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In the Vortex of Great Power Competition: Climate, Trade, and Geostrategic Rivalry in U.S.–China–EU Relations

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In the Vortex of Great Power Competition:

Climate, Trade, and Geostrategic Rivalry in U.S.–China–EU Relations

*Michael A. Mehling**

May 2025

Global efforts to address climate change appear headed on a collision course with strategic self-interest and great power politics. Nowhere are these tensions more evident than at the nexus of climate and trade policy. In the United States, now the world's largest producer of oil and gas, President Donald J. Trump is systematically reversing policy advances of the previous administration and seeking to actively impede the energy transition while deploying controversial trade measures to achieve a number of strategic priorities. China, the world's largest greenhouse gas emitter, has secured a commanding position across all major low-carbon technology supply chains, relying on decades of state intervention to build an unrivalled scale and cost advantage in manufacturing. Yet in that process, China has prompted growing concern among its trade partners about excessive supply chain dependencies and the impacts of China's export-dependent economy on the competitiveness of its trade partners' domestic industries. Meanwhile, Europe finds itself in an increasingly difficult position as the geopolitical landscape evolves, having historically relied on a now increasingly withdrawn U.S. for military security and increasingly for its remaining fossil fuel needs, while at the same time seeking to sustain its ambitious decarbonization roadmap in the face of growing economic pressures and electoral backlash.

How will evolving political dynamics and national interest affect the pace and direction of decarbonization efforts, including international climate cooperation? How do trade and the cross-border flow of goods, services, capital and knowledge shape national priorities? Exploring a number of possible short- to medium-term scenarios, this paper argues that climate policy stands at a crossroads, with a greater than usual range of possible outcomes threatening to upend conventional expectations about climate leadership and the interplay of domestic and international climate policy dynamics.

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BRI	Belt and Road Initiative
BRICS	Brazil, Russia, India, China and South Africa
BRICS+	Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Indonesia, Iran and the United Arab Emirates
CBAM	Carbon Border Adjustment Mechanism
DFC	U.S. International Development Finance Corporation
ECPF	EU-China Partnership Facility
EIA	U.S. Energy Information Administration
EU	European Union
EU ETS	European Union Emissions Trading System
EV	Electric Vehicle
GHG	Greenhouse Gas
IEA	International Energy Agency
IRA	Inflation Reduction Act
JETP	Just Energy Transition Partnership
JRC	Joint Research Centre
MEE	Chinese Ministry of Ecology and Environment
NCQG	New Collective Quantified Goal
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-Operation and Development
OPEC	Organization of the Petroleum Exporting Countries
SGP	EU Stability and Growth Pact
SIDS	Small Island Developing States
STA	U.S.–China Science and Technology Agreement

TrCM Trade-related Climate Measure

TTC EU-U.S. Trade and Technology Council

U.S. United States

UNFCCC United Nations Framework Convention on Climate Change

UNGA United Nations General Assembly

USAID U.S. Agency for International Development

WTO World Trade Organization

1 Introduction

Global efforts to address climate change are increasingly entangled with great power competition between the United States, the European Union, and the People's Republic of China. Over the past decade, a resurgence of geostrategic rivalry has reshaped international relations,[1] introducing new complexities to climate diplomacy (S. M. Moore 2024). This geopolitical turn has profound implications for global climate action: climate change poses a global challenge that necessitates unprecedented levels of cooperation (Barrett 2003; Keohane and Victor 2016; Nordhaus 2015), yet strategic competition between major economies threatens to undermine any collective response. When great powers cooperate, they can mobilize accelerated climate action, as was in evidence when bilateral coordination between the U.S. and China (White House 2014) proved pivotal in securing adoption of the 2015 Paris Agreement (Dimitrov 2016). Since then, however, growing tensions – illustrated by Beijing's temporary suspension of an ongoing climate dialogue with Washington, DC in August 2022 (Mallapaty 2022) – show that climate collaboration can fall victim to broader geopolitical conflicts. Europe, for its part, has long exercised leadership on climate action in both its domestic and foreign policy positions, but is presently finding its green aspirations tested by external and internal pressures, such as transatlantic tensions over trade and security policy, unabated competition from Chinese imports, electoral shifts at the EU and Member State level, and the economic impacts of security crises, especially the Russian invasion of Ukraine (Schreurs 2024).

Recent years have seen climate change become increasingly framed as an economic and distributional issue, in addition to being an environmental crisis (Bergquist, Mildenberger, and Stokes 2020; Aklin and Mildenberger 2020). In the current vortex, however, climate policy is no longer limited to the environmental or economic domains – it has become closely intertwined with foreign policy and international power dynamics (S. M. Moore 2024). Climate change first emerged as an issue of great power politics in contentious global summits such as the Copenhagen Climate Change Conference of 2009 (Bodansky 2010), where major emerging nations led by China formed the BASIC group of countries to assert their demands in negotiations with more advanced economies, such as the EU and the United States (Qi 2011). However, climate change mitigation and adaptation – including aspects such as climate finance and technology transfer – have since become a routine feature of geopolitical rivalries. Trade disputes and industrial policies related to clean energy technologies are now frequent flashpoints in U.S.–China–EU relations (Lewis 2014; Kleimann et al. 2023). Each actor faces a dual challenge: deliver on domestic priorities related to economic growth and sustainability while navigating strategic and competitive pressures abroad.

In the next section, this paper examines recent climate policy trajectories of the U.S., EU, and China, and how these trajectories are shaped by and contribute to great power rivalry. What follows is an exploration of the nexus of climate, trade, and geopolitics, analyzing the turn towards green industrial policy, the rising deployment of trade-related climate measures (TrCMs), and the securitization of low-carbon technology supply chains. These dynamics will have far-reaching

[1] For instance, the 2017 U.S. National Security Strategy formally declared the return of "great power competition," marking a paradigm shift in how major powers engage with each other, see White House (2017, 27)

implications for global climate action, potentially upending established expectations about leadership and obstruction in ongoing climate negotiations. Given the exceptional range of possible outcomes, the implications are approached by way of a scenario analysis that deploys a two-level game framework, highlighting the links between domestic politics and international strategy. In a context of significant uncertainty, prudent planning requires consideration of all possible outcomes, including outlier scenarios, with flexibility, judgment, and adaptability to avert or minimize undesirable results and help harness arising opportunities (Knight 1921).

Using this lens, the paper outlines three scenarios for climate cooperation in the short to medium term, offering an outlook on the prospects of managing climate change amid strategic competition. As the scenarios demonstrate, great power competition complicates climate cooperation and introduces new risks, but could also spur a race for leadership in low-carbon technology manufacturing and innovation, while becoming a new front in the evolving struggle for diplomatic stature and expanding spheres of influence across the developing world. What becomes clear is that, across all scenarios, securing an effective response to climate change in an era of strategic rivalry will require a careful balance of competition and cooperation, aligning national and collective interests by leveraging the economic and technological ambitions of each actor.

2 Climate Policy Trajectories in the U.S., the EU, and China

2.1 United States: Two Steps Forward, One Step Back

For well over two decades, U.S. climate policy has reflected alternating periods of progress and regression. Following retrenchment from international climate cooperation during the administration of President George W. Bush (Lisowski 2002), his successor, Barack H. Obama, took significant steps to advance both domestic and international climate action. Such action ranged from helping secure adoption of the 2009 Copenhagen Accord and building the necessary political support for the 2015 Paris Agreement to advancing clean technology investments through domestic legislation, such as the American Recovery and Reinvestment Act (111th Congress 2009; for discussion, see Aldy 2013) and executive rulemaking to limit greenhouse gas (GHG) emissions across a number of sectors of the U.S. economy (Carlarne 2019; Outka 2016; Richardson 2020). Subsequently, the first term in office of President Donald J. Trump again represented a major step backward: it withdrew the U.S. from the Paris Agreement and reversed domestic regulations, advancing a nationalist agenda and citing skepticism about the reality of climate change and the benefits of multilateral engagement (Mehling and Vihma 2017).

This whiplash in policy continued after President Joseph R. Biden's election in 2020. During his first days in office, he declared that the U.S. was rejoining the Paris Agreement and issued several executive orders to accelerate federal climate action (Chemnick 2021). Over the course of his administration, the U.S. also submitted a nationally determined contribution (NDC) of 50–52% emission reductions below 2005 levels by 2030, which was later updated to call for emissions reductions of 61–66% below 2005 levels by 2035 – and advanced several agency rules to limit sectoral greenhouse gas emissions. Biden also oversaw legislative progress on climate policy: in 2021, he signed

into law the Bipartisan Infrastructure Law (117th Congress 2021), and in 2022 the Inflation Reduction Act (IRA) (117th Congress 2022b), together representing the largest climate investments in U.S. history, with up to $1 trillion assigned to the expansion of clean energy, low-carbon manufacturing, electric vehicles and appliances, and climate resilience (Bistline, Mehrotra, and Wolfram 2023). The IRA, in particular, was hailed as a substantial step forward in addressing climate change (Marcacci 2022; Credit Suisse 2022), indicating that U.S. greenhouse gas emissions would accelerate their decadal trend of gradual decline – owed primarily to fuel switching in the power sector prior to this time (see below, Figure 1) – and nearly achieve the pledged NDC target for 2030 (Bistline et al. 2023; Jenkins et al. 2023).

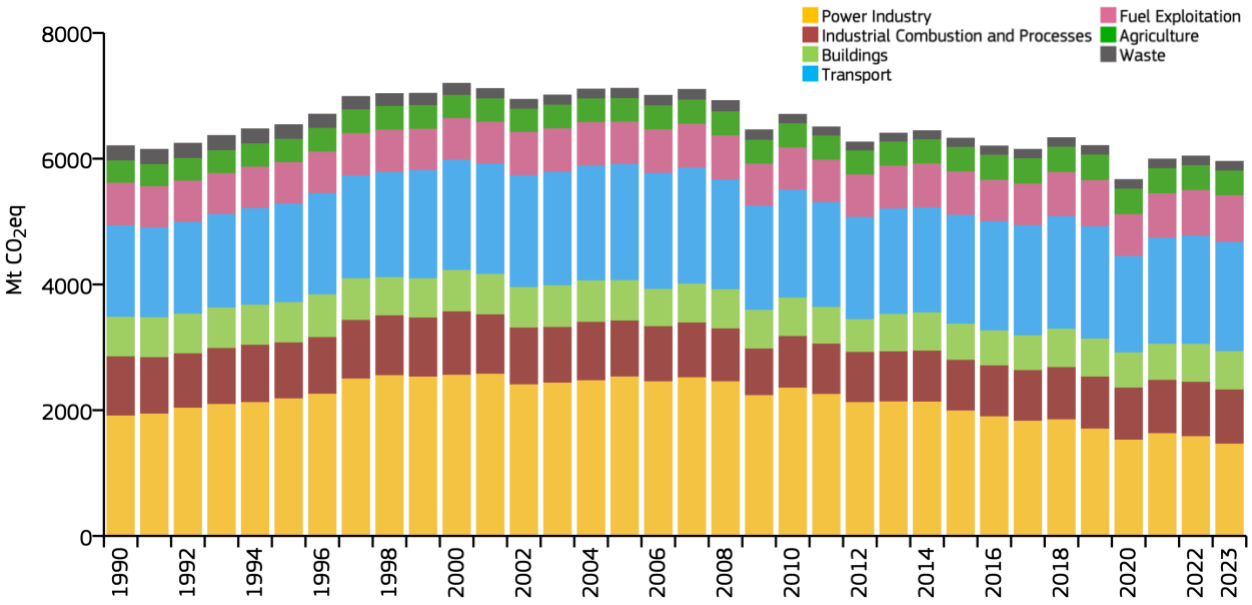

Figure 1: Greenhouse Gas Emissions by Sector, United States (in Mt CO_2eq). Source: JRC (2024)

In response to these legislative advances, investments in low-carbon technology deployment and manufacturing did also rapidly increase (Bermel et al. 2024). Still, even under Biden, climate policy faced setbacks and inconsistencies. Political opposition and legal challenges stalled aspects of his climate agenda. For instance, unfavorable court rulings – most recently the Supreme Court decision in *Loper Bright Enterprises et al. v. Raimondo et al.* overturning the Chevron doctrine of judicial deference to executive discretion (Supreme Court of the United States 2024) – hampered the implementation of several executive rules on sectoral decarbonization, and a divided Congress diluted parts of the Build Back Better plan, necessitating extensive compromises in the final IRA. The administration approved new oil and gas leases on federal lands and waters, including one of the largest offshore lease sales in U.S. history, unable to reverse a trend that has contributed to the U.S. becoming the world's largest producer of oil and gas (see below, Figure 2).

