

Net-Zero and the China Challenge

Decarbonization amid Great Power Competition in the Indo-Pacific

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With tensions mounting between the United States and China, the Indo-Pacific is thrust once again into the geopolitical spotlight. On April 11, 2024, the first trilateral summit between the United States, the Philippines, and Japan purportedly took place in response to China's growing military presence in the region. The summit—billed as the first of many—is meant to signal a united front against any threats to stability in the region, with the United States pledging “ironclad” support for its Pacific allies. Although military defense cooperation figured high on the agenda, a key pillar of the new security engagement is energy cooperation, focusing on shared interests in securing supply chains for critical minerals, renewable energy projects, and clean technologies.

As the global impetus for decarbonization accelerates, the strategic importance of the region has risen as a supplier of raw materials critical to transition and as a vast destination market for low-carbon technologies. In this article, we examine how decarbonization is driving key players to reconsider strategic priorities, alliances, and (re-)engagements, focusing in particular on the energy underpinnings of the U.S.-China rivalry and how this plays out in the Indo-Pacific. We argue that the material foundations of this rivalry now encompass a much broader set of resources and technologies than before, generating new patterns of dependence and interdependence between regional powers and emerging resource frontiers. U.S. re-engagement in the region is part of a broader strategy to contain China by leveraging U.S. military capabilities to control key trade routes while locking in economic partnerships on critical minerals, clean energy infra-

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structures, and supply chains, over which China holds significant control. We further examine how this partnership impacts and aligns with the interests of the Philippines and Japan and its implications for decarbonization.

The Geopolitics of Energy Transition

The fossil fuel energy system has been integral to the making of industrialized economies. The United Kingdom's embrace of coal for generating thermal energy – considered the historical turning point that facilitated its rise as the dominant source by the first half of the twentieth century – heralded a leap in productive capacity, making coal central to Britain's emergence as the world's leading industrial power. The availability of abundant and cheap domestic oil similarly made possible the post-Second World War economic boom in the United States that propelled the country to global economic leadership. Energy sources serve as a “key currency of power for states,” influencing their position in the international order.¹ This makes access to and control of these resources a priority and a matter of strategic concern.

Under a fossil fuel regime, ensuring the stability and security of supplies is a challenge, given the spatial concentration that characterizes fossil fuel resources (for example, those in the Middle East for oil, and in Russia for natural gas). This has resulted in energy dependence on a league of exporting states. This has historically been a source of vulnerability for those who lack access. States thus have adopted strategies to reduce vulnerabilities by forging alliances with resource holders. For the United States, dependence on oil focused its relations in the Middle East, and shaped its foreign policy objectives and military engagements in the region.² Since cross-border flows of energy are highly susceptible to strategic “chokepoints” in transport, states have also deployed naval forces to protect major sea lanes and invested in pipelines in order to diversify transportation routes. In the Indo-Pacific, the risks associated with the long-distance transport of oil and gas have shaped both interstate cooperation and antagonism. The U.S. Navy's presence in the region – the highest concentration of military personnel outside of the United States – is justified as deterring potential threats to the status quo and maintaining “freedom of navigation” in contested waters. Over 30 percent of global maritime trade in crude oil passes through the South China Sea, a major trade route and a flashpoint for geopolitical tensions over maritime boundaries and overlapping territorial claims.³ The risks and uncertainties associated with fossil fuels heavily shaped the formation of alliances in different segments of the supply chain, from the point of extraction to destination markets.

The passage of the Paris Agreement in 2015 and subsequent pledges by industrialized nations to reach net-zero emissions introduce in this context new opportunities and challenges in the energy landscape. To achieve the target of limiting the global temperature rise to 1.5°C, 80 percent of global primary energy demand must be drawn from renewable energy sources by 2030, and all fossil fuel sources phased out by 2050. This will moreover involve rendering “unburnable” or “unextractable” significant fossil fuel reserves.⁴ Recent estimates suggest that nearly 60 percent of oil and methane gas generated by fossil fuels and 90 percent of coal must remain in the ground, with oil and gas production peaking “now or during the next decade.”⁵

The shift to renewable and clean energy sources will entail new dependencies on materials that are markedly different from high-carbon sources.⁶ While fossil fuels are finite and geographically concentrated, renewables are inexhaustible and highly dispersed.⁷ At the same time, the technologies needed for their generation are mineral- and metal-intensive, with production concentrated in a few countries. Some of these minerals, especially those that are essential components to clean energy technologies, are considered “critical,” or at high risk of supply disruption. Achieving energy security, then, requires striking up new partnerships, as well as finding new modes of cooperation in ways distinctive from those established to secure traditional energy resources.

