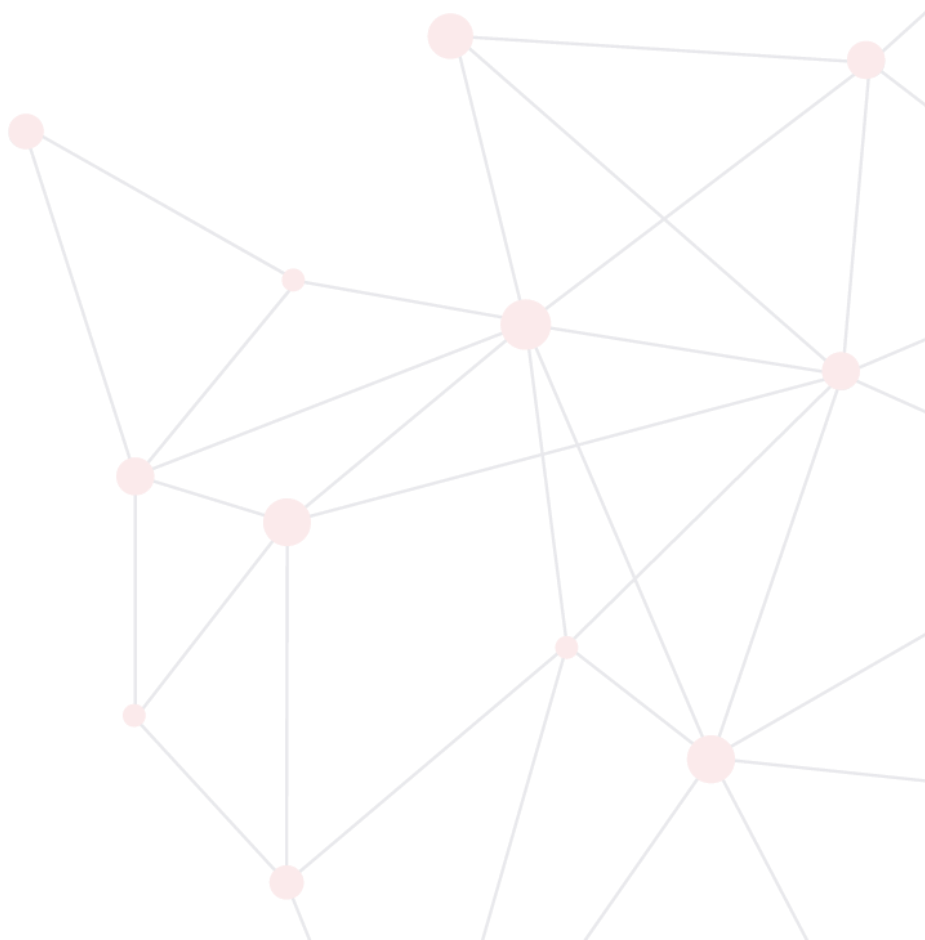

Policy roadmap for China's growth through decarbonisation

How government bodies can seize
the green growth opportunity

Mathias Larsen, Maria João Pimenta and Nicholas Stern

Policy insight

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Summary

China's CO₂ emissions likely peaked in early 2024, or have at least plateaued since then, but halting the rise in emissions and reducing them are different challenges that require different strategies. Progress so far has come largely from the power sector. Reducing emissions systematically means extending the decarbonisation process across the rest of the economy, where the remaining sectors are harder to address. Around 60% of Chinese emissions come from activities that are already electrified or cheap to electrify, over 30% from sectors that are hard to electrify and carry a cost premium, and under 10% from agriculture and land use, which still lack a clear path to decarbonisation. Each area requires a different logic of intervention.

The way to meet this challenge is to treat the green transition as a growth opportunity. Falling costs, increasing returns to scale, gains in resource efficiency, system productivity, better health and a sustained rise in investment all make the clean economy self-reinforcing. This matters especially for China, where the old growth model is running out of steam and the 2035 vision implies growth of around 4.17% per year. Green industries already make up over 10% of the economy and have accounted for upwards of 40% of growth in recent years. The roadmap summarised below sets out what an active state should do to seize this opportunity.

Strategic planning and coordination

- Strategic planning and coordination should give public and private actors the stable and predictable environment they need to make near-term investments that produce long-term returns.
- Green growth should become the organising principle of the '1+N' architecture, from the Central Financial and Economic Affairs Commission and the Leaders Group on Carbon Peak and Carbon Neutrality through to the National Development and Reform Commission as its operational arm.
- An official term for the green growth opportunity comparable to New Quality Productive Forces would signal that the focus is widening from building green industries to greening every sector.

Industry, technology and trade

- Industry, technology and trade policy should shift from accommodating structural change to driving it.
- As emissions from steel, cement and aluminium production have fallen mainly due to weaker demand, the Ministry of Industry and Information Technology should reinstate suspended capacity replacement requirements; the Emissions Trading Scheme should adopt declining absolute caps with less free allocation of permits; and the State-owned Assets Supervision and Administration Commission of the State Council and public procurement at the central and local levels should guarantee demand for low-carbon outputs.
- The Ministry of Science and Technology should direct research towards green technologies that are not yet feasible at scale, and the Ministry of Commerce should pair critical minerals security with recycling and cooperative supply arrangements.

Finance

- Finance will deliver the investment push that the green growth opportunity requires; China's challenge here is reallocation rather than mobilisation.

- The People's Bank of China and policy banks should extend the Carbon Emissions Reduction Facility model beyond renewable generation to industrial decarbonisation, grids and frontier technologies.
- The Ministry of Finance should redirect China's US\$270 billion a year in explicit fossil fuel subsidies, a figure that rises by up to 10 times once implicit costs are counted.
- Supervisory benchmarks, taxonomies and the state's role as both a regulator and a shareholder should redirect lending by state-owned commercial banks.

Environment and natural resources

- Environment and natural resources policy should treat the natural world as productive infrastructure.
- The Ministry of Ecology and Environment should extend the effort that achieved a 40% reduction in particulate pollution since 2014 to remaining pollutants, poorer regions and harder-to-electrify industrial processes.
- The Ministry of Natural Resources and the National Forestry and Grassland Administration should mainstream ecosystem accounting into planning and fiscal allocation.
- Adaptation must be planned alongside mitigation and embedded in decisions on infrastructure. Adaptation investments yield median benefit-cost ratios of 4:1.

Local government

- Local government should lead industrial decarbonisation, since manufacturing accounts for two-thirds of emissions and is largely regulated and implemented at the local level.
- Central direction needs to build in regional differentiation, with environmental indicators weighted as heavily as economic ones, transfers to coal-dependent provinces linked to their renewable potential, and coordination that turns regional competition into national capability.
- Zero-carbon industrial parks are a promising vehicle for industrial decarbonisation, as they host 80% of China's factories.

Research

- Research underpins all these efforts. Sustained public support is needed for work on climate impacts and their distribution, the technologies the harder-to-electrify sectors require, and the economics of systemic change, alongside the skills the transition will demand.