In the international arena, the Biden administration sought to rebuild U.S. credibility, but geopolitical tensions and economic realities at times intervened, for instance when U.S.-China climate talks were paused amid frictions over the Taiwan Strait (Mallapaty 2024), or transatlantic discussions

about a global arrangement to limit emissions from the production of steel and aluminum failed to reach agreement due, in part, to domestic stakeholder pressure (Mulholland, Sutton, and Meyer 2024; Rimini et al. 2023). Indeed, while the U.S. once more helped advance important multilateral initiatives, such as securing ratification of the Kigali Amendment to the Montreal Protocol (117th Congress 2022a) or launching the Global Methane Pledge (CCAC 2021), many of its domestic successes – and notably the generous industrial support under the IRA – generated serious tensions with trade partners around the world, including, notably, the EU (Kleimann et al. 2023). As a result, U.S. climate leadership remained highly uneven: renewed policy commitments and unprecedented levels of investment appeared tempered by enduring partisanship, judicial setbacks, and growing diplomatic tensions, underscoring the fragility of self-declared leadership on climate change.

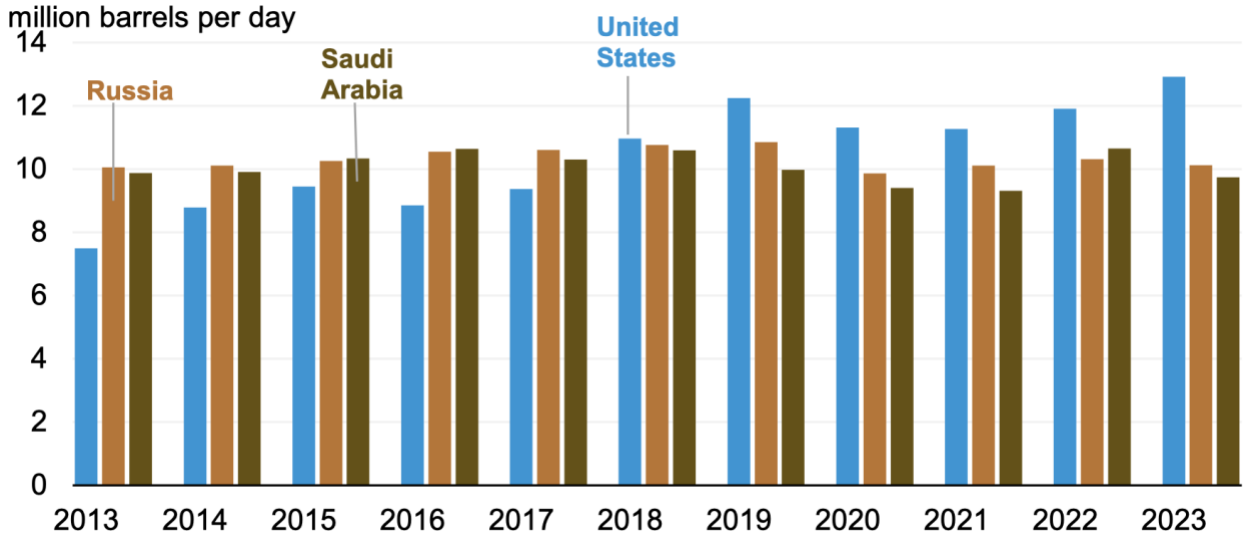

Figure 2: Average annual crude oil and condensate production from top three global producers (2013-2023). Source: EIA (EIA 2024)

This oscillation again manifested itself right away in the first days of the second Trump administration. Within a week of taking office, President Trump has already rescinded virtually all relevant Executive Orders and Presidential Memoranda of his predecessor (Executive Office of the President 2025a), announced the U.S. withdrawal from the Paris Agreement (Executive Office of the President 2025a), and ordered a pause to certain renewable energy permitting processes and federal funding disbursements under the IRA and other legislation (Jenks and Dewey 2025). Instead, the new priorities of federal policy are to unleash U.S. "energy dominance" through expanded production of fossil fuels and critical minerals (Executive Office of the President 2025b), helping underpin a geopolitical strategy of strategic autonomy that entails a more isolationist and transactional foreign policy. While executive actions can be reversed again by a future administration, more lasting impacts may follow from extensive cuts instituted to the federal workforce (Ax, Volcovici, and Pamuk 2025; Friedman 2025) and administrative infrastructure (Bravender, Richards, and Yachnin 2025). Meanwhile, Republican leadership in Congress is considering a wide variety of options to repeal some or all funding for clean energy, low-carbon manufacturing, and climate resilience set out in the IRA (Fujii-Rajani and Patnaik 2025). It remains unclear, however, whether the Trump administration can achieve all its campaign pledges of a further expansion of oil and gas production while reversing existing

climate policies and stalling continued growth of renewable energy sources, such as wind and solar: already, some of its executive actions are being challenged in court, and market forces will likely still favor investment in low-carbon technologies as their costs continue to decline (Worland 2025).

As described in the preceding paragraphs, the "two steps forward, one step back" pattern of U.S. climate policy underscores how domestic politics and national interest remain a decisive factor, creating uncertainty domestically and internationally about the durability of U.S. climate commitments. Unsurprisingly, the dramatic oscillation of U.S. climate policy development has already prompted questions about the reliability of American engagement (Smith 2021) and even calls to forgo it altogether as a partner in international climate policy (Kemp 2017). Going forward, a key question will be whether market forces, litigation, and subnational and corporate climate action allow the U.S. to retain the decarbonization momentum of recent years, or whether the policy lapses across administrations and its emergence as the world's leading producer of fossil fuels have so fundamentally altered its strategic priorities that it evolves from a merely unsteady actor to an obstructionist laggard in global climate cooperation.

2.2 European Union: Continuity Under Pressure

The European Union has long positioned itself as a leader in global climate policy (Oberthür and Roche Kelly 2008; Schreurs and Tiberghien 2007), characterized by remarkable continuity in climate policy design and implementation even in the face of numerous pressures (Dupont et al. 2024). Its approach is defined by a comprehensive portfolio of sectoral policies, such as the European Union Emissions Trading System (EU ETS) (Delbeke 2006; Ellerman, Convery, and de Perthuis 2010; Meadows, Slingenberg, and Zapfel 2015), that are geared towards advancing overarching objectives on greenhouse gas reductions, energy efficiency improvements, and expanded use of renewable energy sources.

Most recently, these objectives have been set out in the European Green Deal (European Commission 2019) and the European Climate Law, with its goal of achieving net-zero emissions by 2050 as well as an enhanced 2030 target of at least 55% emissions reduction from 1990 levels (European Union 2021). Unlike the partisan swings seen in U.S. politics, EU climate policy has enjoyed relatively broad support across mainstream political groups, enabling continuity of ambition through successive Council presidencies and institutional cycles in the European Parliament and the European Commission. Accordingly, the EU has continuously increased its climate targets over time, and so far has also succeeded in achieving them through sustained emissions reductions (see below, Figure 3).

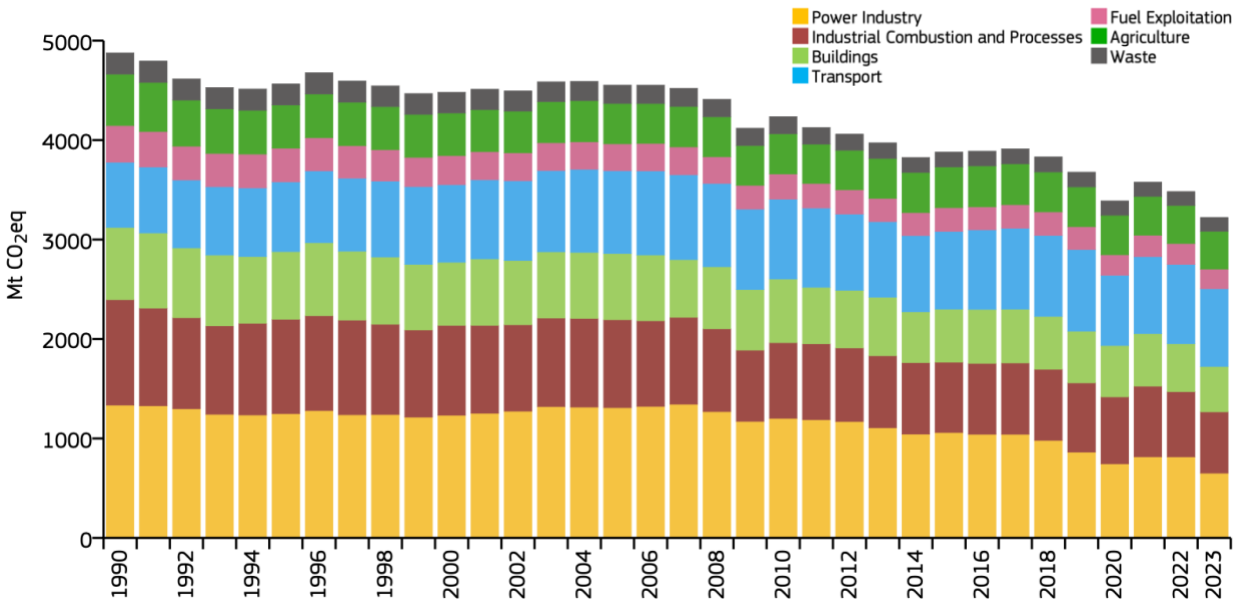

Figure 3: Greenhouse Gas Emissions by Sector, EU 27 (in Mt CO_2eq). Source: JRC (2024)

This steadiness, however, is now under strain from both internal and external pressures. Internally, the EU has begun facing stakeholder opposition and eroding public support as it rolls out policies to meet its European Green Deal objectives. Some Member States and corporate interest groups have expressed growing concern about the cost and pace of the transition, especially amid external shocks such as the COVID-19 pandemic and a broader economic slowdown. Following the Russian invasion of Ukraine in 2022, a surge in energy costs – due, especially, to record prices for natural gas as the EU sought to rapidly diversify from its main supplier, Russia – contributed to broader inflationary pressures and tested public support for climate action. As a result, industrial output declined across Europe (see below, Figure 4), with some strategically important sectors – such as the chemicals sector – seeing dramatic production curtailment and even plant closures (Young 2023).

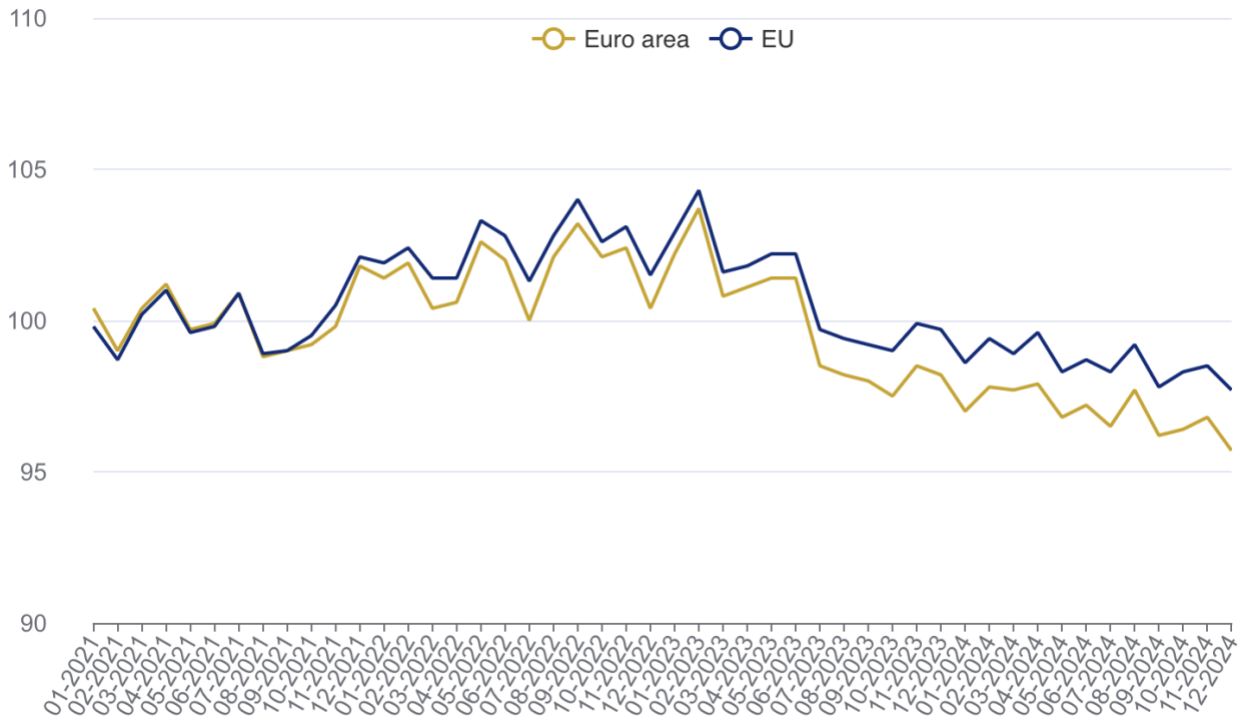

Figure 4: Industrial Production, Seasonally Adjusted (2021=100). Source: Eurostat (2025)

Rather than reverse course, however, the EU has so far responded by doubling down on the European Green Deal (Mišík and Nosko 2023; Taylor 2022), integrating climate action into its pandemic recovery fund, enhancing renewable energy targets, and committing significant funds – including, in a rare choice for the EU, from newly incurred debt – to green investments (European Commission 2022b; Goldthau and Youngs 2023). It also introduced the Carbon Border Adjustment Mechanism (CBAM) to protect its industries from carbon leakage by levying fees on certain imports (European Union 2023; Meadows, Yordi, and Vis 2024). And yet, there have been signs that public support for continued acceleration of climate ambition may be eroding. Recent elections at the European and Member State level have strengthened parties hostile to ambitious climate action (Wong 2024), reflecting a recalibration of political priorities and increased focus on the competitiveness of the European economy (Draghi 2024; European Commission 2025a). Such recalibration has also become a declared focus of the second term of Ursula von der Leyen as President of the European Commission, evident in her pursuit of a Clean Industrial Deal and proposals to simplify and streamline environmental reporting requirements (European Commission 2025b; 2025d; Weise 2025).

