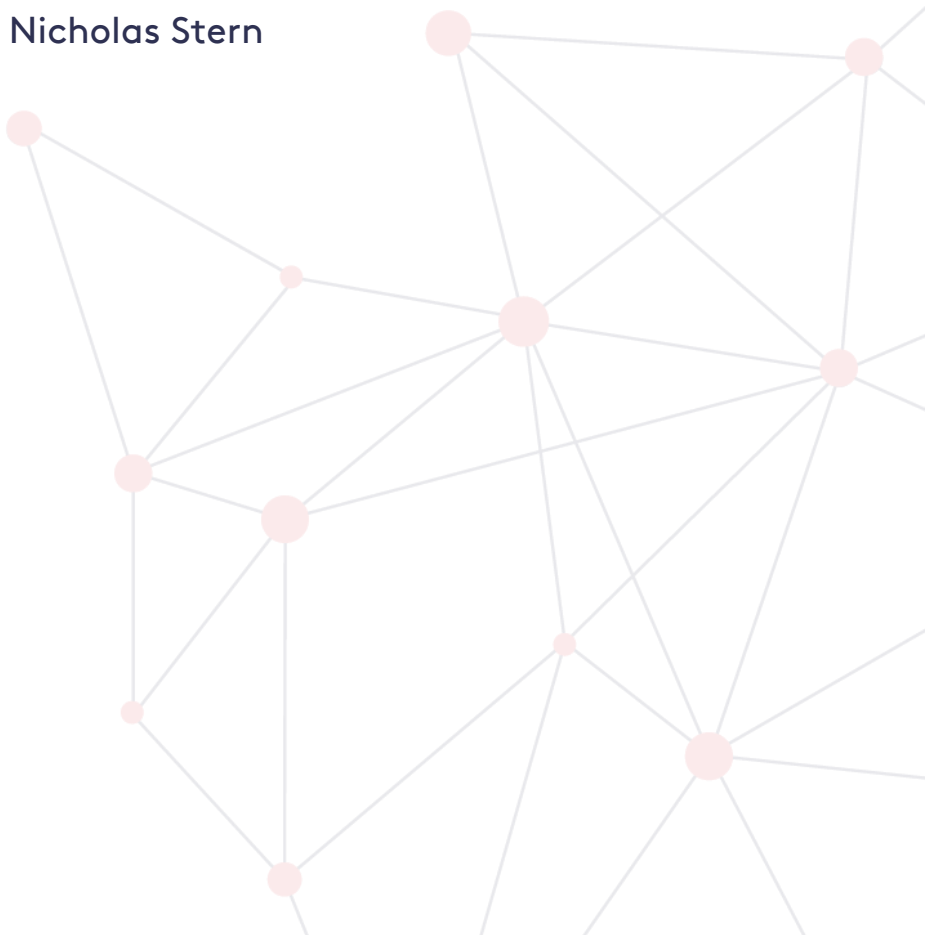

Resilient growth for China in a turbulent world

How a triple logic of clean, secure
and cheap can drive the country's
economy

Mathias Larsen, Yanxi Zhou and Nicholas Stern

Policy insight

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Summary

Geopolitical instability increases the urgency of the low-carbon transition

Geopolitical turbulence does not weaken the case for green growth: it reinforces it – for China and around the world. Rising uncertainty takes nothing away from the economic logic of decarbonisation while creating a strategic imperative, grounded in achieving energy security, industrial competitiveness and supply-chain resilience, to reduce greenhouse gas emissions. Therefore, a triple logic of clean, secure, fair and cheap, as embodied by green technologies, can underpin resilience in China's economy and sustain growth despite global instability. This logic points towards an effort to exceed official climate targets rather than merely meeting them.

The underlying growth opportunity rests on falling costs and increasing returns to scale in clean technology, efficiency gains that compound across sectors, improvements in public health that result from a decline in fossil-fuel combustion, and a large rise in investment. Renewables combined with battery storage are already the same price or cheaper than fossil fuels in major markets. As a consequence, geopolitical instability changes the urgency of the transition rather than its direction.

Structural uncertainty and the advantages of renewables over fossil fuels

The World Economic Forum identifies geoeconomic confrontation as the most frequently cited near-term global risk, with 68% of the experts it surveys expecting further fragmentation of the multipolar order and only 6% the restoration of the post-war multilateral system. The International Monetary Fund has revised global growth projections down from 3.4% in 2025 to 3.1% in 2026; around 55 developing countries are in or near debt distress; US average effective tariffs rose from 2.4% to 9.6% in 2025; and armed conflict is at its highest level since the Second World War.¹

Fossil fuels are not the answer to that instability: the arguments in their favour fail on grounds of stability, cost and onshoring. Three-quarters of the world's population live in countries that are net fossil-fuel importers, with every US\$10 rise in the oil price adding roughly US\$160 billion to global import costs. In 2024, 91% of new utility-scale renewable capacity was cheaper than the cheapest new fossil-fuel alternative, with the price of solar plus storage at US\$54–82 per megawatt hour compared with over US\$100 for new gas. Domestic production offers little shelter from these costs, since prices are set globally. For example, expansion of oil drilling in the North Sea would save UK households £16–82 per year, far less than the £105–441 per year they would save on a renewables and electrification pathway.²

China's investment in green growth is embedded in its 15th Five-Year Plan

For China, this reasoning is long-established. In 2003, with roughly 80% of the crude the country imports passing through the Strait of Malacca, the Chinese leadership identified this vulnerability to fossil-fuel imports as the 'Malacca Dilemma'. China has since developed this recognition into a wider doctrine of supply-chain resilience. Earlier this year, following the outbreak of the US–Iran war and the resulting disruption of Middle Eastern oil flows, President Xi Jinping described China's early investment in wind and solar as "forward-looking". Such investment is often state-directed and coordinated across all 31 Chinese provinces, municipalities and autonomous regions, in line with the 15th Five-Year Plan's targets of a 17% cut in emissions intensity and an increase in the use of non-fossil fuels to 25% of total consumption by 2030. By adopting an approach to economic development based on green growth, China can both expand the economy and reduce emissions faster than these targets suggest.

¹ Figures from WEF (2026); International Monetary Fund (2026); Baqaee et al. (2025).

² Figures from Ember (2024); IRENA (2025a); Lazard (2025).

In the power sector, coal serves as a stabilising backup while China scales up clean capacity. The country's coal utilisation rate fell from 60% in 2011 to 48.2% in 2025, and is projected to decline to around 32% by 2035. Renewables accounted for around 80% of incremental demand growth in 2024, and 75 gigawatts of storage was added in 2025. As power transmission remains the main constraint on efforts to reduce China's reliance on coal, the country should prioritise interprovincial trading of the kind that facilitates the high uptake of renewables in Europe. In transport, electric vehicles accounted for 42% of new registrations in 2024 at broad price parity, reducing fuel consumption by around 430,000 barrels of gasoline per day.³

Beyond electrification, China produces about half the world's renewable hydrogen, which has applications in steel, fertiliser and shipping fuels. Hydrogen's material dependencies differ in kind from fossil fuels, as they are embedded in infrastructure up front rather than continuously purchased.

Clean industries are becoming macroeconomic stabilisers in China, contributing around 40% of additional growth in recent years and thereby offsetting a downturn in the property market that reduced GDP by roughly two percentage points per year. Chinese investment of US\$227 billion in green projects across 53 countries extends the same logic abroad: with importing economies often more exposed to fossil fuels than China, international cooperation remains the cheapest route for all.⁴

To summarise, through deliberate industrial policy, sustained investment and the exploitation of scale, China has built a clean energy economy that is simultaneously cheaper, more secure and more dynamic than the fossil-fuel system it is replacing. The macroeconomic stability provided by clean industries reflects the fact that renewable energy, battery manufacturing and electric vehicles have a structural role to play in building stable and sustainable growth engines, which are underpinned by high investment intensity, steep learning curves, deep supply-chain linkages and expanding export markets.

