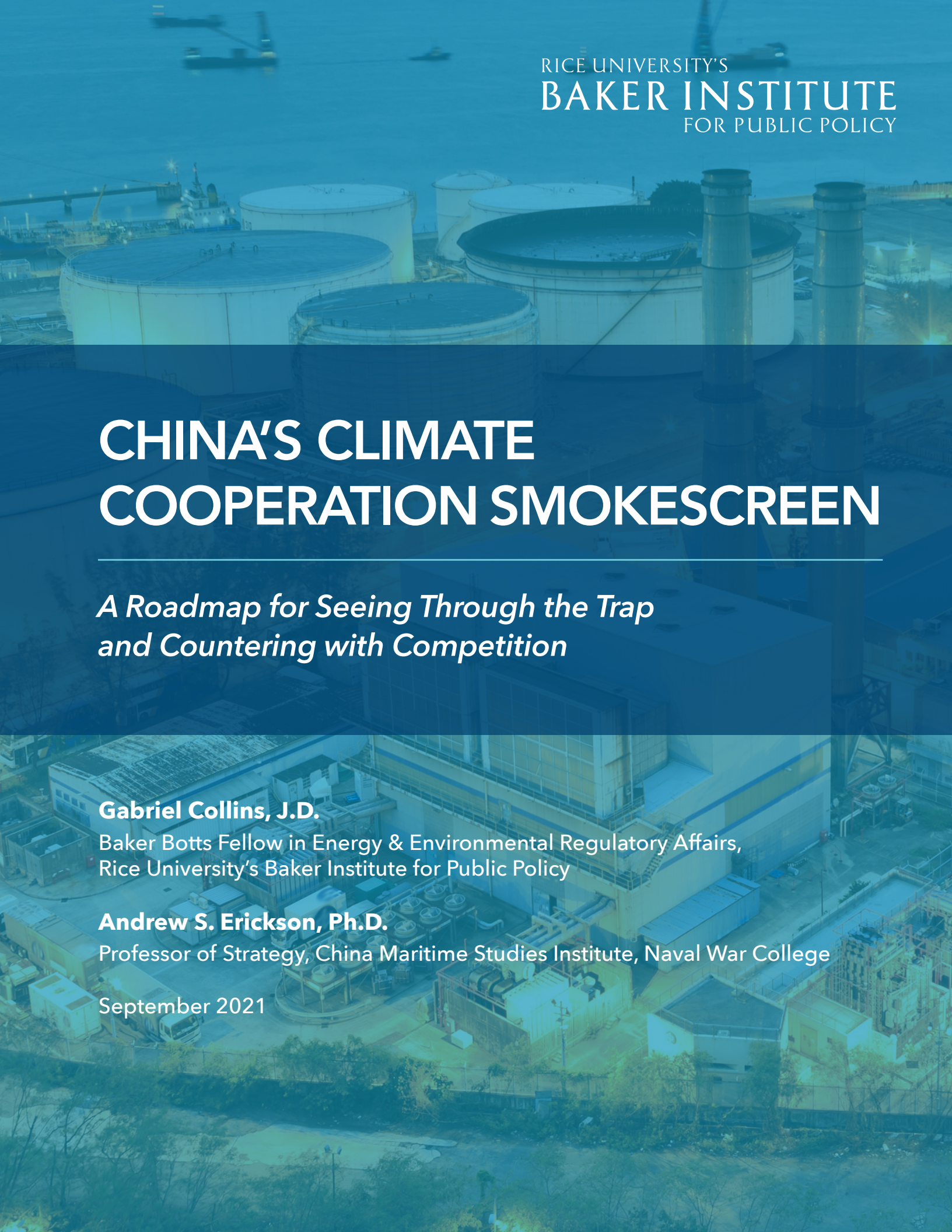

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CHINA'S CLIMATE COOPERATION SMOKESCREEN

A Roadmap for Seeing Through the Trap and Countering with Competition

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Key Points

- Beijing's quest for political leverage at home and abroad overrides its concern for the climate.
- Leading-emitter China pushes to link its political priorities to others' climate priorities.
- When foreign supplicants collide with the Chinese Communist Party's (CCP) self-interest, they will pay with both up-front concessions and wasted time, during which critical climate systems could be pushed beyond the point of no return.
- This is a major danger facing the administration of President Joe Biden.
- Real pro-climate progress requires fundamentally shifting the CCP's calculus by actually altering the economic bottom line on which its power hinges.
- Climate competition—specifically, leveraging the threat of carbon taxation—is the only Archimedean lever powerful enough to incentivize a timely transformation.
- This paradigm-shifting approach would curtail China's latitude for exploitative geopolitical maneuvering and empower sidelined reformers.
- Climate competition supports a whole-of-coalition "race to the top" for pro-climate actions, with the EU carbon border tax proposal an extant example.
- Crucially, it could also anchor the bipartisan domestic support necessary to keep Washington a reliable long-term climate leader and partner of choice.
- Finally, it offers on-ramps for China itself to engage more decisively on climate change both domestically and internationally, and to benefit accordingly.
- No silver bullet exists, but climate competition offers the most viable pathway to preserving the atmosphere and oceans for future generations.

Executive Summary

This report expands on an essay the authors published in the May/June 2021 issue of *Foreign Affairs*.[1] It provides additional explanation of how President Biden and his team can, and must, avoid two important foreign policy pitfalls: (1) entrapment in climate cooperation negotiations with Beijing that compromise vital American interests up front without corresponding Chinese concessions (let alone reciprocation), and/or (2) economic self-sabotage if the United States makes great climate sacrifices unilaterally, but the People's Republic of China (PRC) fails to do its part. To help manage these looming risks, this report provides a roadmap to guide U.S. policymakers through Beijing's climate cooperation smokescreen and into emissions-constraining competition with China.

The most viable path to sustainable biosphere security entails first competing with China by rallying a climate coalition whose alignment Beijing will ultimately seek by making more credible commitments than Washington itself could prompt unilaterally. It is time for a signature American initiative that brings allies and partners from the world's largest market bloc into a massive U.S.-led movement. This conglomerate of the committed can generate the one Archimedean lever too powerful for Beijing to ignore. The fulcrum: carbon taxation and border adjustment taxes that would impose a heavy cost on future PRC climate destruction, directly impacting not only China's international reputation, but—far more consequentially—its core growth model. No amount of domestic repression, propaganda, or recalcitrance could hide or offset an undermining of that growth model, a cornerstone of Chinese Communist Party (CCP) legitimacy.

The most viable path to sustainable biosphere security entails first competing with China by rallying a climate coalition whose alignment Beijing will ultimately seek by making more credible commitments than Washington itself could prompt unilaterally.

To that end, this report first explains the empirical roots of China's contradictory stances on carbon and greenhouse gas emissions and how Beijing's attempts to extract concessions actually reflect a fundamental weakness in its competitive position on carbon. It then articulates a set of actionable, forward-leaning policy ideas aimed at regaining the climate initiative through a novel course of action—competition. A proactive whole-of-coalition effort can incentivize Beijing to defend its global diplomatic, economic, and industrial competitive position in ways that unilateral supplication simply cannot—with much greater prospects for success. Only such a realignment has the potential to bring China to the table for productive negotiations rather than the distracting or extractive ones it currently pursues.

Our report leverages extensive empirical evidence to help explain China's abiding commitment to coal and the CCP interests that drive the ongoing obfuscation in its climate rhetoric.[2] For policymakers, it also outlines a climate competition strategy to incentivize Beijing to become a positive force for climate progress, rather than a selfish spoiler. While competition is presently not a universally popular approach, it offers Washington's most plausible route (in concert with allies and partners) to help fundamentally recalibrate China's incentive structure in the interests of global biosphere security. Competition is also the pathway most congruent with achieving emissions reductions and reshaping the international climate diplomacy paradigm, while also making progress on domestic emissions reduction. While this report emphasizes competition, it also leaves open on-ramps to simultaneous avenues for engagement, should Beijing finally elect to participate in good faith.

China Pursues Climate Leverage Over Genuine Cooperation

> **"The United States cannot repeatedly challenge China's rights and interests on issues related to Taiwan, Xinjiang, and Hong Kong while expecting China to cooperate with it on issues it cares about."**
>
> *—Wang Yi, State Councilor and Foreign Minister, People's Republic of China, April 23, 2021*[3]

In the unforgiving crucible of world affairs, President Biden and his team face two outsized global challenges: China's increasingly aggressive revisionist behavior and the need to accelerate the global energy transition and reduce emissions. But to maintain both America's global power position and global biosphere integrity, Washington must not allow Beijing to link or leverage the two.

Accordingly, a consequential reckoning looms large. Executive Order 14008 has enshrined climate and energy transition activities as central elements of American foreign and national security policy.[4] This prioritization heightens the likelihood that "Team Biden"—with the sincerest of intentions—will fall into the trap behind what we term "China's climate cooperation smokescreen."

Namely, Beijing will seek to either entrap the U.S. government in preliminary maneuvering and "dialogue" that dangles the amorphous prospect of climate cooperation negotiations—but only upon the up-front payment by Washington of concessions on key security and values items—or encourage Washington to preemptively constrain itself with restrictions that China won't reciprocate anytime soon. U.S. climate zeal could, under such conditions, very plausibly compromise vital American interests up front without corresponding Chinese concessions, let alone actual commensurate contributions.

Accordingly, this "friend of the court" roadmap explains how President Biden and his team can and must avoid this train wreck. Divisions have already emerged within the Democratic Party on how to approach climate diplomacy vis-à-vis China. Dozens of progressive groups and a progressive contingent in the House and Senate are increasingly pressuring the White House and fellow legislators to emphasize a cooperation-first climate agenda, even if that, in practice, means accepting multiple revisionist PRC actions and substantial human rights violations.[5] Meanwhile, John

Kerry, the U.S. special presidential envoy for climate, and U.S. Secretary of State Antony Blinken have explicitly promised never to allow such trade-offs.[6] Yet the "Road to Glasgow" they emphasize, where the UK will host the 26th UN Climate Change Conference of the Parties (COP26) on November 1-12, 2021, is fraught with peril.

The international diplomatic battle is already underway. China's repositioning from emissions-control opponent a decade ago to establishing a carbon-neutrality plan ahead of the United States in 2020 thus far appears superficially persuasive. It creates the impression of Chinese global leadership on the issue, albeit one that diverges from reality. PRC President Xi Jinping's December 12, 2020, Climate Ambition Summit speech, marking the Paris Agreement's fifth anniversary, epitomized this smokescreen. He made no meaningful commitments binding Beijing to specific actions, but he clearly expected binding commitments from Washington. This is a classic example of China under Xi seeking advantage through a second-mover position (e.g., by promising "carbon neutrality" before 2060—a goal the U.S., U.K., and other Western industrialized democracies have committed to reaching by 2050).[7] With climate action plans that are often "backloaded" and save the hardest and most expensive steps for future political leaders, a decade-long deferral can mean a lot. At China's current emissions pace, 10 years could mean 100 billion tonnes of additional CO_2 emissions—perhaps more, if offset measures are not implemented in time.

Between 2009 and 2019, China emitted nearly twice as much cumulative CO_2 as the United States—a gap likely to widen further in coming years.

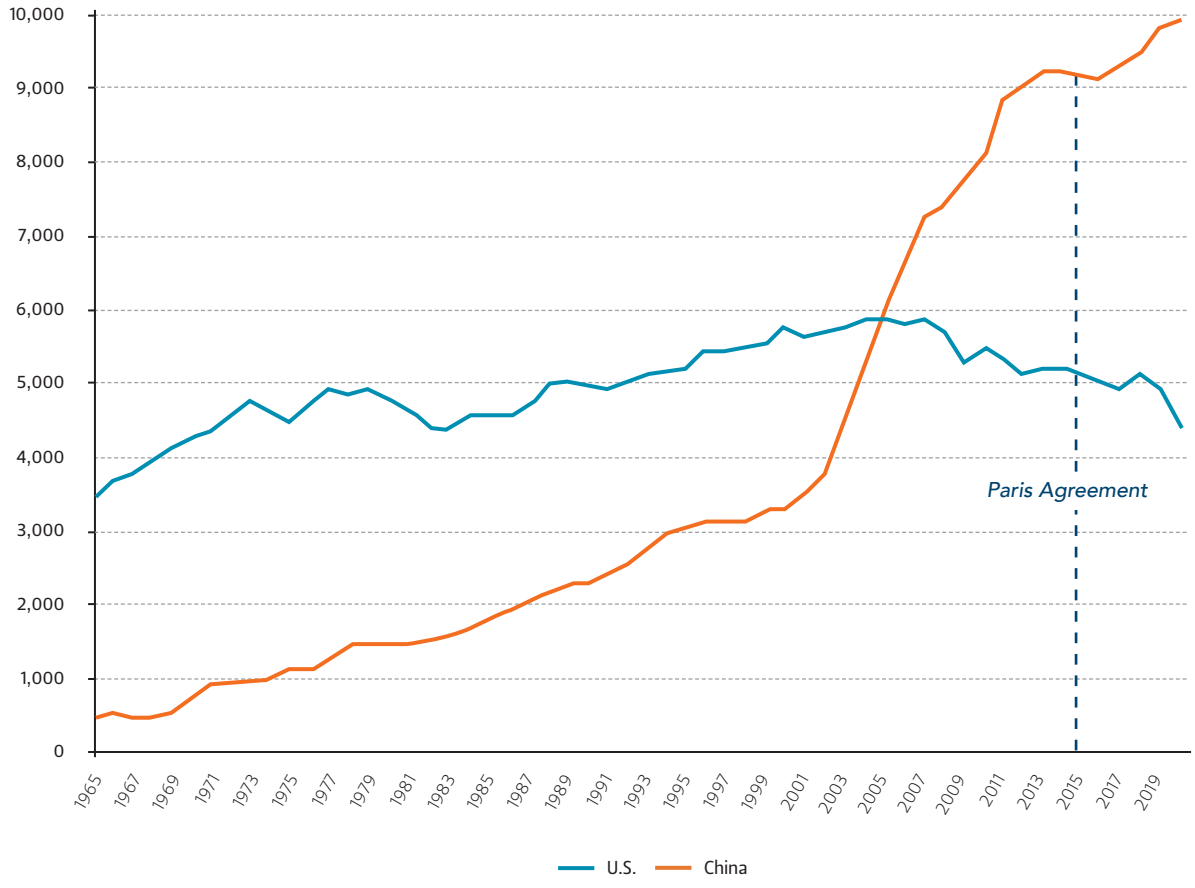
It also illustrates a second risk dimension: Beijing setting a much later date for significant emissions cuts of its own, while goading the U.S. and the EU into serving as the "crash test dummies" for ascertaining the extent to which aggressive decarbonization generates an economic hit. If the U.S. and EU successfully transition to lower-carbon emissions profiles with manageable impacts on economic growth and industrial competitiveness, China can cherry-pick "second-mover advantage" practices that work, without having to pay as many of the "growing pains" costs that first movers incur. Conversely, if some of China's major industrial competitors undermine their position through a transition process that imposes major economic costs, creates energy scarcity, and triggers serious socio-political disruptions, Beijing's global economic and industrial base advantages would be further entrenched without China having had to incur anywhere near the same costs.[8]

Consider President Biden's Leaders' Summit on Climate in April 2021, where he pledged a U.S. emissions reduction of at least 50% by 2030, relative to 2005 levels, as well as a "100 percent carbon pollution-free" power grid by 2035.[9] Meanwhile, Chairman Xi reiterated prior, subjective PRC targets—for instance, an intent to "strictly control coal-fired power generation projects, and strictly limit the increase in coal

consumption over the 14th Five-Year Plan period and phase it down in the 15th Five-Year Plan period."[10] In rhetoric, this builds on Xi's announcement at the Belt and Road Forum for International Cooperation in May 2017 that "[w]e should pursue the new vision of green development and a way of life and work that is green, low-carbon, circular and sustainable."[11]

While PRC summit statements may sound meaningful in theory, they crumble under the weight of the nearly 10 billion tonnes per year of carbon dioxide plus two billion tonnes or more of other greenhouse gases that China now emits annually, along with a profusion of toxic pollutants released by its coal combustion.[12] China accounts for approximately 29% of global carbon dioxide emissions (twice the U.S. share—as seen in Figure 1, below), roughly a third of global PM2.5 particulate emissions (about 10 times the U.S. share), and more than 30% of global mercury emissions (a long-lived toxic that can poison ecosystems for decades).[13]

Figure 1: U.S. and China CO_2 Emissions (Million Tonnes)



Source: *BP Statistical Review of World Energy 2021*.

