

Testimony before the U.S.-China Economic and Security Review Commission

Hearing on "China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets"

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Engagement by Chinese actors is shaping the future trajectory of global energy production and consumption. Examples of such activities include, but are not necessarily limited to, the construction of energy-related infrastructure, the export of new energy technologies produced in China, and foreign direct investment (FDI) in overseas manufacturing capacity of energy products. Discerning the trends, drivers, and impacts of China's global energy engagement is critical for helping countries achieve their objectives for energy security, economic development, and reducing emissions. A nuanced understanding is also a prerequisite for any country or business that desires to effectively compete with Chinese energy providers in overseas markets.

Much of the research agenda on China's overseas energy has focused on state-driven lending for large-scale infrastructure projects carried out under the banner of China's so-called Belt and Road Initiative (BRI), which was first proposed by Chinese President Xi Jinping in 2013.¹ However, a more accurate picture of China's engagement in recent years requires looking at a broader set of activities. As infrastructure lending has declined, exports of Chinese low-carbon energy technologies and the establishment of overseas production capacity for these products by Chinese companies have risen dramatically. These are largely commercially driven activities that have received a boost as China's clean energy companies have become major drivers of China's domestic economy, but also experienced overcapacity, thus prompting them to seek new markets abroad.

In recent years, the value of China's exports of clean energy products and FDI in new manufacturing capacity have far outstripped sovereign loans for energy infrastructure overseas.

¹ "President Xi Jinping Delivers Important Speech and Proposes to Build a Silk Road Economic Belt with Central Asian Countries," Ministry of Foreign Affairs, The People's Republic of China. 7 Sep 2013. https://www.fmprc.gov.cn/eng/gjhdg_665435/2675_665437/3180_664322/3182_664326/202406/t202406/t20240607_11410011.html.

On one hand, energy-related lending from China's two major state-sponsored development finance institutions – the Export-Import Bank of China (CHEXIM) and the China Development Bank (CDB) – has slowed dramatically. Only four loans totaling \$737 million were recorded from 2021-2023, all in non-fossil energy.² This compares to an annual average of \$14.8 billion in energy-related lending annually from 2013 when the BRI was launched through 2020, indicating that commitments from 2021-2023 comprised less than 1% of the total sum of loans from 2013-2020.

By comparison, in 2024, China exported a total of \$177 billion in clean energy technologies.³ In other words, total energy lending by China's policy banks in the *entire decade* since the BRI was launched was still only two-thirds the value of China's clean technology exports in *just last year alone*. Deals for overseas manufacturing facilities for these products in 2024 were worth \$58 billion, with a potential annual output value of \$111 billion once these facilities are completed.⁴ Hence, while sovereign lending for energy infrastructure may rise somewhat and continue trending cleaner in the coming years, China's overseas energy footprint is much larger and more complex than just public finance.

These figures reflect a fundamental set of shifts that are defining, and will continue to shape, the nature of China's overseas energy footprint going forward:

- The extent of China's clean energy exports and overseas manufacturing investments is surpassing that of its energy infrastructure engagement. This shift, which is largely driven by economic factors, means that clean energy industries have become more significant to Beijing's political and foreign policy interests.
- The economic model that cultivated these clean energy industries in China and drove down costs, but also led to their overcapacity, is unlikely to change. Therefore, other countries should focus their efforts on navigating global markets in light of China's economic structure, rather than attempting to compel Beijing to change it.
- As the U.S. and some other countries adopt trade restrictions as means of navigating China's clean energy industry dominance, China will increasingly seek other markets that impose lower or no barriers, many of which are in the Global South. While it will be difficult to compete against Chinese energy on price alone in these markets, these countries may still have an appetite for certain energy technologies that provide comparative benefits to those products where China is currently dominant.
- Meanwhile, countries that figure out how to learn from and leverage China's clean energy innovation, such as through technology transfer and joint ventures, may lower the costs of their energy needs and derive greater economic benefits.

As such, this testimony aims to shed light on recent trends in China's overseas energy engagement, the factors that are driving these shifts, and their implications for the global energy

² "China's Global Energy Finance Database," Boston University Global Development Policy Center. Accessed Apr 2025. <u>https://www.bu.edu/cgef/</u>.

³ Asia Society Policy Institute analysis.

⁴ Ibid.

sector. It concludes by putting forth a series of recommendations to the U.S. Congress and policymakers based on the analysis within.

I. China's sovereign lending for energy infrastructure abroad has slowed dramatically as commercial deals have trended greener

Breaking down Chinese overseas energy into three core categories – infrastructure, exports, and manufacturing facilities – can help to distill differences in their drivers and impacts on recipient countries. The first category, energy infrastructure, includes power plants, transmission, pipelines, and other facilities and equipment used to produce, transmit, store, and distribute energy. Such infrastructure typically requires an influx of labor during the period when projects are being built, with construction contracts often favoring Chinese workers. Infrastructure projects can also provide local benefits by way of energy security and, when cleaner energy sources are deployed, emissions reductions. In cases where infrastructure projects consume fuel or resources to operate, they can provide economic benefits to the providers of these fuels. Yet, infrastructure deals generally do not provide significant long-term employment or major economic returns. Moreover, they are typically financed with a combination of equity and debt, often requiring the host country to pay back the debt financiers over the course of decades.