China's international collaboration follows the same logic. The country's low-carbon foreign direct investment extends its industrial strategy to markets where there is great demand for clean technology, an acute dependence on fossil fuels and significant cost advantages in buying Chinese products. For recipient countries that are more exposed to volatility in fossil-fuel prices than China itself, this cooperation offers the cheapest available route to energy security and affordable power. The policy implication for both China and its partners is, therefore, the same: deepening the green transition is the strategy most consistent with growth, stability and resilience in an era of geopolitical turbulence.

³ Figures from Wood Mackenzie (2026); National Energy Administration of China (2025).

⁴ Figures from Xue and Larsen (2025).

1. Introduction: the need for green growth amid geopolitical uncertainty

This policy insight demonstrates that geopolitical turbulence does not weaken the case for green growth – it reinforces it. The economic rationale for decarbonisation remains intact, while rising geopolitical uncertainty adds a further strategic imperative centred on energy security, industrial competitiveness and supply-chain resilience. Green growth should, therefore, be understood not as a constraint on economic development but as a driver of innovation, productivity and long-term competitiveness (Stern, 2025). In this sense, the green transition can maintain growth even during periods of global instability. Furthermore, such an approach can support President Xi Jinping’s ambition to “strive to do better” (Xi, 2025) and can help China quickly surpass its official climate targets. Numerous modelling exercises show that decarbonisation can achieve this without sacrificing growth (Energy Foundation China, 2025).

We set out the foundations of resilient growth in China, showing how using green technologies follows a triple logic of clean, secure and cheap that can underpin resilience in the economy and drive growth in an era of geopolitical uncertainty. Since this logic applies globally, we also explore the concepts of resilience and green growth by considering examples from other countries. Future work will examine each of their components in greater depth. The aim is to strengthen the analytical basis for policymaking and to deliver concrete recommendations in specific policy areas, timed to coincide with key moments in the Chinese policy cycle. We provide a starting point for a dialogue with Chinese policymakers and other experts who focus on how to pursue resilient growth in practice. The triple logic that underpins resilient growth is an opportunity for China today, but achieving it will take sustained work over the coming years.

2. How geopolitical uncertainty shapes the green growth opportunity

Globally, the prevailing model of economic growth is reaching its limits. It is dirty and resource-intensive, increasingly leading to pollution, ill health and climate risk. The central idea of green growth is that the investment, innovation and structural change required to address climate change together constitute a new and more attractive model of growth. This model is built on clean technology and resource efficiency, with climate action driving growth rather than constraining it (Stern, 2025).

This opportunity is underpinned by four interlocking forces: falling costs and increasing returns to scale in clean technology (such as solar, wind and batteries); efficiency gains that compound across sectors; improvements in public health and productivity caused by the elimination of fossil-fuel combustion (World Health Organization, 2024); and a large-scale increase in investment that adds directly to productive capacity.

The cost of renewables plus storage is already at or below that of fossil fuels across major markets. The opportunity will not seize itself. It requires active state policy to correct market failures, shape investment and manage the social dimensions of the green transition. But the direction is clear, and the economic logic is self-reinforcing: the more the clean economy grows, the cheaper and more productive it becomes (Stern, 2025).

An era of geopolitical turbulence

The global economy has entered a period of unusually high geopolitical and economic instability. The World Economic Forum (2026) identifies geoeconomic confrontation as the near-term global risk that is most frequently cited by the experts it surveys, describing current conditions as the most severe since the beginning of the Davos process. Trade fragmentation, financial instability, armed conflict, volatile fossil-fuel prices, climate disruption and weakening multilateral cooperation increasingly interact with one another, creating pressures that reshape the environment in which climate and development policy operate.

Meanwhile, global economic conditions are weakening. The International Monetary Fund (IMF) revised projected global growth downward from 3.4% in 2025 to 3.1% in 2026, warning that the outlook remains “highly uncertain” (IMF, 2026: 177). Emerging markets and developing economies (EMDEs) are expected to face particularly severe slowdowns due to the combined effects of tariffs, debt burdens, commodity-price volatility and constrained fiscal space (IMF, 2026). Debt vulnerabilities have become increasingly acute: around 55 developing countries are either already in debt distress or at high risk of entering it, significantly reducing their capacity to finance structural transformation or climate transition investments (Gray Group International, 2026).

Trade and investment relationships are being rapidly reconfigured as geopolitical tensions intensify. Economies such as members of the Association of Southeast Asian Nations (ASEAN), Brazil and India are simultaneously strengthening ties across competing geopolitical blocs, indicating a shift towards more fragmented and multipolar trade networks (McKinsey Global Institute, 2025). At the same time, trade policy uncertainty has reached historic highs. In 2025, the US introduced sweeping reciprocal tariffs that increased its average effective tariff rate from 2.4% to 9.6%, the highest level in nearly 80 years (Baqaei et al., 2025). These developments signal a broader shift away from stable globalisation and towards a more contested international economic order.

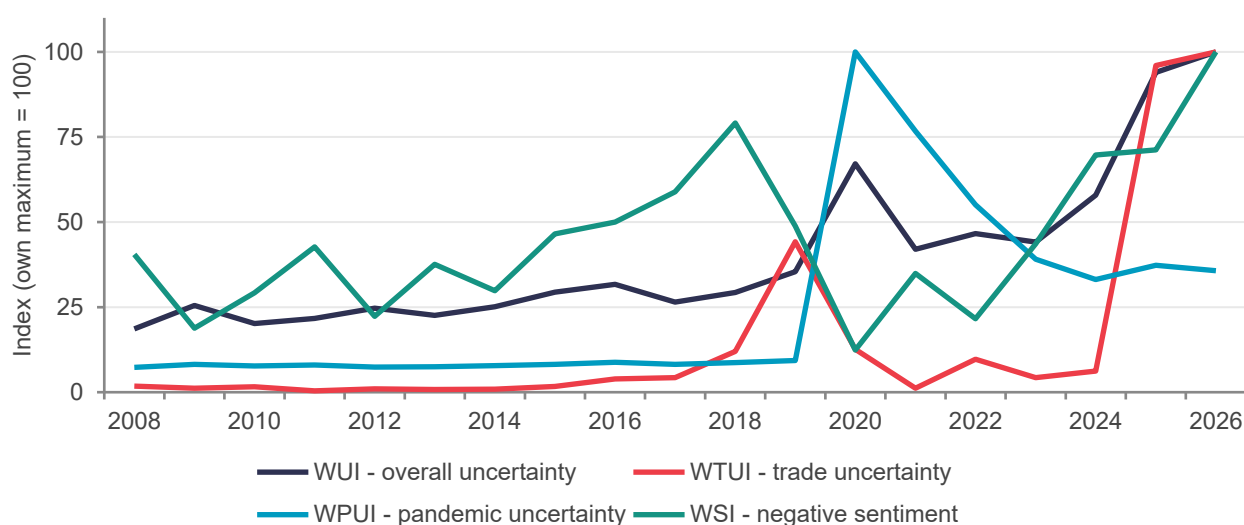
At the same time, armed conflict has intensified sharply, reaching its highest level since the Second World War. By late 2025, there were 61 active conflicts involving 36 countries, with conflict-related deaths rising to approximately 223,000 in 2024 alone, a 25% increase compared to the previous year (Armed Conflict Location & Event Data Project [ACLED], 2025). At a conservative estimate, more than 204,000 individual conflict events occurred between November

2024 and November 2025, resulting in over 240,000 deaths (ACLED, 2025). The resurgence of large-scale conflict has reinforced concerns around energy security, supply chains, commodity access and political fragmentation.