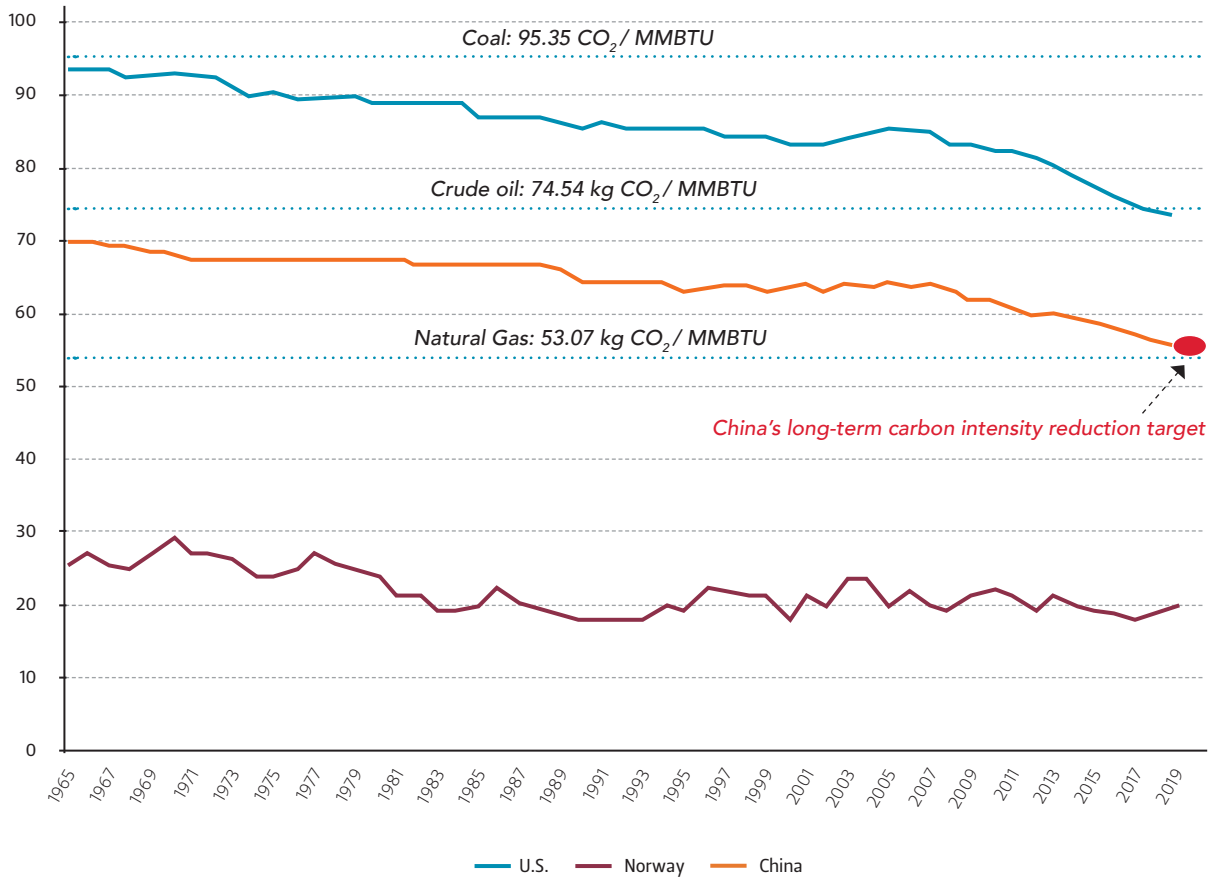
China's massive annual CO_2 flows also mean that it accounts for an increasingly large portion of the world's atmospheric CO_2 stock. Between 2009 and 2019, China emitted nearly twice as much cumulative CO_2 as the United States—a gap likely to widen further in coming years. Beijing circa 1979 would have had reasonable moral capital to argue that Washington should cut emissions first. But China in 2019 and beyond has reached a level where the sheer scale of its emissions overwhelms arguments about emissions intensity and treating China as a less-developed country for climate purposes.

Indeed, recent research from the Rhodium Group finds that in 2019, China's emissions of the six key greenhouse gases covered by the Kyoto Protocol—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—exceeded the emissions of all developed countries combined.[14] Meanwhile, "since the Paris accords, China has produced more greenhouse gases than the combined total of cuts by Europe and the United States."[15] Moreover, policy incentives in China are set to keep coal a core energy source for decades to come, yielding even more future emissions. And, as will be discussed later, fully factoring in the lifecycle impacts of energy sources and related technologies reveals China's leading emissions impact and continued coal-centricity in even starker relief.

Even if China's leadership made emissions reduction its top priority—an unlikely shift given the countervailing incentives that will be explored later in this report—the sheer scale of the task is astounding. To reach its stated target of reducing emissions intensity by 60%–65% relative to 2005 levels, it would need to attain the current U.S. level—albeit on a significantly larger scale, in a country that consumes 1.5 times as much primary energy, and in one that is far more coal-reliant.[16] For perspective, China would have to bring its economy-wide emissions intensity down from the current level of approximately 73 kilograms (kg) of CO_2 per million British thermal units (BTU) of primary energy consumed (about the same as burning crude oil) to an economy-wide level equivalent to burning natural gas—which is where the United States is now after many years of major investments in natural gas and renewables (Figure 2).

It has been nearly a century since the United States relied on coal to the proportional extent that China still does today. America now obtains almost 10% of its primary energy from almost-no-carbon nuclear energy (an order of magnitude more than China's proportionate share), 34% from natural gas, nearly 13% from "scalable" renewables (i.e., wind and solar), and less than 10% from coal—a sixth of China's relative level.[17] Even if China were able to accomplish the Herculean energy sector rewiring needed to reach the current U.S. emissions intensity level, the underlying continued use of coal and likely growth in energy usage could still realistically leave its absolute carbon emissions similar to the present level of nearly 10 gigatons a year. "Holding steady" will be hard enough, and approaching net-zero will likely be an order of magnitude more difficult.

Figure 2: Kilograms of CO_2 Emitted Per Million (MM) BTU of Primary Energy Consumed



Sources: *BP Statistical Review of World Energy 2021*; EIA (U.S. Energy Information Administration); authors' analysis.

Even if China's per capita emissions—already higher than those in Italy and the U.K.—are still lower than those of some OECD countries, the relative basis becomes much less meaningful when nearly one in every three tonnes of anthropogenic CO_2 entering the atmosphere now comes from the PRC. Moreover, present policy incentives in China are poised to keep coal a core energy source for decades to come, leading to massive future emissions. In theory, the PRC government could impose stricter reductions. Yet, the far likelier outcome is that the CCP will treat a tragedy of the global atmospheric and oceanic commons as the lesser evil in its unrelenting quest to retain a monopoly on political control domestically and deference abroad.

The implications for U.S. policy in coming years are therefore stark: Any accommodations or self-limitations made to coax China to discuss climate issues would, in fact, make America, East Asia, and the world lose twice. America would weaken its economy and stress its social fabric while forfeiting its ability to effectively confront China's ongoing coercive envelopment efforts in the Indo-Pacific, as PRC interlocutors stall at the negotiating table. Meanwhile, existing coal-fired plants in China and those being built by Chinese firms abroad would continue to emit millions of tonnes per day of additional greenhouse gases. The CCP would win on the geopolitical front, but all parties would ultimately lose from degradation of our shared biosphere.

China Talks Green, but Runs on Coal

The coal numbers the PRC keeps burning domestically fly in the face of its environmental rhetoric to the outside world. China's economic growth model depends on tera-scale industrial activity that cannot be operated competitively without reliable, affordable energy supplies. An infrastructure-building juggernaut fed by emissions-intensive industries remains the central pillar of China's economy—including its post-pandemic economic recovery attempts. On both accounts, coal provides the reliable and affordable baseload energy needed.

PRC officials talk green abroad but burn coal at home to power their industrial economy and political position. In 2020, blast furnaces and mills in China produced over a billion tonnes of crude steel—a historic high.[18] Aluminum smelters in China also produced record volumes during 2020, while cement plants baked nearly 2.4 billion tonnes of product—each accounting for nearly 60% of total global production of their respective commodities.[19] This was powered, in part, by China's consuming over four billion metric tonnes of coal—55% of all coal consumed globally in 2020.[20]

Thanks to this constant coal consumption course, China was the only major industrial power whose emissions actually rose in 2020, as policymakers leaned on "King Coal" to power economic recovery. And emissions-intensive industries are not just a temporary lifeline to growth during the pandemic. Rather, they exemplify the Chinese economy's deep structural reliance on massive brick-and-mortar projects and the carbon-belching basic materials sectors that feed the resulting skyscrapers, rails, roads, bridges, airports, and power plants. Beijing reaches quickly for coal to dial up economic output, but it will likely move much more slowly to moderate its dependency—particularly as growth slows or sputters in coming years.[21]

History shows that even with less consequential emissions, economic expedience (and the underappreciated power of local officials) still often trumps the country's international climate commitments. As just one example, Beijing has repeatedly backslid on binding commitments it made when it ratified the Montreal Protocol 30 years ago, agreeing to reduce—and eventually eliminate—emissions of ozone-

destroying, heat-trapping chlorofluorocarbons (CFCs). Even as a "developing country," it still needed to end the production and use of multiple CFC varieties by January 2010. Yet, multiple independent scientific inquiries have found that not only have production and emissions of CFCs (and their chemical cousin, hydrochlorofluorocarbons—HCFCs) continued in China, but that emissions actually rose after 2010—all despite Beijing's pledge in 1991 to phase them out entirely.[22] The global biosphere likely cannot afford China requiring a 30-plus year cushion to peak and the meaningfully reduce emissions from coal use.

The CCP's concerns over environmental degradation have clearly grown in recent years, particularly for the most visible, publicly controversial manifestations. However, this has motivated a focus on reducing localized air pollution in first-tier coastal cities, typically through approaches that have failed to meaningfully reduce net national greenhouse gas emissions. Moreover, environmental policies must be implemented along a continuum of priorities that frequently shifts in its middle and bottom portions but is consistently dominated at the top by economic prerogatives that the Party leadership equates with its ability to maintain power. As just one contemporary example, consider that China's ongoing economic recovery is led by industrial production and real estate investment: the same two sectors it has relied on to generate growth for more than a decade, despite consistent calls for restructuring.[23]

And activity may be poised to expand in the coming several years. Excavator sales, one of the best indicators of real economic activity in China, reached a historic high in 2020 (Figure 3). Some of this represents fleet recapitalization. But, even accounting for that, the sales numbers are still remarkably high.

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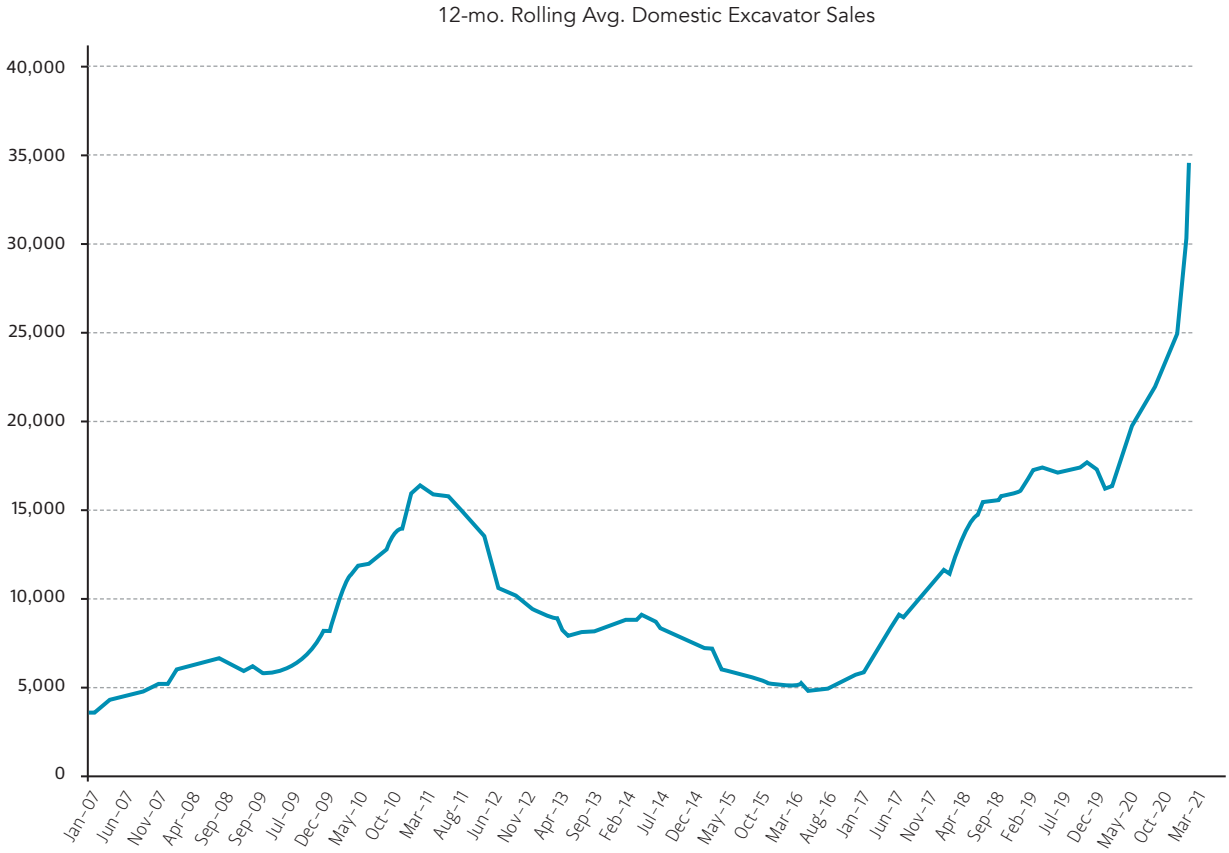
Heavy equipment buying sprees suggest that local contractors, the best-positioned of anyone outside government to anticipate future construction plans, see major new projects on the horizon. This, in turn, portends substantial further production of steel, cement, and other high-emissions commodities in coming months and years. Furthermore, if China adheres to previously stated plans to have its carbon emissions peak by 2030, it is sandbagging the international community by creating a higher baseline from which future "peak carbon" would be measured.