Lending for energy infrastructure by China's core state-sponsored policy banks, CHEXIM and CDB, has fallen off dramatically since the pandemic and essentially stayed that way. The value of loans from these two players has yet to return to anywhere near its post-2013 peak in 2016 of \$28.1 billion in BRI countries and \$34.1 billion across all geographies.⁵ Lending from CHEXIM and CDB had already been declining steadily since then, before hitting a nadir with no new energy loans recorded in 2022. The average size of commitments was also much smaller, with the average loan in 2023 worth \$167 million as compared to the \$574 million average for energy-related loans committed between 2000 and 2022.⁶ With only \$0.5 billion in new loans recorded in 2023, the policy banks have shifted away from their previous role in shaping the contours of China's global energy footprint. While sovereign lending for energy projects may tick back up following a lull during the pandemic, broader challenges, including debt distress in host countries and the need for policy banks to fund domestic stimulus, make it unlikely they will return to previous levels of activity seen in the BRI's early years.

Despite this, when commercial investments in energy infrastructure are considered together with construction deals⁷, the overall value of Chinese energy deals in BRI countries has recovered post-pandemic to the highest levels since its previous peak in 2017, during the heyday of the BRI's political momentum. Such deals approached a total value of \$40 billion in 2024, representing the largest overall share of China's BRI engagement by sector.⁸

⁵ "China's Global Energy Finance Database," Boston University Global Development Policy Center.

⁶ Jiaqi Lu and Diego Morro, "'Small' Belt, 'Beautiful' Road," Boston University Global Development Policy Center. Nov 2024. <u>https://www.bu.edu/gdp/files/2024/11/GCI-PB-24-CGEF-2024-FIN.pdf</u>

⁷ These include deals with a range of corporate players, including state-owned enterprises (SOEs), publicly listed companies, and privately-owned companies.

⁸ "China Belt and Road Initiative (BRI) Investment Report 2024," Green Finance & Development Center, Fudan University. 27 Feb 2025. <u>https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-2024/</u>.

Engagement across all sectors in BRI countries was also the highest since the BRI's launch in 2013, totaling just over \$70 billion in construction contracts and \$51 billion in investments. Notably, energy-related deals skew heavily toward construction, which comprised about 90% of the overall value of projects in 2024, with investments making up only around 10%; previously, construction deals had made up around a third of overall energy engagement in the period since 2013. This means that only about \$4 billion of China's BRI energy engagement in 2024 was in the form of actual investments, indicating a much smaller portion of the overall total. Only one of these investments exceeded \$1 billion in size: a \$3.18 billion investment by China's CNOOC in the Whiptail offshore oil project in Guyana, representing a 25% stake of the \$12.7 billion project.^{9, 10}

China's engagement in overseas energy infrastructure is also the greenest it has been in relative terms. In September 2021, Chinese President Xi Jinping delivered a speech at the UN General Assembly, where he stated that "China will step up support for other developing countries in developing green and low-carbon energy, and will not build new coal-fired power projects abroad."¹¹ Since then, no new loans to fossil fuel projects have been approved by China's policy banks, though the overall volume of loans has also remained minimal as noted above. More broadly, the share of China's construction and investment deals in energy in BRI countries has seen its highest percentage share of "green" projects in solar, wind, and biomass, which totaled \$11.8 billion or 30% of China's total energy engagement in 2024, or \$8 billion when biomass is excluded.¹² Another 11% of energy engagement went toward distribution systems, such as substations and power lines, and an additional \$0.64 billion went into hydropower projects, although this represented the lowest overall volume and share of engagement in hydropower since 2013.

Nevertheless, despite no new fossil loans from policy banks, fossil fuel investments are still a prominent part of Chinese energy engagement in BRI countries. While over half of the record 24 GW of new power capacity installed in these countries by Chinese companies in 2024 was for solar, wind and hydropower, nearly half still went toward fossil projects.¹³ Approximately two-thirds, or around \$27 billion, of the total value of BRI energy engagement in 2024 – including both investments and construction contracts together – went toward oil, gas, and coal projects. Cumulatively since 2013, China has completed 94 GW of such fossil power projects overseas in BRI countries.¹⁴

⁹ "China Global Investment Tracker," American Enterprise Institute. Accessed Apr 2025. <u>https://www.aei.org/china-global-investment-tracker/</u>.

¹⁰ "ExxonMobil Guyana moves forward with sixth offshore development," ExxonMobil. 12 Apr 2024. https://corporate.exxonmobil.com/news/news-releases/2024/0412 guyana-offshore-development-whiptail.