1. Introduction: the need for a roadmap

This policy insight provides a basis for the development of the policy roadmap needed for China's green growth opportunity. It applies the conceptual and universal framework of the growth opportunity to China's context, translating broad ideas into practical policy recommendations. It serves to complement, not replace, Chinese expertise. It is a starting point for dialogue with Chinese policymakers and other experts.

China's decarbonisation is both a defining force in the global transition and a vision for its own green and prosperous future. This vision is attainable, and it is *the* growth opportunity of the 21st century, one that effective climate policy can unlock. As part of this growth story, China's dual carbon goals of reaching peak emissions by 2030 and carbon neutrality by 2060 can and should be accelerated. The 2035 Nationally Determined Contribution (NDC) target of reducing emissions by 7–10% from their peak can be exceeded, in line with Xi Jinping's own ambition of "striving to do better" (Xi, 2025). Accelerating decarbonisation is not a constraint on growth. In fact, it is central to the growth opportunity. China can both decarbonise faster and grow its economy on sustainable terms. Seizing this opportunity requires continued efforts to scale up clean technologies and green the broader economy. These efforts will be the primary drivers of growth and will require clear, coordinated policy direction to succeed. The green growth opportunity should, therefore, be an integral part of policymaking across government bodies.

We demonstrate why and how decarbonisation provides China with a growth opportunity that meets its short- and long-term socioeconomic development needs. This captures how green industries are already important drivers of growth in China and how decarbonising the broader economy can extend this growth to more sectors. We build on previous work by Nicholas Stern, Zhu Min and others on how China can embrace a new paradigm of green development (Zhu et al., 2023).

We provide an outline of the policies needed to seize this growth opportunity. Our approach is to offer a broad policy blueprint for Chinese decision-makers, addressing the 'who does what, and why' questions across government functions. We are deliberately comprehensive, reflecting the economy- and society-wide nature of the transformation in question. Building on outcomes of our consultation with Chinese experts in academia and government, future work will expand the analysis in greater depth, including through sub-sector reports and annual updates to the roadmap. These efforts will seek to inform key moments in the Chinese policy cycle, such as the Dual Sessions, the NDC drafting process and Five-Year Plans.

2. The green transition as a growth opportunity: applying a universal concept to China

This section builds the conceptual foundation for the policy insight. It summarises Nicholas Stern's work on the green growth story in his 2025 book *The Growth Story of the 21st Century* and earlier work with Zhu Min on its applicability to China, before mapping these ideas onto China's own policy ambitions, such as its NDC, the 15th Five-Year Plan, its consumption targets, and the concept of New Quality Productive Forces. China is already demonstrating that decarbonisation and growth are complementary, and this section traces those successes. It also identifies the challenge ahead: actively reducing emissions is distinct from halting the rise in emissions, requiring different strategies. The transition from building out green industries to decarbonising the broader economy marks a pivot in policy ambition and, therefore, in concrete policy action. The section closes by situating China's green growth opportunity in its global context.

China's decarbonisation matters beyond the sheer quantity of its emissions; its clean technology leadership can help other countries seize the growth opportunity. And other countries' transitions can create demand for the clean technologies China leads on, supporting its growth and deepening partnerships. This global green growth opportunity is greater than the sum of its parts.

The logic and principles of the growth story

The model of growth and development on which the global economy has relied for the past two centuries is showing its limits. It is dirty, resource-intensive and destructive. It is driving the climate and biodiversity crises, putting the world at grave risk. The mounting costs in pollution, ill health and climate risk are increasingly visible (Intergovernmental Panel on Climate Change, 2022), damaging economies, lives and livelihoods. Future risks are severe and, for many, existential.

The world finds itself at a critical juncture, facing the choice between continuing on the current, destructive path or embracing a better one. The idea behind a new growth story for the 21st century is that the investment, innovation and structural change required to address climate change itself constitutes a new and more attractive model of growth – one built on clean technology, resource efficiency and productive systems. This growth story counters the perceived trade-off between growth and climate action. In this story, climate action drives growth. The case for urgency and the case for opportunity together underpin, as Stern (2025) shows, the growth story of the 21st century.

The conceptual framework behind this growth story lies in its six driving forces, which operate individually and in interlocked ways. The most immediate are, first, falling costs and, second, increasing returns to scale. Climate action drives investment in clean technologies, accelerating learning curves that reduce costs across the energy system, a fundamental input into every sector of the economy. As clean industries expand, fixed costs are spread, networks deepen and clusters of activity raise productivity well beyond the clean energy sector. Together, these forces make the clean economy self-reinforcing: the more it grows, the cheaper and more productive it becomes. The cost of solar power has fallen by nearly 80% in the past decade (Walter et al., 2025). Wind and battery costs have fallen by nearly 60% and over 80%, respectively, in the last decade (ibid.). As of 2025, renewables plus storage costs are cheaper or have reached parity with fossil fuels across major markets, including new coal in China (Energy Transitions Commission, 2025).

Decarbonisation also demands a reorganisation of the economy's key systems, which provides further drivers of growth. The third driving force is the increased resource efficiency that comes with this reorganisation. Investment in resource efficiency – which means doing more with less energy, material and waste – is investment in productivity, with gains that compound across sectors. The fourth driving force pertains to system productivity. Redesigning energy, transport,

urban, land and water systems around clean technologies creates economies that are more interconnected and less wasteful than those built around fossil fuels.

The fifth driving force is the elimination of fossil fuel combustion, which removes one of the leading causes of premature death and chronic illness (World Health Organization [WHO], 2024), producing healthier, more productive populations and reducing the economic drag of healthcare costs and lost working time. Underpinning all these driving forces is the sixth: a substantial increase in investment. The transition requires sustained, large-scale investment in new infrastructure, industries and capabilities, adding directly to productive capacity, crowding in private capital and enabling every other driver to operate at speed and scale. Investment is central to seizing the green growth opportunity.

The energy transition is vital to decarbonisation and the green growth story, and has far-reaching effects across systems and the broader economy. Investment in adaptation, nature and a just transition are equally important and interconnected dimensions of the opportunity. Investment in adaptation builds resilience against climate impacts, protecting infrastructure, lives and livelihoods. Therefore, investment raises output relative to a world in which these impacts go unmanaged.

Furthermore, investing in adaptation can yield the 'triple dividend' of additional economic, social and environmental co-benefits (Surminski and Tanner, 2016). Adaptation can produce substantial economic returns, with a recent meta-analysis finding median economic benefit-cost ratios of 4:1 for adaptation investments globally, with higher ratios of 5:1 in developing countries (Rising et al., 2026). Investment in natural capital operates similarly: by avoiding the degradation of ecosystems on which economic activity depends, it also protects productivity and development over the long run. Both are as much investments in future growth as they are acts of risk management. The green growth opportunity also requires investment in people and places.

Economic dislocation, such as the loss of jobs in carbon-intensive industries or the restructuring of regions built around fossil fuels, is an inevitable feature of the transition. Managing it well is a condition for sustaining public support across a broad base, which is vital to seizing this economy-wide growth opportunity. Taken together, investments across all these dimensions are investments in physical, human, natural and social capital, all of which generate and protect value and growth (Stern, 2025).