Externally, the EU's climate leadership is being challenged by the actions of other great powers. U.S. climate policy during the last administration, and in particular the generous support for domestic clean technology infrastructure, manufacturing, and deployment under the IRA and certain Executive Orders on public procurement, spurred European fears of investment diversion and competitive disadvantages for EU industry (Schreurs 2024; Kleimann et al. 2023). In response, the EU has unveiled a Green Deal Industrial Plan and adopted implementing legislation to bolster its own clean technology manufacturing capacities, loosen state aid rules, and secure critical raw material supply chains (European Union 2024a; 2024b). China's surging exports of a growing number of

strategically important goods, including clean technologies such as solar photovoltaic modules, batteries, and electric vehicles (EVs), have likewise imposed rising pressure on European producers. Following several trade remedies against Chinese renewable energy imports (Lewis 2014), the EU has more recently imposed countervailing duties against Chinese EV imports to prevent economic harm from underpriced Chinese vehicles (European Commission 2024). Such moves, while protecting European industries, risk straining EU-China relations and increasing the cost of decarbonization options.

So far, the EU has been largely able to maintain continuity in pursuing its climate policy agenda. It has updated decarbonization targets rather than rolled them back, and implementation of climate legislation – from the expansion of carbon pricing and renewable energy generation to vehicle emissions standards – has steadily progressed. The question now is whether this continuity can withstand "the combined stresses of Russian aggression, US competition, and a rising China" (Osornio and Menzel 2023), especially at a time when the fraying transatlantic alliance prompts a substantial redirection of resources towards European security and defense (European Commission 2025c). Recent election outcomes in important Member States such as France and Germany suggest that establishment forces might prevail over rising populist and potentially more climate-skeptical political movements.[2] It remains unclear, however, whether further electoral shifts across the continent and pressure from the new U.S. administration will ultimately prompt Europe to halt or reverse further advances in decarbonization, or whether these internal and external forces incite greater solidarity within Europe, a renewed effort to accelerate the energy transition as a way to avoid growing dependence on fossil fuel imports from North America and elsewhere, and possibly even exploration of new international partnerships to counter the climate leadership vacuum left by U.S. withdrawal.

2.3 China: A Rapidly Evolving Paradox

China's climate policy trajectory is, in many ways, a paradox: the country has become the largest greenhouse gas emitter in the world, yet also has committed to a steep decarbonization pathway while emerging as the leading producer of clean technologies and materials. Over the past two decades, its emissions have risen in line with its economic growth and heavy reliance on coal (see below, Figure 5). Currently, China accounts for about half of global coal demand and roughly 30% of global CO_2 emissions, more than all developed countries combined (Larsen et al. 2021). At the same time, it has emerged as a powerhouse of low-carbon technologies: illustrating the importance of this sector for China's economy, production of solar panels, wind turbines, batteries, electric vehicles, and critical minerals has been estimated to account for more than 10% of its GDP (Myllyvirta, Qin, and Qiu 2025). While this figure may overstate the actual share due to data inconsistencies and methodological shortcomings, it is likely to continue growing as China contributes more than 75% of global investment in low-carbon technology manufacturing (IEA 2024a) and a similar share of low-carbon technology patents (Bond et al. (2024); see below, Figure 6).

[2] See, for Germany, for instance Arasu (2025)

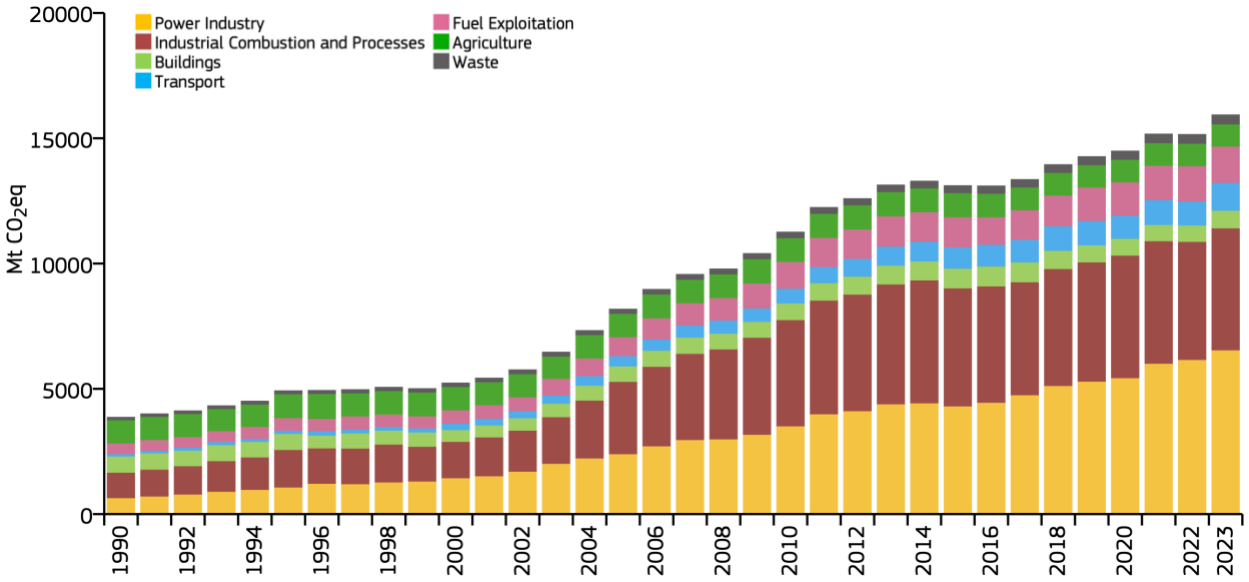

Figure 5: Greenhouse Gas Emissions by Sector, China (in Mt CO_2eq). Source: JRC (2024)

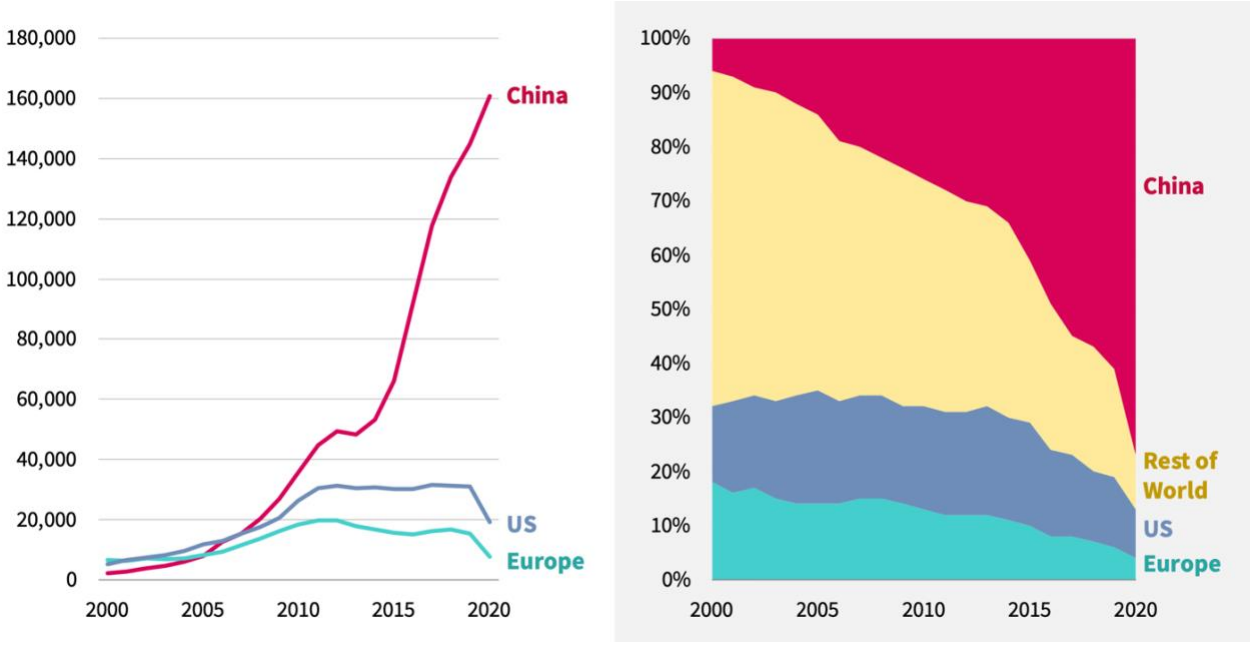

Figure 6: Clean Energy Patents per Year (left) and Share of Global Clean Energy Patents (right). Source: Bond et al. (2024)

This paradox is reflected in Chinese climate policy, which has evolved from declared skepticism about climate constraints to making substantial pledges, including, notably, President Xi Jinping's 2020 announcement to the United Nations General Assembly (UNGA) that China will aim to peak carbon emissions by 2030 and achieve carbon neutrality by 2060 (Ministry of Foreign Affairs 2020). Such commitments mark a turning point, reflecting China's interest in being seen as a responsible steward and global actor during a period when the U.S. had withdrawn from climate leadership (S. M. Moore 2022). Despite such political pledges, China's short- and medium-term actions reveal conflicting trends. On the one hand, China has consistently led the world in renewable energy capacity additions

for several years, installing more wind and solar energy in recent years than all other countries combined (Rangelova and Altieri 2024). To curb its power sector emissions, it has already introduced the largest emissions trading system in the world (Jotzo et al. 2018), and is planning to further expand it to cover emissions from several industrial sectors (MEE 2024). It has further imposed "dual control" targets to limit energy intensity and coal consumption in some provinces, reflecting an intention to address climate change alongside other pressures, such as air pollution and energy security concerns. As a result, China has consistently achieved or exceeded its policy targets related to decarbonization and renewable energy penetration: not only has it already surpassed its 2030 goals for wind and solar deployment, but it is also expected to achieve its 2035 target of 50% electric vehicle sales a decade early (Kennedy 2025).

On the other hand, China's economic and energy policies still variously favor activities that contribute to greenhouse gas emissions. When economic growth falters or energy shortages loom, Chinese policymakers have tended to rely on expanded use of coal and increased output from emissions-intensive industries as a solution. Recent grid instability owed to surging electricity demand and unfavorable weather conditions prompted several provinces to rely on new coal generation as an emergency measure to cover peak load and provide balancing power. In 2023, for instance, China accounted for 95% of the world's new construction activity in coal-fired electricity generation, threatening the country's ability to meet its own decarbonization targets for 2025 (Champenois et al. 2024). Additionally, subsidies for renewable energy have been reduced, causing a temporary dip in new investments and disrupting domestic manufacturing, which struggles with lowered margins due to increased domestic competition. Persistent bottlenecks in the grid integration of new renewable energy capacity in some parts of the country and curtailment events have further weighed on the sector. Still, going forward, expert surveys suggest that China will soon meet all incremental power demand with renewable energy capacity expansions, with a majority of experts surveyed expecting a peak in emissions as early as 2025 (Myllyvirta et al. 2024).

At the same time, China has championed a decadal strategy of coordinated industrial policy, targeted public investments, and strong support for research and development to foster competitive low-carbon technology markets, integrating these with global supply chains and thereby shifting the balance of technological leadership (Sims Gallagher 2014). This approach has, for instance, found its expression in extensive government intervention to increase exports of "strategically important" goods with its "Made in China 2025" strategy (State Council 2015), and has expressly included low-carbon technologies in the mandate to "[d]evelop and expand strategic emerging industries" set out in the 14th Five-Year Plan (2021–2025) (National People's Congress 2021). Overtime, these initiatives have not only afforded Chinese manufacturers more favorable government support in terms of direct subsidies, fiscal incentives, concessional loans, targeted public procurement, state investment funds and other benefits – such as forced technology transfers, subsidized inputs, and preferential access to critical raw materials – than their competitors in other economies (DiPippo, Mazzocco, and Kennedy 2022; W.-H. Liu et al. 2024), but have also contributed to Chinese dominance of nearly all relevant supply chains for low-carbon technologies and critical minerals (IEA 2022).