¹¹ "Bolstering Confidence and Jointly Overcoming Difficulties To Build a Better World," Ministry of Foreign Affairs, The People's

Republic of China." 22 Sep 2021. <u>https://www.mfa.gov.cn/eng/xw/zyjh/202405/t20240530_11341561.html</u>. ¹² "China Belt and Road Initiative (BRI) Investment Report 2024," Green Finance & Development Center, Fudan University.

¹³ "Record year for Chinese overseas power projects: 24 GW installed in Belt & Road countries," Wood Mackenzie. 27 Jan 2025. <u>https://www.woodmac.com/press-releases/china-br-2025/</u>.

¹⁴ Ibid.

Given Xi's high-level pledge in 2021 to stop building new coal-fired power abroad, the share of coal is worth examining further. Xi was ambiguous as to whether projects already in the pipeline would be included in his pledge. Many of these have thus moved ahead, with a total of 26.2 GW of coal power capacity becoming operational between then and October 2024¹⁵ – thus signifying that the original pledge was intended to exclude those projects that had already been announced. However, when assessed against the interpretation that Xi's announcement only applied to projects that were not already in the pipeline, China has largely abided by its high-level commitment, albeit with a few loopholes – mostly for captive coal power plants at industrial facilities and expansions of existing facilities with new coal-fired units. In 2024, at least 3.4 GW of previously unannounced coal-power projects in Mongolia and Bangladesh and another company purchasing stock in a coal mine in Indonesia.¹⁷ Still, a total of 42.8 GW of coal-fired projects abroad have been cancelled since Xi's pledge, which has avoided 4.5 billion tonnes of cumulative carbon emissions that would have been produced over these plants' lifetimes.

These changes in China's engagement in overseas energy infrastructure are shaped by a combination of domestic "push" factors and foreign "pull" factors. The rebound in energy infrastructure investments in BRI countries with projects trending greener reflects many of the same economic incentives that are driving China's clean energy exports, but also the different nature of clean energy projects as compared to large-scale fossil infrastructure: they are smaller in size and oftentimes hampered by local policy challenges, such as inflexible power pricing on the grid or a lack of sufficient transmission infrastructure, leading to widespread curtailment if new power is installed. This could be a factor in why China's policy banks have yet to move in earnest on green lending, as they are ill-suited and inexperienced with lending to these types of projects. At the same time, the trend toward a greater overall volume of construction contracts compared to investments may reflect developers taking advantage of China's technical knowhow gained from its own domestic renewable installation success. China's ongoing fossil projects also reflect vested domestic interests, such as a need to secure oil and gas supplies internationally given lack of domestic resources, or China's coal mining companies searching for economic viability in the face of the energy transition.

While political signals and guidance on China's overseas energy infrastructure have reinforced economic factors and global incentives, they have typically followed market influences rather than shaped them in the first place. Starting even before the Covid-19 pandemic, China's lending for overseas energy had begun to decline as many host countries increasingly struggled with debt. Dirtier projects, such as coal-fired plants, were also being challenged legally and by civil society on a local level.¹⁸ Thus, when President Xi began deploying the phrase "small and

¹⁵ Daniel Nesan, "Three years later: Impacts of China's overseas coal power ban," Center for Research on Energy and Clean Air. Oct 2024. <u>https://energyandcleanair.org/publication/three-years-later-impacts-of-chinas-overseas-coal-power-ban/</u>.
¹⁶ Ibid

¹⁷ "China Belt and Road Initiative (BRI) Investment Report 2024," Green Finance & Development Center, Fudan University.

¹⁸ "Kenya halts Lamu coal power project at World Heritage Site," BBC. 26 Jun 2019. <u>https://www.bbc.com/news/world-africa-48771519</u>

beautiful" to guide the direction of BRI investments, this political framing served as means of hedging against China's declining capacity and interest to invest in large-scale, polluting projects, and to cater to the needs and desires of host countries, while providing cover for the smaller overall volume of lending.

China has also been leveraging its greener overseas finance to boost its global reputation within multilateral spaces and on climate change action. Notably, at the COP29 UN climate conference in Baku, Azerbaijan in November 2024, China's vice premier Ding Xuexiang stated that "since 2016, China has provided and mobilized more than RMB 177 billion yuan of project funds in support of other developing countries' climate response."¹⁹ This statement was the first time that a Chinese official referred to its climate finance for developing countries using the same framing applied to developed countries' contributions – a significant step, as China is still classified as a "developing" country within the UN climate regime. It also reflects China's interest to deploy more of its clean energy in markets abroad, including by financing projects. The figure put forth, which roughly equates to \$24.5 billion – or approximately \$3.1 billion per year – places China's climate finance contributions on par with, if not higher than, those of many developed countries.²⁰ While China did not disclose how this figure was calculated, it presumably includes a wide range of finance from China's policy banks and other actors, rather than just South-South aid related to climate, which had previously been benchmarked by officials at 1.2 billion RMB (\$170 million).²¹