Climate risks are simultaneously intensifying. Global average temperatures reached approximately 1.55°C above pre-industrial levels by the end of 2024, making it the hottest year on record, while global greenhouse gas emissions climbed to 57.1 gigatonnes of carbon dioxide equivalent (GtCO_{2e}) in 2023 – around 16 GtCO_{2e} above a pathway compatible with limiting warming to 1.5°C (United Nations Environment Programme Finance Initiative [UNEP-FI], 2024). Climate change is, therefore, no longer a future risk but an immediate source of systemic instability that affects food security, migration, infrastructure and economic resilience.

These developments are contributing to historically high levels of uncertainty in multiple dimensions. The Global Risks Perception Survey evidence from the World Economic Forum shows that 68% of experts worldwide expect the geopolitical environment to become increasingly fragmented and multipolar over the coming decade, while only 6% believe the post-war multilateral order is likely to be restored (World Economic Forum, 2026). Quantitative indicators point in the same direction. The World Uncertainty Index (Ahir et al., 2022) has remained elevated in successive quarters, suggesting a structural rather than temporary shift in the global information environment. Overall, trade uncertainty has emerged as the dominant driver, with the World Trade Uncertainty Index rising proportionally faster than broader uncertainty measures (Figure 1). This reflects the growing centrality of trade disruption to inflation, supply chains, growth prospects and geopolitical competition. Policy uncertainty increasingly reflects instability in the rules, institutions and agreements that previously underpinned the global economic system.

Figure 2.1. Trends in the World Uncertainty Index



Source: Ahir et al. (2022). Note: each series is normalised to its own historical maximum (100 = series peak).

Why green growth is the answer to geopolitical uncertainty

Some commentators argue that geopolitical turbulence strengthens the case for expanding fossil fuel production. However, such claims are flawed on three fronts: stability, affordability and onshoring. In fact, recent crises have demonstrated that fossil-fuel dependence often increases exposure to geopolitical disruption, price shocks and systemic instability. By contrast, green growth, which includes scaling up renewables, storage and electrification, provides a more durable pathway to energy security and economic resilience. This transition also shifts part of the risk from continuous fuel dependence towards material and technology risks that can be managed through diversification, recycling, substitution, strategic stocks and domestic manufacturing. Below, we consider each claim in turn.

The instability of fossil fuels in turbulent times

The first claim is that fossil fuels offer a more stable and reliable source of energy during turbulent times – but recent experience suggests the opposite. Fossil-fuel systems are highly vulnerable to geopolitical shocks because supply chains depend on internationally traded commodities. Around three-quarters of the world's population live in net fossil-fuel-importing countries, meaning that oil and gas price spikes rapidly translate into wider economic vulnerability. This is why every US\$10 per barrel increase in oil prices raises global net import costs by an estimated US\$160 billion annually (Ember, 2024). The Russia–Ukraine war illustrated this vulnerability clearly, as disruptions to Russian gas supplies triggered severe energy price shocks across Europe (Hille and Angerpointner, 2025). More broadly, geopolitical tensions can delay investment, disrupt production and increase energy-price volatility (Yasmeen and Shah, 2024).

Unlike oil and gas, which are often routed through contested straits and politically volatile regions, renewable energy resources are geographically distributed and harder to blockade, embargo and weaponise (Green Central Banking, 2026). Moreover, for renewable energy, supply chain risks linked to geopolitical uncertainty can be managed through diversification, efficiency improvements via technological innovation, and the expansion of domestic manufacturing capacity. Most importantly, renewables involve a one-time, upfront investment in infrastructure rather than the continuous flow entailed by fossil fuels. Importantly, the primary energy input for renewables is domestically available, such as sunlight and wind, which cannot be embargoed.

While clean tech supply chains are concentrated around China, they are increasingly diversifying as Chinese companies invest in manufacturing outside the country (Xue and Larsen, 2025). Furthermore, renewables combined with storage reduce this exposure because they rely primarily on domestically available energy flows rather than imported fuels. According to the International Renewable Energy Agency (IRENA), the use of renewables allowed countries to collectively avoid an estimated US\$467 billion in fossil-fuel costs in 2024 alone. Meanwhile, advances in grid management are undermining the argument that renewables are inherently unreliable. Smart grids, demand-response systems, advanced forecasting and grid-forming inverters now allow electricity systems to balance variable renewable generation more effectively (Tsaousoglou et al., 2024; Kroposki et al., 2017; Adetokun et al., 2023).

Energy storage plays a particularly important role: modelling for California shows that pairing storage with renewables can reduce curtailment from roughly one-third to below 10% while simultaneously lowering emissions (Arbabzadeh et al., 2019). This effect has been expanded as the costs of storage are falling and the storage market is rapidly scaling up. Off-grid renewables deployment is also accelerating globally, particularly in solar-based systems in developing regions (IRENA, 2026b), making renewable energy a more reliable source for most people. For example, in terms of both cost and reliability, the 600 million–800 million people who lack access to electricity would be far better served by decentralised solar plus storage than by grid extension or diesel generators (Bautzer, 2025).

Cheaper alternatives to fossil fuels

Another claim is that fossil fuels remain the cheapest source of energy. This is increasingly inconsistent with current market evidence. Solar is already the cheapest way of generating electricity in most parts of the world, while solar plus battery is the cheapest source of round-the-clock renewable electricity (Turner, 2024; 2026). The apparent affordability of fossil fuels often depends on externalised environmental and health costs, as well as the absence of carbon pricing. Once carbon costs are included, fossil-fuel generation becomes substantially less competitive (Lazard, 2025).

At the same time, the economics of renewables and battery storage have improved dramatically over the past decade. According to IRENA, in 2024, 91% of newly commissioned utility-scale renewables capacity generated electricity at a lower cost than the cheapest newly installed fossil-fuel alternative. Solar photovoltaic costs have fallen by 87% since 2010, onshore wind by 55%, and battery storage by 93% (IRENA, 2025a). Battery Energy Storage Systems have become one of the

fastest-growing technologies in the power sector, with installation costs having fallen to around US\$192 per kilowatt hour by 2024 (IRENA, 2025b). These trends are reshaping the comparative economics of electricity systems. Solar plus storage projects in the US now generate electricity at around US\$54–82/MWh, while wind plus storage ranges from US\$59–94 per megawatt hour (MWh). By comparison, new combined-cycle gas turbines cost around US\$102/MWh, while gas peaking plants can cost as much as US\$149–251/MWh (Lazard, 2025). In many regions, renewables are, therefore, no longer simply a climate solution; they are increasingly the lowest-cost option for new electricity generation.

The limits of domestic fossil-fuel production amid geopolitical uncertainty

A third argument is that countries can shield themselves from geopolitical instability by increasing domestic fossil-fuel production. However, fossil-fuel markets remain globally interconnected, meaning that even energy-producing countries are exposed to international price shocks. For instance, a key policy question in the UK's energy market concerns whether increasing production from its remaining North Sea oil and gas reserves would help reduce household energy bills. There is evidence that the potential savings would be significantly lower than those achievable through a renewables-led energy transition (Schroeder et al., 2026). Estimated annual household savings from North Sea fiscal revenues range from £16 to £82 (around 1–5% of a typical dual-fuel bill), compared with £105 to £441 (around 6–25%) on a renewables and electrification pathway (ibid.).

The US also provides a clear example: despite being largely energy self-sufficient, domestic gasoline prices have surged during the current conflict in the Middle East because oil prices are determined in global markets. This is why gasoline prices in Texas have risen by more than 25% in the period, sometimes increasing more sharply than in certain oil-importing economies (*The Straits Times*, 2025). US-marketed natural gas production averaged 120.2 billion cubic feet per day in the first quarter of 2026, a 4% increase compared with the same period in 2025. The US Energy Information Administration (2025) expects production growth to continue throughout 2027, driven in part by rising associated natural gas volumes as stronger crude oil prices encourage oil production.