These contradictory moves – expanding fossil fuel use while leading in renewables – have led observers to see China as both a progressive force and obstacle in global climate action, depending on which aspect is emphasized. In reality, both aspects exist side by side: the sheer scale of China's economy and population allows it to aggressively pursue fossil and clean energy simultaneously, even though doing so complicates its own emissions trajectory while the international spillover effects are increasingly antagonizing trade partners such as the U.S. and the EU. Scale and agglomeration effects have already enabled China to grow its share of global markets for strategically important goods, in many cases dominating entire market segments – as is the case with low-carbon technologies – with vertically integrated supply chains and rising degree of automation (Atkinson (2024); see below, Figure 7). Such manufacturing strength creates a foundation for innovative advantage, bolstered by competitive scale, public investment in science, and a deep talent pool (Campbell and Doshi 2025). According to one survey, China already leads in 37 out of 44 critical technologies spanning a range of fields such as defense, space, robotics, energy, the environment, biotechnology, artificial intelligence, advanced materials and key quantum technology areas (Gaida et al. 2023). Concerns about supply chain vulnerabilities and distributional impacts of Chinese competition are hardly new (D. H. Autor, Dorn, and Hanson 2016; Alessandria et al. 2025), but have acquired new urgency in light of recent developments, suggesting that, for many trade partners, politically tolerable thresholds of China's global market share may have been crossed. Consequently, China has been simultaneously criticized for its domestic emissions growth as well as its dominance of low-carbon technology manufacturing, reflecting another dimension of the aforementioned paradox.

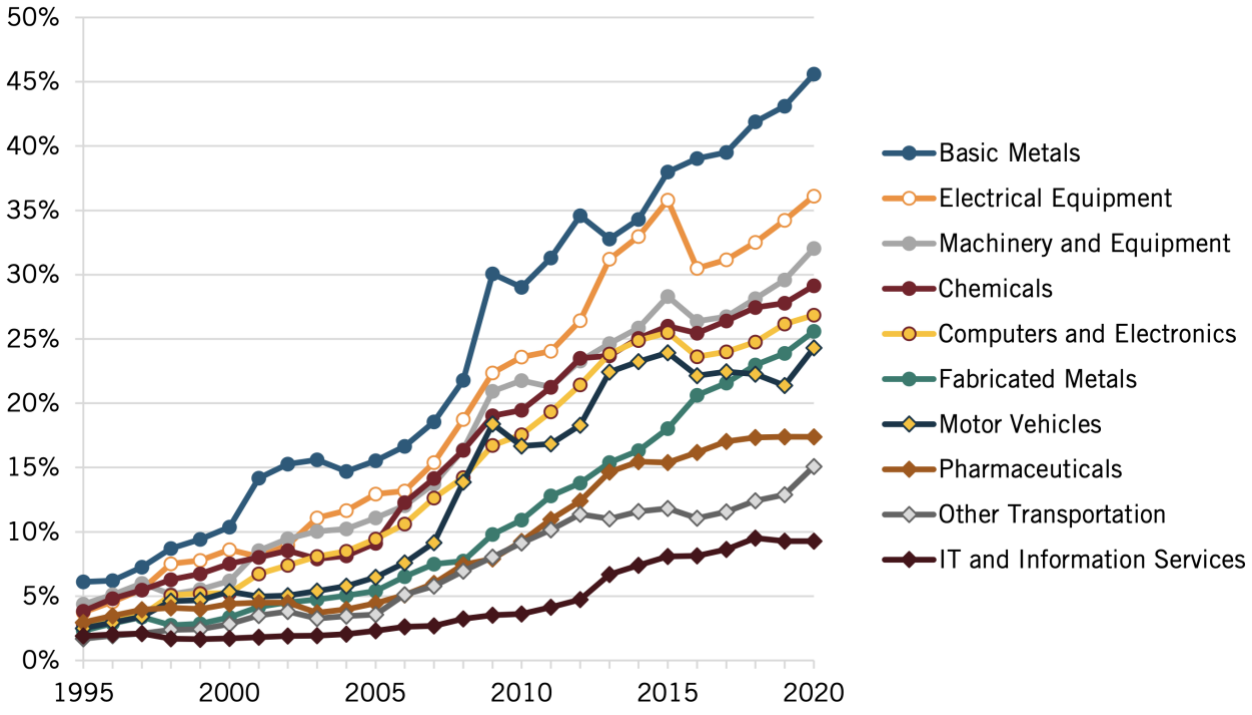

Figure 7: China's Global Market Shares in Advanced Industries. Source: Atkinson (2024)

China's climate paradox also has a geopolitical dimension. Internationally, China seeks recognition for its climate efforts, yet resists external pressure to accelerate emissions cuts, citing development rights

and the historical responsibility of developed nations for climate change. Beijing has often positioned itself as a voice for equity, insisting on the principle of "common but differentiated responsibilities and respective capabilities" set out in the United Nations Framework Convention on Climate Change (UNFCCC) (Tsang 2024). However, as climate impacts worsen and domestic vulnerabilities become more evident, Chinese leadership has started framing climate action as part of its own national interest and security, and as an increasingly integral dimension of its perceived role as a responsible great power and leader of the developing world (Hurri 2023).

Notably, the aforementioned 14th Five-Year Plan includes climate and low-carbon development as key themes, and President Xi has personally championed initiatives such as the Global Development Initiative, which integrates green development components into China's ambitious Belt and Road Initiative (BRI). In 2021, again before the UNGA, President Xi had already declared that "China will step up support for other developing countries in developing green and low-carbon energy, and will not build new coal-fired power projects abroad" (State Council 2021). Still, China's outsized contribution to global emissions will continue to place it in a defensive position in international climate negotiations, unless it is able to dramatically accelerate the pace of domestic decarbonization. Much will therefore hinge on the stringency of China's upcoming NDC for 2035 (Myllyvirta and Bland 2024) and whether China can bend its emissions curve downward before 2030, both of which would send a meaningful signal to the international community.

In all this, China is keenly aware of the geopolitical dimensions of its climate ambitions and its dominant role in low-carbon technology manufacturing (Z. Z. Liu 2024), as seen in its responses to protectionist reflexes in a number of trade partners, including restrictions on exports of several critical raw materials such as bismuth, graphite, indium, molybdenum, tellurium, and tungsten, as well as complete bans on gallium, germanium, and antimony exports to the U.S. (Lv et al. 2025). As China struggles with overdue structural reforms and demographic decline, with both the health of its economy and its social cohesion overly dependent on export-led growth (Alperovitch and Graff 2024), China's market leadership in clean technology manufacturing affords it a strategic incentive to promote accelerated decarbonization in other countries, which would likely rely on Chinese exports to meet growing demand. But this entails a delicate balance: U.S. and EU reactions have already shown that excessive market concentration can also spur trade partners to intervene in trade flows by erecting barriers and forcing the expansion of local production capacities, potentially weakening China's market position in the long run. For the time being, however, global demand for low-carbon technologies should outpace new production capabilities, especially given China's lead in both low-carbon manufacturing investment and innovation. How China manages to navigate the foregoing set of paradoxes will determine whether it can step up as a climate leader – potentially filling a vacuum in global climate cooperation left by the U.S. withdrawal from the Paris Agreement – or remains entrenched in the defensive mindset of the past. More than any other set of choices, its success will determine whether humanity can rise to the global challenge of climate change.

3 Climate, Trade, and the Geopolitical Turn

3.1 Climate and Trade at the Nexus of Great Power Politics

Climate change has moved to the center of great power politics, creating a complex nexus where climate policy and international trade intersect with geopolitical rivalry. In the era of renewed great power competition, major actors increasingly view climate-related initiatives through a strategic lens (Dalby 2014). This is a marked shift from the cooperation-focused narrative of the early 2010s when climate diplomacy was often insulated from other disputes. Now, climate issues are both an arena for competition and a bargaining chip in broader diplomacy. One clear example of this geopolitical turn occurred in August 2022, when China unilaterally suspended its climate dialogue with the U.S. over a political provocation, a high-level U.S. visit to Taiwan (Mallapaty 2024). This suspension demonstrated that climate cooperation could not be shielded from geopolitical tensions, with traditional security and sovereignty issues capable of derailing joint climate efforts and undermining progress on initiatives that should be in the collective interest.

Trade has also become increasingly entwined with climate geopolitics. As countries ramp up climate action, they are adopting measures that affect international flows of goods, services, capital, and knowledge. Such TrCMs, including border measures or subsidies for green goods and manufacturing that are conditional on meeting local content and other requirements, can distort trade and trigger trade conflicts (UNCTAD 2023; Evenett et al. 2024). The EU's CBAM, for instance, has strategic implications: while it aims to prevent carbon leakage and encourage others to adopt carbon pricing, several trade partners of the EU have criticized it as a protectionist tool (Eicke et al. 2021; Øverland and Sabyrbekov 2022), even leading a group of influential emerging nations, the BASIC group (comprising Brazil, South Africa, India and China), to threaten holding up international climate negotiations by insisting on inclusion of an agenda item on "climate-change related unilateral restrictive trade measures" in the 2023 and 2024 UN Climate Summits (Brazil 2023; China 2024). Similarly, the United States, through the Inflation Reduction Act, offers subsidies and tax credits favoring domestic production of clean technologies, a condition that incited vigorous backlash even from close allies (Stokes 2024) and prompted China to initiate judicial proceedings under the World Trade Organization (WTO 2024). Similarly, China's subsidy-driven dominance in solar panel production has led to trade disputes (Lewis 2014), a trend that is widening to electric vehicles and critical minerals, and echoes broader concerns about the economic and social impacts of Chinese competition and industrial relocation (D. Autor, Dorn, and Hanson 2021).

Against this backdrop, climate policy measures can carry geopolitical weight beyond their environmental intent. For instance, nations worry about overreliance on rivals for energy technology; thus, they opt to restrict trade to bolster energy security. As already mentioned in the previous section, China's control over rare earth metals and other critical minerals, essential for renewable energy and defense technologies, has repeatedly been leveraged in diplomatic standoffs, underscoring how climate and clean technology issues can become part of a larger geopolitical dynamic. The major powers are striving to secure advantages in sectors considered to be the industries of the future – including renewable energy, batteries, and electric vehicles – viewing leadership in these sectors as key to

economic and strategic influence. As a result, policies to address climate change are deeply intertwined with policies to enhance national competitiveness and resilience. Scholars observe that geopolitics now "depends as much on … energy or economics" as on traditional military might, meaning control of clean energy supply chains can translate to geopolitical power (S. M. Moore 2024).

Accordingly, the nexus of climate and trade in great power politics appears to be characterized by a dual dynamic: competition in which states seek to outmaneuver each other for economic and technological dominance, and contention where climate measures cause diplomatic or trade conflicts. However, such competition can also have a silver lining: If rivalry spurs a race to the top in deploying clean technology – each power trying to outdo the others in cutting emissions and building green industries – then great power politics could paradoxically accelerate climate action (Tsang, Tollmann, and Oertel 2020). Up until recently, this dynamic appeared a credible possibility, but the change in administration from President Biden to President Trump, and the already notified withdrawal of the U.S. from the Paris Agreement (Executive Office of the President 2025d), suggests that such a virtuous cycle is by no means guaranteed. Geopolitical rivalry and strategic priorities could equally lead to climate action being superseded by other priorities, such as economic competitiveness and military security. In such a scenario, increased deployment of trade-related climate measures could backfire, or fall victim to negotiations over trade access and military security. Climate and trade, in other words, now sit at a fraught intersection of great power relations: a zone of both heightened tension and potential catalytic competition.

3.2 Economic Competitiveness, Trade Measures, and the Industrial Policy Turn

As climate action becomes a priority, major economies are increasingly resorting to industrial policies and trade measures to secure economic competitiveness in a low-carbon future (Evenett et al. 2024; Juhász, Lane, and Rodrik 2024). This represents a significant shift from the market-oriented approaches of previous decades to a more interventionist stance - a trend often referred to as the "return of industrial policy" (Cherif and Hasanov 2019). In the United States, the clearest embodiment is the aforementioned IRA: it not only allocates large investments for clean energy, but is explicitly designed to strengthen U.S. manufacturing of relevant technologies through local content requirements and other conditions attached to fiscal incentives. Tax credits for electric vehicles, for instance, only apply fully if a certain percentage of battery components are made or assembled in North America. Such provisions aim to onshore supply chains and reduce dependence on Chinese batteries, but they also erect trade barriers that risk fragmenting global markets. U.S. allies like the EU, Japan, and South Korea have voiced concerns and sought exemptions, worried that their companies could be cut out or pressured to relocate to the U.S. (Crawford 2023; Moens and Overly 2023).