China's pivot within this context demonstrates how China may take active steps to bolster its multilateral reputation when they align with its existing objectives. Ding's strategic announcement set the stage for China to come across as a constructive player in negotiations, especially after having received pressure from the U.S., EU and other developed countries to make active contributions on global climate finance. Ultimately, China broke from existing precedent in the final outcome of subsequent negotiations on a new UN goal for global climate finance by agreeing for the first time to count its multilateral development bank (MDB) contributions alongside those from developed countries. Notably, despite lower bilateral lending by its policy banks, China had been ramping up its contributions to MDBs for clean energy and climate lending, which had grown from around \$1.2 billion in 2017 to nearly \$4 billion in 2022 after averaging around \$0.5 billion per year from 2013–2016.²² China's consistent support for multilateral lending and potential backing of further reforms to expand MDB lending on clean energy in the face of U.S. retreat could further enhance the world's perception of China as a constructive player. China has also expanded its climate and clean energy aid projects since

¹⁹ "Full Text: Address by Chinese Vice Premier Ding Xuexiang at World Leaders Climate Action Summit," The State Council, The People's Republic of China. 14 Nov 2024. <u>https://english.www.gov.cn/news/202411/14/content_WS67352200c6d0868f4e8ecea3.html</u>.

²⁰ "COP29: Key outcomes agreed at the UN climate talks in Baku," CarbonBrief. 24 Nov 2024. <u>https://www.carbonbrief.org/cop29-key-outcomes-agreed-at-the-un-climate-talks-in-baku/</u>.

^{21 &}quot;丁薛祥在"77 国集团和中国"气候变化领导人峰会上的致辞(全文),"中华人民共和国中央人民政府.

³ Dec 2023. https://www.gov.cn/yaowen/liebiao/202312/content_6918225.htm.

²² "China's international climate-related finance provision and mobilization for South- South cooperation," World Resources Institute. Sep 2024. <u>https://doi.org/10.46830/wriwp.24.00036</u>.

establishing a standalone aid agency, the China International Development Cooperation Agency (CIDCA), in 2018.

II. Exports of Chinese clean energy products have surged on the back of these industries' rise to prominence

The relative greening of China's overseas energy infrastructure engagement reflects a much more fundamental game-changer: China's clean energy companies have risen to prominence as a major force helping to keep its domestic economy afloat amidst relative economic stagnation otherwise. Beginning around 2023, the term *xin san yang*, or the "new three," began appearing in Chinese media and policy discourse to refer to the three major clean energy products where China had come to dominate the global market: solar panels, electric vehicles (EVs), and lithium-ion batteries.²³ In 2024, clean-energy technologies contributed over 10% of China's total GDP, with sales and investments worth over \$1.9 trillion.²⁴ By way of comparison, this figure is on par with total global investment in fossil fuels in 2024 from all sources. China's clean energy sectors also grew three times as fast as the overall Chinese economy, driving over a quarter of China's GDP growth in the same year. To place this in context, without the growth from these technologies, China's economy would have only risen by 3.6% and thus would have missed its 5% growth target.²⁵

These industries' success has been spurred by myriad factors. It can be attributed in part to policy support for these sectors, including the "Made in China 2025" initiative in 2015 that aimed to secure China's leadership in high-tech manufacturing industries. In contrast to traditional energy sources, which are largely state-dominated, most new energy companies are private enterprises, accounting for over half of China's "new three" exports and more than 92% of China's high-tech enterprises overall. While subsidies and targets contributed to their development, policy support extended well beyond this to encompass consistent investment signals, spending on R&D, and support for integrated industrial clusters.²⁶ Innovation has also played a role. While some of this occurred through technology transfer, other factors – including entrepreneurship, human capital, and supply chain interactions – have also been important, leading to coevolution of technologies between manufacturers, component providers, and customers.

At the same time, these sectors have also experienced hyper-competition, or "involution," leading to overcapacity and intense price wars. On one hand, China is installing the world's highest capacity of renewable energy by far domestically in 2024 – including 277 GW of solar

²³ Xiaoying You, "The 'new three': How China came to lead solar cell, lithium battery and EV manufacturing," Dialogue Earth. 7 Nov 2023. <u>https://dialogue.earth/en/business/new-three-china-solar-cell-lithium-battery-ev/</u>.