Fossil-fuel infrastructure is also inherently vulnerable to supply disruptions, as it depends on continuous fuel extraction, transport and trade flows, while most renewables infrastructure operates differently, relying only on freely available natural resources. Once solar panels, wind farms or batteries are installed, they can continue to facilitate energy production for decades even if international trade or fuel supply chains are disrupted (IRENA, 2023). Electrification further strengthens resilience by encouraging a diversified domestic energy supply. For instance, countries can substantially reduce their exposure to imported fossil fuels by expanding EV batteries as distributed storage, developing heat pumps to avoid gas shortages and pipeline failures, and increasing the portion of renewable electricity in their energy mix. Meanwhile, electric systems are more efficient: they waste less energy when rapidly responding to supply changes. Electric vehicles (EVs) convert 85–90% of energy into motion, and a gas boiler converts at most 94% of fuel into heat; a heat pump delivers 200–400% (expressed as coefficient of performance, which means that for every unit of electricity consumed, a heat pump moves two to four units of heat energy from the outside air or ground into the building). Some estimates suggest that large-scale electrification could reduce fossil-fuel import bills by as much as 70%, providing a long-term buffer against geopolitical volatility (*The Straits Times*, 2025).

Taken together, these trends suggest that responding to geopolitical uncertainty by doubling down on fossil fuels is unlikely to improve long-term energy security or economic stability. Indeed, the evidence increasingly points in the opposite direction: countries that accelerate clean industrial development and renewable energy deployment, electrification and storage are likely to become more resilient against geopolitical shocks. This logic applies globally, including in China, where green technologies are increasingly central not only to decarbonisation but also to industrial competitiveness, energy security and long-term economic strategy.

3. Growth and resilience in China: clean, secure and cheap economic development

China's capacity to pursue the green growth opportunity

China's strong institutional, industrial and policy advantages ensure that it is well-positioned to pursue green growth, even in conditions of geopolitical uncertainty. The green transition aligns closely with the country's existing economic, industrial and energy-security objectives (Zhu et al., 2023). China's state-led political economy enables long-term strategic coordination, large-scale infrastructure investment and rapid industrial mobilisation in ways that many market-led economies struggle to replicate.

One key advantage lies in the Chinese state's ability to direct investment and other forms of finance towards strategic sectors. High levels of state-directed investment as a share of GDP allow China to accelerate the deployment of clean-energy infrastructure and clean technologies, and implement industrial upgrades and transitions, at scale. This capacity is reinforced by strong policy coordination across national and subnational governments. All 31 provinces, municipalities and autonomous regions have now released or completed subnational Implementation Opinions and Action Plans for halting the rise in CO₂ emissions. In many cases, provincial targets exceed national ambitions, particularly in areas such as renewable energy deployment and carbon-intensity reduction, creating the possibility of bottom-up overachievement of national climate goals.

Across China, such policies are increasingly organised around a common set of green growth levers, which include reducing coal dependence, controlling oil consumption, stabilising natural gas supply and rapidly expanding non-fossil energy sources (State Council of the People's Republic of China, 2024). Provincial strategies also prioritise industrial energy efficiency, industrial upgrades and the development of emerging green industries, alongside green buildings, low-carbon urban renewal, EVs and sustainable transport systems. Green finance, low-carbon technology innovation and pilot demonstration projects are also becoming central pillars of regional development policy. Together, these measures indicate that China is integrating decarbonisation into broader industrial modernisation rather than treating it as a separate environmental agenda.

Importantly, green growth is increasingly embedded in China's overarching economic and strategic planning framework. The country's updated Nationally Determined Contributions (NDCs) are expected to cover all economic sectors and greenhouse gases, aligning more closely with its target of achieving carbon neutrality by 2060. The overarching strategy goes beyond emissions reduction alone and reflects a broader transformation of the energy system. Simultaneously, China is advancing a dual-control system covering both total carbon emissions and emissions intensity, alongside sectoral decarbonisation efforts across buildings, industry, transport and the power system. Accounting for one-third of global emissions, China has more power to shape its own climate than any other country. Hence, the more ambitious China's climate mitigation efforts are, the more resilient it will become – since this will reduce the impact of climate change.

At the same time, the most recent 15th Five-Year Plan reaffirms the direction of travel: the Plan targets a 17% cumulative reduction in CO₂ emissions intensity between 2026 and 2030, and aims to increase the share of non-fossil energy in total energy consumption to around 25% by 2030 (State Council of the People's Republic of China, 2026). The Plan emphasises the need for the "safe, reliable and orderly" (State Council of the People's Republic of China, 2026) replacement of fossil fuels with non-fossil alternatives and for maintaining a diversified energy mix that includes wind, solar, hydro and nuclear power. It also proposes a ten-year action plan to double non-fossil energy capacity, expand coastal nuclear and offshore wind bases, strengthen distributed energy

systems, and improve the efficiency of the remaining fossil-fuel infrastructure through coal retrofits and cleaner utilisation.

In this context, geopolitical uncertainty does not fundamentally alter China's development trajectory; rather, it strengthens the strategic rationale for accelerating it. Green growth supports multiple core national objectives simultaneously: energy security, industrial competitiveness, technological leadership, economic upgrades and long-term resilience (Stern, 2025). For China, therefore, the main implication of the current geopolitical turbulence is not to reverse decarbonisation but to increase the urgency and strategic value of accelerating the transition, exceeding the pace currently embedded in China's NDC commitments and national economic strategies.

Energy security amid geopolitical uncertainty

Among the various pressures created by geopolitical instability, energy stands apart as uniquely critical for both economic growth and national security. Unlike many other strategic inputs, energy underpins every sector of the economy and cannot easily be substituted or insulated from global disruptions. In this context, renewable energy and electrification have structural advantages over fossil-fuel dependence because they reduce exposure to volatile international fuel markets and vulnerable supply routes. For China, this logic is not new. The country's push towards clean energy has long been driven as much by security concerns as by climate objectives.

China's leadership has historically viewed dependence on imported fossil fuels as a strategic vulnerability. As early as 2003, then-President Hu Jintao identified what later became known as the Malacca Dilemma: the risk created by China's heavy reliance on oil imports passing through the Strait of Malacca, a narrow maritime chokepoint beyond Beijing's control (Fan, 2025). At the time, roughly 80% of China's imported crude oil transited this route, raising fears that supply lines could be disrupted or blockaded during a geopolitical conflict. This concern intensified as China became the world's largest energy consumer and increasingly dependent on imported oil and gas.

Under President Xi Jinping, energy security has become more deeply integrated into broader strategies of technological and economic resilience. In a major article published in *Qiushi* in 2020, Xi argued that strategically important sectors needed the capacity for "self-circulation" during periods of external pressure and should be resilient against foreign restrictions and supply-chain disruptions (Xi, 2020). This logic has extended beyond manufacturing and technology to energy itself. While semiconductors and other industrial inputs can be stockpiled temporarily, fossil-fuel supply chains are continuously exposed to maritime chokepoints, geopolitical conflict and global price fluctuations.

Recent geopolitical crises have reinforced this strategic calculation. Following disruptions to Middle Eastern energy flows during the 2026 US–Iran conflict, Xi argued that China's early investment in wind and solar power had proven "forward-looking," describing a "greener, more diversified and resilient new energy system" as essential to China's energy security and economic development (Lee and Fu, 2026). Taken together, the progression from Hu Jintao's Malacca Dilemma to Xi Jinping's supply-chain resilience doctrine and subsequent emphasis on renewable energy security reveals a consistent strategic trajectory. For Beijing, the renewable energy transition has never been solely an environmental agenda. It has also been a long-term national security strategy aimed at reducing the vulnerability of China's energy security to external geopolitical shocks. Therefore, the current disruption of global fossil-fuel markets has not fundamentally changed China's approach; they have strengthened the rationale for accelerating the transition towards a more domestic, diversified and resilient clean-energy system.