The EU, traditionally a proponent of free trade, has responded by formulating its own suite of industrial measures, while nevertheless trying to remain within the boundaries of the rules-based international order. The Green Deal Industrial Plan announced in early 2023 seeks to streamline regulations and funding to accelerate clean technology manufacturing in Europe. Since then, the Net-Zero Industry Act and Critical Raw Materials Act have been adopted with a view to strengthening European production of technologies like batteries, wind turbines, and heat pumps, and to diversify

sources of critical raw materials away from China (European Union 2024b; 2024a). Additionally, the EU has relaxed state aid rules temporarily, allowing Member States to better support manufacturers so they are not drawn to relocate by incentives such as those available under the IRA. This marks a notable turn for Brussels, which traditionally guarded against state intervention but now acknowledges the need to "compete on quality, not on subsidies" (Jack et al. 2023) while shoring up its industrial base. Europe is effectively trying to find a balance: countering the threat of foreign competition by either entering a full subsidy war, or deploying trade restrictions that could undermine its commitment to free trade disciplines.

China, for its part, has long utilized industrial policies to foster its low-carbon technology sectors (Sims Gallagher 2014), which is a major reason it leads in nearly every relevant market segment. Generous subsidies, concessional loans, and domestic content rules in the 2000s and 2010s allowed Chinese companies to achieve economies of scale and undercut international competitors (DiPippo, Mazzocco, and Kennedy 2022; W.-H. Liu et al. 2024). Western countries criticized these practices, accusing China of violating trade rules through subsidized overcapacity and dumping. Now, however, the U.S. and EU are to some degree following the Chinese playbook: intervening to build domestic industries deemed critical for the future. This convergence on industrial policy reflects a broader geoeconomic trend: states are prioritizing supply chain security and technological leadership, even if it means tempering free-market principles.

A dramatic increase in trade-related climate measures has accompanied these policies. Besides the EU CBAM mentioned earlier, more traditional tariffs, export controls, and localization requirements have emerged as routinely deployed policy tools. For instance, the U.S. has imposed excess tariffs on Chinese solar panels and recently imposed 100% tariffs on Chinese electric vehicles and batteries, explicitly citing China's dominance as a security threat. In late 2023, the EU initiated a process to impose more nuanced trade remedies – countervailing duties applied to imports from individual producers – on Chinese EVs after an investigation found evidence of state subsidies fueling cheap exports. Experience shows that such measures almost invariably invite retaliation and therefore risk escalating into a full-blown trade war, though they are also leverage for negotiating a level playing field.

During the Biden administration, efforts were made to foster a dialogue on transatlantic cooperation on supply chains to reduce collective dependence on China, for instance through the U.S.–EU Task Force on the Inflation Reduction Act (European Commission 2022a) and efforts to harmonize standards for critical minerals sourcing. Likewise, both actors sought to create a cooperative arrangement on sustainable steel and aluminum that was expressly intended to also counter the perceived threat of "non-market excess capacities" (European Union and United States 2021), but this effort ultimately failed in view of persistent differences on specific policy details (Rimini et al. 2023). Whether any of these bilateral initiatives survives under the new U.S. administration remains to be seen.

The turn to industrial policy and trade measures underscores how economic competitiveness is now viewed as intertwined with climate leadership. Being a leader in the production of solar panels, wind turbines, hydrogen electrolyzers, or EVs is not just an economic goal, but can also be seen as

conferring geopolitical advantage and energy security. If each bloc aggressively pursues its own industrial policy without coordination, however, it raises the risk of inefficiencies, duplication, and trade conflicts that distract from the primary goal of reducing global emissions (Mehling 2024; Noll, Steffen, and Schmidt 2024). It is also likely that the new U.S. administration will challenge any strategy that seeks to frame low-carbon technology leadership as a geopolitical advantage. At the same time, U.S. retrenchment and increased competition may also drive other powers such as the EU and China to intensify their domestic and international policy efforts – and possibly accelerate innovation and cost reduction in clean technologies – to the benefit of the worldwide transition. The current challenge for the U.S., EU, and China is to navigate this industrial policy turn in a way that safeguards both their economic interests and the collaborative spirit needed for global climate action. Diplomatic engagement, such as aligning subsidy programs or jointly setting standards, will be crucial to prevent a zero-sum outcome where trade tensions undermine climate progress.

3.3 Clean Technology Supply Chains and the Security Dimension of Decarbonization

Decarbonization has a further geopolitical dimension: the security of low-carbon technology supply chains. As countries pivot from fossil fuels to renewable energy and electrification, they become reliant on a new set of resources – lithium, cobalt, graphite, silicon, and several rare earth metals – as well as critical components such as batteries, solar photovoltaic cells, and wind turbine parts (Mertens et al. 2024). This shift has redefined global energy security, moving concerns from oil and gas supply to the minerals and materials needed for clean technology (Bordoff and O'Sullivan 2023). Several risks converge around these supply chains: a potential cutoff of essential supplies, which can enable coercive strategies by suppliers or "weaponization" of supply chain dependencies (Farrell and Newman 2019); intellectual property theft; and losing competitive advantage in industries deemed vital for the 21st century. Currently, these supply chains are highly concentrated, with China playing an outsized role at multiple stages: mining and processing of critical minerals, manufacturing components, and assembling low-carbon technologies. For instance, China processes more than half of the world's lithium and cobalt, over 90% of battery-grade graphite, and over 77% of refined rare earths, produces over 70% of solar PV modules, and is home to about 70% of global wind turbine and battery cell manufacturing capacity (IEA 2024c; see also below, Figure 8). This concentration has raised strategic concerns in Washington and Brussels that dependence on China for the hardware and materials needed for the energy transition could become a strategic liability. In both regions, the security dimension of decarbonization has thus focused on diversifying sources of critical materials and reducing the monopoly of any single country in low-carbon technology manufacturing.

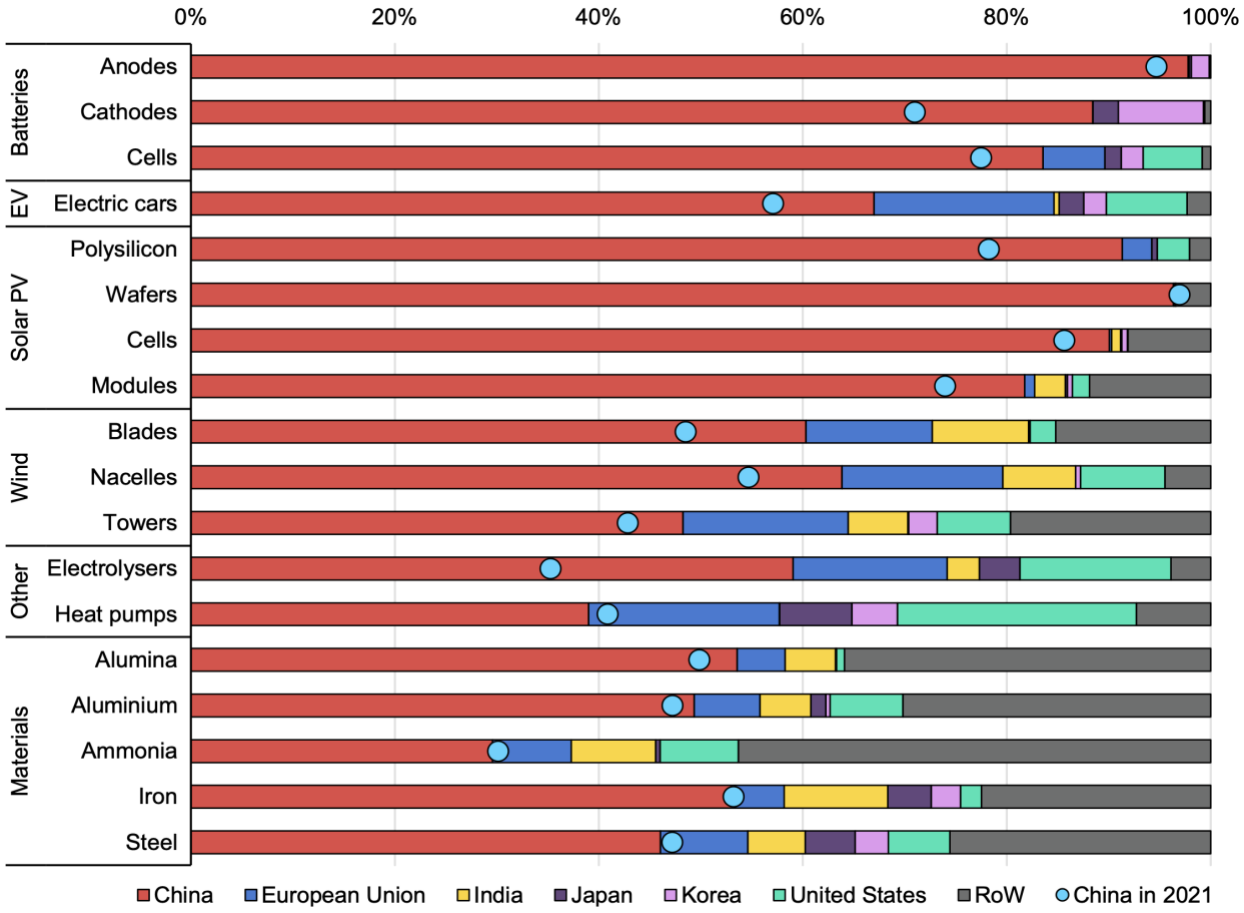

Figure 8: Installed Low-Carbon Technology Manufacturing Capacity by Country/Region, in % (2023). Source: IEA (2024b)

In the U.S., a bipartisan consensus has emerged that reliance on China for essential supply chains is a risk that needs to be avoided for the sake of national security. Under the administration of President Biden, economic policy already shifted from market openness to greater autonomy, placing increased emphasis on the risks associated with economic interdependence, more resilient supply chains, and reduced dependence on foreign suppliers (Sullivan and Harris 2020). Consequently, the U.S. embraced concepts such as "friendshoring" and "de-risking" (Yellen 2023), and expanded the use of trade remedies against foreign producers to diversify supply chains (Bown 2023). Even the new administration under President Trump has acknowledged the importance of critical minerals, including in early policy documents declaring a "national energy emergency" (Executive Office of the President 2025c). At the agency level, the Departments of Energy and of Defense have launched initiatives to secure domestic or allied sources of critical minerals, including use of the Defense Production Act to boost mining of battery minerals and providing loans for battery manufacturing plants on U.S. soil (Executive Office of the President 2021). Furthermore, export controls have been tightened to prevent advanced technological know-how from strengthening Chinese capabilities.

In Europe, the language differs slightly, emphasizing "strategic autonomy" and resilience as early as 2016 in the context of a global strategy on security and defense (European Council 2016). Russia's invasion of Ukraine in 2022, which caused a spike in energy prices and forced rapid

diversification of fossil fuel suppliers, sharpened attention to supply chain vulnerabilities; the EU realized it must avoid similar overdependence in the realm of low-carbon technology inputs. Still, the European approach has been more nuanced than that of the U.S., with the official policy narrative calling for a "de-risking" of supply chains (European Commission 2023b). This has prompted inclusion of related targets in the Green Deal Industrial Plan (European Commission 2023a), which the EU Critical Raw Materials Act seeks to operationalize with targets to mine and process a certain percentage of key minerals within Europe or obtain them from trusted partners, aiming to ensure that no more than 65% of supply for any critical raw material comes from a single country (European Union 2024a).

For China, the security of supply chains is also a concern but with a different perspective: it worries about access to foreign technology and inputs under possible U.S. export restrictions or blockades (Miller 2022). That has led Beijing to pursue self-sufficiency in areas such as semiconductor chips and aircraft, while maintaining its lead in low-carbon technology manufacturing as a buffer against external pressure. Notably, China has shown willingness to use its dominance for leverage, as seen by its export controls on several critical raw materials essential for low-carbon technology manufacturing (Lv et al. 2025). For western nations, these restrictions were a signal that China could retaliate in the economic domain if strategic competition intensifies, potentially disrupting the energy transition in the U.S. and EU. China's dominance of low-carbon technology and critical raw material supply chains also acquires relevance in another important way: economies of scale and agglomeration, achieved with more than a decade of targeted government support, have enabled Chinese producers to supply the goods needed for global decarbonization at higher volumes and lower cost than any other region (Helveston and Nahm 2019; M. R. Davidson et al. 2022).

