

SUNBURN

The Chinese Communist Party's Extended Dominance of the Solar Supply Chain through Beachheads in the United States

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Executive Summary

China pursues energy dominance. This is a government-led project. In it, Beijing prioritizes emerging energy domains; areas that promise control of tomorrow's energy generation technologies.¹ Both this ambition and its consequences are glaring in the photovoltaic (PV) solar technology sector.

Beijing frames its solar energy project as a collective good. But, in reality, that project threatens American and global energy independence, and creates a significant strategic vulnerability for the United States. It also threatens international norms, including free market principles. China's control over the solar supply chain is an acute manifestation of the Chinese Communist Party's (CCP) non-market, autocratic model for establishing and projecting global power, and this report demonstrates how it is extending this model - and its reach - to US soil.

China's dominance of the solar sector is part of its larger '*Made in China 2025*' agenda to dominate manufacturing. The CCP wants to collect asymmetric supply chain control in everything from semiconductors to high-speed rail to renewable energy - and then to leverage that market power for strategic ends. Beijing's strategy prioritizes two main types of sectors: First, those that sit upstream of global production, or on which other critical sectors depend. For example, semiconductors are necessary inputs into the entire computing economy; energy is a necessary input into all productivity and movement. Second, Beijing prioritizes areas of industrial and technological transition. Those offer the opportunity to capture the initiative in new markets - and unseat incumbent powers.

The solar PV sector fits both of these conditions. And it shows not only China's strategy at play, but also China's strategy at the point of near-cemented success.

Beijing has subsidized its solar champions all along the value chain to guarantee that they acquire near monopolistic market share and global scale. Backed by Chinese industrial policy, PRC companies have been able to undercut and decimate their global competitors, often by selling their products at prices below the cost of manufacturing them. They have also been able to position for opportunities to dump excess capacity on the global market in order effectively to eliminate any viable alternative, even if it translates into losses. And the Chinese government has encouraged and supported them in investing internationally to acquire footholds into and leverage over global markets.

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This is a non-market playbook to guarantee market dominance.

¹ *Competing for Fuel: Benchmarking the US-China Energy Competition*, Force Distance Times, June 2024, <https://forcedistancetimes.com/competing-for-fuel-benchmarking-the-us-china-energy-competition/>.

Its logical conclusion dovetails with the CCP's overall strategic ambition. If China controls solar energy, it controls a major renewable energy technology supply chain toward which the world is rapidly shifting. Crucially, its success with solar PV also establishes the template to dominate other technologies including electric vehicles, wind turbines, batteries, and hydrogen electrolyzers.

And if China does that, it can hold American energy independence at risk, claim leverage over the US political ecosystem, and influence the American industrial base. It is also applying the same model to other systemic rivals such as the European Union and India.

This is a grand strategic challenge. But this one is not being contested by naval fleets or jet fighters. It is a contest between and among upstream supply chains, downstream manufacturers, and regulatory and policy ecosystems. All the same, China's approach stands to give Beijing a strategic advantage up to and including in times of conflict.

This report documents the risks that China's positioning in the solar sector presents, including its ability to exploit well-intended US industrial policies, such as the Inflation Reduction Act of 2022, to establish beachheads in the United States, while benefitting from hundreds of millions in US taxpayer dollars flowing to Chinese companies.²

A number of factors at play in China's approach to the solar sector must be accounted for in US Federal tax credit and funding guardrails as well as by State and local leaders, who may be inclined to harvest short-term economic development boons promised by Chinese State-backed players:

- China's State-backed solar champions benefit from Beijing's largesse and are deeply steeped in CCP ideology, even if they present an Americanized version of themselves in the US. The executives leading some of China's largest solar manufacturers with US investments, including the CEO of Trina Solar, and the Chairmen of LONGi and JA Solar, also have influential positions in the Chinese political and Party landscape, even serving as Deputies in the National People's Congress, "the highest organ of state power" and only branch of government in China, which operates within the framework defined by the Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. The CCP controls the nomination and election processes at every level and these corporate leaders would not be 'elected' Deputies in the National or Provincial People's Congresses without the Party's express approval. The close ties and access to Party leadership enjoyed by Chinese solar

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² Emily De La Bruyère And Nathan Picarsic, "How Actually to Compete with China: Can America Avoid the Coming Solyndra Hydra?," The Spectator, <https://thespectator.com/topic/solyndra-hydra-compete-china/>.

manufacturers not only allows them to benefit from but also to shape government resource allocations.