Power sector

Coal as backup while developing clean-energy networks

China's power-sector transition is based on a "first build, then break" strategy (Central Committee of the Communist Party of China and State Council of the People's Republic of China, 2023). This involves maintaining coal as a stabilising backup energy source while rapidly expanding renewables, grids and storage to meet rising electricity demand from growth and electrification. This approach reflects a recognition that energy security and decarbonisation must advance together rather than in sequence. It also aligns with broader international evidence that gradual system substitution is often the most feasible way for a large industrialised economy to undergo a structural energy transition.

At the same time, coal is gradually running out of room for large-scale expansion as utilisation rates decline and clean-energy deployment accelerates. In 2025, coal still accounted for around 51.4% of China's total energy consumption, which partially insulated the economy from fluctuations in global oil and gas prices. The coal power utilisation rate fell from 60% in 2011 to 52% in 2024 and to 48.2% in 2025, and is projected to fall further to 32% by 2035 as portions of the fleet formally transition to reserve status (Wood Mackenzie, 2026). This means that coal power can gradually move from a baseload provider to a peak load provider, scaling up power generation only when needed.

Meanwhile, the growth of non-fossil energy increasingly drives the expansion of the power system. According to the National Energy Administration, during the period covered by the 14th Five-Year Plan (2021–25), wind and solar power (referred to in Chinese energy policy as new energy sources) accounted for nearly 50% of all newly added power generation and for almost half of the increase in total non-fossil energy supply (Liu, 2025). China also added approximately 75 gigawatts (GW) of storage capacity in 2025 alone (National Energy Administration of China, 2025). This underlined the central role of storage in balancing renewable generation and strengthening grid stability. China has begun to expand ancillary-services rules and pricing, including by releasing in 2025 new national standards that open the market for storage to participate as an independent commercial entity, bidding competitively for services including peak shaving, frequency regulation, ramping support and backup capacity. However, China's transmission grids are not yet ready for the level of variable renewables now entering the system. This means that batteries, demand response, forecasting and grid upgrades will require investment to grow alongside renewable generation.

Renewables, storage and electrification to meet rising demand

Because oil and gas play only a limited role in electricity generation in China, the power system is in a better structural position to accommodate electrification than in many other Asian economies. Oil and gas together account for roughly 4% of China's power mix, compared to 40–50% in many neighbouring economies (Cheng, 2026). China's electricity supply currently consists of roughly 60% coal and 30% renewables, with the remainder coming largely from nuclear power.

This structure has important implications for energy security. Renewables reportedly met around 80% of the incremental growth in China's electricity demand in 2024, while EVs accounted for more than half of new vehicle sales (Cheng, 2026). As a result, China's power sector is significantly less exposed to global oil-price shocks than it was during earlier energy crises, even though fossil-fuel consumption remains substantial overall.

Crucially, advances in energy storage and grid management increasingly make it possible for renewable electricity systems to provide a reliable power supply at competitive costs. The combination of solar, wind, batteries, flexible grids and demand management is progressively reducing concerns about intermittency and allowing electrification to support both economic growth and decarbonisation simultaneously.

Electrification and emissions reductions

Electrification also offers major opportunities beyond electricity generation itself, particularly in heating and industrial energy use. At the household level, replacing gas boilers with air-source

heat pumps can reduce home-heating emissions by up to 80%, depending on the carbon intensity of the electricity grid (Friends of the Earth, 2026).

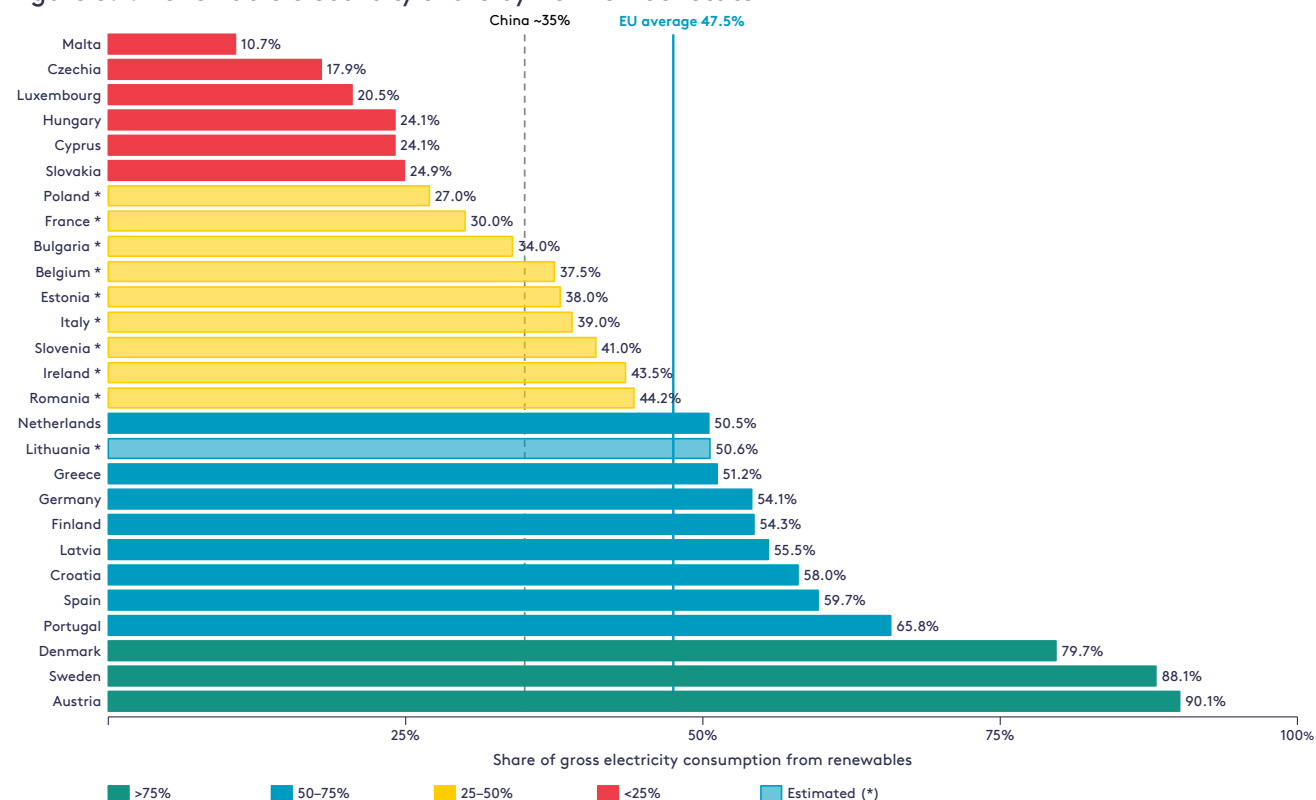
This issue is especially important for China, because manufacturing accounts for approximately 61% of national CO₂ emissions, and nearly three-quarters of those emissions are linked to industrial heating processes (Sawe et al., 2024). Decarbonising industrial heat is, therefore, essential to achieving both climate targets and broader industrial modernisation goals. If China's electricity system continues to decarbonise, direct electrification will become one of the most practical pathways for meeting industrial thermal-energy demand efficiently and at scale.

Industrial electrification would also generate wider economic and social benefits. It would reduce air pollution, which contributed to approximately 1.85 million premature deaths in China in 2019. It would also help lower dependence on imported fossil fuels. In 2021, China relied on imports for around 85% of its oil products and crude oil, and 46% of its natural gas (National Bureau of Statistics of China, 2022). Accordingly, electrification can strengthen energy security while reducing exposure to volatile fossil-fuel prices and future carbon-pricing risks. It may also improve the competitiveness of Chinese exports as overseas markets increasingly adopt carbon border adjustment mechanisms and demand lower-carbon industrial products.

