus on specific needs and monitor energy use, improve industrial machinery efficiency, improve the fuel efficiency of inefficient combustion engines (ICEs), and promote energy-efficient appliances. Concrete initiatives businesses can take include adoption of solar energy heaters and energy-efficient compressors, ventilation devices, lighting, and other industrial devices. Businesses can also leverage digitalization to make heat and mechanical energy efficiency gains in industrial processes and recover heat via low temperature waste and absorption heat transformers.

Companies can leverage carbon capture, utilization, and storage (CCUS) technology to capture and store carbon emissions during coal, natural gas, or biomass power generation. Furthermore, businesses can transport carbon using chemical-loop combustion and oxyfuel combustion, using onshore, offshore and ship pipes, while leveraging onshore, offshore, and depleted oil and gas reservoirs for storage. Businesses can directly use captured carbon to make dry ice or use as a raw material for the production of chemicals such as methanol, urea, and ethylene, biomass energy, and liquid fossil fuel. Other novel uses could include carbon nanotubes, organic solvent bacteria, and carbon black.

### 3.3 Tech-driven Energy Mix Transformation is Key

Transformation of tech-driven energy sources is the most important lever for businesses across the board. (See Exhibit 11.) BCG’s model projects that, under the 1.5 °C pathway, a change in energy sources that would deliver the greatest drop in excess GHG emissions, as much as 1.7B tons CO<sub>2</sub>-equivalent, compared to improving operation efficiency (600M tons), energy efficiency improvements (100M tons), and CCUS (30M tons).



For example, green power procurement is now a focus for many companies, but businesses will need to consider feasibility, costs, and local policies. Direct power purchases (DPPs) and inter-province power exchanges are both relatively cheap, but DPPs are only recognized in some provinces. If a business can reach an agreement with a renewable energy provider, it may make deals at the provincial-level power exchange. Inter-province power exchanges, on the other hand, must be led by the provincial government, and require an agreement between two provincial governments. The final deal must then be registered at the national power exchange in Beijing. China recently launched its renewable portfolio standard (RPS) policy, modified the existing purchase quotas, and enacted subsidy-free pricing to spur market trading of power. In the future, more Chinese provinces may adopt DPP policies.

For DPPs, buyers need to understand and consider multiple factors before coming to the negotiation table. Buyers will be preoccupied with energy prices and price stability and will expect the price of renewable energy to remain at least at the base price level. The government will need to ensure energy stability to protect production and manufacturing demand. Renewable generators are particularly margin-sensitive, and they will hope to sell energy not purchased by the national grid in order to gain generation rights and offset growing peak-shifting costs. Grid companies need to ensure safe transmission, control loads, and provide peak-shifting services. The trading market is responsible for compliance, producing contracts, and monitoring prices as required by policy. Local government agencies need to roll out laws and regulations to ensure the stable supply of renewable energy, while meeting RPS and subsidy-free objectives set by the central government.

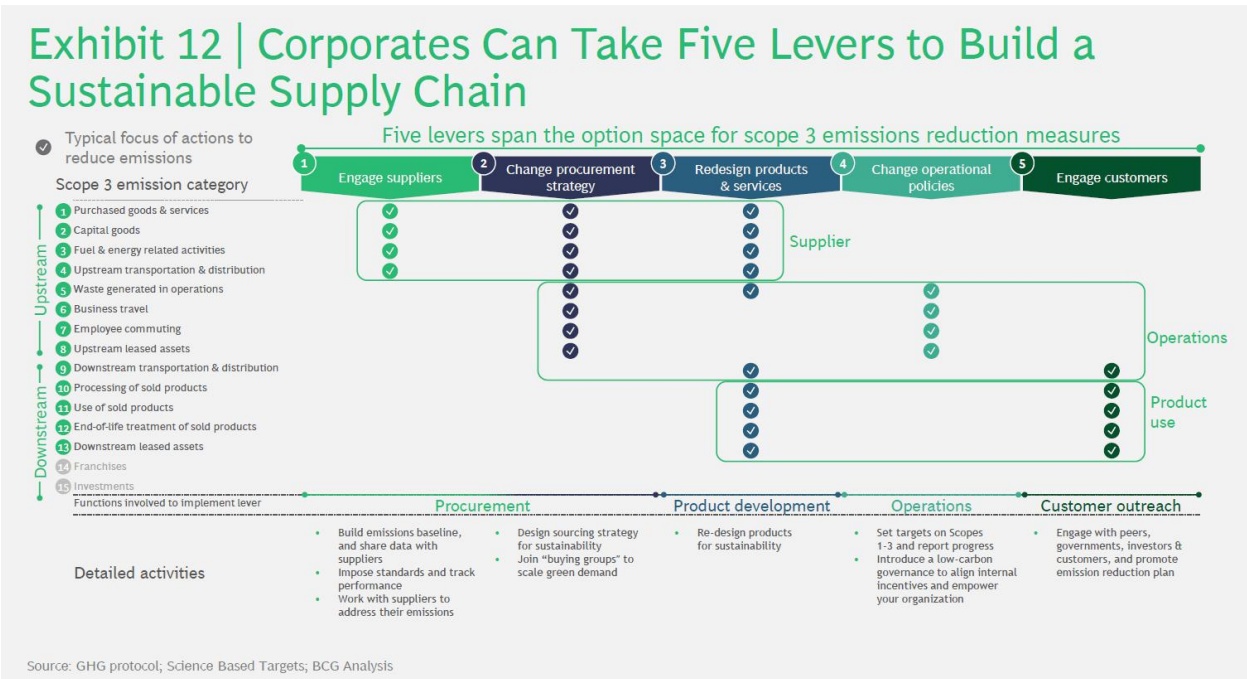
BCG research shows that most electricity providers would agree to giving a discount of RMB0.2 (USD0.03) per kilowatt-hour on sales to the national grid. Power companies in Hebei, Shanxi, and Guangdong provinces have all expressed willingness to sell electricity at below national grid price. For example, the average renewable electricity transaction price on DPP agreements in Fujian in December 2019 was RMB0.37 (USD0.06) per kilowatt-hour, or RMB0.2 (USD0.03) lower than the national grid price. Although direct purchasing of green electricity would help businesses to lower their electricity costs and fulfill their environmental obligations, the feasibility in practice depends largely on local governments. Currently, the plan is affected by two policies: the quotas on direct purchases of renewable electricity within a province, and preferential dispatching for renewable electricity.