- The CCP and Chinese government form industrial policy. They then translate that policy, and its non-market means, into firm-level activity through both direct engagement and indirect engagement operationalized by industry associations - both in China and in the US Those industry associations - and their role in enabling the PRC's State-led, Enterprise driven approach - have received little attention in US policy discourse up to this point.
- Beijing prioritizes the solar, and larger renewable energy, sector because of the grand strategic opportunity it creates. This underscores the stakes of the energy transition and the importance of the supply chains behind it. Those supply chains carry short-term and tactical security risks: For example, Chinese dominance of the inverter and solar panel markets introduces cyber security and energy network monitoring risks. A recent ethical hack in the Netherlands revealed that solar panels with integrated electronics - the majority of which are made by Chinese companies - can be "easily hacked, remotely disabled or used for DDoS [Distributed Denial of Service] attacks."³ Worse yet are the strategic risks of supply chain dependency and energy security that are invited by allowing a single, State-backed ecosystem of solar producers to control the global value chain.
- The expansion of Chinese solar champions into the US market is blessed - even encouraged - by the Chinese State. The Chinese government's guidance clearly translates into Chinese solar champions localizing in the United States in ways that neuter trade remedies and complicate the ability of American policymakers to effectively push back against China's non-market industrial policies. Crucially, this strategy ensures that China never loses control of the highest value aspects of the solar value chain. While the building blocks, including the production of polysilicon, ingots, wafers, and cells, are primarily retained in China and One Belt, One Road initiative partners in Southeast Asia, Chinese expansion into the United States has largely focused on assembling solar panels using imported components sourced from China or Southeast Asia. Absent guardrails, simply assembling solar panels in Alabama, Arizona, Florida, Ohio, or Texas, using imported components, would allow Chinese solar manufacturers to access a \$0.07/watt tax credit (or \$70 million per gigawatt of solar panels assembled) under Section 45X of the Inflation Reduction Act (IRA), as well as numerous local and state incentives. Chinese solar manufacturers create the illusion of domestic manufacturing and earn goodwill from American politicians, without loosening China's grip of

Chinese solar manufacturers create the illusion of domestic manufacturing and earn goodwill from American politicians, without loosening China's grip of the supply chain or creating substantial and sustainable economic value in the US, all while receiving substantial taxpayer-funded incentives.

³ "White hat hacker shines spotlight on vulnerability of solar panels installed in Europe," August 24, 2024, <https://www.euractiv.com/section/energy-environment/news/hacker-shines-spotlight-on-vulnerability-of-solar-panels-installed-in-europe/>.

the supply chain or creating substantial economic value in the US, all while receiving substantial taxpayer-funded incentives. In some cases, Chinese solar companies even use US subsidiaries of Chinese State-Owned Enterprises to construct their facilities, as Jiangsu Runergy did when it contracted China Construction America, a subsidiary of China State Construction Engineering Corporation Ltd. (CSCEC), to build its Huntsville, Alabama facility.⁴ When completed, its 5-gigawatt facility could benefit from as much as \$350 million in US tax credits per year under Section 45X of the Inflation Reduction Act for assembling a solar panel from foreign-sourced components in Alabama.