International evidence on high-renewables systems

International experience further demonstrates that large-scale renewable electricity systems are achievable. Renewables accounted for more than 75% of electricity consumed in the EU in 2024, with Austria at 90.1%, Sweden at 88.1% and Denmark at 79.7% (see Figure 3.1). In contrast, Portugal sourced 65.8% of its electricity from renewables, Spain 59.7%, Germany 54.1% and the Netherlands 50.5% (Eurostat, 2025).

Figure 3.1. Renewable electricity share by EU member state



Source: Eurostat (2025); Ember, China Energy Transition Review 2025. Note: renewable energy statistics show the share of gross electricity consumption for 2024. Confirmed figures for 17 countries from Eurostat press releases; remaining 10 EU member states (*) are estimates consistent with Eurostat-reported EU total (47.5%) and general transition data. Norway (~117%) and Iceland (~100%) are European Free Trade Association countries that would top this chart but are excluded as non-EU members.

More broadly, between 2015 and 2024, nine countries worldwide shifted at least one-quarter of their total electricity consumption from fossil fuels to renewables, while 12 countries now generate more than half of their electricity from renewable sources (Zero Carbon Analytics, 2025). These examples demonstrate that high-renewables electricity systems are not merely hypothetical models but have already become operational realities in multiple advanced economies. A key factor in EU countries' capacity to reach a high share of renewables is the ability to trade electricity between countries: large hydro resources, firm low-carbon generation from nuclear power in some countries, and more mature market coupling all help European energy systems balance variable renewables without relying as heavily on coal as a backup. However, the equivalent inter-provincial electricity trading faces obstacles in China. Facilitating such trading should continue to be a priority of China's power market development in the coming years, especially with regard to transmission infrastructure and the creation of a national energy market.

Transport

EVs as a cheaper alternative to petrol vehicles

China's transport transition increasingly demonstrates that EVs are not only cleaner but also economically and strategically superior to oil-based vehicles. The price gap between EVs and petrol vehicles has narrowed rapidly in recent years. According to the International Energy Agency (2025), 39% of EV models sold in China in 2024 were priced below US\$25,000, compared with 45% of petrol models. This suggests that EVs have broadly achieved price parity with such models. EVs already account for a large proportion of China's car market: 11.25 million EVs were newly registered in the country in 2024, accounting for 41.83% of the total number of newly registered vehicles (State Council of the People's Republic of China, 2025).

The running costs of EVs are even more favourable. As Sinopec's Economics and Development Research Institute estimated at the OPIS Forum, fully charging an EV in China costs around ¥35–50 (US\$5–7), compared with at least ¥500 (US\$70) for an equivalent petrol vehicle (Cho, 2025). This creates a substantial long-term cost advantage for electrifying transport.

EVs' technological simplicity and advancement

EVs also have important technological advantages over conventional vehicles. Fossil-fuel combustion engine vehicles contain thousands of moving mechanical components that are subject to wear and breakdown, requiring significant maintenance over time. By contrast, EVs contain relatively few moving parts (primarily the motor and transmission system), which reduces the complexity of maintaining them and improving their reliability.

China is emerging as a leader in next-generation battery technologies, particularly sodium-ion batteries, which promise to have a lower cost and greater durability, and which reduce dependence on lithium. Chinese firms such as Contemporary Amperex Technology Co., Limited (CATL) have already commercialised advanced sodium-ion batteries, including systems that have received China's national certification for EV deployment (CATL, 2025). This strengthens China's technological leadership across the wider electrification ecosystem.

EVs as a source of energy security

For a country historically concerned about dependence on imported oil and vulnerable maritime supply routes, transport electrification forms part of not only a climate strategy but also a long-term energy-security strategy. Rising EV adoption has already reduced China's gasoline demand substantially. EV deployment reduced the country's gasoline consumption by approximately 100,000 barrels per day by 2020 and by around 430,000 barrels per day, or roughly 12% of its gasoline demand, by 2024 (Bencivelli et al., 2025). In more aggressive adoption scenarios, gasoline displacement could reach 1 million barrels per day by 2035 and 1.7 million barrels per day by 2040.

Hard-to-electrify sectors

Green hydrogen and strategic growth

For sectors that are difficult to electrify directly, green hydrogen is emerging as a key decarbonisation pathway. China's 15th Five-Year Plan explicitly identifies hydrogen energy and green fuels as new growth drivers, reflecting their strategic importance. Holding a significant early-mover advantage, China currently accounts for roughly half of global renewable-energy-based hydrogen production. The country also benefits from cost advantages in both renewable electricity generation and electrolyser manufacturing (Energies Media, 2026).

By mid-2024, China's renewable hydrogen production capacity had reached approximately 100,000 tonnes annually, with around 8 million tonnes under development (Lead the Charge, 2025). Multiple provinces, such as Hebei, Inner Mongolia, Shandong and Guangdong, have also prioritised hydrogen within their implementation plans under the framework of the 15th Five-Year Plan.

Green hydrogen's important role in decarbonisation

One of the dominant decarbonisation pathways in the steel sector involves replacing coking coal in blast furnaces with hydrogen-based Direct Reduction of Iron (DRI), in which green hydrogen acts as a reducing agent. China has already planned DRI projects equating to an estimated 6 million tonnes of annual production capacity (Lead the Charge, 2025).

Hydrogen also plays a critical role in fertiliser production, which currently uses grey hydrogen, produced from natural gas without capturing the resulting CO₂, to synthesise ammonia. Replacing this with green hydrogen, produced by using renewable electricity to split water into hydrogen and oxygen, enables the production of green ammonia, reducing emissions from one of the world's largest hydrogen-consuming industries. China's planned and specific industrial bases – which connect wind, solar, hydrogen, ammonia and alcohol – are designed to combine renewable electricity with hydrogen production and ammonia synthesis on a large scale, embedding green fertiliser production directly within the broader energy transition. The petrochemical sector presents similar opportunities. The global chemical industry is already the world's largest hydrogen consumer, primarily using grey hydrogen in refining, along with ammonia and methanol production.

Shipping and aviation fuels

Green hydrogen derivatives are also increasingly important to shipping and aviation. China's National Energy Administration has included green hydrogen, green ammonia and green methanol projects in its long-term industrial financing support schemes. In 2024, China completed its first ship-to-ship green methanol bunkering operation in Shanghai, supplying 504 tonnes of methanol to Maersk's Astrid Maersk vessel (*South China Morning Post* [SCMP], 2024). This marked an important milestone in maritime fuel deployment. Green methanol (produced from green hydrogen and captured CO₂) can also function as a low-carbon shipping fuel and as a petrochemical feedstock, allowing China's methanol industry to decarbonise while helping meet expanding demand for cleaner maritime fuels (SCMP, 2024).

China is also actively developing the sustainable aviation fuel industry, which is currently led by hydrogenated esters and fatty acids technology, and has already begun large-scale commercialisation (Huang et al., 2025). At the same time, electrofuel or 'power-to-liquid' pathways are advancing rapidly and may eventually break free of the traditional constraints of biomass feedstock, enabling the adoption of near-zero-carbon aviation fuels at scale.

Raw material imports and supply security

Clean-energy technologies require imported critical minerals, whose supply chains are fundamentally different from those of fossil fuels. As discussed, the latter require continuous imports and are highly exposed to geopolitical price shocks, partly because fuel purchases

constitute an ongoing operating cost. Critical minerals, by contrast, are largely embedded upfront in infrastructure and manufacturing costs. Therefore, fluctuations in the price of these minerals have a smaller long-term effect on operating costs than exposure to volatile oil or gas prices.

Chinese firms own or have major management interests in cobalt mines in Congo (which supply over 70% of cobalt globally) and lithium operations in Argentina and Chile, as well as copper mines across Africa and South America. Collectively, these firms give China dominant influence over critical minerals value chains, which are essential to batteries, EVs, solar panels and wind turbines (World Economic Forum, 2026). This means that China already occupies a central position in global clean-energy materials supply chains. According to the US Energy Information Administration (2025), China imported around 46% of globally traded raw battery minerals in 2023 and subsequently exported approximately 58% of the world's processed battery minerals. This position provides China with significant strategic leverage in the emerging clean-energy economy, even while countries continue their efforts to diversify supply sources and strengthen materials security.