### **3.4 Five Levers to Build Sustainable Procurement and Supply Chains**

In addition to the initiatives mentioned above, businesses can also build more sustainable supply chains through five levers: suppliers, procurement, products & services, operational policies, and customer engagement. (See Exhibit 12.)

- First, businesses can engage their suppliers to help reduce their emissions by setting an emissions baseline, sharing data, and working with them to reduce emissions. Businesses can impose standards for emissions reductions, but suppliers need to be fully engaged, and performance needs to be tracked.

- Second, businesses need to design sustainable procurement strategies, and they can join “buying groups” to scale green demand.
- Third, businesses need to look at which of their offerings need redesign to ensure sustainability.
- Fourth, businesses can also change their operational policies, set targets for upstream and downstream operations and report progress, and introduce low-carbon governance to align internal incentives and empower the organization.
- Finally, businesses can engage with peers, government, investors, and customers on emissions reduction plans.



### 3.5 Define an Abatement Curve and a Comprehensive Green Development Strategy

Emissions reduction is a serious and challenging task, the responsibility for which goes far beyond a single stakeholder, management group, or sector. Businesses need to look at the bigger picture, set an abatement curve, and set an emissions reduction path that is both cost-effective and feasible. Businesses need to consider the following internal factors: emissions inventory and baseline scenario analysis, the attitude towards emissions reduction and target setting, and technology scouting and feasibility assessment. They should also consider supply chain factors such as the emission inventory and baseline in the value chain, CO<sub>2</sub> reduction potential, abatement technology cost, willingness of ecosystem partners to participate, nature of carbon emission, and the division of responsibility in emissions reduction.

Furthermore, by defining an abatement curve, companies can better identify the most cost-effective and feasible path to emission reductions. (See Exhibit 13.)

## Exhibit 13 | Corporates Need to Develop a Cost-efficient and Feasible Path Considering Sets of Factors

Key factors to build emission reduction path

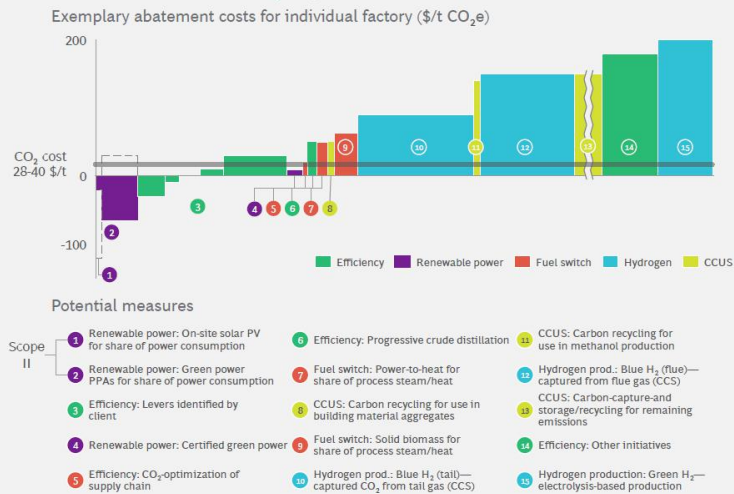
Scope 1 & 2 factors (own company)