These differences between fossil fuels and renewables imply different geopolitical arrangements that could impact the global distribution of power. For energy-intensive industrialized nations like the United States, the transition to a low-carbon system opens new vulnerabilities arising from its heavy reliance on fossil fuels, which currently supply about 80 percent of its energy needs. Its place in the international order has been built, and remains premised on, control over the supply of fossil fuels. For emerging and developing economies such as China, transition will require nothing short of an overhaul of the energy base that made possible its rapid rise to economic prominence. Despite challenges, this transition also offers significant opportunities to attain self-sufficiency, diversify energy sources, and take leadership in technology and climate action. The path to carbon neutrality for the United States and China involves harnessing these opportunities, which, amid the unfolding rivalry between the two countries, is changing the geopolitical landscape in ways that are consequential to climate goals.

Rival Powers

For carbon-intensive economies like the United States and China, committing to carbon neutrality revitalizes concerns over energy sup-

plies. Both countries remain heavily dependent on fossil fuels for their energy needs and are cognizant of the challenges associated with shifting their economies to alternative sources. Climate pledges by the United States set a 1.5°C-aligned goal of 50–52 percent emissions reductions by 2030, while China under Xi Jinping pledged to reduce carbon dioxide emissions from their peak before 2030 and achieve carbon neutrality before 2060.

Over the past years, China has made leaps in expanding renewable energy capacity domestically, with consequential effects globally. Between 2019 and 2024, China accounted for 40 percent of renewable capacity expansion worldwide. Although coal remains its most significant energy source, making up 60.6 percent of its energy mix in 2021, the clean energy sectors are now its largest driver of economic growth, contributing up to 40 percent of GDP growth in 2023.⁸ This contribution proved pivotal to China reaching its growth target that year. Beyond environmental imperatives, decarbonization is increasingly instrumental in achieving the country's broader industrial and economic objectives.

The emergence of China as a global leader in renewable energy, far outpacing its Western and East Asian counterparts, brings with it increased leverage for shaping the direction of global energy markets. Strong and sustained government policies to support innovation in strategic sectors such as solar energy facilitated rapid capacity expansion and cost reductions, impacting the uptake of renewables abroad. China currently leads globally in both production and deployment of solar technologies, allowing it to establish a significant presence in key markets. Beyond market share, China's global expansion also creates avenues for extending its sphere of influence, especially in the Global South. The Belt and Road Initiative (BRI), China's ambitious infrastructure program, has been pivotal for financing energy (and energy-related) infrastructure projects tailored to the needs of middle- and low-income countries. While fossil fuel infrastructures have previously taken up a sizable share of the energy investments in the BRI (especially as China's infrastructural diplomacy is also intended to help reduce its dependence on energy imports that pass through contested waters), new capital commitments under the program have prioritized clean energy projects and shifted financing away from coal.⁹ Ten years into the BRI, China pledged new clean energy initiatives such as the Green Investment and Finance Partnership and fresh infusions of capital to strengthen its programs.

China's dominance in renewable energy markets mirrors its parallel efforts to gain supremacy in technology and manufacturing in strategic industries and over which it has attained either leadership or competitor

status. This meteoric rise has often put it in competition with the United States, but also made the U.S. economy heavily dependent on China, a relation that has been a source of discomfort within the U.S. establishment. Public statements, for example, highlight the vulnerability of the United States to tendencies to weaponize natural resources for geopolitical ends.¹⁰ Concerns that “Clean-energy supply chains are at risk of being weaponized in the same way as oil in the 1970s, or natural gas in Europe in 2022,” as Jake Sullivan, the Biden administration’s national security adviser remarked, underscore the emerging consensus on the geopolitical significance of alternative energy resources.¹¹