 ²⁴ Lauri Myllyvirta, Qi Qin, and Chengcheng Qiu, "Analysis: Clean energy contributed a record 10% of China's GDP in 2024,"
 CarbonBrief. 19 Feb 2024. <u>https://www.carbonbrief.org/analysis-clean-energy-contributed-a-record-10-of-chinas-gdp-in-2024/</u>.
 ²⁵ Ibid

²⁶ Anders Hove, "Clean energy innovation in China: fact and fiction, and implications for the future," Oxford Institute for Energy Studies. Jul 2024. <u>https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/07/CE14-Clean-energy-innovation-in-China-Final.pdf</u>.

and nearly 80 GW of wind power – and, as of 2024, installs more solar panels than it exports.²⁷ Yet, the country's manufacturers still possess an excess supply of clean energy products. For instance, at the end of 2024, China's solar PV manufacturing capacity was estimated to be 1.2 TW, or about twice the current market demand.²⁸ While this has made solar panels incredibly cheap, it has also caused challenges for companies to turn a profit. Solar modules and batteries have seen year-on-year price drops of 60% and 50% respectively, while lithium prices have decreased by 80%.29

China's glut of clean energy products has led to a sharp uptick in exports of these technologies. In contrast to overseas energy infrastructure, exporting energy products from China to other countries often poses more immediate benefits to the Chinese companies making these technologies. Products that require installation and maintenance also spur local job creation, though many associated positions are temporary rather than long-term. While exports are scalable and low risk compared to long-term lending for infrastructure or investments in manufacturing capacity, they may be susceptible to pushback if dumping is perceived.

The total value of China's low-carbon energy exports in recent years far exceeds its energy infrastructure engagement. In 2024, China exported a total of \$177 billion in clean energy technologies, including \$66 billion in solar panels, \$48 billion in new energy vehicles (NEVs), \$62 billion in batteries, and \$1.2 billion in wind turbines.³⁰ Put another way, for China's "new three"³¹ clean energy products – solar panels, EVs, and batteries – total global exports of each respective product exceeded the total value of all Chinese energy investments and construction contracts in BRI countries. Exports of these respective products were also greater than total energy lending from China's two main policy banks at their peak in 2016, when these banks committed \$34.1 billion in loans across all geographies.³² In recent years, the Global South has become a major market for China's cleantech exports, with the value of EV exports from China to the Global South overtaking those to the EU last year in 2024, for instance.³³

The impact of these exports is amplified when one considers the projects where they are being deployed. The estimated value of overseas solar power generation projects that are using Chinese panels exported in 2024 is \$210 billion, which is triple the value of the panels alone.³⁴ Only approximately \$9 billion of these projects, or less than 5%, involve Chinese overseas

²⁷ Dave Jones and Libby Copsey, "Guest post: Saudi Arabia's surprisingly large imports of solar panels from China," CarbonBrief. 31 Mar 2025. https://www.carbonbrief.org/guest-post-saudi-arabias-surprisingly-large-imports-of-solar-panels-from-china/.

²⁸ Yujie Xue, "China to erase excess solar-panel capacity by 2027, UBS forecasts," South China Morning Post. 6 Jan 2025. https://www.scmp.com/business/article/3293592/china-erase-excess-solar-panel-capacity-2027-ubs-forecasts.

²⁹ "Green capital tsunami: China's >\$100 billion outbound cleantech investment since 2023 turbocharges global energy transition," Climate Energy Finance.

³⁰ Asia Society Policy Institute analysis.

³¹ Xiaoving You, "The 'new three': How China came to lead solar cell, lithium battery and EV manufacturing," Dialogue Earth. 7 Nov 2023. https://dialogue.earth/en/business/new-three-china-solar-cell-lithium-battery-ev/.

³² "China's Global Energy Finance Database," Boston University Global Development Policy Center.

³³ Lauri Myllyvirta and Hubert Thieriot, "Why China's clean energy need not fear US tariffs," Dialogue Earth. 9 Jan 2025. https://dialogue.earth/en/energy/why-chinas-clean-energy-need-not-fear-us-tariffs/ ³⁴ Asia Society Policy Institute analysis.

financing or construction contracts.³⁵ This implies that most power sector projects using Chinese technologies are not actually invested in or constructed by Chinese actors. In short, the sheer economic clout and dominance of China's clean energy industries has become more significant as a driver of China's overseas energy footprint than its engagement in energy infrastructure, let alone fossil fuels. This economic influence makes these industries central to China's political interests and diplomacy.

As the U.S. and other countries have adopted policies to limit imports of Chinese-produced clean energy, Chinese companies have turned to other global markets, especially those in the Global South that may not have the same concerns about importing cheap Chinese products undercutting domestic industries.³⁶ The availability of such markets means that Chinese companies may be relatively resilient to the adoption of trade barriers by the U.S., EU, and other markets. Furthermore, while it is likely still too early to understand the full impact of the latest series of tariffs announced by U.S. President Donald Trump, signals indicate that China's clean energy industries will manage to cope by continuing to pursue such alternate markets, a process that had already started following restrictions that the U.S. had already put in place under former President Joe Biden. "Pull" factors from recipient countries are also driving imports of Chinese clean energy technologies. Since the Paris Agreement was adopted in 2015, nearly all countries globally have adopted climate targets to reduce emissions, thus necessitating their energy sectors to transition from fossil fuels to clean energy. Economic considerations are also playing a role in some markets, such as surging electricity prices that far exceed the cost of purchasing and installing affordable, Chinese-produced solar panels.