- Emissions inventory and baseline scenario analysis
- Target setting
- Preference for emission reduction technologies
- Technology scouting
- Technology feasibility
- Technology cost
- Emission reduction potential

Scope 3 factors (supply chain)

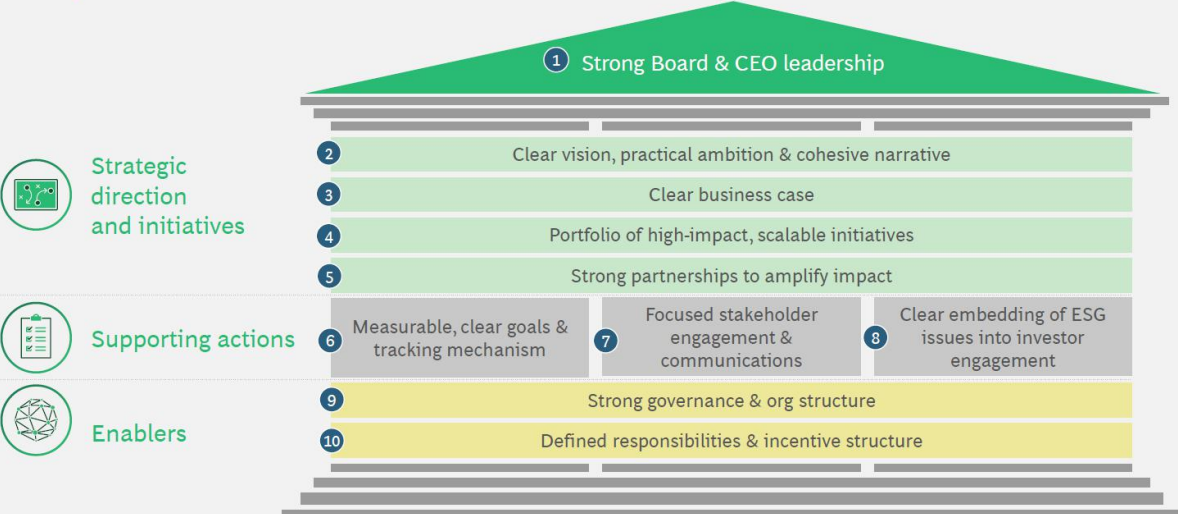
- Value chain emission inventory and baseline
- Emission reduction
- Technology cost
- Willingness of ecosystem partners
- Supply chain engagement initiatives and steering model

Abatement curve helps to identify the most cost-efficient and feasible path to emission reduction for the company



Businesses also need to design better green development strategies that can support emissions reductions and empower organizations. (See Exhibit 14.) First, boards of directors and CEOs need to get behind green development strategies by providing strong corporate governance and organizational structures, defining responsibilities, and setting up an incentive structure. Second, companies need a clear vision, practical ambition, and a cohesive narrative. Green development strategies need to be backed by a strong business case and high-impact, scalable initiatives. Finally, businesses need to forge strong partnerships to amplify the impact of their strategies. Setting up measurable, clear goals and a tracking mechanism, managing effective engagement with stakeholders, and clearly embedding ESG issues into investor engagement are all key supporting actions that underpin a green strategy.