Energy security concerns have especially centered on the way emerging critical mineral supply chains are organized. Bottlenecks due to the limited availability of rare earth elements – seventeen metals crucial to the production of solar, wind turbines, and electric vehicle batteries – as well as China’s control of 60 percent of these metals’ production and near total control of refining and processing have elevated the “criticality” of these resources, despite their wide geological occurrence.¹²

Addressing U.S. supply chain vulnerabilities has ushered in policies targeted at developing local supply chains and spurring investments in domestic manufacturing. Bipartisan consensus on this front was also behind the adoption in the United States of the Inflation Reduction Act, Creating Helpful Incentives to Produce Semiconductors and Science Act, and Infrastructure Investment and Jobs Act, which aim to strengthen the resilience of supply chains in sectors deemed crucial to U.S. national security interests. In recent years, more assertive policies have seen tariffs imposed on Chinese imports with the strategic goal of regaining comparative advantage for U.S. industries and “de-risk[ing] from China.”¹³ Such measures are intended to hit back at China’s export-led industrial power, which has been central to its economic growth, and from which U.S. transnational corporations have benefited and contributed, at the expense of deindustrialization in the United States.¹⁴

China’s phenomenal ascent poses a direct challenge to longstanding U.S. dominance in various domains. While the United States remains the world’s preeminent military power – a position that will go unchallenged in the near to medium term – and retains significant economic and diplomatic influence, the potential shift in the global balance of power is suggestive of a multipolar world order in which China plays a significant role. With China increasingly viewed as a threat to the U.S.-led liberal order, United States has moved to rally its allies in the Indo-Pacific in an attempt to restore the balance in its favor.

Green Trilateralism?

The United States views the Indo-Pacific region as vitally important to its security and prosperity. For decades, its engagement has been driven by a strategic imperative to safeguard its interests and foster alliances to counterbalance emerging geopolitical challenges. In a reversal of Donald Trump's openly "America First" foreign policy, the Joe Biden administration has reverted to the less overt trilateral (and minilateral) approach to enroll old allies, linking longstanding regional security concerns to emergent energy concerns in the Indo-Pacific. The United States sees a "lattice-work" of alliances in the region as crucial to countering China on all fronts.

Japan

U.S. strategic interests map onto growing anxieties about China's regional influence in recent years. China increasingly is seen as incompatible with Japan's "Free and Open Indo-Pacific" strategy, which seeks to establish a regional order ostensibly based on the rule of law, free trade, and freedom of navigation. To this end, Japan, notably under former Prime Minister Shinzo Abe, has marshaled its diplomatic, economic, and military resources to bolster alliances and partnerships with like-minded nations such as the United States, Australia, and, to a lesser extent, India. The success of this strategy heavily depends on U.S. commitment and willingness to engage in the region. Being highly dependent on maritime transport for over 99 percent of its imports and exports, Japan is acutely aware of the importance of maintaining open sea lanes and stable maritime conditions for its economic prosperity. Indeed, its post-Second World War economic development owes much to its emergence as a shipbuilding powerhouse, which allowed it to mobilize raw materials globally to service its growth.¹⁵ Bereft of fossil fuels, Japan is dependent almost entirely on oil, liquefied natural gas (LNG), and coal imported by sea for its primary energy supplies. Following the closure of its nuclear power plants after the Fukushima disaster, the share of fossil fuels have grown: in 2021, this stood at 83 percent share of its energy mix.¹⁶ Although, in principle, an energy shift is poised eventually to lessen this dependence, and with it, the geopolitical tensions associated with fossil fuels, Japan's net-zero strategy props up LNG as a "transition fuel," and its development of low-carbon alternatives remains premised on maritime transport of resources from abroad.

These strategies reinforce the importance of traditional oil and gas routes in the region, although the energy sources and resources are becoming much more diverse. The creation of a hydrogen strategy, a core component of Japan's net-zero ambitions, involves repurposing existing LNG maritime infrastructure and capitalizing on established shipping

routes for its transport. Japan's leadership in LNG technology development and its strategic positioning of LNG as a "bridge" between fossil fuels and renewables together are also carving out new markets in Southeast Asia that inevitably rely on sea-based transport for LNG shipments.