Country-specific case studies illustrate the variation in how "pull" factors are shaping China's overseas energy footprint. Solar panels provide one example to interrogate. Pakistan, which was the third largest importer of Chinese solar panels in 2024 after rising from 12th place in 2022, imported 17 GW of panels just last year.³⁷ The main reason Pakistan's imports surged is due to the spiking cost of electricity and unreliability of the grid due to regular power outages. Distributed installations of low-cost, Chinese-produced solar panels, coupled with battery storage and paid for by consumers, have become a cheaper and more reliable energy source and are helping to drive down electricity generation from fossil fuels, even as electricity demand is still growing. The overwhelming majority of these installations are not grid-connected and are instead located on-site on rooftops or next to factories for direct use. In a somewhat ironic twist, a major reason electricity prices are so high is due to the increasing lack of financial viability of Chinese-financed coal plants built in recent years.³⁸

By contrast, Saudi Arabia, which also imported 17 GW of Chinese solar panels last year – thus rising to fourth in 2024 from 26th in 2022 – has been deploying Chinese panels in large-scale

³⁵ Ibid.

³⁶ Lauri Myllyvirta and Hubert Thieriot, "Why China's clean energy need not fear US tariffs," Dialogue Earth.

 ³⁷ Dave Jones and Libby Copsey, "Guest post: Saudi Arabia's surprisingly large imports of solar panels from China," CarbonBrief.
 31 Mar 2025. <u>https://www.carbonbrief.org/guest-post-saudi-arabias-surprisingly-large-imports-of-solar-panels-from-china/</u>.

³⁸ Humza Jilani, "Chinese solar panel boom threatens Pakistan's debt-ridden grid," Financial Times. 18 Sep 2024. <u>https://www.ft.com/content/69e4cb33-3615-4424-996d-5aee9d1afe19</u>.

solar parks located in its vast deserts.³⁹ These solar installations have achieved the lowest reported electricity prices in the world of 1.3 cents per kilowatt hour. The construction of these solar parks will help Saudi Arabia achieve its target of 50% electricity generation from renewable energy by 2030, up from almost no renewable electricity generation in 2020.

As clean technology industries have grown in prominence and thus significance for China's economic health, Chinese leaders have also boosted their emphasis on these sectors in highlevel speeches and documents. For instance, in a special address at the World Economic Forum in January 2025 – delivered the day after Donald Trump's inauguration – vice premier Ding Xuexiang emphasized China's dominance in new energy supply chains, while stating that the "green transition is a prevailing trend of global development and the fundamental solution to climate change. The international community should work together to accelerate the energy transition in an equitable, orderly and just manner, keep the new energy industrial chain stable, and promote green products and technologies."40 Meanwhile, recent pushback from Chinese leaders against trade restrictions for green products may also be aimed at ensuring stable overseas markets for Chinese goods while managing political pushback toward China's perceived dumping as means of addressing domestic overcapacity. For instance, the 2025 Government Work Report stated that China will "actively respond to green trade barriers."⁴¹ and new narratives from Chinese thought leaders have emerged calling for free trade on green goods, including by leveraging existing trade frameworks such as the Regional Comprehensive Economic Partnership (RCEP).⁴²

III. In the face of trade-related challenges, Chinese companies have ramped up investment in overseas manufacturing for clean energy technologies

As China's exports of clean energy technologies have skyrocketed, related factors – including pushback against alleged dumping and trade restrictions – have accelerated China's foreign direct investment into overseas manufacturing capacity for these products. As more countries have limited their imports of Chinese energy technologies, Chinese companies have looked to circumvent tariffs by manufacturing their clean energy products in other countries where such policies might not apply. In other cases, such as in Brazil, countries have adopted their own tariffs toward Chinese clean energy technologies, while at the same time encouraging Chinese companies to invest in building factories within their borders. An incentive to this approach is the desire to derive greater domestic economic benefits from Chinese companies, such as by creating local job opportunities and contributing to domestic GDP growth. Companies may also establish factories abroad as means of courting new markets, securing supply chains, and to further globalize and extend their influence.

 ³⁹ Dave Jones and Libby Copsey, "Guest post: Saudi Arabia's surprisingly large imports of solar panels from China," CarbonBrief.
 ⁴⁰ "Davos 2025: Special address by Ding Xuexiang, Vice-Premier of the People's Republic of China," World Economic Forum. 21 Jan 2025. https://www.weforum.org/stories/2025/01/davos-2025-special-address-ding-xuexiang-vice-premier-china/.

⁴¹ "Report on the Work of the Government," The State Council, The People's Republic of China. 12 Mar 2025. <u>https://english.www.gov.cn/news/202503/12/content_WS67d17f57c6d0868f4e8f0c0d.html</u>.

⁴² Jun Ma, "Regional Green Trade Bloc to Fight Both Climate Change and Protectionism, Forum on Trade, Environment & the SDGs. 28 Mar 2025. <u>https://tessforum.org/latest/regional-green-trade-bloc-to-fight-both-climate-change-and-protectionism</u>.