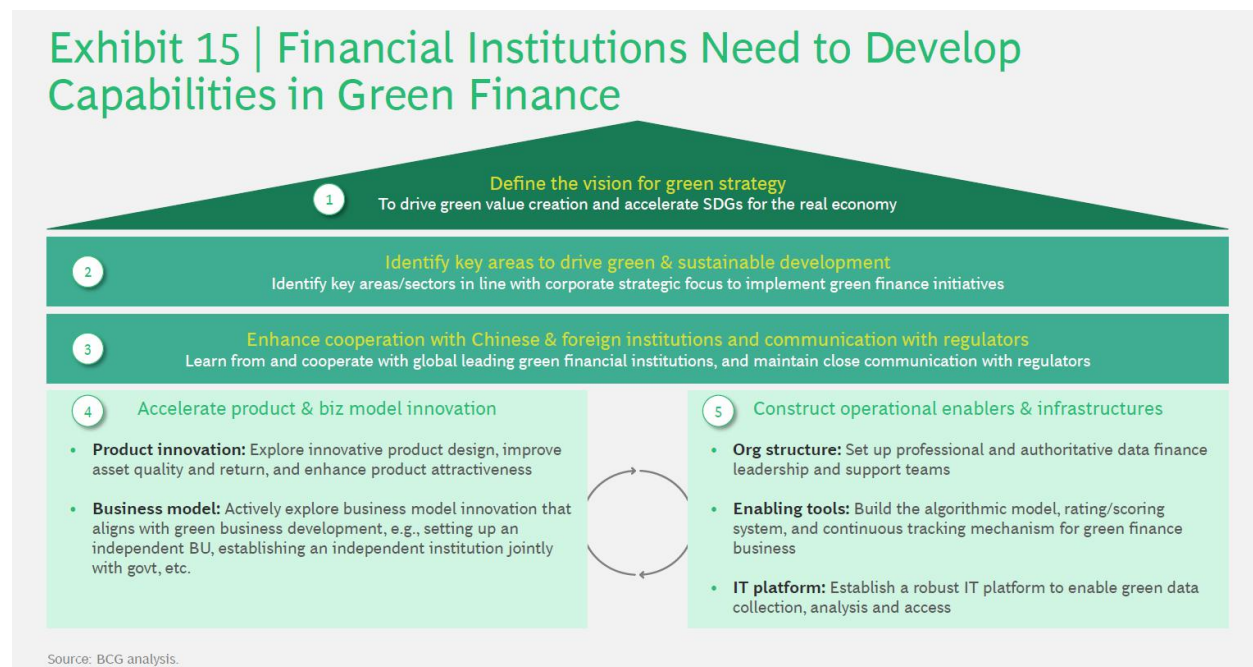
# Exhibit 14 | To Develop a Comprehensive Green Strategy, Corporates also Need to Consider Key Enablers



Source: BCG analysis.

## 4. Financial Institutions Must Develop Green Finance Capabilities

As an integral player in reducing emissions, China’s financial institutions need to develop their green finance capabilities across the board, improve their green value creation, and accelerate progress toward the sustainable development goals for the real economy as a means to realize their green strategy vision. (See Exhibit 15.)



First, financial institutions need to identify key areas to drive green and sustainable development. Companies can identify key sectors, such as industry or energy, to implement green finance initiatives in line with their strategic focus. China’s financial institutions can also look to leading international policy financial institutions’ practices to guide their own investment, financing decision-making, and financial innovation. For example, global financial institutions including the World Bank, European Investment Bank, and Green Climate Fund are giving greater priority to funding for renewables, low-carbon transport, healthy food and water security, sustainable urban communities, and environmental buildings, cities, and industrial machinery.

Second, financial institutions can collaborate with partners in China and around the world to leverage the best practices and initiatives, while remaining in close contact with regulators. Success in green finance, however, requires China’s financial institutions to innovate on their products and business models. They need to redesign their offerings and enhance asset quality and yields to give their offerings greater appeal. Meanwhile, they need to find the business model that best suits their individual circumstances, such as setting up an independent business unit like a green

finance department or investment bank, or establishing an independent institution jointly with the government. One practice that Chinese financial institutions could learn from is experience of a German bank, which set up a green institutional business bank. The subsidiary bank focuses on re-lending and refinancing services, helping other financial institutions expand their green business. This bank has now become a major contributor to the development of green finance in Europe, with an ROE higher than the average of German commercial banks.

Finally, to flourish, green finance requires the support of infrastructure and operations. For instance, financial institutions need to build up professional and authoritative data finance leadership and support teams. Financial institutions can use blockchain tech to directly connect issuers and investors, cutting out the middleman. They can also build up their algorithm capabilities to automate some processes and reduce labor costs. The Internet of Things and other new technologies can support algorithm models and appraisal mechanisms for green finance, delivering a continuous tracking mechanism to ensure the reliability and authenticity of asset certification and ratings. Financial institutions need to establish a robust IT platform to enable better green data collection, analysis, and access.

# Conclusion

It is the consensus of the scientific community that climate change is a chiefly man-made phenomenon. Furthermore, climate change is accelerating at an unprecedented speed. If it is not slowed, our living environment will be destroyed; coral reefs face extermination; the vast majority of the world's tropical rain forests will disappear; the Greenland ice sheet and summer Arctic ice will melt; and thousands of coastal cities will be swept by flooding for ten months of the year. We are at a crossroads: If we do not make a stand and act to fulfill the commitments of the Paris Agreement, we face oblivion.

Climate change is the most important global challenge of our time. It mandates a global, society-wide consensus and comprehensive action. By working together to meet our temperature control targets globally, we can avoid disaster. As a major carbon emitter, China is also a model for green energy technology and green land development. The sustainable development strategies and emission reductions measures China takes in the future will undoubtedly have a major impact on the world. Reducing emissions needs to be on the agenda of every government department, business, and individual in China. The government, businesses, and financial institutions can set an example and act cohesively to leave a greener planet for future generations.



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