At the same time as Japan seeks to develop renewable energy sources, its need for rare earth elements, for which it is nearly 100 percent dependent on imports—60 percent of which come from China—is intensifying.¹⁷ To secure a stable supply of these resources, Japan looks to involve emerging producers to diversify supply chains, as well as develop its own production capacity through deep-sea mining. China's 2010 ban on exports of rare earths to Japan for two months amid disputes over the Senkaku Islands underscored the vulnerability of relying on a single source. Bypassing China also requires developing refining and smelting capabilities outside of China, with Malaysia and Australia emerging as key partners. A "Free and Open Indo-Pacific" is considered an important underpinning of these alternative arrangements.

Japan finds a firm ally in the United States, given mutual interest in countering fears of China's military and economic expansion. The United States in turn relies on Japan, Taiwan, and South Korea to extend its industrial capacity, leveraging their hard-won technological advantage in metals processing, chemicals production, and capital-intensive industries (for example, automotive, semiconductor, and digital technology) to exclude China from critical supply chains. Such an alliance, however, cuts both ways. As a trusted ally, Japan is clearly well-positioned to benefit from the U.S. move to "friendshore" and "reshore" its supply chains. The U.S.-Japan Critical Minerals Agreement and Chip 4 Alliance, for example, give Japanese companies such as Panasonic and Toyota access to U.S. subsidies and tax credits that could allow them to catch up with their East Asian competitors. Yet, Japan must also navigate the potential repercussions in light of its economic linkages with China, which remains its largest trading partner and the third-largest destination for investments by Japanese companies.¹⁸ Japanese firms have in the past faced retaliatory actions, such as import and export bans, raising concerns over an impending backlash. Additionally, Japan still significantly relies on China for the majority of its critical minerals supply, complicating efforts to diversify without undermining its own competitiveness. It is a delicate balancing act, given the importance of both the United States and China to Japan's security and economy.

The Philippines

The flourishing of diplomatic ties between the United States and the Philippines under the Ferdinand Marcos Jr. presidency overturns its prede-

cessor's generally pro-China stance. In the previous Philippine administration, the century-old U.S.-Philippine relations (arising out of U.S. colonial rule) nearly came to a halt following former President Rodrigo Duterte's multiple attempts to abrogate the Visiting Forces Agreement, an arrangement that the United States regards as key. Duterte also courted China's favor during his term, and was openly hostile to the United States. China pledged \$24 billion in investments and big-ticket projects under the BRI, which largely failed to materialize as the attempt to reduce tensions in the South China Sea was reversed. Following Marcos's presidential victory, the United States openly pursued renewing its military position in its former colony. For the United States, the Philippines holds an unparalleled geostrategic position as a potential staging point for U.S. intervention, given its proximity to Taiwan and the South China Sea.

Aside from enhanced military cooperation with Japan and the United States, key outcomes of this U-turn include a new nuclear pact with the United States to help decarbonize its economy through nuclear energy and a partnership agreement to diversify the global semiconductor supply chain. Energy and infrastructure projects have also been announced under the Partnership for Global Infrastructure and Investment (PGI), the U.S. counterpart to the BRI, which will establish the first economic corridor under the PGI in Luzon, the largest island in the Philippines. Investments in infrastructure, critical minerals, and renewable energy—the identified priority areas—are claimed to translate to \$100 billion worth of investments over the next decade. The green credentials of the partnership fit right into Marcos's agenda to “aggressively advance” renewable energy deployment and nuclear energy.¹⁹ Since taking power, Marcos immediately sought to revive the mothballed Bataan Nuclear Power Plant, a legacy project of his father, former dictator Ferdinand Marcos, which was never activated due to safety and other issues that plagued its construction. The Philippines is also the second-largest producer of nickel after Indonesia, with significant untapped reserves. Following Indonesia's ban on export of nickel ore, it is, in the words of the Philippine Department of Trade and Industry Secretary, “effectively the only major producer now of mineral ores that are still selling to the global market, particularly China.”²⁰ Like most developing countries, the colony is attempting to position itself in emerging supply chains for low-carbon technologies, especially by tapping into U.S. and Japan interest in building an alternative nickel supply chain.