The green transition as a new growth model

China's clean drivers of new growth

China's emerging growth model is increasingly centred on sectors that are inherently aligned with decarbonisation, particularly clean technology, advanced manufacturing, digital technologies, AI and modern services (China's policy shorthand for knowledge-intensive, tradeable services including finance, software, R&D and professional services, as opposed to traditional labour-intensive services). As a result, geopolitical uncertainty does not fundamentally weaken the green-growth rationale. Instead, it reinforces the logic of doubling down on these sectors rather than retreating towards fossil-fuel dependence.

The scale of this transition is already visible in the Chinese economy. Between 2022 and 2025, the real value of China's clean energy industries nearly doubled (CET, 2025). The so-called new three industries (EVs, batteries and solar PV) now account for a significant share of industrial output, exports and investment – together, they contribute roughly 8% of GDP and hundreds of billions of dollars in exports annually. More broadly, clean-energy sectors contributed approximately ¥13.6 trillion (US\$1.9 trillion) to China's economy in 2024, equivalent to just over 10% of GDP, while growing faster than the economy overall. These sectors accounted for approximately 26% of total GDP growth in 2024; without the development of clean technologies, the Chinese economy would have likely grown at an estimated 3.6%, falling short of its target rate of 5.0% and official rate of close to 5.0% (Carbon Brief, 2026; Centre for Energy and Transportation, 2025). This trend accelerated in 2025: China's clean-energy sectors reportedly generated a record ¥15.4 trillion (approximately US\$2.1 trillion). This is equivalent to around 11.4% of China's GDP, or the entire economy of a country such as Brazil or Canada.

How green growth can offset a broader economic slowdown

The expansion of clean-energy industries is also increasingly important because China's property-led growth driver is weakening structurally. Before 2021, the construction and real estate-related industries accounted for roughly one-quarter of China's economy. However, the ongoing property downturn is estimated to have reduced annual real GDP growth by around 2 percentage points in both 2024 and 2025 (Goldman Sachs, 2026).

In this context, clean-energy industries are not merely climate sectors. Instead, they are becoming macroeconomic stabilisers capable of partially replacing declining growth from real estate and infrastructure-heavy investment. Unlike portions of the earlier property boom, many clean-energy investments simultaneously support industrial competitiveness and technological upgrades, while improving export capacity and long-term productivity. At the same time, AI and other digital technologies are emerging as complementary growth engines alongside clean technology. Over

the next few years, AI could add approximately 0.2–0.3 percentage points to China’s annual GDP growth and generate labour-value gains equivalent to roughly ¥6.7 trillion (US\$930 billion), or about 4.7% of 2024 GDP (Morgan Stanley, 2025).

China’s investment patterns further demonstrate that clean technology is becoming central to the country’s development strategy. According to the IEA (2025b), China remained the world’s largest clean-energy investor in 2024, accounting for approximately US\$625 billion or 31% of global clean-energy investment. Such investment reportedly accounted for roughly 90% of all investment growth in China during 2025. Moreover, the new three sectors have continued to dominate this expansion, generating around two-thirds of value added across China’s clean-energy economy and attracting more than half of all sectoral investment. The country invested approximately ¥7.2 trillion (US\$1 trillion) in clean energy in 2025, roughly four times the amount invested in fossil-fuel extraction and coal-fired power generation combined (Ember, 2025).

Clean technology’s capacity to replace other activities is critical from a distributional perspective, as local governments and the workforce face economic difficulties with efforts to reduce China’s reliance on coal. Fortunately, many provinces with large coal industries, such as Inner Mongolia, also have significant advantages in wind and solar resources. However, the transition challenge is not only technical but social: provinces that rely on coal may require fiscal transfers, retraining and alternative industrial strategies if coal utilisation continues to fall. To mitigate the impact of this trend, China’s central government allocated remuneration for coal and steel workers’ resettlement during the 2016–20 overcapacity reform, before extending transfer payments and just-transition support to provinces such as Shanxi, while introducing policies to develop replacement industries and improve social services.

How green growth accelerates decarbonisation

Pursuing these growth opportunities will not require China to sacrifice its climate goals. On the contrary, modelling consistently suggests that faster decarbonisation can occur alongside continued economic growth (Energy Foundation China, 2025).

As discussed, China can decarbonise more rapidly than is implied by its current NDCs while still maintaining its planned economic development trajectories. One economic-carbon-employment optimisation model projected that China could have halted the rise in energy-related CO₂ emissions between 2022 and 2025 while still sustaining annual average GDP growth of 6.1–6.4% (Yu et al., 2018). Similarly, other models found that low-carbon energy-transition pathways could enable emissions to peak as early as 2021–25 without hampering economic growth (Wang et al., 2019; Xu et al., 2019). These findings suggest that the core challenge concerns not whether China can simultaneously grow and decarbonise but whether it can accelerate the deployment of the technologies and industrial systems already driving both processes. In conditions of geopolitical uncertainty, this logic becomes even stronger: energy security, industrial competitiveness, technological leadership and decarbonisation increasingly reinforce one another.

Notably, clean technologies reduce operational emissions but still require minerals whose supply depends on mining, refining, land use, water and biodiversity-intensive supply chains – that is, supply chains that can significantly affect ecosystems and biodiversity through habitat loss, pollution or other forms of ecological disturbance. China has started to address the lifecycle impacts of such technologies, mostly through standards, traceability, recycling and industrial efficiency. By introducing mandatory carbon-footprint reporting for EV batteries, stricter battery-safety rules and national battery-tracking and recycling systems, China is trying to support durable, just and circular growth through better social protection, mineral-supply governance, and recycling systems. In the same vein, the country is playing a stronger role in setting international standards for EVs, batteries and other clean technologies.

China’s leading role in global green growth

The green growth opportunity is not only domestic. China is also increasingly shaping the global clean-energy economy through exports, overseas investment and industrial supply chains.

Since 2022, China's overseas investment in green technologies has accelerated rapidly – first in solar manufacturing, then in batteries and new energy vehicles, and more recently in green hydrogen. China's disclosed overseas green-investment commitments reached at least US\$227 billion between 2011 and mid-2025, with upper estimates approaching US\$250 billion and spanning 461 projects across 53 countries (Xue and Larsen, 2025).

The country's dominance in clean technologies manufacturing is equally significant. By 2024, China produced approximately 80% of global solar PV modules and battery cells, as well as around 70% of EVs globally (Ember, 2026). This position gives China substantial influence over the emerging global low-carbon economy and strengthens the argument that green industrial leadership is now deeply intertwined with geopolitical and economic competitiveness.

4. Clean, secure and cheap growth as a global strategy

The combination of energy security, economic growth and decarbonisation is not unique to China. In fact, the same triple logic increasingly applies to most fossil-fuel-importing economies that have access to affordable clean technologies. Many countries are structurally even more exposed to fossil-fuel imports than China because they possess far fewer domestic coal resources. As renewables technologies, batteries, EVs and electrification solutions become cheaper and more scalable, countries can simultaneously reduce import dependence, improve economic resilience and accelerate industrial development. In conditions of geopolitical fragmentation and fossil-fuel volatility, this logic becomes stronger.

Policy responses: domestic energy resilience and industrial strategy

Countries are increasingly responding to these challenges through a combination of domestic clean-energy deployment, industrial policy and infrastructure investment. On the energy side, countries that invested early in renewables have already proven more resilient during recent geopolitical and fossil-fuel crises. According to IRENA (2026a), countries with substantial renewables deployment have been significantly less exposed to recent energy-price shocks. Across the EU, the addition of 406 GW of solar and 246 GW of wind capacity helped avoid approximately €58 billion in additional fossil-fuel import costs during the current crisis (IRENA, 2026a). However, Europe has also demonstrated that deployment will need to continue before electricity systems can fully decouple from gas-price volatility.