Certain heavy industrial activities—such as cement and steel production—involve direct combustion of coal to provide process heat,[24] while others are very electricity-intensive. Yet, even greater electrification will not push coal out of China's energy

Figure 3: Excavator Sales in China Hit a Historic High in 2020

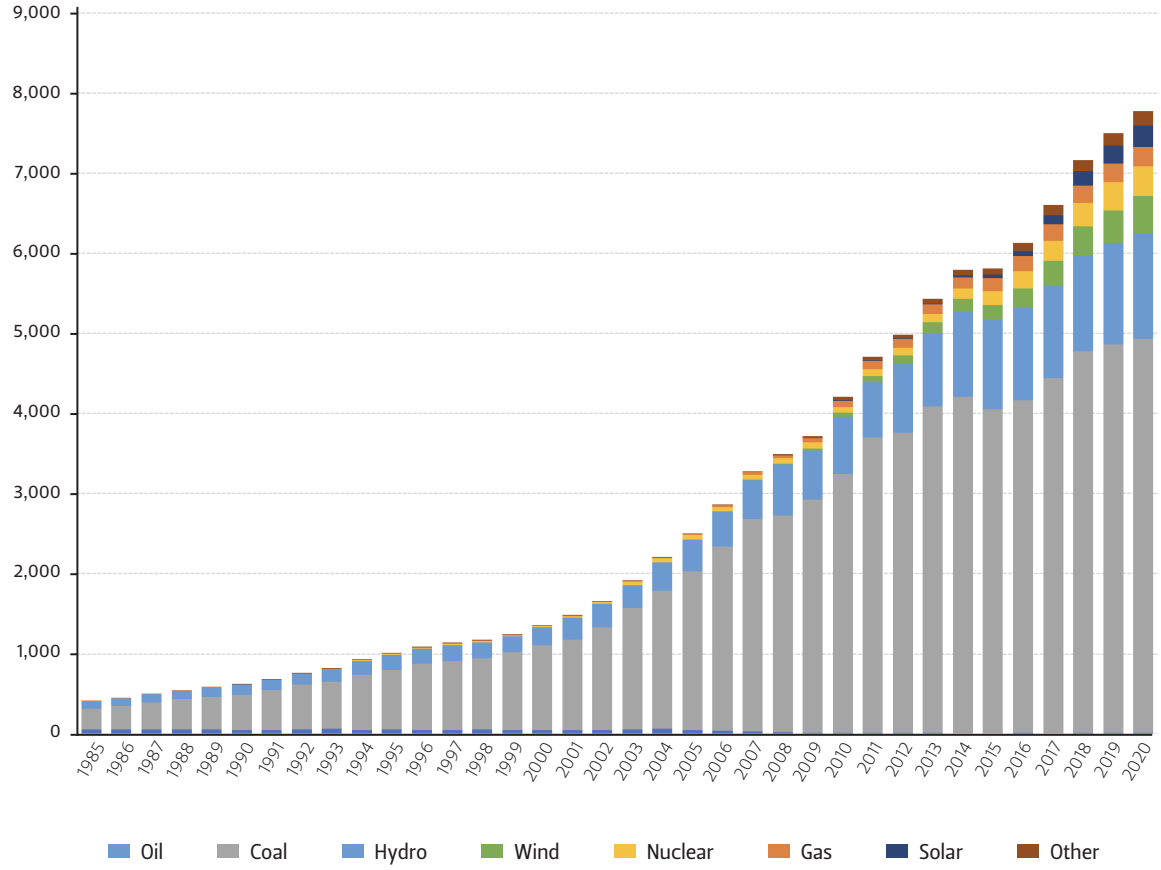


Sources: China Construction Machinery Association; Xinhua; authors' analysis.

system. Under certain assumptions, electrification could actually entrench coal use, since efficiency losses in power generation mean that an industrial facility that formerly burned coal directly for process heat but now uses electric boilers could require more than twice as much coal to apply the same ultimate heat load in its facility. Over the last four decades and counting, since China became a major global emitter, coal has formed the bedrock of the nation's electricity supply, followed distantly by hydropower (Figure 4).

Two fundamental quandaries dog China's heavy reliance on basic materials production as a bedrock of economic activity. First is the diminishing returns in efficiency: Gains are slowing as world production (often dominated by China) draws closer to basic thermodynamic limits.[25] Second, how can producers obtain affordable and reliable process heat in sufficient quantities to support world-class production volumes of steel, cement, and other energy-intensive basic materials? In China, the answer often circles back to direct or indirect combustion of coal.

Figure 4: China's Electricity Supply by Fuel Source (Terawatt hours/TWh)



Source: *BP Statistical Review of World Energy 2021;* authors' analysis.

Note: One terawatt-hour is approximately the amount of energy contained in the cargo of an Aframax oil tanker (a ship 250 meters in length).

Two plausible core explanations arise for China's continuing production of energy-intensive commodities on a scale unprecedented in human history. Neither augurs well for Beijing's dependability as a climate partner. Either (1) China's central leadership is being purposefully disingenuous when it says what foreigners hope to hear while tolerating continued growth in domestic coal use, or (2) key elements of the central leadership are making aspirational climate commitments but cannot reign in local and provincial officials whose advancements hinge on largely unrestrained use of coal, locking in world-scale CO_2 and toxics emissions for many years to come. In either case, allowing Beijing to tie indefinite promises of climate cooperation to definite forbearance or concessions in other areas of strategic interest, or to motivate unreciprocated American economic self-limitation, would jeopardize the vital interests of the United States, its treaty allies, and other regional stakeholders. Any viable solution must squarely address both dynamics.

Beijing Won't Negotiate Coal Away with Washington Alone, Today

Multiple structural factors and incentives in China's political-economic system are currently on track to keep the CCP treating climate diplomacy as a leverage point rather than a true space for cooperation—let alone as a basis for making and delivering on promises. Party control and the desire for political survival and economic growth, which hinge upon continued coal use, mean that PRC leaders currently aren't incentivized to even begin to negotiate coal away. This poses a profound set of challenges for meaningful bilateral (or multilateral) climate diplomacy.

President Reagan famously remarked amidst U.S.-Soviet arms control negotiations that he preferred to "trust but verify," an approach based on reality-tinged optimism that Moscow's future actions would be positive. But American and Soviet interlocutors confronted a problem—the dangers of mounting nuclear weapons stockpiles—wherein each government could literally negotiate away hundreds or more warheads without practically undermining its security. This is unfortunately not true when dealing with China's coal-centric energy sector and its currently inextricable bonds to the CCP's political imperative of delivering growth to help it maintain control and stay in power.

Like virtually all other matters, China's climate interactions are subordinate to the Party's quest for control, further aggrandizement of power, and political survival.

Like virtually all other matters, China's climate interactions are subordinate to the Party's quest for control, further aggrandizement of power, and political survival.[26] A tragic track record looms large: Elizabeth Economy and Yanzhong Huang have each documented China's extreme air, water, and soil pollution and their direct linkages to toxic legacies of CCP control.[27] Moving forward, the CCP faces a profound strategic quandary: Its social contract with China's population (growth and stability in exchange for repressed liberties) yields an addiction to over-investment across the board, as well as to the coal that still powers most of the enterprise.

Economic expediency will be hard to dislodge as a core driver of PRC decision-makers' energy-sourcing calculus. Local officials pursue investments of questionable efficacy to boost growth figures and other metrics long enough to be promoted to higher assignment elsewhere. Coal plants under their administrative influence help their career progression far more than developing climate-friendly, trans-provincial energy transmission-infrastructure collaborations beyond their direct control. The

repeated result: investments of questionable efficacy, including additional coal plants, and green power capacity that is often built to meet targets but ultimately faces substantial curtailments that keep it off the grid.

These factors directly influence officials' tolerance for private, parastatal, and state-owned enterprises' non-compliance with emissions control targets promulgated by the central leadership in Beijing—particularly when environmental objectives conflict with economic growth imperatives.[28] With economic growth remaining a paramount Party priority, China will continue trying to swap cleaner sources into its tera-scale energy system, but this will remain subordinate to three dominant preoccupations: (1) ensuring energy supply security amidst source substitution, (2) managing the relationship between energy affordability and reliability, and (3) minimizing the disruption that energy transition measures can have upon China's vast coal production and use, its value chain, and the millions of workers it employs.

Energy Source Substitution

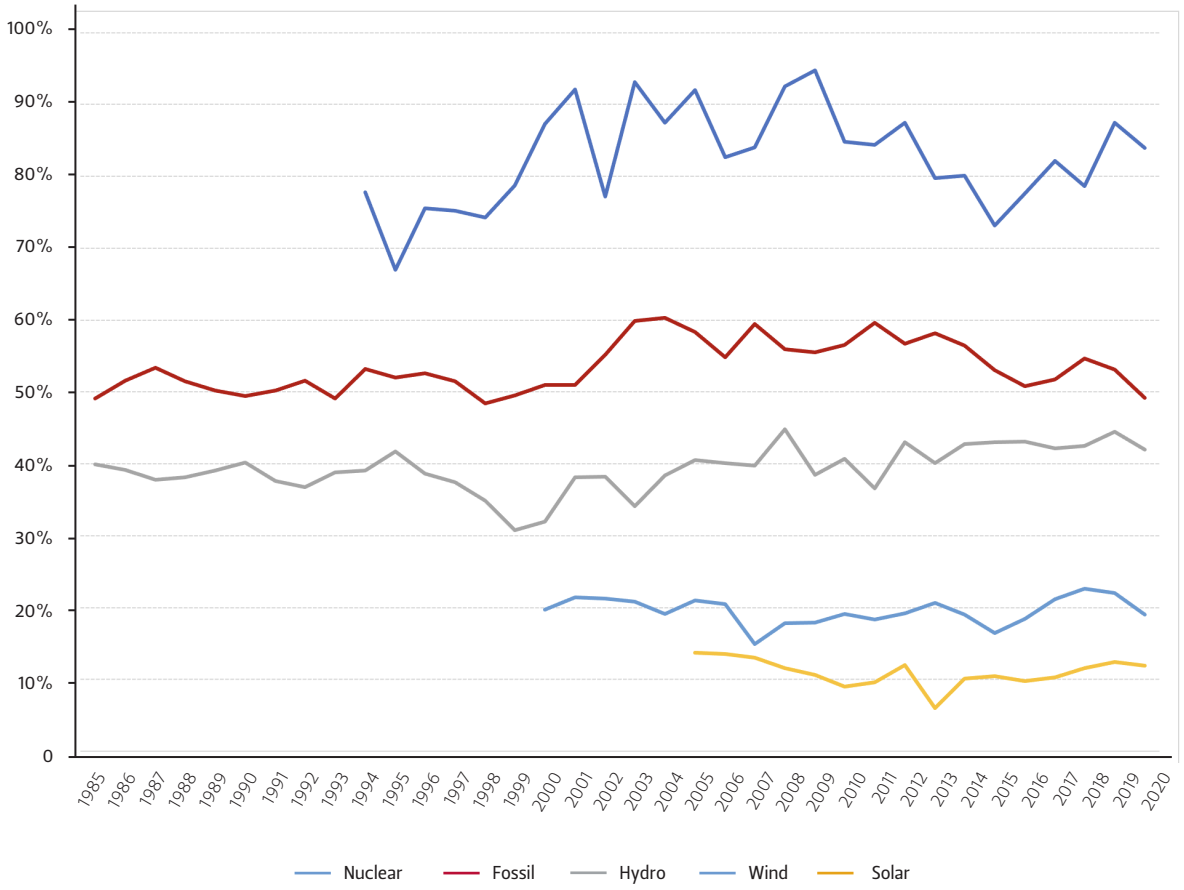
Undeniably, PRC policymakers face costs and disruptions inherent in transitioning a colossal energy system that is 50% larger than that of the United States. They are trying to accelerate source substitution in the world's largest energy ecosystem as consumption still expands. An increasing preference for domestically sourced energy means there are three core possibilities for ensuring stable baseload supplies—coal, hydro, and nuclear.[29]

Of these, only coal and nuclear (assuming requisite political will) have the ability to be expanded at scale and stored onsite in a manner immune to weather events—i.e., as coal piles or a long-lived nuclear fuel assembly. Further complicating matters, the energy sources needed to substitute for coal are either: (1) not being built quickly enough and are marred by the recent emergency shutdown of a reactor at the Taishan Plant in Guangdong province—nuclear, (2) running intermittently at low-capacity factors that require massive investments in backup energy sources—wind and solar, (3) able to be built quickly, but would subject China's power grid to risks associated with commodity import reliance—natural gas, or (4) possibly capable of being scaled up, but only at substantial environmental and diplomatic cost—hydro.[30]

The challenge is staggering. Using data from the China Electricity Council, we estimate that replacing 10% of China's coal-fired power plants with nuclear energy would require more than triple the nuclear capacity it has slated to enter service by 2026. Replacing 10% of coal with renewables could require China to install nearly as much wind capacity as it has built cumulatively to date, or more than 1.5 times the existing solar generation base—both of which are already the world's largest.[31] Only true leverage can incentivize Beijing to pursue such a heavy lift on the timeline needed to decisively address a potentially existential set of global climate challenges.

Meanwhile, PRC decision-making continues to emphasize coal's central role. Witness, for example, Premier Li Keqiang's remarks to the State Council in October 2019 calling coal a priority "energy resource endowment for China" ("我国以煤为主的能源资源禀赋") and urging accelerated development of coal transport and power transmission infrastructure, as well as promoting mine safety and clean coal efforts.[32] Accordingly, the economic and political arithmetic of energy source substitution in China fundamentally and inexorably traces back to coal. Even briefly examining the capacity utilization (actual power produced versus theoretical nameplate capacity) of the core electricity generation sources in China helps illuminate the scale of the challenge. China presently has about 1,100 gigawatts (GW) of coal-fired power plant capacity—more than half the global total—which in 2020 ran at about a 50% utilization rate, according to the China Electricity Council (Figure 5).

Figure 5: Capacity Utilization of Key Electricity Production Sources in China



Sources: CEC (China Electricity Council); EIA; authors' analysis.

In simple terms, this means that China would need 56 GW of additional nuclear reactors—which run at roughly 90% capacity utilization—to replace 100 GW of coal plants. Yet, World Nuclear Association data reveal that China only has about 18 GW of nuclear capacity under construction and slated to enter service by 2026. That is the functional equivalent of 32 GW of coal-fired power capacity under current utilization rates and is actually less than the net coal power station capacity added in 2020 alone.

China is certainly a "build fast" society, but even under the favorable conditions it can offer, nuclear power stations still entail site selection, planning, and permitting, followed by a five-to-six year construction period, before they can deliver power to the grid. Accordingly, even a re-prioritization toward nuclear power that occurred today would likely not show up as coal-free electrons on the country's power grid until close to 2030.

Wind and solar present different challenges. They can be built rapidly, but do not produce reliable baseload power unless integrated with substantial energy storage capacity (e.g., batteries) or are coupled with thermal power sources that can fill in the gaps when the wind isn't blowing or the sun isn't shining.