This opportunity will not seize itself. It will require active policy from an active state, redefined for the task. Climate change reflects a collection of market failures beyond just the well-documented greenhouse gas externality. These must all be addressed, and not only with carbon pricing. The role of the state in this process should be to shape markets, set incentives, reduce uncertainty and create the conditions in which private investment and entrepreneurship can drive the transition. Overarchingly, active policy should be organised around the central vision and clear direction of the green growth story, embedded in mandates across government functions.

Embracing the growth story is the defining challenge and opportunity for all countries. Stern (2025) identifies five forces that facilitate this. First, global savings are abundant relative to planned investment, particularly in the developing world, and provide fertile ground for the expansion of investment in decarbonisation and growth. Second, technological change is accelerating, causing costs to fall across an ever-wider range of sectors. Third, international recognition of the scale of the challenge, despite the difficulties of coordinated action, is deepening. Fourth, younger generations, who understand what is at stake most acutely, are becoming an increasingly powerful force for delivery. And, fifth, the private sector is mobilising, as firms recognise that the investment opportunity of this century lies in decarbonisation and the green growth path.

For China, the challenge is real, given the size of its economy and population, and its need to transition to a greener model of development. But China is also particularly well-placed with respect to both the six driving forces and the five forces above. The country's technological

leadership, state capacity, domestic market scale and investment mobilisation all point in the same direction. A sustainable, resilient and inclusive path of development is within reach.

China and the growth story

The green growth story requires a re-evaluation of the development model at the centre of the Chinese economy. China's traditional infrastructure- and export-driven model delivered an extraordinary four-decade miracle, sustaining average GDP growth of around 10% per year between 1978 and 2012 (World Bank, 2025a). But these drivers are now structurally depleted. Property and related sectors, which in 2021 accounted for around 25% of GDP, have been slowing (Rogoff and Yang, 2024). This is an opportune moment to commit fully to a new model of growth – all the more so given that China's economy is expected to more than quadruple in size by 2060 (Zhu et al., 2023), making the choice of development paradigm one of the most consequential decisions to be made. While achieving pure GDP growth targets, a green growth story should simultaneously emphasise the quality of growth and broader dimensions of wellbeing.

The green growth story, underpinned by carbon neutrality, represents a paradigm shift that goes beyond a mere energy transition away from fossil fuels. In China, fossil fuels still account for around 80% of energy consumption (IEA, 2026), while manufacturing is responsible for around 25% of GDP (World Bank, 2025b) and, when indirect emissions are included, around two-thirds of national carbon emissions (Zheng et al., 2024). This means that the transformation required is economy-wide. As Zhu et al. (2023) put it, the transition demands a rethink of the fundamental purpose of development: what to produce, how to produce it and how to measure success. Achieving carbon neutrality will require an estimated 174 trillion yuan (around US\$28 trillion) in cumulative energy investment between 2022 and 2050 (Chang et al., 2022), a signal of how profound a shift this will be.

There are unique challenges and advantages for China in implementing this shift in development strategy (Zhu et al., 2023). The challenges are considerable. China must decouple economic activity from carbon while continuing to grow, meaning that energy efficiency and emissions intensity will need to improve dramatically even as total energy demand rises. Unlike developed economies, where services account for 60–80% of output, China's economy is geared towards industry and manufacturing. Concurrently, unlike many of its developing-country peers, China engaged in decades of heavy industrialisation that built up an enormous capital stock, which must now be decarbonised. And China's vast territory, diverse regional dynamics and significant inequality across its population mean that managing a fair and inclusive transition is another massive task that compounds an already complex structural transformation.

The advantages, however, are equally distinctive. China's government has an unparalleled capacity to coordinate systematic change in a national development strategy. This is a decisive asset for a transition that demands economy-wide action at speed and scale, particularly given the abundant savings the country can channel into productive investment. China's domestic market, which includes more people than those of Europe and the US combined, creates the conditions for clean technologies to be developed, scaled and commercialised faster than anywhere else. Through regulation and administration, the Chinese government can directly ensure the alignment of the private sector with green growth. And its strong foundation in digital technology and artificial intelligence provides a powerful accelerant for low-carbon development across sectors. This will be a story of green *and* intelligent growth (Stern, 2025). These advantages are already serving China well and positioning it as a leader in clean technologies.

China's successes in green growth

Applied to China, the green growth story operates through multiple channels, many of which are already active. The scale-up of clean technologies is a measurable driver of Chinese growth. In 2025, China's green industries grew by 18%, accounting for around 40% of China's growth rate (5% of GDP), and made up over 10% of the entire economy (Myllyvirta and Shaepe, 2026). As China's broader industrial base matures and traditional manufacturing slows, value-added

dynamism will be concentrated in clean technology. Within the 'new three' – electric vehicles (EVs), batteries and solar photovoltaic (PV) – China has moved from assembler to integrated manufacturer to technology pioneer, capturing an increasing share of the value embedded in what it makes (International Energy Agency [IEA], 2024). This shift is visible in its export footprint, too: in 2024, China produced 80% of the world's solar PV modules and battery cells, and 70% of its EVs (Ember, 2025).

The structural shift already underway is visible in the energy system and the job market alike. In 2025, coal power generation in China fell for the first time since the 1970s, as record clean energy additions of over 300 GW of solar and 100 GW of wind (Ember, 2026) were enough to meet rising demand without coal (Myllyvirta, 2026a). Coal mining employment has more than halved since its 2013 peak (Davidson, 2024), as the old model of modernisation has retreated. However, coal mining is a source of economic and fiscal strength in provinces such as Shanxi, which was home to over 850,000 coal mining workers in 2022, and in labour-intensive mining regions such as Henan and Guizhou (Davidson, 2024). As we discuss below, managing coal's decline while supporting the growth of new industries is one of the central requirements of a coordinated and balanced transition.

Air quality is another front on which China has had visible success. Thanks to a sustained effort beginning in 2014, particulate pollution levels have fallen by around 40% since then (Air Quality Life Index [AQLI], 2025a), adding an estimated two years to the average life expectancy (AQLI, 2025b). Beijing saw the largest gains: a 55% reduction in pollution and nearly four years added to life expectancy (ibid.). This is a tangible aspect of the green growth story: cleaner air reduces the drag of ill-health on productivity, raising human capital across the economy and, ultimately, driving growth. Complementary measures, such as the expansion of cycling and walking infrastructure, have had similar spillover benefits for health and productivity. The gains are real, but the task is unfinished. China remains among the 20 countries with the highest levels of air pollution in the world (AQLI, 2026), with pollution of more than five times the level deemed safe by WHO guidelines cutting average life expectancy by 2.2 years (AQLI, 2025b). This, too, is an area where accelerating decarbonisation can deliver further dividends, and thus where the green growth story has room to run.