The younger Marcos's embrace of the United States comes at a time of worsening diplomatic relations with China, following repeated conflicts regarding Philippine vessels in the South China Sea following the end of the “Gentleman's Agreement” to reduce tensions of the Duterte

period. Internally, Marcos is battling military unrest, political splits within his administration, and threats of Mindanao secession from Duterte, who continues to enjoy popular support. Allegations of corruption and a subpar economic performance (which saw the price of basic goods, such as onions, skyrocket) further fueled discontent and lingering distrust of the Marcos family. By solidifying ties with Japan, an industrial and economic powerhouse, and the United States, whose military power remain unmatched, Marcos hopes to overpower internal and external threats. Amid rising tensions with Duterte, who more than any previous president sought to align the Philippines with China, and growing distrust of his vice president, Sara Duterte, the daughter of the former president, Marcos hopes to increase his faction's influence through foreign realignment.²¹ Doing so helps weaken former president Duterte and his allies, who benefited from closer relations with China during his term. Thus, although Marcos initially expressed an intent to pursue a more balanced approach to diplomatic relations, aiming to be "friends with everyone, foe to no one," domestic weakness and external pressure favored a more decisive shift toward the United States and Japan.

The Limits of Containment

The Indo-Pacific is a key center of growth for the world economy, accounting for over 60 percent of global GDP, and is forecasted to be the largest contributor to global growth over the next three decades.²² The Indo-Pacific is an important trade partner for both China and the United States: In 2022, trade between the United States and the region surpassed \$2 trillion, with the United States receiving \$956 billion in foreign direct investment.²³ China, however, is the largest trading partner of most Indo-Pacific countries. China and the Association of Southeast Asian Nations (ASEAN) bloc are also each other's largest trading partners, with the BRI being a significant driver of economic cooperation between the two.

With the U.S. shift toward protectionism during the Trump administration, U.S. engagement in the region focused upon the military. This period also saw the United States withdraw from the Trans-Pacific Partnership, a trade agreement among twelve countries bordering the Pacific Ocean. Trump's ambivalent commercial relationship with the region contrasted with China's aggressive economic diplomacy. China poured over \$200 billion worth of investments in Southeast Asia over the past decade, helping to bridge major infrastructure gaps in transport and energy, among other sectors.²⁴ This set off a geopolitical race, with the United States and its allied major Pacific economies launching parallel initiatives, as the BRI came to be viewed as a geopolitical instrument that

would secure greater influence for China in the region. Most recently, a survey by a Singapore-based think tank noted that sentiments are shifting in favor of China.²⁵ Asked to choose between the two rival powers, over half of the respondents from ASEAN countries preferred to align with China over the United States. China's favored status is especially pronounced in Malaysia, Indonesia, and Laos, which are the primary recipients of investments under the BRI. This has led Japan's Prime Minister Fumio Kishida to vow an expansion of Japan's presence to "provide an attractive alternative for Asian countries."²⁶

These rivalries are unfolding in a region that accounts for over half of global greenhouse gas emissions, a share that is expected to rise over the next decades, even as it also stands to be one of the most affected by climate change.²⁷ The region's energy pathway is considered decisive in reaching global climate goals, despite the fact that it is extremely challenging for it to decarbonize. Vast differences in economic development, governance structures, resource endowment, and population growth complicate efforts to phase out fossil fuels, especially in the context of rising demand. Rapidly industrializing countries such as Indonesia, Vietnam, and the Philippines, for instance, will struggle to roll back their reliance on coal, the single largest contributor to carbon emissions, without infrastructural, technological, and financial support from more advanced economies.

Initiatives that seek to facilitate closer cooperation on clean and renewable energy could help accelerate the transition process. Renewable energy projects require significant upfront capital and technical expertise that developed economies and front runners in technologies are well-positioned to help address. The United States, Japan, and China represent some of the largest funders of energy infrastructure regionally and globally. Their substantial investments have significantly influenced the energy pathways of recipient states, which, over the better part of the past two decades, went to supporting fossil fuels. Earlier BRI investments, for example, went into fossil fuel infrastructure, such as coal-fired power plants and oil and gas pipelines, reflecting China's priorities at the time and its traditional strengths in these sectors. Japan and the United States followed a similar path, with their bilateral overseas financing going into natural gas and coal projects.²⁸ Given the long lifespan of energy infrastructures (the typical average lifespan of a coal-fired power plant is forty years), any additional fossil fuel investment will have the effect of locking in future emissions. Thus, energy investments pushed by major regional powers will have implications for 2050 net-zero targets.