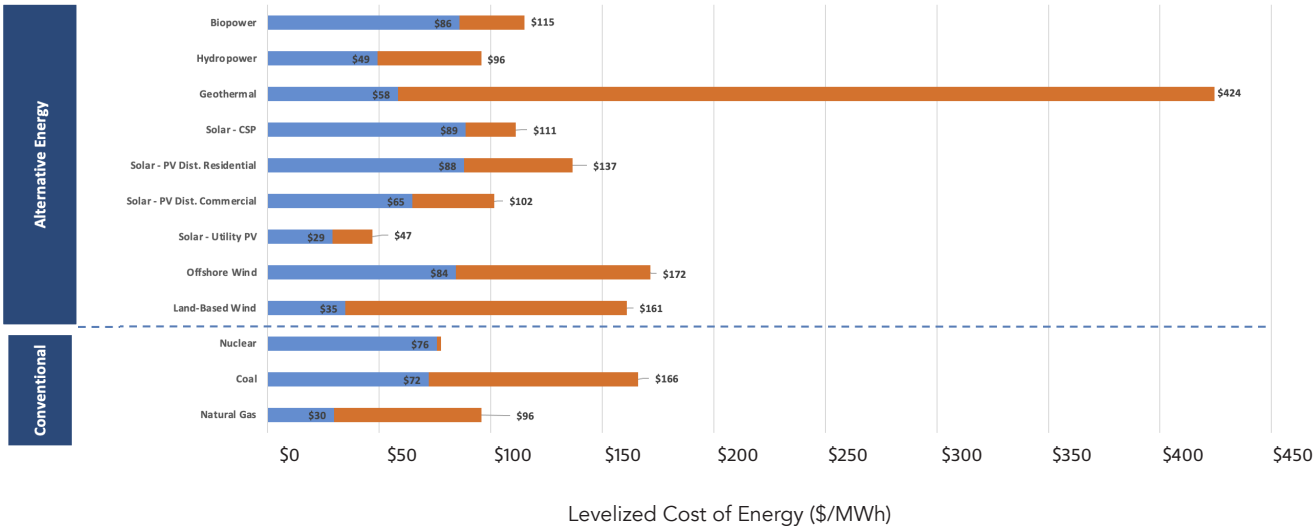
Multiple studies have concluded that intermittent renewables can provide stable baseload power supplies.[33] Yet, thus far, the collision between neat computer simulations and messy real-world energy system realities suggests that going beyond certain threshold levels of intermittent power in a large industrial economy would, in fact, likely create costly reliability challenges that could be obscured by the zero fuel costs of intermittent renewables. "Zero fuel costs" reflect the idea that the owners of a wind or solar generation facility do not have to pay for the moving air or photons that allow their assets to generate electricity.

Renewables need energy storage—either batteries, pumped hydro, or throttleable spinning thermal reserve power (i.e., coal or natural gas-generated electricity dispatchable on short notice)—to compensate for their intermittent electricity delivery. This need invokes two distinct levels in a large industrial economy like China's. On the first level, smoothing "peaking" energy demands in a system where renewables are one source in a diverse portfolio can likely utilize a combination of gas-fired "peaker" power plants (i.e., small, simple-cycle turbine facilities that help meet electricity demand during periods of maximum usage) and grid scale batteries for short-term balancing.

The second level—a system in which renewables are the chief energy generator—poses much larger physical and economic challenges. Batteries or other storage mechanisms must not only handle larger peak management tasks, but they must also be able to balance variations across a terawatt-scale power system in a country where multi-day weather disruptions can simultaneously affect major swathes of territory. Chinese grid planners will likely ask how a high-renewables energy system might have responded when faced with an event such as the nearly month-long cycle of multiple snowstorms and severe cold that afflicted Central and Southern China in early 2008.[34]

Figure 6: Levelized Cost of Energy for Various Electricity Sources in United States

2020 ATB LCO Range by Technology for 2018 Based on R&D Financial Assumptions



Source: NREL (National Renewable Energy Laboratory).

The economic and political costs of building resiliency against infrequent, but extremely high-impact weather events will be formidable if China moves to use renewables to substitute for baseload thermal energy sources. As Steve Brick, a senior advisor to California's Clean Air Task Force, put it in a 2018 interview with *MIT Technology Review*:

> The system becomes completely dominated by the cost of storage. You build this enormous storage machine that you fill up by midyear and then just dissipate it. It's a massive capital investment that gets utilized very little. ... You have to pause and ask yourself: "Is there any way the public would stand for that?"[35]

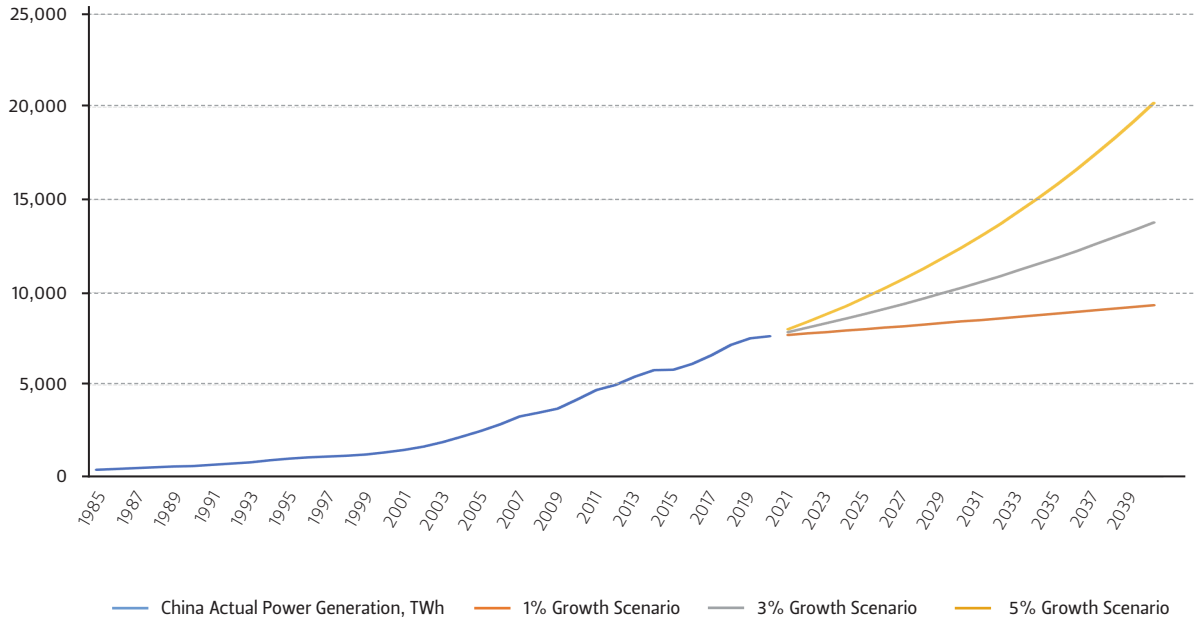
To put the matter into an approximate quantitative perspective, consider the impact of adding 10-hour lithium iron phosphate grid-storage batteries to a wind power system. Absent an obligation to provide firmly consistent, reliable power supplies, wind farms' rapid and relatively uncomplicated construction process, plus their zero marginal fuel cost, make them a low-cost power source—able to provide power for as little as $35 per megawatt-hour (Figure 6). But, pairing renewables with associated utility-scale storage raises the levelized cost of energy supplied by the facility beyond $100 per megawatt-hour—roughly a three-fold increase.[36]

While U.S. price levels often do not translate directly into a Chinese domestic context, they provide a useful directional benchmark as to what would happen if storage requirements were imposed on wind and solar project developers in the PRC.

Ultimately, coal-fired and nuclear-power generation facilities would suddenly find themselves even more economically competitive if intermittent renewable facilities had to internalize the costs of their generation variability by including substantial storage capacity for new projects. Large power consumers would also likely more explicitly seek to obtain lower-cost electricity from large baseload projects [i.e., "opting out"], which would force the government to either (1) override these rational economic preferences with mandated power offtake requirements (indirect subsidy) or (2) increase subventions to continue incentivizing the installation of wind and solar capacity (direct subsidies).

System balancing challenges and storage costs will be magnified in a market where electricity demand is likely to grow for some years to come. The world's "first-mover" deep decarbonization experiments are now unfolding at the national level in Germany and the state level in the United States (particularly in California). Decarbonization in these highly developed marketplaces is primarily a substitution exercise given that electricity demand has plateaued for years. In China, however, even relatively bearish projections still suggest that power generation needs could expand by more than 20% over the coming two decades (Figure 7).

Figure 7: China Power Generation to 2040, Actual and Forecast (Terawatt hours/TWh) *1%, 3%, and 5% annual growth projected*



Sources: *BP Statistical Review of World Energy 2021*; China Electricity Council; authors' analysis.

Moreover, green economy advocates should note that coal in China is not just focused on the "old way" of obtaining energy. Behind picturesque portrayals of wind and solar generation facilities around the world, a largely coal-fired, China-centric supply chain underpins the global green energy revolution. Activities ranging from rare earth smelting to electric vehicle (EV) battery production still generally rely heavily on coal power.

Indeed, EV batteries and components exported from China require significant energy inputs, which often come from coal.[37] A study by Argonne National Laboratory researchers, who accessed primary data from battery component producers in China, suggests that a Tesla Model S-sized 100 kilowatt-hour, nickel-manganese-cobalt battery could embed approximately seven tonnes of thermal coal equivalent worth of input energy.[38] Electric pickup batteries can be twice the size of car batteries, with those for freight trucks significantly larger still.

Furthermore, EVs are only as clean as the power grid from which they charge. Accordingly, vehicles plugging into grids with large shares of hydro, nuclear, or renewable energy will have much lower emissions intensity. Conversely, grids dominated by coal (the baseline in China), mean that a growing EV fleet is basically replacing petroleum with coal at approximate emissions parity and with a re-housing of emissions from car tailpipes in cities to power plant smokestacks that are often hundreds of kilometers distant. Thus, the global impacts of giga-scale PRC coal use are poised to continue. A battery-powered electric passenger car using 18 kilowatt-hours of electricity from China's power grid, per 100 kilometers (km) driven, would, with 60% of power coming from coal, emit approximately 13.5 kg of CO_2.[39] For comparison, a Great Wall Haval H6 SUV (China's 2020 bestseller), consuming seven liters of gasoline per 100 km driven, would emit 16.5 kg of CO_2 over that same distance.[40] Thus, one million EVs could still create CO_2 emissions on par with more than 800,000 SUVs under China's present national power generation mix.

De-carbonizers thus will likely have to chase a gargantuan moving target and try to change China's carbon-intensity course by capturing both incremental demand growth and replacing legacy installed infrastructure—tasks that, by themselves, are already extremely challenging. The CCP can marshal the resources to overcome such complexity and scale, but doing so would require substantial financial resources and—critically for climate issues—time.

Economic Costs, Climate, and Possible Geological Disadvantages

A viable path to a net-zero emissions profile by the 2050–2060 timeframe will likely require pursuit of what Princeton University's Net-Zero America project calls the "six pillars" approach. The respective pillars are: (1) development of increased efficiency and greater electrification, (2) reduction of electricity production's carbon intensity, (3) expanded use of zero-carbon fuels, (4) implementation of CO_2 capture and storage, (5) reduction of non-CO_2 greenhouse gas emissions, and (6) greater use of natural carbon sinks through forest management and improved agricultural practices.[41]

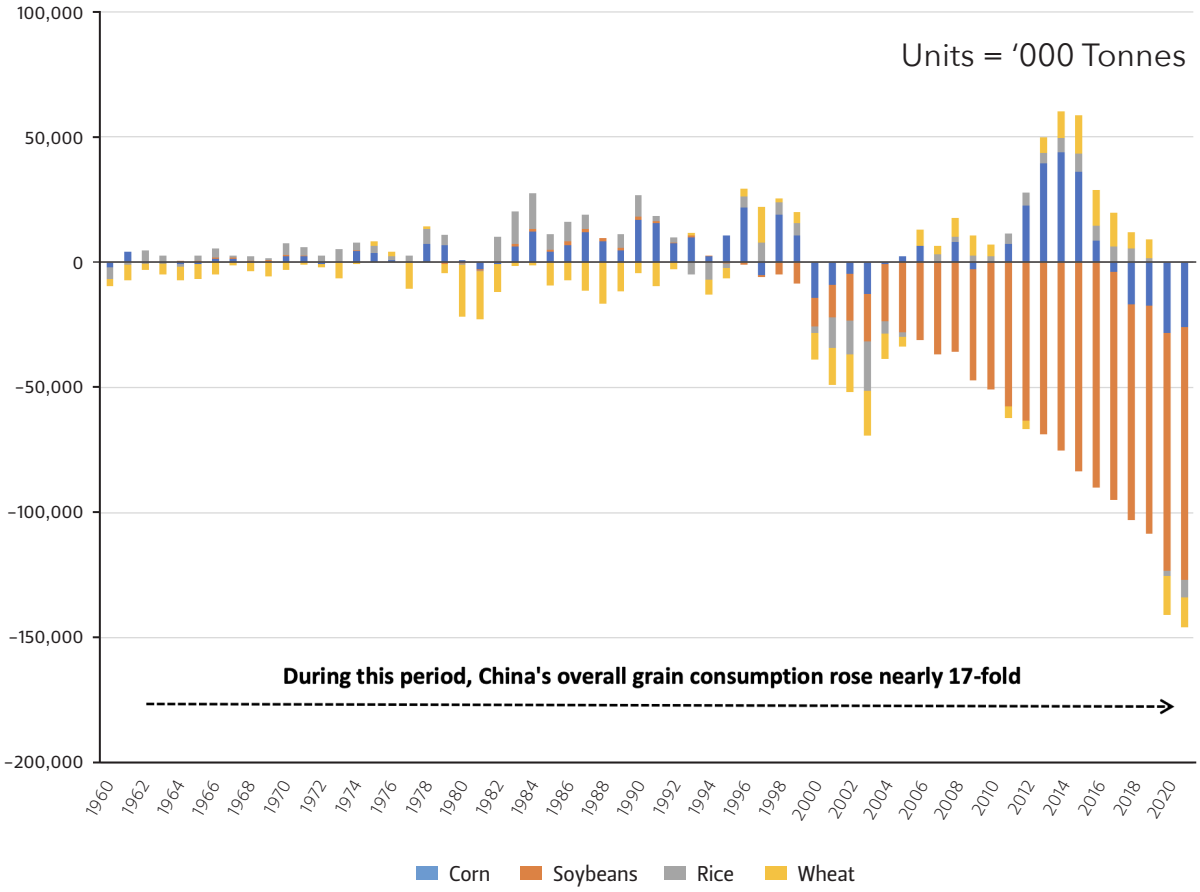
Net-Zero America emphasizes using existing technologies, rather than predicating achievement of emissions targets on the successful deployment of technologies that may not even exist at the present time. Nevertheless, energy transition costs appear formidable. Its high-electrification ("E+") scenarios in the United States could require $2.6 trillion worth of supply-side capital investment by 2030 and $10 trillion by 2050. Readers should note that the models that yielded these estimates do not include demand-side capital investments—of which electric vehicles are but one example. Such omissions can lead to a substantial understatement of energy transition costs.

The models also assume perfect foresight and seamless integration—which are exceedingly unlikely to actually occur in the real world amidst the complex physics, chemistry, economics, and politics of the energy transition in a large, industrialized society.[42] Furthermore, China's energy system is 1.5 times larger than America's in pure consumption terms. While the cost figures might not directly translate, extrapolating the projected price tag of the American energy transition likely underestimates the total cost that would be incurred for China to move closer to net-zero, particularly given the relative disadvantages imposed by its geography and energy structure.