Another reason to seize the green growth opportunity lies in the avoidance of climate risks. The costs are already accumulating and will continue to undermine growth. China's average surface temperature rose by 0.31°C per decade between 1961 and 2024, faster than the global average, with 2024 as the warmest year since records began (Xu, 2025). Extreme weather is intensifying alongside warming, which has consequences for public health, the electricity system and agriculture, among other economic activities. Summer 2022 saw 79 consecutive days of extreme heat across central and eastern China, with over 440 meteorological stations breaking historical records (Song and Tandon, 2025). In 2023, heatwave deaths rose by 309%, and work hours lost by 24% relative to the 1986–2005 average (Cai et al., 2024). The risks extend to food security: rising temperatures and more frequent droughts threaten yields of China's staple crops: wheat, maize and rice (Shaw et al., 2022). The severity of these risks creates an imperative that sits alongside the growth opportunity. As China accounts for one-third of global emissions, it is arguably the country most in control of its own climate. With the changes to China's climate comes the need for adaptation and resilience measures, which need to be part of a green growth strategy.

The scale of China's clean technology success and tangible productivity gains, combined with the structural shift already underway in the energy system and the severity of climate risks, make a compelling and grounded case for fully seizing the green growth opportunity. China can build on its current momentum. The role of the state and of policy should be to act as accelerants of what is already underway.

China's ambitions and targets

China's policy direction and national ambitions are already interwoven with core ideas of the green growth opportunity, such as the complementarity of development and decarbonisation, the

centrality of investment and innovation, and the vision of a productive and sustainable economy. They are discernible both in the targets China has set and in the broader vision it has articulated. Current targets for the Chinese economy create an imperative for growth. China's 2035 economic vision implies sustained growth of around 4.17% per year (Reuters, 2025). As discussed, the old and depleted economic model is unlikely to achieve this level of growth. Such growth must come from somewhere new, and China's own policy framework points to where.

China's latest NDC committed to reducing net economy-wide greenhouse gas emissions by 7–10% from peak levels by 2035. The country can likely exceed that target, as economy-wide and energy sector models show that a ramped-up policy approach could achieve reductions in the range of 20–40% (Energy Foundation China, 2025). This is also intuitively feasible: China installed 434 GW of renewables and 66GW of storage capacity in 2025 (Fogarty, 2026; Shaw, 2026). At that pace, power sector emissions would fall by at least 30% by 2035 even at current rates of growth in energy demand (Centre for Research on Energy and Clean Air [CREA], 2024). The 15th Five-Year Plan, and its nearer-term targets of a 17% reduction in carbon intensity and a 10% reduction in energy intensity over 2026–30, provide further grounding for ambitious renewable energy deployment. Xi Jinping's ambition of "striving to do better" could be realised.

China's consumption ambitions reinforce a similar logic. The 15th Five-Year Plan places domestic consumption at the centre of China's growth strategy, aiming to raise household incomes, expand social welfare and reduce inequality. A consumption-led model is less energy-intensive and more structurally compatible with a low-carbon trajectory than the current growth model. Growth in services, green products and clean mobility is a lever of both development and decarbonisation.

The concept of New Quality Productive Forces pulls these threads together. China's policy framework of high-technology, innovation-led and resource-efficient growth encompasses much of the green growth story. Senior policymakers have made this connection explicitly: for example, China's Vice-Minister of Finance has described the green transition as the core of the high-quality development agenda (Jiang, 2026).

Translating this vision into practice requires clear guiding principles. Five such principles have been set out for the Chinese context (Zhu et al., 2023). The first principle is to design the national carbon neutrality strategy around a broader and deeper understanding of growth, one that reflects the full paradigm shift in the development model and the need for economy-wide change. The Chinese leadership must articulate this vision with a clarity that allows for coherent and mutually reinforcing implementation across local governments and central government departments alike.

Relatedly, the second principle is to embed this paradigm within China's existing '1+N' policy architecture. The '1', the overarching guidance from the Chinese Communist Party's Central Committee and State Council, must reflect the green growth vision so that the full cascade of sectoral and regional 'N' plans is designed around the new development model. Coherence from the centre outwards will be crucial to drive economy-wide structural change.

The third principle concerns the role of markets. As carbon neutrality is a public good, the government must actively create the conditions for its delivery. This will include building a social consensus on the goal of carbon neutrality and the growth story, alongside investment in the development of new technologies. Once these enabling conditions are established, markets are a powerful mechanism for efficient resource allocation and for driving the innovation and deployment that the transition requires. The private sector has both the capacity and the incentive to invest in the green growth opportunity, provided policy creates sufficient clarity and predictability. Carbon pricing is also important, and should involve a multidimensional approach that combines emissions trading with carbon taxes and derivative markets (Zhu et al., 2023). Relying on a range of mutually reinforcing instruments, including standards and regulation, addresses the multiple market failures at play (Stern, 2025). If the role of government is to set the destination and the rules of the road, then the role of markets and the private sector is to find the most rapid, efficient and innovative way to get there.

Finally, there is the principle of ensuring that the transition is secure and balanced. Economic and social dislocation is inevitable. Workers will be displaced, regional economies strained and assets stranded across the financial system. Managing this well is a matter of fairness. It is also a condition for sustaining the political support on which the entire transition, and thus growth, depends. Moreover, a balanced transition is not only about managing costs (Zhu et al., 2023). Actively managing the transition turns a potential source of instability into a further source of growth. For example, the regions most exposed to coal phase-down – Shanxi, Inner Mongolia and Shaanxi – are also rich in renewable energy resources (Zhu et al., 2023). Building the new before dismantling the old is both economically efficient and politically viable.

This set of principles reflects China's own strategic logic, which is embedded in its targets, policy architecture and development vision. The green growth opportunity and China's national ambitions have commonalities to be harnessed. The task is to move with clarity and ambition towards further implementation of enabling and accelerating policies.

From peak emissions to reductions: a different challenge

China's emissions likely peaked in early 2024, or have at least plateaued since then (Myllyvirta, 2026b). But halting the rise in emissions and reducing them are different challenges requiring different strategies. The decarbonisation behind this shift has been driven largely by the energy sector, where record renewables deployment has begun to crowd out coal in power generation. Each phase of the transition adds new policy challenges on top of existing ones: the tools that delivered the electricity transition are necessary but not sufficient for what comes next (Markard and Rosenbloom, 2022). Systematic reduction requires extending decarbonisation across the full economy, and the sectors that remain are progressively harder to abate.

The different levels of difficulty in decarbonising can be grouped into three broad categories (Turner, 2026). The first, accounting for around 60% of global greenhouse gas emissions and Chinese emissions, covers activities that are already electrified or that can be electrified at low or zero cost, including buildings, road transport and low-to-medium-temperature process heat in industry. For these sectors, clean electricity is the primary decarbonisation tool, and the economics of it are already compelling.

The second group, accounting for around 25% of global emissions and 30% of China's,¹ covers sectors where electrification is difficult or not yet technically feasible at scale, such as long-distance transport and heavy industry. This reflects the heavy-industrial structure of China's economy, where steel, cement, chemicals and aluminium production account for a greater share of output than in most economies. These sectors have often been called hard-to-abate, but they might be more precisely called hard-to-electrify. Decarbonisation of them currently carries a green cost premium, but this will likely fall as technology advances.

The final category, accounting for a further 15% of emissions globally and 10% of China's, covers agriculture and land use, where less than 10% of activities can be electrified and there is no clear technological pathway to changing this. The technological challenge for these sectors is to find solutions to biological processes, such as reducing methane from livestock and nitrous oxide from fertiliser, and improving the efficiency of photosynthesis. The first two categories, in contrast, deal with the relatively simple technological challenges of harnessing the physics of photons and electrons, and the chemistry of heavy industry (Turner, 2026).