New modelling from IRENA (2026c) shows that combinations of solar, wind and battery storage can already provide 'firm' (reliable and always available) electricity at costs that are competitive with fossil fuels, or even at a lower price. Solar plus storage systems now provide electricity at roughly US\$54–82/MWh in high-resource regions, while new gas generation often exceeds US\$100/MWh globally (IRENA, 2026c).

As a result, industrial policy is becoming central to energy-transition strategy. Many countries are now seeking to develop domestic clean-energy manufacturing capabilities – not only for climate reasons, but also to reduce their dependence on external supply chains. This includes local-content policies (such as Indonesia's reduced VAT on EVs), renewable manufacturing incentives (such as Thailand's EV assembly hub), workforce training (such as South Africa's Energy and Water Sector Education and Training Authority) and support for innovation ecosystems in sectors including batteries, wind equipment, grid infrastructure and EVs (such as Brazil's decade-long biofuel programme). Infrastructure investment is equally important. Electrification requires upgraded grids, charging systems, storage capacity, transmission networks and digital energy-management systems. Countries that can accelerate these complementary investments are likely to improve both their economic productivity and their energy resilience simultaneously.

Many developing economies may also possess a structural advantage: they are less constrained by legacy fossil-fuel infrastructure. According to UN Trade and Development (2022), countries that industrialised relatively late often adopt newer technologies more rapidly and at lower cost because they avoid the sunk costs, lock-ins and transition frictions faced by advanced economies. This allows them to leapfrog to cleaner and more efficient systems while avoiding the long experimentation phases previously required. In energy systems, this is particularly important because renewables technologies are modular, rapidly deployable and increasingly cost-effective even in countries with weaker legacy infrastructure. Several countries are already seeing the benefits of pursuing green growth amid geopolitical uncertainty.

Pakistan

Pakistan has rapidly expanded decentralised solar and battery deployment in recent years. The growth of rooftop solar, combined with rising EV adoption, has helped households and businesses

reduce their reliance on imported fossil fuels while improving their resilience against electricity shortages and fuel-price volatility. Pakistan's private-sector-led solar revolution had installed over 20 GW of solar-based distributed and utility-scale capacity by mid-2025 and pushed renewables' share of the energy mix to 46% by September 2025, exceeding the government's target of 40% (Pakistan Government Power Division, 2025).

India

India has significantly increased its renewables deployment while linking this to its industrial strategy. Renewables' share of electricity generation rose from 14.2% in 2016 to over 20% by 2025 (Centre for Research on Energy and Clean Air [CREA], 2026). As of late 2025, wind and solar accounted for 14% of total electricity generation (up from approximately 3–4% in 2016) and renewables for 40% of installed capacity (CREA, 2026). The country is simultaneously investing heavily in domestic solar, battery and clean manufacturing capacity. In some regions, electric cooking has become a contingency measure during disruptions to the supply of liquefied petroleum gas, illustrating how electrification can strengthen energy resilience.

Cuba

Cuba's distributed renewable-energy systems demonstrate how decentralised solar and battery solutions can improve resilience in energy-constrained environments. Community-level renewables systems have supported agricultural production and reduced the country's dependence on imported fuels while helping communities cope with weather-related disruptions. Cuba is simultaneously scaling up biogas production, with 98% of existing biodigesters located on small-scale peasant farms. This produces both energy and biofertiliser as a by-product, reducing dependence on imported chemical fertilisers and fossil-fuel electricity (EU Capacity4Dev, 2025).

Brazil

The IEA cites Brazil's decades-long biofuel programme as an example of EMDE innovation leadership in synthetic fuel synthesis and feedstock processing. The country is now extending the programme to sustainable aviation fuel under its RenovaBio mandate, which targets a 4.6% reduction in greenhouse gas emissions between 2018 and 2026 (IEA, 2025c). Brazil has simultaneously developed domestic wind turbine manufacturing capacity through auction-linked local content requirements, making it the only major EMDE with both demand-side and supply-side policy innovations working in tandem across clean-energy sectors.

Indonesia

Indonesia has introduced a graduated local content requirement for EVs, known as Tingkat Komponen Dalam Negeri (TKDN), or Domestic Component Level, which will rise to 60% by 2027. These requirements are linked to VAT reductions ranging from 1% to 11% and to luxury tax exemptions, which are conditional on meeting that threshold (Joson, 2025). As of early 2024, only two models (the Hyundai IONIQ 5 and the Wuling Air EV) met the 40% threshold required to qualify for full incentives (Joson, 2025).

The economic benefits of international cooperation

Despite rising geopolitical tensions, the economics of international integration still strongly favour cooperation in clean-energy supply chains. Cross-border industrial integration allows countries to specialise according to comparative advantage, lowers production costs and accelerates technological diffusion. Policies that reverse this integration also reverse many of the productivity and income gains that globalisation previously generated (Ballingall and Schoutz, 2024).

For many developing economies, access to affordable Chinese clean technologies may significantly accelerate electrification and industrial upgrades. Policies such as those that reduce tariffs on imported solar panels, batteries and EVs, and that streamline import licensing and customs procedures, can reduce transition costs substantially.

Meanwhile, green-finance cooperation, joint ventures and technology-transfer agreements can help countries build domestic industrial capabilities rather than simply become import markets. In this sense, green industrialisation increasingly operates through hybrid models of domestic capacity-building combined with international supply-chain integration. In practice, several countries have already adopted elements of this triple-logic approach to development.

How countries' green growth strategies reinforce one another

Countries' green policies can generate cumulative global effects, and China plays a central role in this process. Chinese investment, manufacturing scale and exports have dramatically reduced the global costs of clean technologies, especially solar panels, batteries and EVs. This has made clean-energy deployment more affordable for other countries while accelerating global adoption.

Chinese overseas clean-tech investment has also expanded rapidly. According to Xue and Larsen (2025), ASEAN remains the largest destination for projects, but investment has increasingly expanded into the Middle East and North Africa, Europe, Latin America, and Central Asia. Meanwhile, the share of Chinese clean-tech exports going to emerging markets reportedly rose from 24% in 2022 to 43% in 2024 (BloombergNEF, 2025). It is worth noting that global demand for clean technologies supports growth inside China itself. As more countries pursue electrification, renewables deployment, EV adoption, and industrial decarbonisation, demand rises for the technologies in which China currently specialises. This creates a mutually reinforcing dynamic in which global decarbonisation, industrial growth, and international economic integration increasingly support one another.

The way forward

In summary, geopolitical turbulence strengthens rather than undermines the case for green growth. Mounting geopolitical uncertainty does not change the economic logic of decarbonisation but layers on an additional strategic argument grounded in energy security, industrial competitiveness and resilient supply chains. Following this logic, green growth is less a brake on development than an engine of innovation, productivity gains and durable competitiveness (Stern, 2025). This means the transition may quicken growth rather than dampen it, even amid global instability. The argument holds both at the global level and for China specifically. As countries across the world implement policies to pursue this type of growth, they can learn important lessons from one another – highlighting the need for coordination based on mutual benefits.

The geopolitical environment is rapidly evolving just as artificial intelligence and new measures of climate risk change our perceptions of what the future holds. While the case for resilient growth is clear, our understanding of how to achieve it in practice will need to develop with changes in that environment. Given that we have set out the foundation for resilient growth in China, future work will focus on exploring the individual aspects of this in greater detail. In doing so, we intend to provide greater analytical backing for policymakers and to provide recommendations for China in specific areas at key moments in the policymaking cycle. The triple logic of clean, secure and cheap development that underpins resilient growth provides an opportunity for China today and will require extensive work over the coming years.

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