Emissions-neutral synthetic fuels are one example of an area where China will likely be severely disadvantaged. Various U.S. scenarios for such fuels could require as many as 1.2 billion tonnes of biomass feedstock per year—a feasible target given the abundance of arable land, the supporting water supplies, and the lack of competition with food crops in an extraordinarily grain-abundant nation.[43]

For China, in contrast, directing scarce arable land and water resources to biomass cultivation would risk exacerbating the already-fraught competition between the production of food and fuels. For most of the past 20 years, China's grain supply deficit, as measured by simple subtraction of tonnage consumed from tonnage produced domestically, has risen (Figure 8). Famine and grain supply problems helped topple at least five of China's 17 dynasties, and the strong correlation between food supply disruptions and regime change keeps the CCP tightly focused on ensuring sufficient grain supplies.[44]

Figure 8: China's Grain Supply Deficit has Increased for 20 Years Running



Sources: USDA (U.S. Department of Agriculture); authors' analysis.

China's emissions reduction plans also suggest that the bulk of the effort and cost are "backloaded"—i.e., saved largely for future generations of cadres to implement. In addition to kicking the political can down the road, backloading also increases the risk that the greatest energy sector reform costs coincide with the period when demographic pressures and other anti-growth factors are imposing significantly intensified constraints and challenges relative to current levels.

Managing Economic Impacts of an Energy Transition Away from Coal

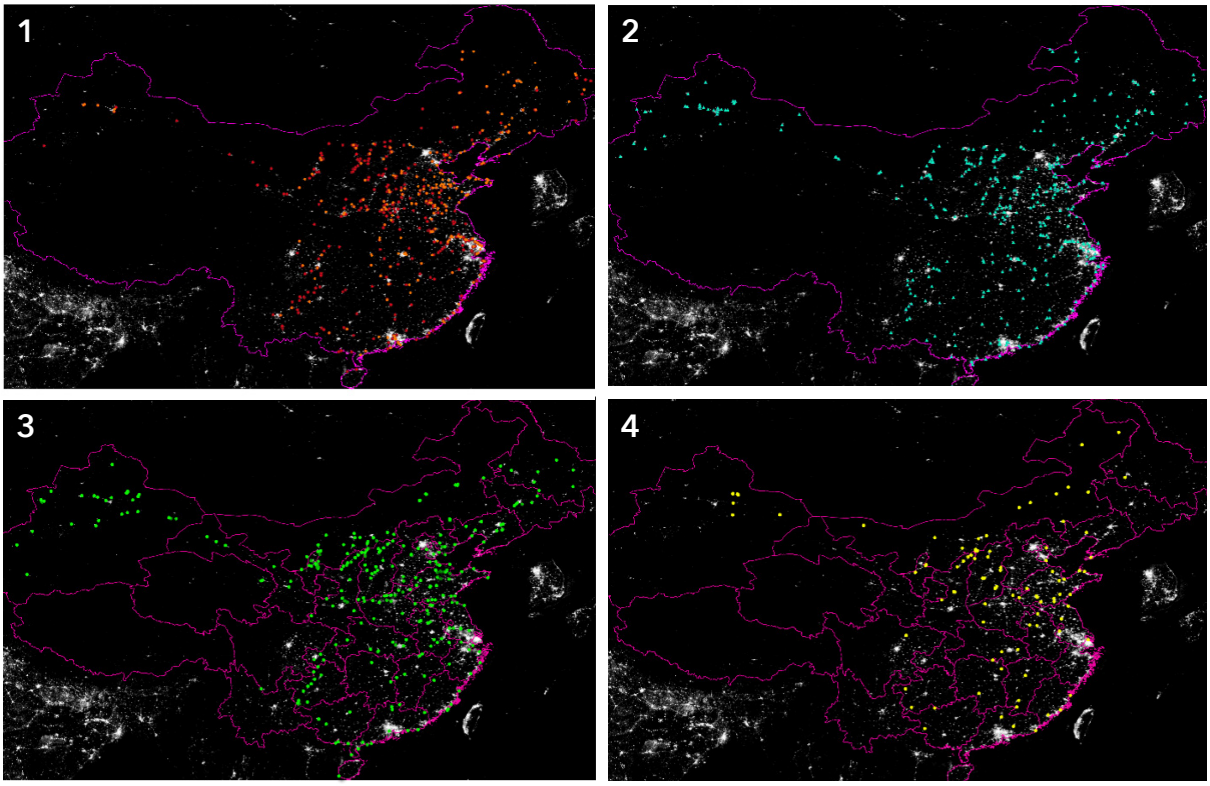
Despite Xi's centralization of power, it will be incredibly hard to get China off the coal-for-growth treadmill. Local officials readily tap into coal to boost growth figures and other metrics long enough to be promoted to a higher assignment elsewhere. Amplifying the continued carbon-dependency, officials prefer local solutions within their jurisdiction over more climate-friendly, trans-provincial energy optimization that would place more of the supply chain beyond their control.

When officials engage in these practices contrary to Beijing's directives, the center often finds it difficult to fully exert its will. As we put it in our *Foreign Affairs* essay, "Efforts to change China's colossal energy system in an acceptable timeframe will work only if the interests of power brokers at the local, provincial, and national levels are broadly aligned."[45] A Chinese idiom summarizes the challenge even more succinctly: "a powerful dragon cannot repress a local snake" (强龙不压地头蛇). To be more precise, the powerful CCP dragon must make local snake repression one of its few foremost priorities, or else rapid systemic energy evolution will not actually succeed.

Economic factors intensively shape the alignment of interests among China's various levels of government on coal and emissions policy issues. Shanghai, Guangdong, and other wealthy coastal areas do not mine much coal and only a tiny sliver of their workforces draws paychecks from the coal sector. For those provinces, coal-fired powerplants are an eyesore and "lung sore" that also occupy scarce real estate that could be used for more valuable (i.e., tax base-boosting) purposes. The coastal economic powerhouses still need abundant energy, but coal increasingly comes in by "wire" (via ultra-high-voltage power lines) from plants hundreds of kilometers distant. Geospatial analysis of how coal plant siting has evolved over time across China illustrates how "Coastal metropolises' eyesores are Northwest and rural China's employers." The images below plot (1) operational coal plants in China in 2008, (2) plants added between 2009 and 2014, (3) plants added between 2015 and 2020, and (4) plants currently under construction.

Satellite images of light emissions offer a proxy for areas of human habitation and shows how, relative to the orange and red dots representing coal-fired power plants circa 2008, coal plant additions have increasingly emphasized (1) locations further from major cities, and (2) siting closer to major coalfields in Northwest China/Xinjiang. Neither trend reflects an overall decline in coal use. The "black rock" remains critically important to China's energy system and its location of combustion and conversion into electrons is simply being geographically reshuffled.

Figure 9: China Coal Plants are Being Located Further from Cities (Marginal Additions)



Sources: GADM; Global Energy Monitor; NASA; authors' analysis.

Notes: Images' underlayer comes from NASA's Earth at Night satellite showing lights. Images chart marginal incremental (not cumulative) additions. Hence, Image 3 depicts peak new coal plants added, not Image 4.

Coal use and greenhouse gas emissions can only be addressed through a fundamental rewiring of the CCP's relationship with China's citizenry and the personal ambitions of Xi and his successors. The current course is clear: despite green rhetoric, coal plant construction in China continues to occur at a world-leading giga scale. According to the *Global Energy Monitor*, China had an additional 88 GW of additional domestic coal-fired plants under construction as of year-end 2020, equivalent to more than one-third of the United States' *entire* existing coal-fueled generation capacity.[46] If these plants enter service and operate for four decades, they could collectively burn more than six billion tonnes of coal. This would come atop an existing fleet of nearly 3,000 coal-fired units that could very plausibly burn more than 50 billion tonnes of coal by the time they reach the end of an assumed 40-year service life.

Adding coal plants abroad built—and planned—by PRC firms as part of the Belt and Road Initiative (BRI) suggests a further 18 billion tonnes of coal yet to be burned. And that amount does not even account for China's vast fleet of industrial boilers, at least 500,000 of which were coal-fired as of late 2018. The bottom line: without major changes—few to none of which will be driven by bilateral American pressure—China's net additional "coal to be burned" could realistically exceed 100 billion tonnes by 2045–60. That's enough to bury all five boroughs of New York City under a 340-foot (104-meter)-tall pile.

Burning a metric ton of bituminous coal emits approximately two metric tons of CO_2, according to U.S. Energy Information Administration data. To put the potential effects of China's future carbon dioxide emissions in perspective, Earth's atmosphere has an estimated mass of five quadrillion (million billion) tonnes. Each five billion tonnes of additional net CO_2 emissions would thus raise the global level by one part per million. As of May 2021, instruments located at Hawaii's Mauna Loa Observatory showed the atmospheric CO_2 concentration to be just under 420 parts per million.[47] An additional 100 billion tonnes of coal burned in China could thus raise atmospheric CO_2 levels by nearly 10% relative to today's levels.

Long Shot: Could China Use Carbon Capture to Balance Coal Reliance and Emissions Reductions?

Capturing and storing carbon offers a path to move coal-fired power plants toward carbon neutrality. It would potentially help mitigate some of the economic impacts that would come from de-emphasizing coal and allow China to continue utilizing a reliable, domestically available energy resource. Carbon capture, utilization, and storage (CCUS) would also appeal to the Chinese leadership's persistent propensity to try to engineer its way past physical challenges—a legacy arguably dating back thousands of years to the earliest dynasties.[48] Yet in keeping with this report's broader theme, China's significant CCUS opportunity faces a formidable set of implementation challenges. Efforts to date won't offset much, and Beijing doesn't yet show evidence of a willingness to make the enormous investments needed to scale up storage meaningfully—an endeavor that would take many years to reach a systemically impactful scale.

Deep saline aquifers are a preferred CO_2 sequestration option. China has them in abundance, favorably located near the coal-rich zones toward which the country's coal-fired power plants are increasingly migrating. Research suggests that the Tarim and Zhunggar basins in Xinjiang combined could sequester more than 300 billion tonnes of CO_2, the Ordos Basin nearly 130 billion tonnes, and the Qaidam Basin in Qinghai roughly 125 billion tonnes.[49]

Even conservatively assuming that (1) the basins can only hold in practice 50% of the CO_2 volume they could theoretically accommodate and (2) that China's CO_2 emissions rise by 25% from today's levels, the aforementioned basins could still store the equivalent of 25 years of total national emissions. Counting other areas with deep saline aquifers such as the Bohai Bay, East China Sea, and Pearl River delta area would significantly augment China's CCUS storage base near major industrial emissions centers. Against the backdrop of a large theoretical CO_2 sequestration capacity, therefore, what is the current state of CCUS in China, what would it potentially cost to reach an impactful level, and how much additional energy could be required?

The bottom line: without major changes—few to none of which will be driven by bilateral American pressure—China's net additional "coal to be burned" could realistically exceed 100 billion tonnes by 2045–60. That's enough to bury all five boroughs of New York City under a 340-foot (104-meter)-tall pile.

China currently has 14 CCUS projects in operation, which combined can sequester 2.1 million tonnes of CO_2 per year—equal to approximately half the annual emissions from a **single** utility-scale coal-fired power generation unit.[50] As such, the ramp-up required to materially reduce the country's emissions is enormous and likely to incur a commensurately large price tag. Goldman Sachs estimates that CCUS implementation large enough to slash China's carbon emissions by 60% between now and 2050 could cost $450 billion.[51]

CCUS would also likely impose additional capital investment costs in generation expansion to offset the loss of electricity that would have formerly been dispatched onto the grid—but, through CCUS utilization, would instead be directed to power carbon capture operations. A team of scholars from Harvard and MIT conducted just such a thermodynamic analysis for the United States in 2009. They concluded that under their "most likely" efficiency scenario, 69–92 GW of additional baseload power (15%–20% of the then-installed coal-fired generation capacity) or a commensurate reduction in electricity use would be necessary to compensate for the parasitic load (energy consumed by carbon capture procedures) incurred by large-scale CCUS use in the U.S. coal power space.[52]

At least one study regarding CCUS implementation at coal-fired power plants in Wyoming found that the parasitic load loss could be higher—on the order of 25%–35%.[53] This requires a corresponding increase to the numbers described in the paragraph below, which we base on the Harvard-MIT study's findings due to its national-level (rather than state-level) assumptions.

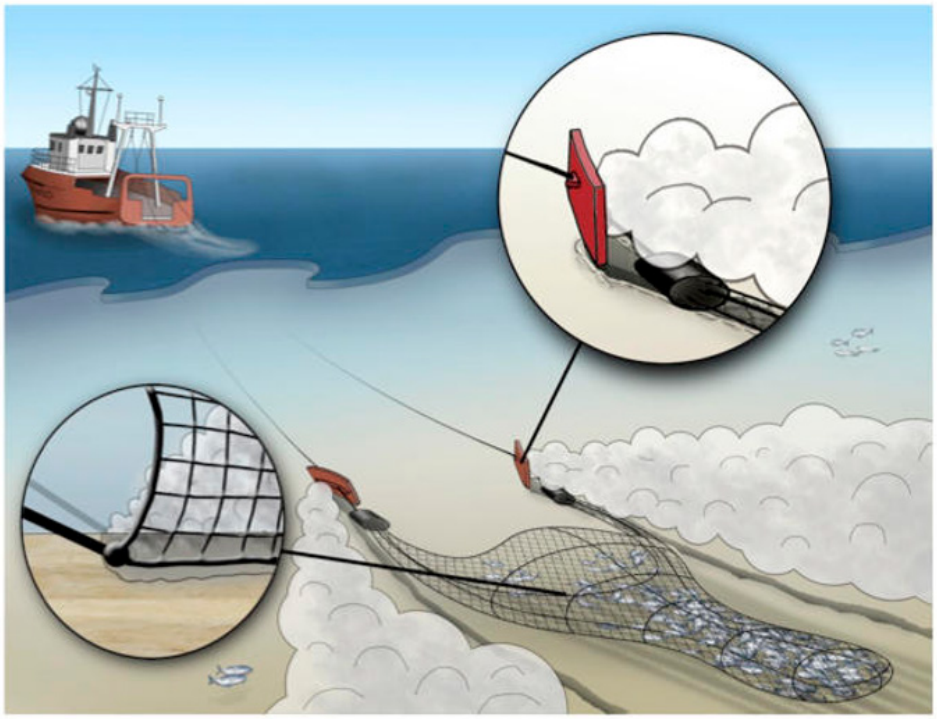
The Chinese energy system is now far larger than America's was in 2009. That year, the U.S. coal-fired power sector featured about 314 GW of capacity.[54] At the end of 2020, China had approximately 1,100 GW of operational coal power plants, with an

additional 88 GW under construction. As such, compensating for a 20% increase in energy usage in CCUS to capture CO_2 emitted by China's coal-fired power plants—while still sustaining prior levels of power supply onto the grid—could require the construction of nearly 250 GW of additional coal-fired generation (or much greater utilization of present capacity)—or 140 GW of nuclear, 500 GW of wind, or more than 800 GW of solar generation capacity.

Not Just Coal: Climate Impacts of China's Fishing Practices

China also leads the world in a less-well-known but highly climate-destructive activity: bottom trawler fishing by the world's largest fishing fleet that disrupts sensitive seabed ecosystems, releasing copious carbon and compromising its future sequestration. Bottom trawling entails dragging a weighted net along the seafloor, effectively plowing the seabed and damaging or destroying coral reefs and other marine flora and fauna that either cannot move or otherwise cannot escape the net (Figure 10).[55]

Figure 10: Conceptual Illustration of Bottom Trawler Fishing



Source: "What a Drag: The Global Impact of Bottom Trawling," U.S. Geological Survey, March 14, 2016, https://www.usgs.gov/news/what-drag-global-impact-bottom-trawling.