Consequently, all three powers are seeking secure, resilient, and sustainable supply chains through strategies like diversification, innovation, and strategic alliances. The recent concept of "friendshoring" encapsulates this approach: sourcing materials and manufacturing in countries that are political allies, to reduce the risk of coercion or disruption (Yellen 2023). In practical terms, this shared objective has contributed to the emergence of initiatives such as the Minerals Security Partnership – led by the U.S. with over a dozen partners, but excluding China – to finance new mineral projects (Department of State 2022; Vivoda and Matthews 2024), and a number of bilateral critical mineral agreements between the U.S. and key trade partners (Ufimtseva, Li, and Shapiro 2024). Meanwhile, companies are hedging their bets: Western firms are exploring production in India, Vietnam, or Mexico as alternatives to China, and Chinese companies are deploying outbound investments in mining in Africa and South America to secure raw materials at the source. Particularities of the global value chains of many low-carbon technologies allow for multiple ways to circumvent trade restrictions (M. Davidson 2025), exacerbating the already weak track record of trade and financial sanctions more generally (Demarais 2022).

The securitization of clean technology supply chains underscores a reality of the great power climate paradox: even actors that profess commitment to decarbonization are simultaneously maneuvering to ensure that the transition happens on their terms and without exposing them to strategic dependencies. Such maneuvering risks slowing down the global deployment of low-carbon

technology, however, if it leads to trade restrictions or inefficiencies. As interventions in international trade flows prevent optimal allocation of resources in line with the comparative advantage of each region (Ricardo 1821; Deardorff 1980), the pursuit of supply chain diversification through managed trade harbors the potential for significant economic losses (Cerdeiro et al. 2024). The challenge, thus, will lie in finding cooperative frameworks to keep supply chains open and reliable – perhaps through broader cooperation on critical minerals, shared stockpiles, or codes of conduct – while still addressing legitimate security concerns. This balance will be crucial to sustain the pace of decarbonization in an era where trust among great powers is in short supply.

4 Implications for the Future of Global Climate Action

4.1 Climate, Trade, and Foreign Policy: A Scenario Analysis

Scenario analysis provides a structured approach for assessing possible futures in complex and rapidly evolving geopolitical landscapes. Because states define and defend their interests differently as their relative power changes and as internal and external circumstances evolve, static predictions about future outcomes tend to fall short (Chivvis 2024). Unlike single-outcome forecasts, scenarios offer multiple plausible trajectories, allowing decision makers and stakeholders to categorize policies according to their alignment with different futures while navigating uncertainty (Schoemaker 1995; Schwartz 1991). When seeking to understand future climate policy trajectories in a highly uncertain context of shifting domestic interests and political pressures, such an approach can offer helpful insights about strategies to shape desired outcomes. In such a context, scenario analysis cannot predict the future, but rather illustrates how different configurations of policy choices, economic shifts, and geopolitical tensions might unfold. As such, it can help explore alternative strategic equilibria, where tipping points in political or economic conditions may propel actors towards certain outcomes. It can also serve as a tool for driving forward policies that may seem politically or economically unviable in the short term by contextualizing their implications within possible futures.

In the next section, three distinct scenarios will be explored through the lens of two-level game theory, which conceptualizes international cooperation in terms of a first level of diplomatic negotiating positions constrained by a second level of domestic politics (Putnam 1988). Earlier studies have extended this framework to climate diplomacy and energy cooperation, highlighting the difficulty of aligning international commitments with national interests, particularly in great power competition (Lisowski 2002; Keohane and Oppenheimer 2016). As a quintessential collective action problem – creating a free rider dilemma that has long defied effective cooperation (Nordhaus 2015) – climate governance underscores the usefulness of a two-level game perspective: actors such as the U.S., the EU, and China must each reconcile international pressure to increase climate ambition with domestic economic interests and political forces. Conceptually, this two-level approach helps identify domestic economic and other short-term concerns which outweigh long-term environmental imperatives, helping explain why climate cooperation is often difficult to achieve and even harder to sustain.

In a two-level game setting, policymakers operate within constrained win-sets – the range of diplomatic outcomes that can secure domestic ratification – meaning that effective climate diplomacy

hinges on expanding these win-sets through narrative framing, institutional design, and phased policy commitments.[3] To structure scenario analysis within this framework, classic game-theoretic models offer a useful means of characterizing strategic interactions. Prior work on international environmental agreements has, for instance, demonstrated that cooperation structures can resemble different types of games: assurance games when mutual cooperation yields the highest payoff, prisoner's dilemmas when incentives favor defection, or coordination games where actors must align strategies under conditions of uncertainty (Barrett 2003). Variants of these game-theoretic models include the "chicken game", which captures a brinkmanship scenario in which each actor risks significant losses if both insist on holding their ground, yet if one yields, the other gains a strategic advantage (Rapoport and Chammah 1966).

Each of the scenarios below focuses on particular domestic interests and political constraints to argue different implications for climate action, including bilateral, regional, or multilateral cooperation. Models drawn from game theory can conceptually explain particular outcomes, but by embedding the discussion in a broader scenario analysis, climate cooperation is depicted as an evolving strategic space rather than a fixed binary between specific outcomes. Doing so also highlights how external shocks – ranging from economic disruption caused by climate change to shifts in domestic politics – could serve as tipping points, upending previous win-sets and propelling the system toward an altered state of equilibrium. Overall, this heuristic approach recognizes scenario analysis as a tool for understanding not just what may happen, but how strategic choices shape different pathways, affording latitude to influence cooperative outcomes. Ultimately, the two-level game perspective illustrates why climate negotiations must be attuned not only to the diplomatic dimension, but also to the domestic context in which the actual implementation of climate commitments will occur.

4.2 Short- and Medium-Term Scenarios for Climate Action

In the foregoing shadow of global fragmentation and great power competition, scenario analysis – informed by domestic interests and political constraints – allows charting several possible trajectories for global climate action in the short and medium term. Three alternative short- to medium-term scenarios – with an approximate time horizon of five to ten years – are described in this section, none of which presumes a return to traditional multilateral coordination. The first scenario envisions some degree of progress on global decarbonization due to virtuous competition and continued cooperation on selected issue areas; the second, a pessimistic scenario, envisions a rise in geopolitical hostility and downward spiral of nationalist retrenchment; and the third scenario imagines a fundamental reversal of roles around climate leadership and obstruction, upending conventional assumptions. Because the scenarios are stylized and focus on a particular dynamic, actual outcomes will not play out exactly as described below, with actual developments more likely to reflect elements of different scenarios. That

[3] In this framework, the EU presents an additional layer of complexity, functioning as a "three-level game" in which individual Member States, EU institutions, and international actors all interact in shaping policy. Its ability to navigate great power dynamics between the U.S. and China depends not only on its external positioning, but also on its internal coherence, which is subject to political fragmentation and divergent national interests. As seen with EU policies such as the mandate to phase out internal combustion engine cars by 2035, initial agreement at the EU level gave way to renegotiation after domestic lobbying prompted Germany to seek an exemption for synthetic fuels under pressure from its auto industry, showing how domestic interests reopened what was thought to be a settled supranational deal.

notwithstanding, the scenarios help illustrate risks and opportunities facing U.S.-China-EU relations in driving climate action as the world enters a more adversarial and competitive paradigm.

4.2.1 Scenario 1: Competitive Cooperation ("Race to the Top")

As an optimistic outlook in a more adversarial and fragmented world, this scenario envisions a geopolitical landscape in which great power rivalry ends up advancing climate action by fostering rapid innovation and industrial competition while avoiding outright conflict. Climate progress under this scenario is largely facilitated by competition, ensuing cost declines, and market-driven diffusion of low-carbon technologies around the world (Tsang, Tollmann, and Oertel 2020). As with previous sociotechnical transitions, competition proves a powerful lever to accelerate the decline in technology cost which enables broader uptake (de la Tour, Glachant, and Ménière 2011; Kavlak, McNerney, and Trancik 2018). All three great powers – the U.S., China, and the EU – continue to pursue leadership in low-carbon industries, although the sectors each region favors differ in line with domestic resource endowments and comparative advantage. State interventions and industrial policy remain a major feature as each power seeks to expand market shares and secure supply chains in critical sectors. Where cooperation occurs, it takes place in a continuum between the classic prisoner's dilemma – where every actor has a constant incentive to defect – and a coordination game, where some degree of policy alignment is beneficial as long as the other actors follow suit.

In the U.S., state and local policy mandates as well as politically resilient incentives in federal legislation continue to drive domestic low-carbon investment, although the dynamic of recent years is tempered by policy uncertainty and obstruction at the federal level as well as trade barriers that increase the cost and timeline of decarbonization. While the new administration and its allies in Congress succeed in reversing some of the low-carbon technology incentives in Biden-era legislation, backlash and litigation from interest groups that have a stake in a continued energy transition stall or prevent efforts to roll back climate policy progress even as political priorities evolve. Internationally, the U.S. largely retreats from climate diplomacy, without however becoming an active obstructionist in international climate negotiations. Isolating China economically and politically remains one of the few issues that still garners bipartisan support (Lighthizer 2023).

Meanwhile, political headwinds in a number of Member States do not prevent the European Union from advancing its Clean Industrial Deal (European Commission 2025b), enabling it to safeguard the competitiveness of European industry while continuing to pursue its already legislated climate policy objectives (European Union 2021). Shifting geopolitical alliances and concern about U.S. withdrawal from historical security guarantees help foster European unity and spur dramatic new investment and regulatory reform – including a relaxation of the rigid fiscal disciplines in the Stability and Growth Pact (SGP) – to strengthen the manufacturing base, notably in areas relevant to national defense. Domestic policy continuity is mirrored at the international level through continued advocacy for increased ambition in the multilateral climate regime. Policies with extraterritorial reach (Scott 2019) that condition access to the European market on environmental performance or policy ambition, such as the CBAM, result in some diplomatic pushback, but spur greater global climate action overall as well as convergence of policy designs and standards (Clausing et al. 2024; Mehling, Dolphin, and Ritz 2024; Otto 2025).

China, finally, defends its dominance in low-carbon technology manufacturing and innovation with new mandates under the 15th Five-Year Plan. Its low-carbon products face mounting trade barriers as the U.S., Europe, and several other economies apply stricter import restrictions on Chinese goods, yet this drives even greater competition within China and contributes to further technology cost declines, offsetting some of the tariff burden and prompting Chinese producers to absorb part of the cost increases through eroding profits. Where western markets limit market access for Chinese imports with more targeted controls, such as the outright ban of Chinese "connected vehicles" by the U.S. (Department of Commerce 2025), those goods are redirected to satisfy growing demand in developing country markets, where they offer the most affordable option for energy access or mobility and help avoid future emissions growth.

Beyond the domestic dimension, this competitive dynamic also extends to a global investment race. With intensified external engagement through the Global Gateway and Clean Trade and Investment Partnerships (CTIPs), the EU pursues an external dimension of its Clean Industrial Deal, seeking to position itself as a driver of low-carbon infrastructure in developing countries and thereby counterbalance the Chinese BRI (European Commission 2021; Tagliapietra 2024; von der Leyen 2024). Meanwhile, China orients its highly successful BRI – which has already disbursed over $1 trillion since its inception over a decade ago (Nedophil 2024) – towards greater sustainability by ceasing any investments in emissive projects and infrastructure, as already signalled by President Xi in 2023 (Zhou and Ma 2023), and instead scaling up investments in renewable energy and other low-carbon technologies.

In this regard, the U.S. is at a disadvantage, with relevant institutions – such as the International Development Finance Corporation (DFC) and the Agency for International Development (USAID) – firmly controlled and weakened or dismantled by an averse federal administration, and earlier proposals to extend domestic climate progress to the international level through a foreign investment strategy (Deese 2024) unlikely to garner political support. Similarly unclear is the fate of a number of Just Energy Transition Partnerships (JETPs) between advanced donor economies including the U.S. and beneficiary countries in Africa and Southeast Asia, whose effectiveness had already raised questions before the administration changed in Washington, DC (Ordonez et al. 2024). Whereas European and U.S. initiatives have historically emphasized transparency, environmental standards, and democratic governance, they have lacked the strategic coherence of Beijing's outbound investments, limiting their effectiveness in displacing Chinese influence in emerging markets (Ball 2025).

Chinese outbound investment also acquires growing importance beyond the developing world. As the U.S. and Europe erect additional barriers against Chinese goods, Chinese producers increasingly opt to build manufacturing capacities outside China (Jackson et al. 2024). Such investments favor unaligned connector countries with existing free trade agreements that offer access to western markets, affording resilience to global trade even as the global economy becomes more fragmented (Gopinath et al. 2024). Some Chinese investment also targets the U.S. or the EU, although strict screening criteria and restrictions to prevent intellectual property theft or even mandate reverse technology transfer and joint ventures condition such investment, replicating mechanisms that China

has imposed on inbound investments in the past. Concerns about supply chain security are addressed through diversification efforts and targeted restrictions on market access (Meltzer and Pearson 2024), rather than blunt across-the-board trade barriers – such as punitive tariffs – that stifle international flows of goods, services, and capital.