Examining the drivers of Chinese FDI in clean energy manufacturing capacity across different geographies and over time can help unpack how China is applying their merits. As compared to infrastructure and exports, FDI in manufacturing facilities for clean energy products, such as solar panels or batteries, can provide longer-term economic gains through local employment and technology transfer. Especially following the U.S. adoption of the Inflation Reduction Act, more countries globally looked to leverage industrial policy as means of deriving greater economic and social benefits from the global energy transition, thus creating more incentives for manufacturing FDI in many markets. However, these projects may involve evaluating and navigating a complex set of considerations, such as risk of industrial espionage or security concerns. The incentives that facilitate these projects, such as subsidies and tariffs, could also change suddenly because of shifts in local policies.

Similarly to clean energy exports, China's outbound foreign direct investment in manufacturing facilities for clean energy technologies in all countries now exceeds the value of its commercial engagement in energy infrastructure across the BRI. In 2024, China proposed and confirmed approximately \$58 billion in factories for key clean technology sectors, including wind, solar, batteries, and new energy vehicles.⁴³ Over half of these investments, or around \$35.4 billion, were for facilities to make batteries. Beyond this, approximately \$15.3 billion was for capacity to produce new energy vehicles, and the remaining \$7.2 billion was for solar and wind manufacturing combined. These investments are flowing to a range of geographies, but especially Global South regions across greater Asia, Africa, and Central and Eastern Europe; overall Chinese FDI in these regions has far outpaced investment from the US.⁴⁴ More broadly, when overseas investment across all clean energy projects by Chinese companies overseas is considered – including renewable power plants and transmission projects – over 130 new projects totaling over \$100 billion were proposed and confirmed in 2023 and 2024.⁴⁵

Furthermore, the potential output from these factories already rivals the value of China's cleantech exports. For manufacturing deals announced in 2024, the value of their annual output in products could reach over \$110 billion, or more than 60% of the annual value of last year's exports.⁴⁶ For some technologies, the expected value of overseas production could actually be even higher than that of exports: the potential output from electric vehicle factories abroad is estimated to be 3 million units per year, which is greater than the 2.2 million units of EVs exported in 2024. Thus, in the future, the total value of clean energy products manufactured by China-invested factories abroad may overtake that of China's exports – reflecting the potential for China to help other countries produce more than it sells to them.

New energy vehicles provide a useful case study to better understand how local policies, as influenced in part by Chinese exports and industrial policy, are shaping Chinese FDI in overseas

⁴³ Asia Society Policy Institute analysis.

⁴⁴ Raphael Minder, "China 'dwarfs' US investments in EU neighbourhood countries," Financial Times. 15 May 2024. <u>https://www.ft.com/content/bf9132d1-09c7-4604-b972-043f44812eaa?emailId=e04273d7-0394-407f-90c8-d8e445db994e&segmentId=60a126e8-df3c-b524-c979-f90bde8a67cd</u>.

⁴⁵ "Green capital tsunami: China's >\$100 billion outbound cleantech investment since 2023 turbocharges global energy transition," Climate Energy Finance.

⁴⁶ Asia Society Policy Institute analysis.

manufacturing capacity. Amidst the value of Chinese battery EVs surging by 18 times over the course of 2023 and Brazil surpassing Belgium as the top export market for China's EVs in April 2024, the Brazilian government opened several probes into China's potential dumping. It also adopted a 10% tariff on EV imports (not just from China), which will ratchet up to 35% by 2026.⁴⁷ However, Brazilian President Lula has welcomed foreign investment as part of his push to reindustrialize Brazil. As a result, global auto companies invested \$19 billion in Brazil from 2023-24, of which \$3 billion was from Chinese carmakers Great Wall and BYD.

A second example is playing out in Thailand, which has become a production hub for Chinese carmakers and battery companies. Alongside Thailand's role as a regional auto export hub, the country has adopted a target for auto production to reach 30% of electric vehicles annually by 2030⁴⁸, which has attracted more Chinese companies to build factories there. The strategy is also impacting Thailand's local EV penetration, with domestic NEV sales quadrupling in 2023 and reaching 10% of the domestic market; Chinese EVs account for over half of Thai NEV sales. At the same time, given the increasing political importance of these industries, China's leaders are encouraging Chinese companies to avoid investing in manufacturing FDI in overseas markets that might threaten China's interests or be seen as a political concession.⁴⁹

IV. Implications and recommendations to U.S. Congress

The future trajectory and implications of China's overseas energy engagement will likely be shaped by several important factors. First, as researchers have noted, China's overcapacity in clean technology industries – as well as other industries – is "a feature, not a bug, of Xi's new economic policymaking and ideology as the party state prioritizes self-reliance and economic security at all costs, even at the erosion of profitability, return on investment, and efficiency."⁵⁰ Thus, other countries may have few levers to compel China into actively addressing its overcapacity, which is likely to persist as a factor shaping the global energy economy.