Contemporary scholarship based on forensic reconstruction of catch and fishing fleet data for a 70-year period suggests that PRC-domiciled or -controlled vessels presently account for 28% of the entire global bottom trawl fishing catch.[56] This dominant share, which incidentally approximately equals China's share of global CO_2 emissions from fuel combustion activities, entails significant, albeit underappreciated, adverse climate impacts.

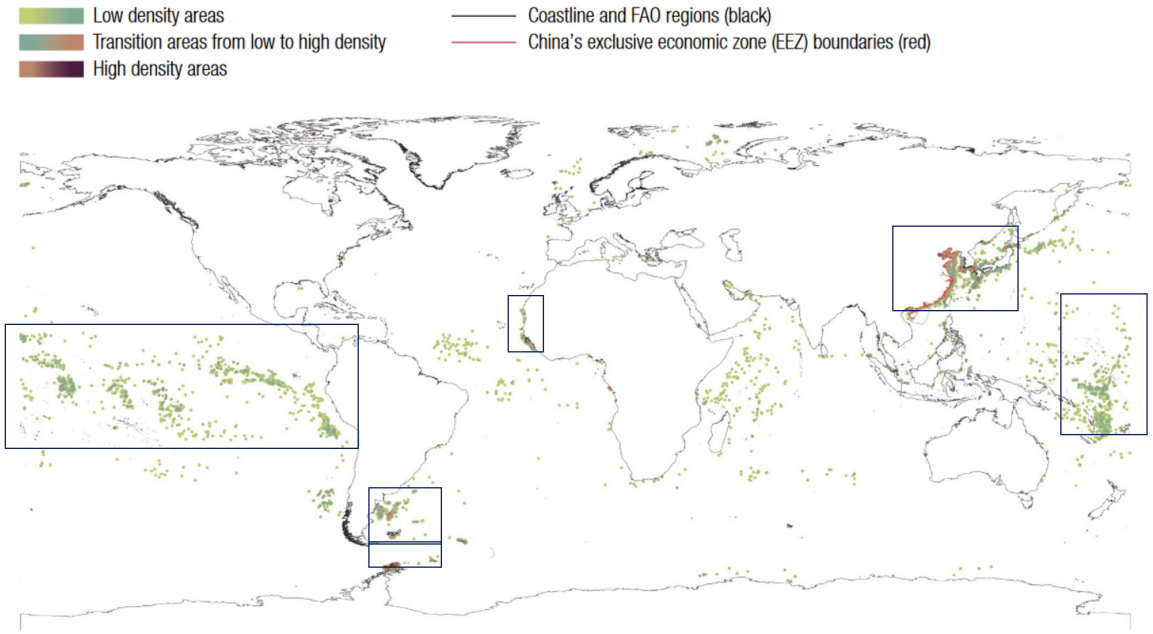
A landmark study recently published in *Nature* notes that "*marine sediments are the largest pool of organic carbon on the planet*," with an estimated volume on the order of 7 trillion tonnes—more than three times the cumulative anthropogenic CO_2 emissions since 1750.[57] Trawling disturbs seafloor sediments and triggers metabolization of stored organic carbon into CO_2. The Nature study estimates that bottom trawling disturbs 4.9 million square kilometers of seafloor each year, an area equivalent to Alaska, Texas, California, Montana, New Mexico, Arizona, Colorado, Oregon, and Wyoming *combined*, with the release of nearly 1.5 billion tonnes of CO_2.[58]

Moreover, seafloor-disturbance carbon emissions are not a one-time event but can continue at a material level for centuries so long as trawling activity continues. Per the *Nature* study, if an area is trawled each year, after nine years its emissions stabilize at about 40% of the first post-disturbance year's level and can continue for up to approximately 391 additional years until all of the carbon originally stored in the sediment has been metabolized.[59]

China is the world's leading emitter of trawling-associated CO_2, with about 770 million tonnes per year from trawling within its own claimed exclusive economic zone (EEZ) alone—to say nothing of its world-leading global fishing operations.[60] This amount is equivalent to about 8% of China's CO_2 emissions from fossil fuel combustion. The total emissions quantity attributable to trawling by vessels owned or otherwise controlled by PRC persons and entities is likely higher due to the aforementioned extensive fishing activities beyond China's own EEZ.

In June 2020, the Overseas Development Institute (ODI) published a data-intensive study that estimated China's distant-water fishing fleet—the world's largest by far—included at least 1,800 trawlers and that the real number could "be considerably higher" given difficulties in tracking vessels' ultimate ownership.[61] These vessels operate both in China's exclusive economic zone and far afield, with ship automatic identification system (AIS) data showing pockets of activity throughout the Northwest Pacific Ocean, in the Southern Ocean near Argentina and Antarctica, in the Atlantic off West Africa, and across a broad swath of Oceania in the Central and South Pacific Oceans (Figure 11).

Figure 11: Intensity of Trawling Activity by China's Distant-water Fishing Fleet



Source: ODI (Overseas Development Institute).

Note: Emphasis boxes added by authors.

In addition to being a significant standalone source of carbon emissions, China's history of fishing regulation offers a sobering cautionary tale for those who might otherwise conclude that high-level official promises to plateau and then reduce coal use will be promptly and thoroughly translated into action. As one example, China's government moved in the early 1990s to impose fishing moratoria in the Bohai Bay area to allow fish stocks to recover after years of intensive exploitation, but the restrictions were often not enforced by local authorities due in large part to countervailing economic incentives and sociopolitical concerns.[62] Local officials continued to prioritize economic development, fishing fleet tonnage rose for many years after the first restrictions on fishing were promulgated, and overfishing endured despite an increasing number of regulatory initiatives "on the books." And at the national level, the PRC government heavily promotes and subsidizes distant-water fishing, even though China is the world's leading source of Illegal, Unreported, and Unregulated (IUU) fishing and related transgressions globally.[63]

Here it bears noting that the Bohai Bay moratoria referenced above affected around 1.2 million fishers (and presumably, their onshore support logistics supply chain) in just several PRC provinces.[64] Chinese government statistics from 2017 reported that nationwide, approximately 5.5 million people depended on marine fisheries to sustain their livelihood.[65] Attempts to eliminate major portions of the domestic coal supply chain would affect a value chain an order of magnitude larger than that of China's fishing industry, one whose capital asset base is worth far more, and one whose lobbying power extends to the top of China's political power structure and is pervasive at every level below as well.

If local and provincial influences can compromise national-level PRC policy implementation for fisheries management (an important sector, but not an existential base of national power), it suggests the outside world must moderate its expectations for the speed and depth of reforms in a "commanding heights" space like energy and emissions.

Overfishing and fish stock depletion impact local fishers' economic wellbeing almost immediately, and yet a severe collective action problem nonetheless impedes reform. A similar pattern emerges with regard to coal use. Tangible emissions like PM 2.5 particulates, sulfur oxides, and nitrogen oxides are being managed by moving coal combustion further from major cities. But the effects of rising atmospheric levels of colorless and odorless but impactful CO_2 are often not acknowledged or addressed in China's official statements and heavily-controlled media. Indeed, press coverage after major Chinese weather disasters tends to avoid mentioning climate change, let alone acknowledging that China's own emissions might be a factor influencing it.[66] Suppressed and selective discussion at the national official and media level again reflects the challenges of obtaining the pervasive buy-in needed to move away from a coal-centric energy system with so many vested, mutually reinforcing interests at all levels of the PRC economic and political power structure.

If local and provincial influences can compromise national-level PRC policy implementation for fisheries management (an important sector, but not an existential base of national power), it suggests the outside world must moderate its expectations for the speed and depth of reforms in a "commanding heights" space like energy and emissions.

Blue Carbon and Seabed Mining: Will PRC-Affiliated Miners Plunder Earth's Final Frontier?

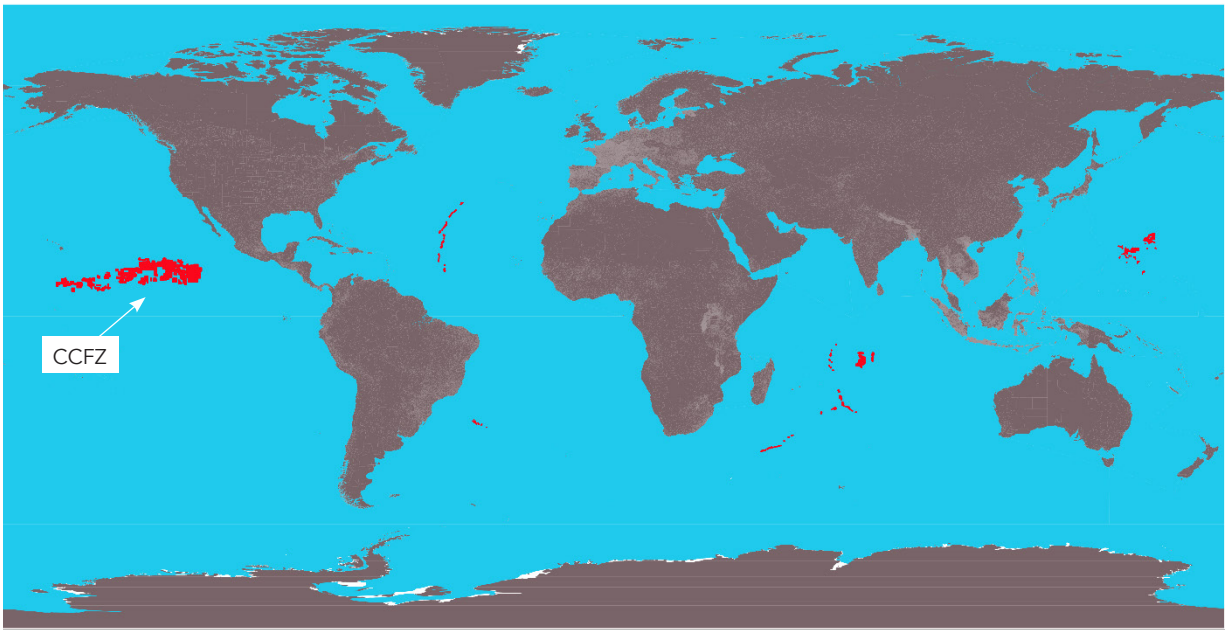
Blue carbon, carbon captured and stored by coastal and oceanic ecosystems, is a little-known but vital global asset—a final frontier of sorts for emissions mitigation.[67] Living systems, including salt marshes, mangroves, seagrass beds, and the ultra-deep abyssal seabed, absorb large quantities of CO_2 from the atmosphere and sequester it. As the U.S. National Oceanic and Atmospheric Administration (NOAA) explains, "These types of habitat are known as carbon sinks and contain large stores of carbon accumulated over hundreds to thousands of years."[68] A study published by the U.S. National Institute of Sciences emphasizes that trawling likewise "represents a major threat to the deep seafloor ecosystem at the global scale," and thereby a major threat to the blue carbon sink.[69]

The United States is taking proactive steps to protect blue carbon sinks—for instance, NOAA's ongoing data support for the U.S. Greenhouse Gas Inventory and international capacity building to help partner nations estimate their respective blue carbon storage levels.[70] Given China's central role in disrupting oceanic carbon storage,[71] a verifiable reduction in bottom trawling and other destructive practices by PRC-affiliated firms and entities would be a positive indicator of broader PRC sincerity regarding climate progress.

The sequestration and disruption of climate-relevant carbon in the seabed is poised to become still more important because of the potential for mining there. In a true "Climate Catch 22," this is particularly the case regarding rare earth elements and other strategic minerals increasingly sought after as the world emphasizes greater use of wind and solar energy, electric vehicles, and battery storage. Battery production at a scale sufficient to power global vehicle electrification requires vast quantities of copper, manganese, nickel, and cobalt—with seabed reserves one of the few remaining untapped sources.

Such critical inputs abound in polymetallic nodules strewn across underwater plains such as the Clarion-Clipperton Fracture Zone (CCFZ), a sprawling oceanic expanse south of Hawaii (Figure 12).[72] Seabed mining leases currently granted in the CCFZ occupy a span of approximately 4,600 kilometers east-to-west: roughly the distance between Los Angeles and Nova Scotia in the Canadian Maritimes.

Figure 12: Seabed Mining Leases Granted by the International Seabed Authority *(Lease areas shaded in red)*



Sources: International Seabed Authority; authors' analysis.

The International Seabed Authority (ISA), which issues seabed mining leases in international waters that lie beyond any specific nation's jurisdiction, has granted entities associated with China and 14 other countries vast prospecting sites across the CCFZ—with PRC-affiliated entities the only ones granted two sites.[73] There are few externally enforceable restrictions on how they will be able to operate there. This lack of meaningful safeguards is cause for concern given recent research confirming that despite its great depth, the CCFZ is an ecologically rich zone of substantial carbon sequestration and ecosystem importance that is only beginning to be understood.[74] Industrial-scale seafloor disturbance could also create additional unintended climate consequences—including, for instance, disruption of hydrates that releases large quantities of methane, a proportionally far more damaging greenhouse gas than CO_2.[75]

Yet despite its potentially far-reaching consequences, undersea mining remains largely unregulated.[76] Complicating matters further, the United States is not an ISA member state.[77] This gives Beijing largely-unchecked influence over the uniquely impactful organization.

The seafloor covers 71% of the Earth's surface.[78] Yet 85% remains uncharted.[79] And, despite the seabed's great and possibly underappreciated significance as a carbon sink, carbon-relevant disruptions are presently not even measured systematically—much less reported by leading disruptor China, or any other nation.

Under existing international arrangements, some categories of maritime climate-influencing activities are relatively well covered. In a prime example, oceanic shipping, together with its consumption of bunker fuel and related emissions, is closely monitored by the International Maritime Organization and industry analysts alike. The Intergovernmental Panel on Climate Change (IPCC) 2013 update finally added coastal wetlands as a category for recommended reporting and offers "Guidance on specified management activities in coastal areas of mangroves, tidal marshes, and seagrass meadows." Notably, however, the word "seabed" does not appear anywhere in the detailed 354-page report.[80] The most recent update, the voluminous *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*, similarly lacks even a single mention of the word "seabed."[81]

To date, in fact, the IPCC does not address ocean sediments at all, let alone offer guidelines concerning responsibility for greenhouse gas impacts therein, or how to measure them. This is a staggering loophole at a time of sweeping climate proposals that can re-shape lives, communities, economies, and geopolitics irreversibly. And China's emissions within such loopholes must be fully acknowledged and accounted for by officials in the United States and its climate partners as they formulate climate diplomacy approaches.

Internationally-accepted data for Greenhouse Gas Inventories are based on guidelines issued by the Intergovernmental Panel on Climate Change (IPCC).[82] The specifics of compliance are entirely voluntary in nature, flexibility that Beijing uses to pursue its own priorities. There are three tiers of reporting for each of approximately 80 compounds.[83] The United States typically provides facility-level reporting—equivalent to the IPCC's Tier 3 (highest-quality) standard, a more specific approach than China utilizes.[84]

China's most recent inventory, *The People's Republic of China Second Biennial Update Report on Climate Change*, is laden with the generalities typical of PRC white papers and thin on specific data and the methodologies by which the data were obtained and assessments made.[85] It is far less substantive, rigorous, and current than its highly transparent, frequently updated

Despite the seabed's great and possibly underappreciated significance as a carbon sink, carbon-relevant disruptions are presently not even measured systematically—much less reported by leading disruptor China, or any other nation.

counterpart, the U.S. Greenhouse Gas Inventory.[86] While climate change reports by themselves do not alter emissions trajectories, data collection and reporting can provide a basis for discussion and negotiation—as well as foreshadow how rigorously a state is willing to hold itself and entities operating within its borders and/or under its jurisdiction accountable for meeting emissions targets.