Each of these categories, therefore, demands different tools and a different logic of intervention: from deployment policy at the bottom, through investment and pricing mechanisms in the middle, to frontier, long-term R&D at the top. It is a move from just growing a thriving green

¹ Shares calculated based on Climate Watch (2026) data for 2023 for both global and Chinese emissions, and allocated to Turner's (2026) three categories. Global estimates differ slightly from Turner's owing to methodological and data differences, notably the treatment of electricity-sector emissions, which Turner reallocates to end-use sectors.

industry to propelling the deeper structural change needed to address the distinct challenges of economy-wide decarbonisation.

At present, China has an ‘all of the above’ energy strategy, deploying all available energy resources while relying on clean energy’s continued outperformance to suppress the growth of fossil-fuel usage (Mylylyvirta, 2026b). This reflects both energy security concerns and the logic of a phased transition in which fossil fuels retain a stabilising role in the near term. President Xi Jinping has simultaneously called for the high-quality development of new energy while simultaneously affirming that coal-fired power remains China’s energy foundation (Xinhua, 2026). As utilisation rates have shown signs of decline recently (2023–25), coal is increasingly shifting from serving the role of baseload energy provider to one of providing system flexibility and security (Yang, 2026). This trend has been reinforced by a growing number of flexibility retrofits (ibid.). And although it may be a rational posture for a country managing supply risks in a volatile global energy environment to continue relying on coal, it does not yet embody a systematic reduction strategy. Clear policy differentiation across the broad sectors in which decarbonisation is needed should be part of the shift. The displacement that the expansion of renewables promises depends on critical power-system reforms. Continued acceleration and success in clean electricity penetration hinge on a well-functioning national electricity market, with interprovincial trading and dispatch, on grid planning built around variable generation, and on remuneration that rewards storage, demand response and coal plants for the flexibility they provide rather than the energy they supply. Without these factors, the mechanism through which clean electricity can displace fossil fuels will remain incomplete.

The investment required for the green growth opportunity is substantial and front-loaded. The lower-hanging fruit of transport and buildings, for example, requires the deployment of capital now to avoid locking in high-carbon assets that have decades-long operational lifespans. Hard-to-electrify sectors such as industry, aviation and agriculture require patient, long-term investment in technologies that are not yet cost-competitive, and sustained R&D commitments that markets alone will not deliver. But China’s challenge is distinct here, too: with gross fixed capital formation running at around 40% of GDP (World Bank, 2025c), roughly double the rate in advanced economies, China does not need to find new sources of investment so much as redirect existing ones (Stern, 2025). The financial system, state-owned enterprises and the public budget already channel investment on a large scale. The policy task is in ensuring those flows are directed towards clean technologies where the returns are already clear, and towards harder-to-electrify sectors where the investment case has yet to mature (Bhattacharya et al., 2025). The earlier such reallocation begins, the better the economics of action.

The case for moving at scale and pace is well-founded. A stepwise acceleration of decarbonisation through ambitious target setting, including the Five-Year Plans, is not only possible but consistent with trends in energy consumption and carbon intensity (Qi et al., 2020). Chinese climate experts broadly expect China to overachieve on its 2035 NDC target (CREA, 2025). The scale of the country’s ambition is illustrated by the fact that it could hit this target with only half the annual installation of renewables capacity it achieved in 2025 (Patel and Evans, 2025). Some estimates find that maintaining the current pace of renewables deployment would deliver a 30% reduction in CO₂ emissions by 2035 (CREA, 2024). And, as indicated above, economic energy models compiled by Energy Foundation China (2025) show that the country is likely to achieve 30–40% of non-fossil fuels in total primary energy by 2030, significantly more than its target of 25%. The challenge is one of policy coherence across sectors and levels of difficulty, ensuring that China’s demonstrated capacity for deployment is directed at the full economy, and that the transition from peak emissions to reductions is actively pursued rather than left to momentum alone.

The global importance of China’s decarbonisation

China’s decarbonisation matters well beyond its borders and the arithmetic of its own emissions. The speed and scale at which China grasps the green growth opportunity will shape decarbonisation trajectories globally.

The most immediate channel of impact is price. China's dominance of the 'new three' technologies – solar PV, batteries and EVs – has driven down the cost of clean technology to a point where the global transition is, meaningfully, being subsidised by Chinese state support and Chinese manufacturing scale (Jackson and Larsen, 2026). Deploying existing Chinese solar supply would reduce global emissions by 15% by 2030 (IEA, 2023). The development of the technologies that drive growth has been powered by China's deployment volumes. Both global solar installation and EV purchasing benefit from cost reductions made possible by China.

Beyond the price dimension, China's investment in clean technology manufacturing across the world, which totals more than US\$250 billion over the past four years, creates direct green growth opportunities in host countries, building industrial capacity and supply chains that propel their own transitions (Xue and Larsen, 2025). Furthermore, China's engagement in international forums, ranging from the United Nations Framework Convention on Climate Change to multilateral development banks, can shape the ambition and architecture of global climate governance. Involvement in more informal, coalition-based multistakeholder initiatives on specific aspects of decarbonisation is also important in making global progress. For example, the People's Bank of China was a founding member of the Network for Greening the Financial System (NGFS, 2017). More recently, China launched and co-chairs the Open Coalition on Compliance Carbon Markets, alongside Brazil and the EU (European Commission, 2026).

As other countries pursue their own green transitions, they create demand for the clean technologies on which China leads, deepening the commercial case for further Chinese investment and innovation, and creating the conditions for partnerships that benefit both sides. The global green growth opportunity is, in this sense, greater than the sum of its parts: countries' decarbonisation strategies are mutually reinforcing, with progress in one economy lowering costs for all, building confidence and creating positive tipping-point dynamics elsewhere.

This virtuous dynamic of mutual benefits and acceleration is not automatic. China's dominance of clean technology supply chains also generates geopolitical friction, leading to tariffs, local content requirements and protectionist responses that risk slowing the global transition. The tension between the cheapest route to decarbonisation and geopolitical competition has a bearing upon international climate governance (Jackson and Larsen, 2026). Managing this tension well through cooperation rather than fragmentation is as much in China's interest as in that of others. The green growth opportunity is greatest when pursued together.

3. Outline of a policy roadmap for decarbonisation

Having set out the green growth framework and how it applies to China, this section turns to the practical policy implications: a policy roadmap for decarbonisation. It is grounded in the understanding that active, well-directed state policy shapes the environment in which markets and the private sector can drive decarbonisation forward quickly and on a large scale. The roadmap outlined below is intentionally brief, with the intention of providing the basis for detailed discussions with policymakers and experts in each policy area. These discussions will provide a basis for extensive research to determine the specific policies that are needed. Ultimately, this will provide a detailed roadmap for China's green growth opportunity.