Despite trade frictions and economic competition, elements of cooperation persist: China, the U.S., and the EU engage in limited multilateral efforts to coordinate on specific issues where interests align, either because they are of lower strategic importance or because doing so affords mutual benefits in enabling nascent industries. This is where the model of a coordination game becomes manifest. Examples include technical standards for hydrogen and energy storage, or working-level dialogues on the phasedown of methane, HFCs and other non-CO_2 gases. More broadly, the U.S. and China continue to maintain open communication channels on topics of shared concern (Wertheim 2024). Where issues prove too sensitive for formal diplomatic channels with China, cooperation might also be relegated to the subnational level or occur via private sector partnerships (S. M. Moore 2022). Some degree of fragmentation of global supply chains results in inefficiencies, yet the Competitive Cooperation scenario ensures that innovation and investment in low-carbon technologies remain at the forefront of great power competition, leading to cost reductions and accelerated global deployment.

Overall, this scenario also highlights the importance of the two-level game, with foreign policy initiatives such as the Global Gateway and the BRI seeking to advance domestic economic interests and policy priorities. The resulting competition provides an impetus to act boldly, and minimal cooperation or at least communication ensures it does not devolve into mutual obstruction. The outcome is imperfect – there is duplication of efforts and some inefficiency – but global emissions still peak and decline in a world that is no longer amenable to multilateral climate diplomacy.

4.2.2 Scenario 2: Geopolitical Fragmentation ("Every Nation for Itself")

With its pessimistic outlook, this scenario describes a world in which intensifying strategic rivalries, economic nationalism, and escalating trade conflicts derail climate cooperation. Rather than coordinate efforts, the U.S., China, and the EU become entrenched in competing blocs, prioritizing economic competitiveness and geopolitical advantage over collective climate goals. The result is a world where climate action is a secondary consideration, with regional competition and geopolitical distrust preventing the scale and speed of transformation necessary to avert catastrophic climate outcomes. This scenario closely resembles a multi-actor Prisoner's Dilemma, with the U.S., China, and the EU each prioritizing short-term domestic gains over collective long-term benefits, leading to mutual defection instead of cooperation on climate policy. From a two-level game perspective, intensifying nationalism and economic self-sufficiency significantly restrict each actor's "win-set," hampering their ability to negotiate international agreements or trust rival blocs. Consequently, the lack of common ground in those shriveled win-sets fuels a downward spiral of fragmentation and conflict, obliterating any possibility of effective climate cooperation.

In this scenario, the U.S. – now under an openly protectionist administration eager to weaponize trade for political ends (Fishman 2025) – doubles down on a tariff-based trade policy that

severely weakens international trade cooperation and disrupts low-carbon technology supply chains, exacerbating supply constraints and increasing the costs of the energy transition (Executive Office of the President 2025f). Domestically, presidential actions and agency rulemaking reverse all regulatory progress made by previous administrations, while systematic dismantling of institutional capacities across the executive branch reduces the capacity to administer remaining mandates. Declaration of a national energy emergency (Executive Office of the President 2025c) affords the President broadened powers, including in issue areas where authority is normally reserved to states and municipalities. An administrative finding that existing environmental legislation does not apply to greenhouse gases – upheld by the conservative majority in the Supreme Court – further limits the ability of future administrations to resume more progressive climate action.

Republican majorities in both chambers of Congress successfully eliminate many of the incentives for low-carbon technology manufacturing and deployment contained in the IRA and other federal legislation. Even where market forces would otherwise favor low-carbon technology options, slow permitting decisions, targeted regulatory burdens aimed at furthering U.S. "energy dominance", and a generally uncertain investment environment stall new low-carbon investment. Even in states with subnational climate and low-carbon energy mandates, investment slows down. Internationally, an increasingly coercive style of foreign and economic policy seeks to further U.S. interests by leveraging its dominance in fossil fuels, alienating traditional allies. Arbitrary initiatives to counteract perceived asymmetries in international trade and unfair treatment of U.S. producers (Executive Office of the President 2025e; 2025f) accelerate the decline of the multilateral trading system (Berg 2025). Earlier engagement with China, even if increasingly limited over time (Chivvis 2024), has given way to unfettered hostility, with China now declared the primary strategic adversary of the U.S. in an often foretold escalation of geopolitical rivalry (Allison 2017; Pillsbury 2015). In multilateral settings, the U.S. distances itself from former allies and increasingly sides with other petrostates to actively sideline or obstruct negotiations that might advance climate action, using its economic and political leverage to coerce other countries to do the same.

The EU, while initially aligned with the U.S. on a number of policy priorities, including critical minerals and industrial decoupling from China, faces growing internal fractures. Election outcomes have strengthened parties that are skeptical of climate change as well as European integration, calling for a reversal of climate policy ambition and openly raising the prospects of withdrawal from the EU. With internal unity in disarray, and facing existential security risks in its immediate neighborhood, the EU reluctantly deepens its dependence on energy imports and military support from the U.S., constraining its ability to meaningfully oppose increasingly aggressive policy demands out of Washington, D.C. Instead of incentivizing global climate action, EU policies with extraterritorial reach – such as the CBAM – provoke retaliation from trade partners (Øverland and Sabyrbekov 2022), which respond with countervailing measures and supply chain rerouting. Continued pressure to revive industrial competitiveness, and the massive reallocation of resources to new priorities such as defense, hollow out the European Green Deal and its ambitious policy agenda.

With both the U.S. and the EU surrendering global leadership on climate action, a vacuum ensues that no other country is able to fill. On the contrary, U.S. retrenchment emboldens other

countries to reconsider their own commitment to multilateral climate cooperation, with several even considering their own withdrawal from the Paris Agreement (Stavins 2025). China continues to rely on state-backed overcapacities and a trade surplus to compensate for faltering domestic consumption, exacerbating market distortions that prompt new waves of trade remedies and tariffs from the U.S. and the EU. China retaliates with export controls on critical components and materials, slowing down the reshoring of low-carbon manufacturing capabilities in western countries. Simmering hostilities in disputed areas such as the South China Sea threaten to escalate into outright conflict as the U.S. withdraws security guarantees in the region. As China realigns its strategic priorities to expand its already formidable defense capabilities, it delays decarbonization efforts and increases consumption of fossil fuels from neighboring Russia, a major ally in efforts to counterbalance U.S. and European influence in the world. Together, both nations work together to circumvent economic sanctions and export controls, weakening western leverage over their domestic and foreign policy choices. By the same token, China's BRI is increasingly framed not as an economic initiative, but as a means of projecting geopolitical power and building a growing community of aligned nations in the developing world.

Globally, the win-set for cooperation between the U.S. and Europe is, at best, limited to initiatives that advance economic and strategic interest, such as joint tariffs against China or collaboration on critical mineral supply chains. Emerging economies become more assertive and leverage alliances such as the BRICS and BASIC groups to resist increased responsibility for climate change mitigation, even as their cumulative emissions surpass those of the original group of advanced economies listed in Annex I of the UNFCCC (Evans and Visainen 2024). As multilateral climate diplomacy stalls, critical finance targets, such as the New Collective Quantified Goal (NCQG) – which aims to mobilize $300 billion annually for developing countries – remain unmet, eroding trust and reinforcing skepticism across the developing world. Economic fragmentation deepens as restrictions on the flow of goods, services, capital, and knowledge stifle global innovation and learning rates (Noll, Steffen, and Schmidt 2024), slowing the diffusion of advancements in low-carbon technology and infrastructure (Mehling 2024). As managed trade no longer directs the allocation of resources based on Ricardian notions of comparative advantage (Baldwin 2025), these trends lead to a system of competing spheres of political influence and economic ties: a China-centric bloc that maintains its dominance in manufacturing but sees rising emissions as it pivots from western engagement to a growing coalition of developing countries focused on sovereignty and development rights; and a fractured U.S.-EU bloc that has lost international climate leadership and attempts to strengthen domestic production as it decouples from China, but struggles with perpetually higher costs.

Several concurrent factors exert growing pressure on social welfare and cohesion in all three regions. Demographic decline, rising stocks of public debt, and persistent structural budget deficits are a challenge shared by the U.S., EU and China, straining fiscal capacities and jeopardizing the continuity of social and environmental programs as a growing share of public investment is diverted to security and defense. Protracted trade conflicts lower aggregate welfare while realigned trade flows lead to pronounced distributional impacts in affected regions as industries relocate and adjust to evolving trade barriers. Over time, the failure to mount an effective response to climate change contributes to these dynamics by aggravating climate impacts around the world, leading to economic

and social disruption. Growing migration from vulnerable regions exceeds the absorption capacities of advanced economies, further bolstering populist parties and strengthening nationalist sentiment in a downward spiral that accelerates economic and political disintegration. At the end of this dynamic lies armed conflict, altogether eliminating any prospect of coordination around environmental concerns such as climate change.

4.2.3 Scenario 3: Reversed Leadership ("Brave New World")

In this disruptive scenario, climate leadership is not only redistributed but fundamentally reimagined, offering a hopeful if geopolitically unorthodox path for global decarbonization. Evolving domestic and international pressures – as well as emerging opportunities to expand geopolitical influence – compel China to abandon its longstanding defensive posture in international climate diplomacy and become a *de facto* global climate leader, filling the diplomatic void left by a retreating U.S.

Motivated by both economic self-interest and geopolitical ambition, Beijing repositions itself by committing to an aggressive decarbonization agenda. Long eager to overcome its reputation as a laggard in climate policy (Li 2016; Qian Xia 2022), China announces an accelerated phase out of coal use and other emissive activities, while leveraging its dominant role in low-carbon technology manufacturing to accelerate decarbonization domestically and abroad. Already commanding a significant share of the global markets for solar photovoltaic and wind energy, batteries, electric vehicles, electrolyzers and critical raw materials, China harnesses this capacity to drive further innovation (Bond, Butler-Sloss, and Walter 2024), outpacing foreign competitors and resulting in an increasing gap that North America and Europe are unable to close despite public investment – some of which is redirected to other strategic priorities in a more confrontational world – and localization targets. Rather than restrict exports of low-carbon technologies and critical raw materials in response to U.S. and EU trade sanctions, however, China continues to supply foreign markets, enabling the diffusion of increasingly competitive low-carbon technologies around the globe.

At home, state policy shifts in important ways, notably in the energy sector. Transitioning away from the past policy of simultaneously expanding fossil and renewable electricity generation, Chinese authorities implement stringent measures to curtail coal consumption, enforce early retirement of existing coal assets, and increase investments in renewable energy, energy storage, and grid modernization, allowing more rapid integration of variable sources such as wind and solar. Optimization strategies – such as broad uptake of flexibility options – allow this transition to advance with limited social and economic disruptions (Wang et al. 2025). In doing so, China is embracing an electrification strategy that advances several simultaneous objectives: it not only improves domestic air quality and displays action against intensifying climate impacts, addressing a growing concern among the Chinese population, but also enhances domestic energy security by reducing dependence on energy imports, and safeguards the competitive edge of Chinese producers in a global economy that sees growing deployment of trade-related climate measures such as the EU CBAM. With an annual electrification rate of 10% or more, China becomes the first major economy – ahead of the U.S. or the EU – to largely wean itself off of fossil fuels, earning it the moniker of being an "electrostate" (Kennedy 2025).

This internal transformation underpins China's claim to climate leadership, as it can point to tangible emissions cuts and technology successes at home, as well as, unlike many of its western counterparts, policy stability and continuity. Reflecting this domestic evolution, China's international stance is marked by a resolute commitment to multilateralism. Beijing takes a more proactive stance in climate negotiations, advocating for more stringent global emissions targets under the Paris Agreement. To help build political support and international goodwill across the developing world, it significantly scales up its climate finance initiatives, leveraging public finance to direct private outbound investment, expanding technology transfer initiatives, and forgiving debt in exchange for climate-friendly policies. The BRI continues and expands reforms that are already underway (Zhou and Ma 2023): investments in coal-fired electricity generation projects are halted, and resources are redirected toward low-carbon energy and sustainable infrastructure projects. Solidifying its status as the leading provider of South-South climate finance, China is thus able to help rapidly developing beneficiary nations avoid long-term carbon lock-in, significantly altering future emission trajectories while also enhancing its global credibility and soft power. In the process, it also moves to the next phase of a long-term industrial diplomacy strategy, from initially securing access to resources and helping build the infrastructure for global production and shipping to now dominating global supply chains and expanding access to markets around the world (Chan 2025).