The present disjuncture of interests and urgency will play a pivotal role as Beijing searches for leverage points in an international environment that (1) looks likely to yield various counter-China strategic diplomatic and economic alignments, and where (2) the individuals presently deciding policy in many of China's competitors increasingly make climate concerns a central principle guiding their strategic courses of action. The bottom line is that seabed sequestration and its disruption must finally be factored into the overall climate equation. No "Road to Glasgow" that ignores the seabed's fundamental importance as a carbon sink, or China's leading role in undermining it, can be a route to climate progress. Most fundamentally, Beijing must acknowledge its leading "blue carbon" stewardship responsibility, and reform accordingly.

Why—and How—Beijing Will Seek to Exploit a "Climate-First" U.S. Foreign Policy

Climate change did not become an organizing principle for American foreign policy overnight. On the contrary, the issue's present central status was years in the making and can be dated at least to the climate summitry between then-President Obama and President Xi in 2014 and 2015.[87] Even amid the Trump administration's official climate skepticism, high-profile scholars and former government officials continued to privately build the intellectual groundwork for climate to become a core U.S. foreign policy objective in a way it never had been before.

Consider an article by John Podesta and Todd Stern in *Foreign Affairs*' May/June 2020 issue, which stated that "… not only must the United States continue to work with China on climate change; it must also put progress toward a net-zero world in 2050 at the very center of the relationship." [emphasis added][88] Likewise, former President Bill Clinton's November 2020 exhortation that there is a "desperate need" for Sino-American cooperation on climate change also presaged the now-imminent policy risk that climate goals could present foreign rivals with an exploitation opportunity.[89]

From an American perspective, high-level entreaties may represent diplomatic olive branches to help set new parameters for bilateral interaction. But for Beijing, the climate concerns that animate an increasing portion of the U.S. political universe present a far different—and more sinister—opportunity. China's worldview under Xi fundamentally revolves around displacing the United States, achieving regional hegemony, and growing its global influence while promoting a narrative of the PRC's inevitable rise and the need for other countries to accommodate themselves to this

new "reality."[90] Making climate cooperation a central tenet of American foreign policy thus opens the door for China to pressure the United States to desist from confronting PRC revisionist activities, lest the PRC side refuse to engage in climate cooperation discussions and embrace actions that would meaningfully alter its present lagging, second-mover "glide path" approach to emissions reduction.

Recent PRC statements strongly suggest that carbon and climate diplomacy remain subservient to the party-state's competition for territory and control. Just a week into the Biden administration, PRC Foreign Ministry spokesman Zhao Lijian made clear that China's willingness to cooperate on climate would require U.S. concessions on key strategic issues. "China-U.S. cooperation in specific areas … is closely linked with bilateral relations as a whole," he emphasized in a press conference. "[N]o one should imagine they could ask China to understand and support them in bilateral and global affairs when they blatantly interfere in China's domestic affairs and undermine China's interests. We hope the United States can create favorable conditions for coordination and cooperation with China in major areas."[91]

In April 2021, China's foreign minister (and state councilor) Wang Yi reinforced the message, stating in a speech to the Council on Foreign Relations that "The United States cannot repeatedly challenge China's rights and interests on issues related to Taiwan, Xinjiang, and Hong Kong while expecting China to cooperate with it on issues it cares about."[92]

While Wang did not mention climate change by name, China's new "climate progressive" international messaging appears designed to present Washington with a dilemma: continue confronting the CCP's aggressive actions in the Indo-Pacific and beyond, or instead relent in exchange for Beijing's hand in climate partnership. China's progressively harder-edged position reveals that it treats climate as part of a broad continuum of national interests, alternately wielding it as a smokescreen for diplomatic positioning, a cudgel to extract concessions that asymmetrically favor parochial PRC positions, and a ruinously expensive **toll gate on the "Road to Glasgow"** and points beyond.

Climate is lower in Beijing's foreign policy "hierarchy of needs" than it is in the consensus emerging in Washington (and key allied capitals). While many American and European decision-makers now increasingly emphasize climate impact as a first principle, Beijing's strategic bottom line is very different—elevating Bismarckian "blood and iron" competition for territory and strategic influence high above carbon and climate.

In key PRC decision-makers' eyes, Washington is the architect, policeman, and lead maintenance engineer for a rules-based regional order inimical to the neo-tributary-state system Beijing seeks to reconstitute. For Xi and his advisors, the preferred world

is one where China has strategically displaced the United States from East Asia and its maritime periphery. If the atmosphere is burdened with another 200 billion tonnes of carbon dioxide (or perhaps much more) along with mercury and other toxics, the control achieved was nonetheless worth the cost to the shared global biosphere. Globalize the ecosystem costs, aggrandize the economic and geopolitical gains.

Fast-shifting global carbon tectonics are thus setting a high-risk trap for U.S. foreign policy: China demanding concrete concessions now in exchange for the hope that it "may choose to" eventually chart a mutually beneficial course. But in exchange for quasi-existential economic, technology, and hard security compromises by Washington (and allied capitals), Beijing will only offer the ***"definite maybe"*** of climate promises that it would either (1) outright fail to fulfill, (2) find itself unable to fulfill following unwillingness to prioritize overriding opposition from powerful sub-national leaders and other domestic interests, or (3) fulfill by default as China's demographics decline, its economic growth slows, and it executes energy sourcing shifts that were going to happen regardless. Washington and its allies would preemptively pay a substantial price in exchange for illusory "climate commitments" that could take decades to pay off, if ever, and in diplomatic and strategic terms cost Beijing little or nothing relative to the *status quo*.[93]

Climate Influence Operations

Climate linkage has become a sensitive topic in Washington. The fact that John Kerry, America's senior climate diplomat, felt compelled to emphasize in the administration's first weeks in office that climate is a "standalone issue" in Sino-American relations underscores the sensitivity.[94] Moreover, climate linkage will likely be a lasting, dynamic theme. PRC policymakers will seek to exploit this perceived vulnerability creatively—and persistently—through manifold channels. The PRC government and its vast and varied ecosystem of official and unofficial agents will very likely use the prospect of climate dialogue and action—however illusory—to gain a psychological foothold within American domestic constituencies for whom climate is the single-most-important issue. Such **climate influence operations** could harness the zeal of multiple domestic influencers—many well-intentioned—and transmute it into virtual gates and walls that more broadly constrain American freedom of action in the Indo-Pacific and countermeasures to pernicious PRC behavior.

Fears of American domestic agenda manipulation by PRC-linked interests are not misplaced. Beijing has for decades enlisted key portions of the U.S. business and finance communities to help maintain a permissive environment in Washington.[95] That technique helped delay American responses to revisionist PRC behaviors regarding Indo-Pacific security, international rules and norms, technology theft, and other malign actions that harmed (and continue to prejudice) vital American national interests.[96] Expect similar tactics on the climate front.

Already many willing fellow travelers are being **taken for a ride on the "Road to Glasgow."** Perhaps the first high-profile public example of domestic groups adopting Beijing's party line on climate compromise came on July 8, 2021. In what was at very least a dangerous display of naïveté, a coalition of 48 progressive groups submitted a letter to the White House and Congress entreating that America must alter its China policies "from competition to cooperation" to achieve climate progress at the cost of accepting security threats created by China's own actions.[97] As we explain throughout this report, such an approach is a counterproductive nonstarter that risks taking the focus and pressure away from precisely where it should be: Beijing.

The Right China Climate Strategy: Competition

To incentivize productive negotiations, America must first compete with China. Seeking cooperation with Beijing on climate issues has been the *status quo* approach—exemplified by the November 2014 Sino-American Joint Agreement that preceded both countries' signing of the Paris Agreement. Emphasis on dialogue likewise permeates multilateral climate diplomacy, whereby the United Nations Framework Convention on Climate Change incorporates most of the world's countries and has met annually since the inaugural COP session in 1995. Yet a quarter-century later, the "cooperation first" climate approach finds global CO_2 emissions half again larger than they were when the COP process commenced and China's share of that expanded global CO_2 exhaust more than double its initial proportion.

PRC backsliding, a lack of enforcement mechanisms to hold signatories accountable, and China's reiterated intent to weaponize climate at the expense of the global commons demands a far better approach: climate competition as the ultimate lever. The need for this shift is now acute: a "cooperation-first" approach in which Beijing sets the fundamental terms is doomed to failure. For China today, emissions restraint is a weapon, not an objective unto itself.

Currently, countries that seek Beijing's hand in cooperation are supplicants and will be compelled to make concessions preemptively to create "favorable conditions," after which the PRC side might finally deign to engage. In contrast, a strategy that leads with competition generates momentum and turns the diplomatic tables on China. To succeed globally in the long run, U.S. and allied climate policy first must emphasize precisely such competition.

Dialogue's contribution of elevating emissions control on key countries' societal and political radars itself is a major qualitative achievement. But to translate qualitative profile elevation into concretely quantifiable emissions reductions requires fundamentally rethinking the diplomatic order of operations. Competition must be first used as the lever to break countries—China first and foremost—out of their present inertial trajectories. Only after that painful evolution will opportunities emerge for meaningful cooperation.

Washington's competitive push should start with a "climate coalition" centered on OECD industrial democracies. Collectively, in 2019 these nations created nearly 75% of global GDP and about 35% of world CO_2 emissions—a substantial emissions level overall but already less than China's. A purpose-built coalition incorporating the key players among this group would have a good chance of establishing the critical mass needed to pressure Beijing to compete and improve its emissions profile, rather than seeing what it can extract upfront from individual suitors.

A coalition helps overcome the challenge of China being "too big to budge" by unilateral means. Holding emitters accountable using U.S. or EU tools of economic statecraft works with most countries. In the November 2020 issue of *Foreign Affairs*, Steven Herz, Brendan Guy, and Jake Schmidt explained the power of market access, noting that in 2018 "the EU warned new governments in Australia and Brazil that it would end negotiations on new trade pacts if those governments followed through on threats to leave the Paris agreement. Both countries quickly reversed course."

But China's economic output is five times larger than Australia's and Brazil's combined. Even for Washington, acting unilaterally is not a viable option at present: a reality highlighted by the past three years' experience with the Sino-American trade war. Beijing weaponizes interdependence to selectively impose pain (via curtailment of American soybean imports during the 2018 mid-term election cycle, for instance). Beijing turns the situation to its advantage by making cooperation in one area contingent on acquiescence in others. It would be dangerously naïve to expect China's leadership to behave any differently if climate change, rather than trade, is the subject of discussion. Accordingly, a large group of countries acting in concert to distribute and equalize costs while pursuing commonly beneficial climate goals helps parry the risk of China singling out specific members for coercion or punishment.

Climate competition emphasizes creating a level, pro-climate playing field. Its central premise is positive—key industrial democracies impose domestic carbon taxes in coordination with each other benchmarked to a negotiated standard. U.S. leadership on carbon taxation would also exert a gravitational force on other key non-China economies—which, as noted above, collectively constitute the world's largest market bloc. But Washington's strength is greatest when exercised in concert with others for the greater good.

Harmonizing the trade impacts of these taxes through border adjustment taxation based on the goods' carbon footprint then creates a multinational standard that PRC (and other) exports will need to match. As a 2016 study by University of Chicago researchers puts it, for imported goods, a carbon border adjustment tax "can be thought of as the carbon tax that would have been imposed had the good been produced domestically (but using the production process and fuel that was actually used abroad)."[98] In other words, if the exporting country insufficiently prices the

embedded carbon resulting from the production process and fuel used within its borders, the importing country's border adjustment tax "levels out" the carbon cost to ensure that domestic firms producing the same good are not disadvantaged. Such an emphasis on the carbon-intensity of inputs would reduce the disadvantages that manufacturers in the United States and partner countries would otherwise face from coal-fired Chinese competitors.

Despite optimistic rhetoric about a "dual circulation" policy re-emphasis of domestic consumption, PRC firms still actively seek access to global export markets. With coal's present systemic pervasiveness in China—generating roughly 65% of the electricity supply, versus 24% in the United States and 18% in Europe, and providing the predominant source of industrial process heat—Chinese firms will thus very likely have to structurally change their energy sourcing to remain economically viable in the energy-intensive goods categories in which they are most competitive.

U.S. leadership in carbon taxation would exert a gravitational force on other OECD and aligned economies that collectively account for the world's largest market bloc. Including a carbon-based border adjustment tax on imports would amplify the impact—and also open the door for penalizing PRC firms' attempts to "free ride" by continuing production of emissions-intensive goods for global markets. Carbon pricing could thus help create a **climate geoeconomics toolset** to protect allied country industrial bases from unfair PRC-domiciled competition while encouraging seeds of potentially positive evolution to sprout in China.

Of nearly equal importance, major commercial entities—including those with existential interests in fossil fuels—also increasingly appear to accept the idea of carbon taxation. Court filings reveal that in 2017 business planners at ExxonMobil—the *de facto* leader of international oil and gas firms—were already assuming a proxy cost for CO_2 emissions of $60 per tonne by 2030 in OECD countries.[99] For perspective, a $60/tonne carbon tax would add about 54 cents per gallon to gasoline pump prices. At U.S. annual *per capita* gasoline consumption of approximately 450 gallons, this would raise annual fuel bills by roughly $245. That is not a politically welcome cost—especially with strained pandemic-era personal balance sheets—but one that is still less than even a basic smartphone data plan, most likely economically bearable, and certainly palatable if part of the revenue raised is returned to households though a "carbon dividend" such as that advocated by former secretaries of state James A. Baker, III, and George Schultz.[100]

If PRC industrial players can rise to the challenge—and the incentives for doing so are existential at both the firm and Party level—the upfront investments made are then likely to help generate a snowballing positive path dependency toward a less carbon-intensive growth model in China. At that point, the enforcement mechanism would be effectively in place for future negotiations (on increasing the carbon tax) and China's former capacity and incentive to weaponize climate issues at the expense of the global commons would have been dramatically reduced.

Foreign policy starts and ends at home. A climate competition strategy would also energize multiple emerging American policy priorities in a way that harnesses domestic imperatives in service of global objectives. It grows from the soil of America's heartland and the floor of its factories—precisely where there is **growing consensus to root a firm middle-class foundation for future national security and well-being.** It embraces the reality that energy austerity, unaffordability, and self-abnegation are political non-starters, and that energy abundance is needed to sustain and expand an American economic revival. This approach has the best chance of ensuring the home-front political buy-in necessary to maximize the long-term policy sustainability needed to (1) reassure partners that Washington is in for the long haul and (2) stay on track for the decades that will likely be needed to make lasting energy transition and climate progress.