This decade is considered especially crucial for putting in place energy infrastructures that align with the objectives and timelines established under the Paris Agreement. According to the International Energy Agency, the tripling of renewable capacity by 2030 “provides the largest emissions reductions” this decade in line with a net-zero scenario.²⁹ Of a range of possible technologies, rapid growth in solar photovoltaic and wind energy, electric vehicles, and battery storage will be pivotal. A dramatic shift in the current direction of energy-related funding will thus be needed to support renewable energy deployment. Support for green and clean energy projects under the trilateral agreement and similar pledges under the Indo-Pacific Economic Framework are positive steps. The greening of the BRI framework in recent years also aligns China’s contributions to global climate ambitions. However, the geopolitical power plays that animate all of these initiatives are set to undermine progress.

First, the uncertainties surrounding the decoupling of the world’s two largest economies have a dampening effect on long-term investments, with especially detrimental impacts on sectors that stand to be adversely affected by escalating trade tensions and policy shifts between China and the United States. Reduced investments in alternative energy due to U.S. tariffs will not only hurt Chinese production, but also U.S. interests. The new electric vehicle battery restrictions on Chinese-made batteries, for example, will impact electric vehicle adoption in the United States, and therefore its ability to decarbonize its transport sector, which currently accounts for a quarter of its emissions, with the Biden administration aiming for 50 percent electric vehicle market penetration. Cutting China out of key segments of the critical mineral supply chains will also disrupt the flow of necessary inputs to renewable technologies at a time when production should be ramping up to accelerate transition. The major leaps in renewable energy capacity over the past decade have much to do with China’s ability to achieve comparative advantage in these technologies, making it a ubiquitous partner in the fight against climate change.

Second, supply chain diversification requires time and capital. The upstream segment alone – the mining of critical minerals – implies long lead times between discovery and initial production of these resources, and takes sizable upfront investments to which few market players are able or willing to commit.³⁰ Establishing alternative supply chains also entails navigating regulatory frameworks and addressing environmental concerns around extraction, which, in the case of rare earth elements, involves radioactive materials. Securing the social license to operate has

been one of the most challenging tasks for industries with significant environmental and social impacts. Further up the supply chain, the refining of rare earth minerals is highly complex and expensive, a process that China took three decades to master, even given strong and sustained government support. Realizing value and profit amid these requirements and uncertainties is daunting, which has been a key reason why Western firms have opted to rely on—rather than compete with—China’s integrated supply chains. U.S.-led efforts to weaken China’s grip on this sector as export controls by China on critical minerals took effect have been met with technical, environmental, and regulatory hurdles. Even if concerted efforts could eventually lead to a breakthrough in the best of cases, diversification will be a gradual process that is increasingly incompatible with the scale and speed needed by a green transition.

For many Global South countries, the inability of the United States, Japan, and allied countries to match what China has achieved underscores the glaring failure of the liberal international order to address pressing social and environmental issues. Countries across Africa, Latin America, and Asia increasingly are taking a more pragmatic relationship with the Chinese state and capital to meet their energy needs and deliver on climate pledges. African governments have welcomed Chinese aid and loans, given their loose political conditionalities compared to traditional international financial lenders. Although these partnerships are naturally not without problems, China has provided an alternative avenue to pursue development and growth. Nevertheless, in a carbon-constrained world, China is itself hard-pressed to provide a credible alternative. Although its state-led development model has delivered breakneck technological advancements, its approach has also been marred by its fair share of ethical and environmental problems. Internally, this success also came at a cost, manifesting in severe environmental degradation and social inequality. Despite its new, greener offerings, China will have to show leadership at unwinding the fossil fuel buildup that it has partially enabled.

The solutions will require a collective approach that takes seriously, above all, the sheer urgency of the climate crisis. In practical terms, this will require finding ways to build a constructive relationship between the United States and China. For the United States and its allies, this may mean accepting China as an inevitable partner in facilitating the worldwide adoption of low-carbon technologies, and more broadly, in solving the climate crisis, despite the challenge posed to U.S. hegemony. This is, of course, no easy task. But as the U.S. Indo-Pacific Strategy puts it: “no country [should] withhold progress on existential transnational issues because of bilateral differences.”³¹

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