Second, if enacted, the latest round of U.S. tariffs on China announced by President Trump may prompt a fundamental rethinking of trade relationships by China and other countries affected. As the U.S. closes its doors to Chinese products due to prohibitive prices when tariffs are applied, China will need to look to both its own domestic market as well as other markets overseas to sell and deploy those products. The ability of these markets to absorb China's clean energy goods, as well as how these countries navigate potential U.S. pressure to follow its lead in decoupling from China, will shape China's global energy influence.

⁴⁷ "Green capital tsunami: China's >\$100 billion outbound cleantech investment since 2023 turbocharges global energy transition," Climate Energy Finance.

⁴⁸ Stella Nolan, "Thailand: A Global Hub for Electric Vehicle Production," EV Magazine, 9 Aug 2024. <u>https://evmagazine.com/news/thailand-a-global-hub-for-electric-vehicle-production</u>.

⁴⁹ Gloria Li and Cheng Leng, "China delays approval of BYD's Mexico plant amid fears tech could leak to US," Financial Times. 18 Mar 2025. <u>https://www.ft.com/content/36ae6f78-aadb-47bb-a5cd-ec69b420cbe1</u>.

⁵⁰ "Beyond overcapacity: Chinese-style modernization and the clash of economic models," MERICS. 1 Apr 2025. https://merics.org/en/report/beyond-overcapacity-chinese-style-modernization-and-clash-economic-models.

Finally, regardless of unilateral U.S. action and diplomacy on trade, other countries will be compelled to decide how they approach their individual trade relationships with China as a function of ensuring these ties benefit their own economies and contribute to industrial development. Developed and developing nations alike will need to determine the extent to which they let in Chinese clean energy imports and their appetite for Chinese FDI in cleantech manufacturing, in light of their relative ability to foster and develop homegrown industries in the same technologies. These responses may also be shaped by whether non-Chinese competitors can provide the same products at a commensurate quality and price, and the extent to which countries might be willing to pay a premium for non-Chinese energy.

There are several actions that the United States and its legislative branch could pursue to better advantage U.S. interests in light of China's overseas energy footprint. Firstly, Congress could commission an updated report on the state-of-play of Chinese industries and policies across a broad range of critical new energy technology products that U.S. states and other countries are looking to source given their energy transition and economic goals. Specifically, this report should analyze the risks and tradeoffs countries would face if and how they move to decouple their supply chains from China for new energy technologies. By understanding the level of dominance of Chinese companies, extent of supply chain leverage, and level of funding and expertise that may be required to cultivate homegrown industries that could compete with Chinese enterprises on both quality and price, the U.S. could better cater its economic and industrial policies toward technologies where U.S. companies may still have a cost-competitive opportunity to rise into key market players globally - such as advanced geothermal energy and solid-state batteries, as well as software and other services. For these areas, the U.S. should ramp up R&D funding, and couple this with additional resources to support demonstration, deployment, and dissemination of these technologies, especially in international markets. As part of this, funding for existing resources should be maintained and enhanced, including for DOE's national laboratories, energy innovation hubs, and battery workforce initiative.

For energy technologies where competing with China may be prohibitively expensive, the U.S. could consider lowering tariffs and other barriers to trade, or ensuring there is a definitive plan to "sunset" such restrictions when appropriate. This should be paired with investing in sufficient "rainy day" manufacturing capacity across the entire value chain of those products, such that the U.S. could procure the full supply chain domestically or from allies and partners for a set capacity should supply chains become volatile or deemed to threaten U.S. interests. As part of this, the U.S. could leverage platforms such as the Minerals Security Partnership (MSP) to expand processing capacity for critical mineral resources toward which the MSP is already working to secure greater access. At the same time, U.S. policymakers should consider reducing barriers to foreign direct investment, including by streamlining the vetting process for key new energy technologies, while promoting technology use and transfer agreements with Chinese firms that are interested to invest in the U.S. This would enable the U.S. to learn from China's expertise and know-how, while ensuring that China's companies benefit the U.S. domestic economy by providing jobs, accelerating local innovation and dissemination, and reducing import dependencies.

The U.S. Congress should also leverage existing tools for ensuring the U.S. has a stake in shaping the global new energy future by maintaining and enhancing its presence in multilateral financial institutions such as the International Monetary Fund and the World Bank. By doing so, the U.S. can leverage their investment activities to ensure that the U.S. has a presence in markets where China is involved bilaterally, while avoiding ceding such multilateral spaces to China. In tandem, the U.S. should also reauthorize and expand the Development Finance Corporation, which is an important mechanism for investing in new energy projects that promote U.S. security, including by nearshoring or friendshoring supply chains, facilitating access to foreign markets for U.S. companies, and maintaining a constructive U.S. presence in critical areas of the world that may otherwise turn to Beijing. Increasing DFC's investment portfolio cap could also enable it to make better use of equity in investments.