Domestic Advantage Factors

Washington can and should lead by example, leveraging multiple "advantage factors." Job-rich infrastructure development promises plentiful energy at manageable carbon levels. First, unlike China's economy, America's growth model is not predicated on coal-dependent fixed infrastructure and basic materials production. In a fortuitous turn of geology, America's biggest fossil fuel bounty is natural gas. The fracking boom in the mid-2000s coincided with much of the U.S. coal-fired power plant fleet reaching retirement age. Wind and solar power have also expanded considerably over the past 15 years. The result is that over the past decade, the United States has been the inverse of China—it often talked regressively about fossil fuels, but in fact became measurably greener in reality. Despite divisive rhetoric and volatile climate policy, America actually reduced CO_2 emissions by nearly 10% between 2010 and 2019, even with primary energy consumption rising by roughly 2%.[101]

Second, American and allied country academic and private sector energy innovation efforts are world-class in renewables, nuclear, and more efficient use of fossil fuels. The next 5 to 10 years will be exciting in the U.S. energy tech space. Firms such as TerraPower (backed by Bill Gates), NuScale, and others are poised to commercialize modular, safer reactors that revolutionize the way society uses weatherproof, virtually carbon-free nuclear energy. If the economic and legal hurdles can be resolved, the United States is also likely to become a global technical and applied practice leader

in pursuing carbon neutrality—capturing CO_2 from the air and processing emissions to retain the logistical and thermodynamic advantages of many legacy carbon fuels and the substantially amortized multi-trillion dollar infrastructure that delivers them to consumers—all while offsetting their harmful emissions.

Indeed, the fact that PRC industrial espionage efforts and corporate technology theft continue targeting American institutions itself demonstrates the sheer extent of American technological prowess (albeit in a perverse way). To maintain this U.S. competitive edge, the Department of Energy should expand its funding of both low-carbon and fossil fuel energy transition projects in order to accelerate the pace of innovation and scientific progress. The United States can also leverage a potent force multiplier for climate technology development: close diplomatic and academic ties with allied techno-industrial leaders. As competition with China intensifies and the PRC bullies and cajoles interlocutors, adept diplomacy can deepen American energy technology partnerships.

Third, the United States can assume climate leadership not through PRC-style rhetoric, but through concrete actions that offer the additional benefits of addressing energy poverty and predatory PRC lending practices. Domestic activities include retiring additional coal power plants, emphasizing natural gas, extending operating licenses for existing nuclear reactors and preparing to bring new ones online, and deploying more renewables. International activities include promoting secure, transparent global supply chains for key renewable energy minerals. Likewise, transparent American-led facilitation and project finance efforts—e.g., involving the Export-Import Bank—can accelerate the global energy transition and help address energy poverty in important strategic locations, including Southeast Asia, South Asia, and Sub-Saharan Africa. Such actions stand in stark—and positive—contrast to China's Belt and Road energy infrastructure projects, which export domestic industrial overcapacity, frequently impose coal reliance for decades to come, and compromise host nation sovereignty through debt entrapment.

Fourth, the United States' physical and economic geography offers great potential for offsetting carbon emissions rather than ruthlessly avoiding them. Carbon neutralization activities can utilize massive, well-understood subsurface reservoir spaces in the Permian Basin and Gulf Coast region capable of sequestering decades' worth of global CO_2 emissions. And the opportunities for reducing the carbon and greenhouse gas emissions profile go beyond petroleum. The United States is the "Super Saudi Arabia" of global grain supplies—producing nearly 20% of the world's total staple food grains.

Agricultural activities can incorporate heretofore underutilized measures, such as biochar to reduce fertilizer requirements and soil-based sequestration, that help offset emissions of multiple greenhouse gases—some of which, like nitrogen dioxide,

are proportionally far more potent than CO_2. Land use patterns also offer untapped sequestration opportunities, such as the BCarbon soil storage initiative currently being developed by a group led by Rice University's Baker Institute for Public Policy. All these actions position the United States as a massive **"Carbon Leadership Lab"** where competing private and academic actors can develop, apply, refine, and scale up new carbon management technologies and practices that can then be applied nationally and exported abroad—perhaps eventually even to China itself.

Finally, climate competition would offer a new set of options for handling adverse domestic PRC actions driven by expedience, contrary to Beijing's international commitments. Climate competition would also protect President Biden himself from PRC mistreatment akin to that suffered during his vice-presidency. In 2009, despite the Obama administration's ill-advised but concerted efforts at "strategic reassurance" of China, PRC officials personally mistreated President Obama at the Copenhagen Climate Change Conference and even physically attempted to outmaneuver him.[102] No PRC head of state, let alone Xi himself, would ever tolerate such disrespect; and no American leader should ever be put in such a position again. For China to chart a more responsible path on carbon in coming years, a major course correction is needed lest similar noncompliance or offensive machinations result.

As with any ambitious policy approach, there will be complexities and challenges, beginning with the dynamic political foundation atop which President Biden and his team stand. The typical American considers climate change an important issue, but generally—and understandably—does not embrace it with the same sense of immediacy that animates their concerns regarding the economy, healthcare, salary, job security, political polarization, education, public safety, national security, and other "kitchen table" and "pocketbook" issues.[103]

Most fundamentally, realistic climate initiatives grounded in domestic economic development and protected from PRC manipulation can help build a sustainable political support base. Our solution emphasizes more comprehensive activation of America's industrial base for energy transition projects while also adopting carbon neutrality measures that protect existing critical value chains—such as the unconventional oil and gas industry—thereby creating new sectoral opportunities. What is already clear is that negotiating with China will not prevent climate change; Beijing would impose unacceptable costs while failing to deliver on its end of any bargain. But, as we explain, there is a far better alternative: competing with China through climate coalitions at home and abroad.

The Practical Path: Building a Climate Competition Coalition

As explained above, Washington's competitive climate push should start with a "climate coalition" centered on OECD industrial democracies. Collectively, these nations commanded nearly 75% of global GDP in 2019 and accounted for about 35% of world CO_2 emissions in that year. A purpose-built coalition incorporating the key players within this group would have a good chance of establishing the competitive critical mass needed to inspire Beijing to compete and improve its emissions profile, rather than seeing what it can potentially extract upfront from ardent suitors.

Perhaps the single most important policy priority should be putting a price on carbon within climate coalition countries, while also ensuring that Beijing cannot exploit such measures to dump artificially underpriced high-carbon goods in those markets. Carbon taxation now attracts serious attention on both sides of the Atlantic. Sixteen European countries already tax carbon to varying degrees and the European Commission has now proposed a carbon border adjustment tax, which will still need to be negotiated among the 27 member countries and European Parliament.[104] Meanwhile, bipartisan interest is rising in the U.S. Congress, with bills to date sponsored by a House Republican and multiple Democratic Representatives and Senators.[105]

As it leads by example and rallies the major advanced industrial economies behind the cause of carbon taxation, the United States can appeal to concerned climate stakeholders around the world and help them hold China to account. A key constituency: the island microstates most threatened by climate change. In the Pacific, Indian Ocean, Island Africa, Caribbean, and beyond, Climate Envoy Kerry and Interagency colleagues should offer comprehensive mitigation, adaptation, and resiliency assistance; including in countering soil erosion, addressing salinity and clean water shortages, developing new sources of power, and helping preserve ecological resources from PRC predation, particularly in the marine sphere. Such initiatives would offer a far more productive "Road to Glasgow" than any American meetings with PRC interlocutors. **The agendas and itineraries of Kerry and other key officials should reflect this reality.**

With Pacific Deterrence Initiative funding, the Seabees can play a constructive American role. Fellow members of the Quad (Australia, India, and Japan) can also offer humanitarian assistance and disaster relief preparations. Having recently helped to establish the Samoa-based Pacific Climate Change Centre for the Secretariat of the Pacific Regional Environment Programme, America's critical Pacific ally and global environmental exemplar Japan can offer unique support. Other key organizations to work with include the Micronesian Islands Forum and Council of Regional Organizations of the Pacific. Envoy Kerry and colleagues should promote American and allied climate-protective efforts, something that their predecessors have already

done with favorable reception in the Pacific Islands Forum, and encourage officials to ask similar accountability of China.

This is not a constituency that Beijing can afford to ignore: even the smallest such state wields a UN vote and has the potential to choose between Beijing and Taipei. Threatened existentially by rising sea levels, these island nations are ultimately unlikely to be swayed by empty PRC rhetoric or attempts to distract with blandishments, none of which will stem dangerous tides—particularly when shored up with American commitment to real results. In this way, climate competition with China can truly trigger a "race to the top" of climate-friendly actions that pierces Beijing's smokescreen of empty emissions promises. EU deliberations on border carbon taxes are already a promising sign.

Conclusion: Seeing Through Beijing's Smokescreen

Competition with China can better protect both American interests and our shared biosphere, by catalyzing and accelerating shifts in global carbon tectonics for the good of all. Currently, in Beijing's foreign policy approach, climate is not the issue of environmental protection that it is for most American and other Western advocates. Instead, the CCP's international climate diplomacy—like its overall pattern of statecraft—is harshly Leninist, narrowly instrumental, and obscured by a pall of propaganda. The longstanding postwar American approach of subsuming its specific national interests within broader institutions and systems—which, as Josef Joffe puts it, "advanced American interests by serving those of others"[106]—is a foreign notion in Xi's PRC.

Instead, Beijing's nonnegotiable end goals are Party perception management, Party control, and Party power aggrandizement—whether through making China a central new energy systems player or demanding that Washington accommodate PRC economic, political, and security imperatives in exchange for a set of "definite maybes" that will likely remain unfulfilled.

Indeed, if the CCP leadership truly cared about global environmental issues, why would state banks finance a massive coal plant buildout in BRI countries without even a symbolic statement of "corporate social responsibility"? Why would PRC state entities dredge thousands of acres in the South China Sea, creating history's greatest coral reef destruction? Why would Beijing subsidize long-range fleets plundering fish stocks in oceans thousands of miles afield? Why would Beijing muzzle even those environmental groups it authorizes as Orwellian "government-organized nongovernmental organizations (GONGOs)"? The answer is simple: up to now, the Party has invariably put its political survival first and heavily sacrificed the climate in the process.

Most fundamentally, how can U.S. officials and the voters to whom they answer trust a Party that won't even accept or air the professional assessments of its own environmental officials? Case in point: the former China Central Television (CCTV) journalist Chai Jing—"China's Rachel Carson." Soon after being commended by Minister of Environmental Protection Chen Jining, her 2015 TED-style documentary, *Under the Dome*, was abruptly censored, as were her personal communications.[107] That silencing of China's "Silent Spring" movement before it could even begin to stimulate much-needed discussion speaks louder than any words—all the more evidence that Beijing's climate cooperation sweet talk is dangerously disingenuous.

Yet now, as Washington risks appearing an "ardent suitor" on climate cooperation, Beijing has a potent playbook ready: entrap American interlocutors in endless, fruitless negotiations with China's numerous, capable official counterparts. The goal is obvious: to delay and diminish larger U.S. policies to counter PRC aggression effectively by diverting and distracting key U.S. officials and constituencies with incessant dissuasions that "now is not the right time to risk undermining relations." Indeed, in this narrative, it will *never* be the "right time" to counter PRC predations. Alternatively, if Washington remains on course to preemptively limit its emissions without awaiting similar reciprocal constraints, Beijing stands ready to benefit as an unfettered "second mover," to its own potentially paradigm-shifting geoeconomic advantage.

In any case, PRC leaders will make climate-related decisions based on their own interests and priorities, rather than any putative cooperation with the United States. In the meantime, allowing a revisionist China to erode the rules-based order in the Indo-Pacific and beyond will only worsen global environmental challenges. Countries making policy decisions in a conflictual, securitized international environment will generally prioritize domestic energy resources even at the expense of the environment. China itself has already blazed just such a toxic trail, leaving domestic soil and water pollution that may take decades or longer to remediate and burdening the global atmospheric and oceanic commons with unprecedented levels of CO_2, mercury, CFCs, HCFCs, and other harmful emissions. Climate competition would offer a new set of options for handling adverse domestic PRC actions currently driven by selfish expedience and contrary to international efforts.

> The best chance of positively shifting this pernicious PRC reality requires using the one Archimedean lever powerful enough to plausibly shift Beijing's calculus: creating a climate coalition of industrial democracies that imposes global-scale competitive forces across the political (emphasizing competition), economic (imposing carbon taxation), and technological (accelerating energy transition technology efforts) spectrum.

To the extent Beijing manages to meaningfully address its structural energy and emissions challenges, the transition will be driven domestically. While it continues to build additional coal-fired power plants, China will also emphasize an increasing flow of investment aimed at reducing emissions—with efforts to boost nuclear, natural gas, wind, and solar generation, as well as the electrification of the country's transport system. The Party has been—and will continue—moving coal plants away from major coastal cities and burning more natural gas to reduce local smog. Doing so generally does not reduce China's net emissions and is fundamentally motivated by a desire to avoid protests in major urban areas, such as those that convulsed Chengdu during December 2016.[108]

Clearly, U.S. officials entreating PRC counterparts in bilateral dialogue to take measures that require major rewiring of an energy system and industrial economy that remains fundamentally coal-based currently represents a bridge too far. Some well-informed voices in China do recognize that reducing emissions and beginning to remedy the CCP's decades-long legacy of environmental destruction should be considered existential ends unto themselves. Unfortunately, for now at least, the true PRC environmentalists cannot reach the Party's power levers. And for those who do wield real influence, climate cooperation will for the foreseeable future be subordinate to hard-edged pursuit of Party power regardless of the costs to our shared atmospheric and oceanic commons.

The best chance of positively shifting this pernicious PRC reality requires using the one Archimedean lever powerful enough to plausibly shift Beijing's calculus: creating a climate coalition of industrial democracies that imposes global-scale competitive forces across the political (emphasizing competition), economic (imposing carbon taxation), and technological (accelerating energy transition technology efforts) spectrum. While the outcome is far from assured, such a paradigm shift could create pressures that create space for domestic constituencies within China to advocate for changes on the basis of enhancing national competitiveness, rather than trying to force changes upon them via an international agreement that would likely lose out to near-term local economic imperatives and end up unenforceable.

The measures America and her allies and partners must take to ensure an open, secure, and prosperous Indo-Pacific strategic order while also pursuing urgent energy transition steps are in fact highly compatible. Critically, neither continued security provision nor a new climate competition coalition requires Beijing's blessing to advance and, ultimately, succeed. In keeping with a "climate-first" foreign policy view, a combination of leading by example, harnessing technological innovation and market forces—and, when needed, economic pressure—can help re-set global emissions in a safer direction. Here we seek to help save the Biden Administration from having its most admirable impulses exploited disastrously by China under Xi.

The 2020s can mark the decade in which the United States renews its powerful tradition of effectively pursuing its interests in concert with those of the international community by forging a coalition of like-minded states to address an issue with potentially existential global consequences. Washington, working with domestic and foreign partners, can re-animate and update its own industrial base, leverage its massive market and technological capabilities, and lead the global energy transition in coordination with a coalition of like-minded countries.

The bottom line: China, the United States, and other major emitter countries have much work ahead of them in the 2020s and beyond, but Washington must first see through Beijing's climate cooperation smokescreen.

By making ourselves and our allies better and more credible and compelling, such a strategy would force China to compete not through exploitative maneuvering or confrontation, but by making commitments to the international community writ large. As these positive processes unfold, they can limit Beijing's ability to entrap the United States and European Union in "climate diplomacy" in fact designed to consolidate revisionist gains. Finally, climate competition leaves open avenues for non-freighted engagement with China, and most importantly, has a better chance of leaving a healthier global atmospheric and oceanic commons for future generations regardless of nationality.

The bottom line: China, the United States, and other major emitter countries have much work ahead of them in the 2020s and beyond, but Washington must first see through Beijing's climate cooperation smokescreen. Avoiding that trap and beginning to build a competing climate coalition of industrial allies and partners will be among the most critical foreign policy tasks facing President Biden and his administration during its first two years in office. This report charts the best way forward—far more promising for the long haul than today's dead-end "Road to Glasgow."

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