As China projects its new climate leadership, the geopolitical landscape is reshaped. In international climate fora, China reconsiders its past alliances with petrostates such as Russia, Iran and the Gulf states in view of falling demand for fossil fuel imports, its economic interests increasingly tied to the global energy transition, and a growing desire to be viewed as a responsible steward and international actor. Meanwhile, the U.S. becomes increasingly isolated alongside those same petrostates, having bound itself to a nationalist strategy focused on expanded fossil fuel exports and defending traditional energy markets despite growing signs of easing and eventually declining global demand for fossil fuels (IEA 2024d). China's rapidly decreasing oil demand as it electrifies its transportation fleet significantly contributes to this global shift (M. Moore 2025), resulting in an imbalance that exerts downward pressure on global fossil fuel prices and, by extension, on U.S. income derived from oil and gas exports. Nevertheless, U.S. rhetoric remains focused on energy dominance and the benefits of reliable fossil fuel supplies for energy security and global development (Executive Office of the President 2025b), but these claims ring hollow against the backdrop of a global economy that is rapidly decarbonizing due to the relentless downward trajectory of low-carbon technology costs, much of it again driven by China. America's credibility erodes as it is seen to prioritize short-term economic gains and old energy paradigms over the collective fight against climate change. By effectively ceding the diplomatic field to others, the U.S. diminishes its influence: it can no longer easily rally allies or shape the rules of global cooperation. Instead, it watches from the sidelines as new coalitions form without it.

Meanwhile, the EU faces a complex geopolitical dilemma in this brave new world. Historically allied with the U.S., the EU is torn between its transatlantic loyalties and its identity as a frontrunner in climate policy. As China steps forward and the U.S. steps back, European leaders find themselves reluctant to alienate Washington, yet unwilling to slow their climate momentum. In the early phase of this scenario, the EU tries to bridge the gap: for instance, it continues diplomatic outreach to the U.S.,

encouraging re-engagement in international fora, even as it deepens climate cooperation with China. European officials quietly urge Beijing to take on more leadership responsibility on climate change, a strategy they had begun when President Trump signaled the U.S. retreat from the Paris Agreement during his first term (Tamma and Oroschakoff 2019). As it becomes clear that the U.S. federal government will not rejoin meaningful climate efforts, however, the EU finds its traditional alliance with the U.S. increasingly at odds with its own values and strategic priorities and opens up to greater alignment with China. Already redirecting scarce public resources to strengthen defensive capabilities against hostile nations in the European neighborhood, prompted in part by diminished trust in the U.S. as a military ally, it comes to see reliance on fossil fuel imports from the U.S. as an economic and strategic liability. Unable to scale up domestic production of low-carbon technologies to levels that would enable it to meet its ambitious decarbonization roadmap, and more reliant than ever on affordable alternatives to dependence on fossil fuel imports, it concludes that the benefits of a pragmatic rapprochement with China outweigh potential risks. Despite initial apprehensions about Beijing's intentions, European policymakers come to view China as an essential partner to revitalize multilateralism and global climate cooperation. Concerns about the social and economic impacts of China's dominant position in many markets are at least partly offset by surging joint ventures and Chinese outbound investment that create new jobs and economic opportunities across the European continent, allowing a gradual lowering of reciprocal barriers to market access.

Ultimately, this scenario upends conventional expectations, entailing an unprecedented role reversal in which China becomes the principal driver of global climate governance and challenges the notion that leadership must come from the U.S. or the EU. This role reversal positions China as the architect of a new global climate regime, in which it leads a growing cohort of progressive countries – including emerging economies committed to green growth and vulnerable developing countries such as small island developing states (SIDS) – to form an alliance pushing for a robust new climate regime. It uses its influence in the expanded group of countries known as "BRICS+" to build consensus around decarbonization pathways that are aligned with the diverse development goals and socioeconomic realities of the group's members. Meanwhile, U.S. influence wanes and the EU plays a supportive yet increasingly collaborative role. In this "Brave New World," China's blend of domestic reform, green industrial policy, and proactive international engagement creates a tipping point for global decarbonization that disrupts traditional hierarchies of climate leadership and reshapes the dynamics of international power. From a game-theoretical perspective, this scenario exemplifies a repeated public-goods game in which China seizes a first-mover advantage, reaping domestic co-benefits and outpacing competitors internationally. Within a two-level game framework, China's expanded "win-set" could be said to arise from its ability to align national priorities – such as improved air quality, energy security, and technology leadership – with global climate objectives, allowing it to fill a diplomatic void left by the U.S.

4.3 Outlook

Across these scenarios, real-world developments will likely mix elements from all three, with no single outcome unfolding in a linear way. On the one hand, intensifying rivalries and nationalist retrenchment point towards the "Every Nation for Itself" scenario, where fragmentation and strategic tensions slow

climate action. On the other hand, the more promising "Competitive Cooperation" scenario illustrates how market forces, industrial policies, and subnational initiatives can continue to drive decarbonization, even if broader tensions remain. Finally, the "Reversed Leadership" scenario serves as a reminder that a dramatic shift, such as China stepping into the climate leadership vacuum, is also possible if the right domestic drivers and geopolitical openings align.

Uncertainty abounds, yet the inevitable physics of a changing climate will continue to impose rising costs on all three powers regardless of policy decisions and political preferences. If history is any guide, political support for climate action tends to be cyclical, reflecting an ebb and flow of public concern. In the near term, incremental steps – such as cautious re-engagement among key players – may remain viable, especially around shared economic and strategic interests as important milestones in the international climate regime approach. Over the medium term, political cycles and public opinion shifts could enable a pivot toward more collaborative endeavors or, alternatively, deepen the schisms laid out in the fragmentation scenario.

Ultimately, whether climate change remains a battleground for zero-sum competition or becomes a unique domain where even strategic rivals must find ways to work together for the common good depends on critical decisions made in Washington, Beijing, and Brussels. The coming decade will determine whether we see further divergence, limited coordination driven by industrial rivalry, or a genuine breakthrough in climate leadership from unexpected quarters.

5 Conclusions

Navigating the vortex of great power competition will be one of the defining challenges of international relations – including climate cooperation – in the coming years. And yet, the future is never set in stone, and describing possible scenarios can help develop strategies to steer the world towards continued climate action. As this analysis has shown, U.S.–EU–China relations on climate and trade policy are already fraught with a complex interplay of rivalry and cooperation. A key challenge will therefore be to manage this interplay so that strategic competition does not derail prospects of meeting committed decarbonization targets and averting the worst impacts of climate change.

Despite recent political developments in various parts of the world, the outlook is not entirely bleak: innovation in low-carbon technologies will continue, even as individual countries scale back support for research and development. While policy interventions can erect new barriers to slow down the manufacturing and deployment of – as well as international trade in – these technologies, markets are likely to drive their further penetration as costs continue to decline. Moreover, another factor should lend growing support to climate action, at least in the longer term: increasingly severe climate impacts. As the disruptive reality of climate change becomes more and more difficult to ignore, public concern is likely to surge again and lead to calls for more ambitious policy responses.

At the same time, any such expectations must be tempered by realism about the remaining risks. As highlighted, trade conflicts, growing security concerns, and a broader trend of national retrenchment are already impeding cooperation across various issue areas, and these pressures are

unlikely to diminish in the near term. In such a context, diplomatic skill and innovative solutions will be critical to sustain conditions for a more coordinated approach to climate action. Countries can explore several opportunities to improve the prospects for a collective effort on climate change mitigation and adaptation, but the most important lever probably remains credible progress at the domestic level.

One priority should be to rebuild communication and scientific collaboration channels specifically on climate and energy issues (Karplus et al. 2025). Recent experiences show that insulating climate talks from broader tensions can be difficult, yet that doing so remains possible. Despite the retrenchment of the first Trump administration and continued imposition of trade restrictions under the Biden administration, for instance, China and the U.S. were able to renew their commitment to bilateral climate cooperation in 2023 (Department of State 2023). Such initiatives show recognition that climate stability remains a shared interest even in the presence of growing strategic and economic rivalries. Engagement through confidence-building measures – such as data sharing on emissions, coordination on politically less controversial non-CO_2 gases, or aligning of standards for zero-emission technologies – can create a baseline of trust. Here, existing bilateral initiatives such as the EU-China Partnership Facility (ECPF), the EU-U.S. Trade and Technology Council (TTC), and the U.S.-China Science and Technology Agreement (STA) can provide a readily accessible entry point for discussions. As the inclusive framework for a 15% global minimum tax agreed in 2021 under the auspices of the Organisation for Economic Co-Operation and Development (OECD) showed, beneficial coordination can remain possible even in an era of great power rivalry (Johannesen 2022). Likewise, even military hostilities between individual members have not prevented collaboration on shared economic interests by setting production quotas within the Organization of the Petroleum Exporting Countries (OPEC).

Although under serious pressure from nationalist retrenchment in a growing number of regions, existing multilateral frameworks can also play a valuable role. For instance, the Paris Agreement will soon enter its second NDC cycle, which can serve as a moment for the EU and China to demonstrate domestic leadership and potentially coordinate, for instance in their response to U.S. withdrawal or shortcomings of other laggards. When advanced economies such as the EU pressure China to scale up its climate efforts in view of its rising income levels and share of global emissions, they should make sure to extend the same demands to even more advanced developing nations such as Singapore, South Korea or the United Arab Emirates, given that failure to do so would create the impression of arbitrary or selective treatment against China. In venues such as the G20, the EU could seek to create a bridge between the U.S. and China on issues related to trade and climate change, while demonstrating willingness to discuss and address concerns about its own policies such as the CBAM.

As already implied above, the most important levers for improved climate cooperation are likely found at the domestic level, manifesting the two-level game dynamic that has informed the discussion in preceding sections. In each region, a complex interplay of factors that underpins current climate policy choices could, in principle, be recalibrated to improve the prospects of international coordination, yet these same forces – ranging from the structure of the domestic economy to

stakeholder pressures and historical policy priorities – are so deeply entrenched that they make adjustments very difficult to achieve.

In the U.S., for instance, climate policy discontinuity across administrations is directly linked to the deep polarization and partisan nature of the topic, which in turn is rooted in the economic dependence of entire regions of the country on extractive industries and conventional manufacturing (Mildenberger 2020). While excessive politicization of climate change may be difficult to reverse at this point, aligning decarbonization with core national interests, such as economic renewal and energy security, has been shown in the past to build political support (Bergquist, Mildenberger, and Stokes 2020). Meanwhile, policy designs that benefit specific constituencies can strengthen the durability of climate policies (Meckling, Sterner, and Wagner 2017; Pahle et al. 2018) and thereby foster greater continuity, which would restore trust in the U.S. as an actor in international climate diplomacy.

China, meanwhile, could shift away from its historical reliance on investment and export-led growth to greater emphasis on curbing excess production capacities and strengthening domestic consumption, which, alongside market opening and faster decarbonization, could help allay some of the concerns that underlie the recent surge in protectionist policies of China's trading partners around the world. Scholars have long argued that such a restructuring is necessary for a more sustainable development pathway, yet have been so far avoided because they would have distributional impacts and come at political cost (Pettis 2013). Europe, finally, will need to show unity and make bold choices as it grapples with electoral shifts and growing economic strains from the transition; its consistent climate leadership is the product of a decadal process of political compromises, but also offers the EU bargaining chips it can surrender in return for concrete climate actions by its trade partners, for instance if it opts to recognize international carbon credits within its domestic carbon market, or loosens rules that condition access to the European market.[4] It should not relinquish these lightly, however: despite persistent contestation by its trade partners, such trade-related measures are already proving among the most effective means to incentivize decarbonization outside the EU.

Activating any of these levers will not be easy, given how deeply enshrined they are in the domestic political economy of each region. They serve as a reminder that international climate strategies are only likely to succeed when aligned with domestic priorities, or, in the terminology of the two-level game, when international coordination falls within domestic win-sets. Diplomats must therefore be attuned not just to negotiating with each other, but also to the domestic game at home, where the ratification and implementation of climate commitments invariably occurs.

What is clear is that none of the three powers can solve the climate crisis alone, and all stand to lose in a world in which that crisis remains unaddressed. Already, signs are emerging that the rising tensions in international relations are beginning to erode long-held policy stances, creating room for shifts in settled compromises and mutual accommodation. It is far from clear, however, whether these foundational changes will also translate into renewed opportunities for coordinated climate action. If

[4] With Article 9 of the CBAM Regulation and its recognition of carbon prices effectively paid in the country of origin, for instance, the EU already has a provision the reduces compliance obligations for imported goods based on the climate policies adopted in a trade partner jurisdiction (European Union 2023); still, its narrow scope – limited to carbon pricing only – has been criticized for failing to consider alternative policy instrumentations, see Boute (2024).

the U.S., China, and the EU are unable to overcome domestic obstacles to cooperation, intensifying climate impacts – and growing public pressure for an effective collective response – may eventually achieve what negotiations cannot. But as the scenario of a cooperative breakdown in this paper indicates, that is not a proposition that humanity should want to test.

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