The state's role in this transition goes beyond correcting market failures. It requires setting the direction of the economy, aligning investment and creating the institutional conditions in which innovation can flourish and deployment can accelerate (Stern, 2025). China holds a key advantage in its effective state capacity. It has an ability to coordinate across government functions, mobilise investment and implement policy at speed and scale that few other countries can match. That capacity is an asset. And the roadmap is, in part, a guide to deploying it.

Effective decarbonisation policy operates on both sides of the economy. On the supply side, policy must drive the deployment of clean technologies and the development of new ones. On the demand side, it must shift consumption patterns, raise the cost of carbon-intensive choices and create markets for green products and services. The two sides need to operate in concert.

An economy-wide transition requires, by definition, policy that reaches across all sectors, underpinned by cross-cutting systems that enforce the direction of travel. These include accurate carbon accounting to provide the information base and emissions tracking at the level of enterprises, regions and government departments. It also means a green finance system that mobilises and directs the capital that the transition requires. And support for the innovation ecosystem can accelerate the movement of new solutions from the laboratory to deployment.

As outlined above, different sectors face different levels of difficulty in decarbonising. Each category requires a different policy approach, and the roadmap reflects this necessary sequencing.

In a country of China's scale and internal diversity, the geographical dimension of the transition, both domestic and international, demands explicit attention. Centrally designed policy must be implemented by local governments whose fiscal structures, industrial compositions and resource endowments vary. This interaction between central direction and local delivery will be a decisive factor in the transition's pace and equity. Beyond China's borders, deep integration into global supply chains, a dependence on imported raw materials and a growing role as the exporter of clean technology all shape the decarbonisation challenge and the opportunities it presents.

The roadmap covers the following policy areas, which are derived from but not identical to the overarching areas in Zhu et al. (2023): strategic planning and coordination; industry, technology and trade; finance; environment and natural resources; local government; and research. We address each in turn, outlining the action needed, its purpose, how it differs from current policy, and the government bodies responsible for delivery.

Policy areas

1. Strategic planning and coordination

Policymakers need to conduct long-term planning and ensure that policy action is coordinated between all government bodies. This is needed to create a stable, credible and predictable policy environment that public and private actors can make long-term decisions within. Such an

environment is critical given that green growth requires near-term actions that produce returns over the longer term. This includes, for example, investment in grid expansion and power generation, as well as in R&D on new green technologies. Green hydrogen is a prime example of this, since it requires planning and coordination to ensure consistent policy support on the supply side and commitments to using the fuel on the demand side.

A suitable way to make the green growth opportunity core to economic planning is to coin an official term that can be used as a slogan in public documents and communications. This is aligned with existing terms used in similar ways, such as the New Development Concept (2015), Dual Circulation (2020) and New Quality Productive Forces (2023). The emphasis on “green development” throughout strategic documents that reference these terms can be used as the basis of a new term that specifically characterises such a transition as a growth opportunity. This term should reflect how the new approach differs from those that have come before, emphasising that greening all sectors of the economy is a priority rather than the development of green industries alone.

China’s existing governance structure provides the system through which planning and coordination for green growth can take place. These efforts should be undertaken throughout this hierarchical system, with continuous input from bottom to top. The concept of the green transition as a growth opportunity needs to be the central principle behind all central planning. At the highest level, the Central Financial and Economic Affairs Commission is chaired by Xi Jinping and sits within the Chinese Communist Party’s Central Committee. Strategies and plans developed here need to place the green growth opportunity at their core. At the next level down, a key body is the Leaders Group on Carbon Peak and Carbon Neutrality, which sits directly below the Central Committee. As the top-level body in the operationalisation of planning on the green transition, the Group plays a key role in coordinating government bodies’ actions by assigning tasks to them. All such actions need to view environmental sustainability through the lens of the economic growth imperative. Within such high-level coordination, the National Development and Reform Commission (NDRC) works to operationalise plans, designing how the economy can develop while organising and coordinating actions between government bodies. At the next level down, several bodies coordinate by economic sector. For example, the National Energy Agency is the NDRC body that coordinates these actions in the energy system.

2. Industry, technology and trade

Industry, technology and trade are three levers that shape the productive economy: what gets made, how it gets made and how it connects to the world. They each have their own decarbonisation challenges and their own methods of decarbonisation – and China is moving in the right direction across all three. In this, the main task is to shift the underlying posture of policy from simply accommodating change to driving it. Directive policy in these areas defines the goal and uses the full toolkit of industrial, technology and trade policy to achieve it. The key government bodies here are the Ministry of Industry and Information Technology (MIIT), the Ministry of Science and Technology (MOST), the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) and the Ministry of Commerce (MOFCOM). Each one leads in its own domain, while the green growth opportunity requires them all to be pulling in the same direction.

Industrial policy has been successful in propelling the ‘new three’ to global leadership (Jackson and Larsen, 2026). Policymakers are now turning their attention to steel, cement and aluminium, with the expansion of the Emissions Trading Scheme (ETS) to these sectors. The *2025–26 Work Plan for Stabilizing Growth in the Steel Industry* published by MIIT signals modernisation through electric arc furnaces and hydrogen metallurgy, supported by ultra-long-term special government bonds and loans (MIIT et al., 2025; Xinhua, 2025). But, so far, emissions reductions in heavy industry have come primarily from falling demand rather than from deliberate decarbonisation (CREA, 2026). China’s policies need to not just accommodate the contraction of heavy industry but also actively drive its transformation. In these harder-to-electrify sectors, decarbonisation technologies exist but carry a green cost premium (Turner, 2026). By themselves, markets will not

choose the more expensive option at the pace and scale required. However, directive industrial policy can close that gap. This means, for example: reinstating the capacity replacement requirements that were suspended in 2024, to allow for the installation of new capacity in steel that is based on electric arc furnaces or hydrogen (Transition Asia, 2024); accelerating and strengthening the move towards absolute emissions caps in the ETS, implementing them with a stringent declining trajectory, expanding coverage and reducing free allocation of permits (CREA, 2024); and using the state's procurement power and SASAC's oversight of state-owned enterprises to create guaranteed demand for low-carbon industrial outputs at scale (Climate Bonds Initiative, 2025).

It is not yet technically feasible to produce at scale the technologies that will define the harder-to-electrify tiers of decarbonisation, such as long-duration energy storage, low-carbon cement chemistries and agricultural innovation (IEA, 2021; Systemiq, 2023). China's research capacity is substantial but has focused on promoting innovation connected with manufacturing clusters and supply chain integration (Hove, 2024). This kind of R&D remains crucial, but the harder-to-electrify sectors require sustained public investment in fundamental research, with long horizons and high failure rates. MOST, working through the State Key Laboratories, universities and the state-owned enterprise research institutes, must direct China's research capacity towards the genuine frontier of addressing challenges with currently limited technological solutions.

Critical minerals such as lithium, cobalt, nickel, copper and rare earths are the inputs on which clean technology manufacturing depends. China dominates the global refining of 19 of 20 strategic minerals with around 70% of all processing capacity (IEA, 2025). Recent export controls on rare earths and lithium-ion battery supply chains have demonstrated the strategic weight of this position (IEA, 2025), but defensive tools have limits. They do not address China's dependency on imports of the raw materials it refines (Snoussi-Mimouni and Avérous, 2024). One constructive route towards doing so involves scaling recycling, which both reduces import dependence and tightens the system productivity that sits at the heart of the green growth story. MOFCOM's task is to translate these elements into a coherent international posture: securing supply through partnerships, scaling recycling and embedding China's manufacturing leadership in a cooperative system.

3. Finance

Finance is the mechanism through which to make the investments at the heart of the green growth story. The aim is to ensure that there is adequate public financing on appropriate terms for the long-horizon investments the transition requires, and to catalyse private capital alongside it. China's distinctive position of having high investment rates and substantial state financial capital is an advantage in efforts to achieve this. The organising principle in these efforts should focus on reallocating financing from carbon-intensive to green investment. As the economy and financial system grow, this changes both the structural allocation and nominal amount of financing in China. The institutional architecture for doing so is well-developed, and green finance is one of the five major financial pillars supporting Chinese modernisation (People's Bank of China [PBoC] et al., 2016).

The PBoC and policy banks (the China Development Bank, the Export-Import Bank of China and the Asian Development Bank) must reduce the cost and lengthen the tenor of capital available for the transition investments that commercial markets will not make. The Carbon Emissions Reduction Facility has demonstrated the model, supporting over US\$150 billion in lending and serving as a reference point for green central banking internationally (Larsen and Jackson, 2026; Waite, 2022). The principle must now be extended beyond renewable generation to industrial decarbonisation, grid infrastructure and the frontier technologies on which the harder-to-electrify tiers of decarbonisation depend.

The Ministry of Finance (MoF) must direct fiscal resources towards the public goods that markets undersupply – including research, networks and the infrastructure on which the broader transition relies – and to the incentives and procurement that crowd in private capital alongside them.

Ultra-long-term special government bonds, which China already uses to support the modernisation of the steel sector, are an example of this. The same instrument can be extended to grid expansion, public charging infrastructure and frontier research. Public procurement, like industrial policy, can convert fiscal demand into early markets for low-carbon outputs. In this context, the MoF needs not only to deploy new fiscal resources but to redirect existing ones. China's fossil-fuel subsidies bill is the largest in the world, at US\$270 billion in explicit subsidies in 2022, rising to US\$2.2 trillion, or 12.5% of GDP, with the inclusion of implicit subsidies such as unpriced climate and air-pollution externalities (Black et al., 2023). Similarly, there are a range of environmentally harmful subsidies in sectors such as agriculture and fisheries that are actively obstructing decarbonisation and that, once redirected, would constitute some of the largest fiscal levers in the world (Damania et al., 2023). It is within the MoF's reach to phase these subsidies out and reallocate the freed-up resources towards clean and nature-positive investment.

The National Financial Regulatory Administration (NFRA) and the China Securities Regulatory Commission must build the supervisory and informational infrastructure on which reallocation depends. These translate national low-carbon objectives into binding expectations of financial institutions, and into the disclosure standards and taxonomies through which capital markets price climate risk. The state's dual role as a regulator of and shareholder in the major state-owned banks gives it genuine reach in this. The Green Finance Endorsed Project Catalogue and the recently updated corporate sustainability disclosure framework have established the foundations of such an initiative (United Nations Environment Programme Finance Initiative, 2025). The task now is to extend coverage to the full range of transition activities, including harder-to-finance sectors in which credible information is especially important.

Operationally, reallocation happens through state-owned commercial banks. The Industrial and Commercial Bank of China, the China Construction Bank, the Agricultural Bank of China, the Bank of China and the Bank of Communications provide most of the credit in the economy, and cost-of-capital adjustments, fiscal incentives and supervisory standards set elsewhere take effect only when they change the lending decisions of these banks. Their green lending should continue to outpace overall credit growth, and their exposure to carbon-intensive sectors should decline against defined supervisory benchmarks. As China's green finance taxonomy broadens to cover transition activities, so does the scope of what counts as green lending, giving the supervisory benchmark more influence on reallocation. The NFRA and PBoC have begun building expectations of such a shift through the Implementation Plan for High-Quality Development of Green Finance (2025). This plan needs to be deepened and enforced, drawing on the state's dual role as a regulator of and shareholder in these five banks (Yang et al., 2026).

4. Environment and natural resources

By ensuring that investment has a central role in the green growth story, China can reframe the protection of the environment and natural resources as a productive activity, not just a protective drag on growth. This story rests on investment in four types of capital: physical, human, social and natural (Stern, 2025). Each generates and protects economic value over the long run. Environmental policy needs to reflect this. For instance, reforms of water and land systems are key to delivering green growth.

The Ministry of Ecology and Environment (MEE) must continue to tighten environmental regulations covering air, water and soil, with its standards calibrated to deliver productivity gains alongside a better quality of life. The 40% reduction in particulate air pollution in China since 2014 has demonstrated that this can be achieved at scale (AQLI, 2025a). The next step is to extend the process to other pollutants, less developed regions and harder-to-electrify industrial processes.

The Ministry of Natural Resources (MNR) and the National Forestry and Grassland Administration (NFGA) must manage China's broader natural capital as productive infrastructure. That means measuring it, valuing it and integrating it into economic planning. Provincial pilots of Gross Ecosystem Product accounting are an example of such an approach (Lan et al., 2024). An important next step is to mainstream this in planning, assessment and fiscal allocation decisions.

Adaptation should be framed in a similar way. Investment in adaptation protects future output and the productive base of the economy. China's significant exposure to climate impacts such as heat, flooding, drought and agricultural disruption makes adaptation equally central to the growth agenda. Therefore, adaptation must be planned alongside mitigation and the energy transition, paying explicit attention to where climate risks threaten people and productive capacity, such as agriculture, water systems, infrastructure and major urban areas exposed to extreme weather. The MEE, the MNR and the NFGA should work with the NDRC and the MoF to embed climate risk in infrastructure planning and fiscal allocation. Many adaptation investments deliver mitigation benefits, too, and many development investments deliver both. For example, restoring mangroves protects coastal communities from flooding while sequestering carbon, while restoring degraded land raises agricultural productivity and builds up soil carbon stocks (Stern, 2025).

China's natural capital and climate resilience are shaped by what happens beyond its borders as much as by what happens within them: shared ecosystems, transboundary climate risks and global commodity flows mean that domestic policy alone cannot secure them. Continued engagement in international processes and agreements relating to nature, adaptation and climate more generally are central to China's efforts to maintain its own growth trajectory.

5. Local government

The direction of China's green growth is set at the highest level, but its delivery depends on the industrial transformation and investment undertaken by provincial, municipal and county governments. Translating the central government's ambitions into local action is the operational backbone of the transition. Central direction must build in regional differentiation and align incentives so that the sum of differentiated local action delivers on the national ambition.

Performance indicators are a key way of translating central directives into such action. China increasingly uses environmental indicators to measure the performance of provinces, municipalities and even individual officials. An important step in that direction was taken in April 2026 with the Comprehensive Evaluation and Assessment Measures for Carbon Peaking and Carbon Neutrality issued by the Politburo Standing Committee (MEE, 2026). In this, it is important to ensure that these environmental variables are weighted as much as other economic and social indicators.

China's regions are in vastly different positions from which to embrace the green growth story. Coal-producing areas such as Shanxi, Shaanxi and Inner Mongolia face the structural transformation of their entire industrial base (Hove, 2024; Zhou and Zhang, 2026). Coastal provinces such as Zhejiang, Jiangsu and Guangdong will need to decarbonise advanced manufacturing and other industries. Inland and western provinces hold the country's largest renewable energy resources and will be required to transmit electricity to eastern demand centres (Yang et al., 2025). These challenges and opportunities differ, and the strategic direction set at the top must be differentiated accordingly. The transition can be a regional development opportunity as well as a national growth story.

Fiscal flows must support the regions undertaking the most disruptive transitions (Zhu et al., 2023). Coal-producing provinces are fiscally dependent on declining industries. Without fiscal support from the central government, the transition will impose its highest costs on the regions least able to bear them (Zhu et al., 2023). Vertical transfer payments from the central budget and horizontal compensation mechanisms between provinces – particularly those recognising that coal-producing regions bear the environmental costs of energy consumed elsewhere – must be expanded and explicitly linked to the renewable energy potential of these regions. Such transfers are particularly critical given the fiscal constraints from high debt levels at the local level.

Competition between regions has been a feature of China's economic dynamism. Without coordination, however, it produces duplication and overcapacity, resulting in the destructive price competition at the firm level that the central authorities describe as 'involution' in the EV and battery sectors. The green growth opportunity rests on productive, system-enhancing investment,

not on duplicated headline projects competing across provinces in the same flagship industries. Stronger central coordination must channel local dynamism towards investments that aggregate into national capability rather than offset each other. This requires clearer signals on where capacity is needed, reformed local incentive structures and cross-provincial coordination mechanisms.

The layered structure of Chinese governance provides the architecture through which to deliver a differentiated transition. As discussed, it is ultimately local governments that will need to implement policies to decarbonise China's manufacturing base, which accounts for two-thirds of emissions. Doing so requires these governments to take on an active and ambitious role in the transition.

Pilot zones are one of China's distinctive institutional levers for local experimentation. The Low-Carbon City Pilot Policy, the ETS pilots that preceded the national system and Ecological Civilisation Demonstration Zones all illustrate how local experimentation generates the evidence base for national policy. China should extend pilot zones across the more difficult areas of the transition, such as industrial decarbonisation, agricultural innovation and biodiversity governance.

Net zero or green industrial parks are a promising model for such expanded local efforts. Industrial parks account for around 30% of China's carbon emissions, 50% of the value of its industrial output and 80% of its factories (Gao, 2023). Therefore, they are a central locus for decarbonisation. Net zero industrial parks enable local governments to tackle energy, industrial and supply-chain decarbonisation simultaneously, while also serving as testbeds for emerging technologies and engines of industrial upgrades (Li et al., 2026). Some provinces have already moved towards this model. For example, Shandong issued one of the earliest full assessment frameworks for near-zero-carbon parks, as did Inner Mongolia with its zero-carbon park construction standards (*ibid.*).

The central government framework has now followed suit, with the NDRC, MIIT and NEA jointly setting standards and launching an application process for establishing national zero-carbon parks. The government selected 52 parks in a first batch in late 2025, with a target of creating around 100 parks during the period covered by the 15th Five-Year Plan (Liu and Yang, 2025). The decisive next step is for local governments to redesign existing parks and plan new ones as integrated low-carbon systems, with energy supply, industrial structure, transport and carbon accounting reinforcing one another within a single park (*ibid.*). These parks show the great potential of improving the functioning of Chinese cities as systems that drive green growth.

While central direction is crucial for achieving green growth, local governments treating decarbonisation as a core part of their development mandate is fundamental to turning the green-growth vision into an operational reality.

6. Research

The research base on which good policy depends also needs continued investment and government support. China will only be able to translate the universal framework of the green growth story into a reality at home through a deep understanding of its own conditions, institutions and constraints. That understanding will come, in part, from the work of the research community. China's universities, network of state research institutes and growing community of government think-tanks together provide a large research capacity. Directing that capacity towards the climate challenge, and the growth opportunity embodied in it, is one of the levers to employ. The following intertwined areas of research require financial support from the government.

Research on climate impacts and their distribution remains a priority. Continued work on how the physical impacts of climate change occur across regions, sectors and populations, and on the adaptation responses they require, is needed both to inform domestic adaptation policy and lend an impetus to efforts at mitigation. The China Meteorological Administration, the Chinese

Academy of Sciences and universities have a central role to play here; their findings should feed directly into policy on adaptation and natural resource management.

Research on the harder-to-electrify sectors constitutes a technological frontier on which further innovation in the natural sciences remains crucial. It is not yet technically feasible to implement, at scale, the technologies that will define the next phase of decarbonisation, such as long-duration storage and low-carbon cement chemistries. Chinese scientific capacity and state research institutes can play a leading role in addressing the technological and cost challenges in such areas.

Research in economics and other social sciences also remains important. As Stern (2025) argues, conventional economic frameworks have often missed the dynamic, system-wide character of the green transition, such as the interactions between investment, innovation, learning and structural change that drive this growth opportunity. Priority areas of research include the meaning of wellbeing beyond GDP, the determinants of sustainability and the analytics of structural, systemic and technological change. China's universities and government think-tanks should be supported in developing this research with strong links to policy.

Investing in people is itself part of the research agenda. Enhancing human capital enhances productivity and growth. The workforce of the next phase of decarbonisation will require new skills across engineering, environmental science, finance and policy, and China's universities, vocational institutes and training programmes must adapt accordingly.

The research effort should be closely connected to policy action. The Chinese Academy of Sciences, major universities and government think-tanks should be embedded in the policy process, aligning research priorities with the strategic direction of the growth story and with the realities of provincial and local governments implementing the transition. Such integration is already common in policymaking, but it is particularly critical with regard to the green growth opportunity given the interdisciplinary nature of the issue. International collaboration on research across all these areas is also needed. The climate challenge is global, but the knowledge required to address it is often local, and the two must inform each other.

4. The way forward

China has made substantial progress on the green transition, but the next phase of the transition poses a different challenge. As the task shifts from halting the rise in emissions to reducing them across the economy, policy must shift in line with this. The solution to the challenge that this shift poses is to approach the green transition as a growth opportunity. Policy action must align more deliberately with the green growth opportunity that has already begun to drive Chinese growth, but which requires an active state to push it forward. Besides achieving pure GDP growth targets, this approach entails an emphasis on the quality of growth encompassing many dimensions of human wellbeing. We have set out the logic of that opportunity and its application to China's own development trajectory. Our policy roadmap builds on the momentum already gathered, identifying the priority areas where directive policy can fully seize the opportunity in the years to come.

The road ahead is not yet entirely paved. As policy is implemented, lessons will emerge on how best to enact the structural change that shifts the economy towards decarbonisation. Future work building on this policy insight will elaborate specific policies in each area and develop sector-by-sector analyses, creating a coherent picture of this change. Our work will ideally feed into key moments in the policy cycle, including the Dual Sessions, NDC drafting and Five-Year Plans. This is an economy-wide transformation, and it can deliver the growth story of the 21st century.

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