- **Localizing in the United States takes one of several forms:**

1. **US incorporated entities:** Larger solar manufacturers that are well known in the industry, such as Trina Solar, have established US-incorporated entities, perhaps to capitalize on their existing brand value and recognition.
2. **Joint ventures with US companies:** PRC industrial policy sources direct Chinese firms to obfuscate forms of localization, such as establishing joint ventures with other international players: “Joining forces makes you indestructible,” notes Huang Yongfu of the National Development and Reform Commission (NDRC).⁵ This tack is on broad display with localization strategies like that leveraged by Chinese champion LONGi Green Energy Technology (LONGi) in Ohio.⁶ And those tactics are only strengthened by simple legal entity and domicile approaches that obfuscate ultimate beneficial ownership and dim the capacity of conventional, placed-based trade remedies.
3. **Third-country registered companies:** Some Chinese companies will go to great lengths to obscure their Chinese origins. For instance, while Canadian Solar is headquartered in Canada, it is one of China’s oldest and largest solar PV manufacturers. Similarly, Nasdaq-listed Toyo Solar, which announced a 2 GW US solar module assembly plant is a subsidiary of Fuji Solar, which is in turn a subsidiary of Abalance, which is headquartered in Tokyo, Japan. Toyo was formed through a merger with Vietnam Sunergy Joint Stock Corporation (VSUN), which was formerly a subsidiary of China Sunergy (CSUN), and has been described as “a pass-through assembly plant for Chinese products.”⁷

⁴ Michael Seale, “6 new high-dollar building permits issued in North Alabama,” H-ville Blast, December 4, 2023, <https://hvilleblast.com/6-new-high-dollar-building-permits-north-alabama/>.

⁵ 黄永富 [Huang Yongfu]. 西方加强外资国家安全审查对中国企业的影响及对策 [The Impact of Strengthening Foreign Security National Security Review in Western Countries on Chinese Enterprises]. 中国发展观察 [China Development Watch], 2019.

⁶ Chris Cowell, “Longi Solar Panel Manufacturing Coming to Ohio via Invenergy Joint Venture,” March 13, 2023, <https://solarbuildermag.com/news/longi-solar-panel-manufacturing-coming-to-ohio-via-invenergy-joint-venture/>.

⁷ “Abalance – Turning Japanese? We really don’t think so,” Viceroy Research, May 16, 2023, <https://viceroyresearch.org/2023/05/16/abalance-turning-japanese-we-really-dont-think-so/#>.

- Chinese solar manufacturers and assembly companies owe their allegiance to China and are subject to Chinese laws and regulations, even as they benefit from open markets and Federal and state incentives in the United States. The US flags hoisted outside their American facilities and 'Made in USA' labels are simply a flag of convenience. Given their ties to the CCP, their commitment to the United States is dubious and can be at odds with Beijing's strategic intent. The US localization push risks being, at best, driven by a dash to seize quick financial taxpayer-funded gains in exchange for minimal investments, and at worst, a ploy to create a strategic vulnerability that could be exploited by the CCP in times of conflict.
- Ultimately, the greatest risk of allowing Chinese-backed operations to dominate domestic American product is an opportunity cost: America stands at the precipice of a once-in-a-generation opportunity to seize energy independence and corresponding boons for security and economic development that accompany a resurgence of US production. The latent potential is there. So, too, is the underlying innovative capacity to define the next generation of energy technologies. But those opportunities all risk being wasted if a short-term tradeoff is made to allow Chinese State-backed players to continue to exploit US industrial policy while eroding America's solar foundation.

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Introduction

China's solar dominance has been well documented. The People's Republic of China controls the global industry, effectively monopolizing every step in the solar supply chain. Today, China's solar dominance even risks control of US-based production: In the absence of appropriate guardrails on tax incentives, the major solar producers in the United States are expected to be Chinese companies.⁸

China's Share of Global Solar Ingot, Wafer, Cell, and Module Production



China has developed this solar stranglehold according to the same playbook that it has deployed in other high-tech and renewable energy domains. Beijing leverages a non-market industrial policy to subsidize the entire value chain - with an emphasis on winning at the upstream and gradually building market share on a global scale.

⁸ Marybeth Collins, "Chinese Firms Set to Control Nearly Half of US Domestic Solar Panel Production by Next Year," Environment and Energy Leader, August 20, 2024, <https://www.environmentenergyleader.com/2024/08/chinese-firms-set-to-control-nearly-half-of-u-s-domestic-solar-panel-production-by-next-year/>.

Reported Subsidies for Select Chinese Solar Champions 2022 & 2023 (million USD)⁹

Company	2023 Subsidies	Subsidy as share of Profits	2022 Subsidies	Subsidy as share of Profits
LONGi	\$189.4 million	12.7%	\$138.7 million	6.3%
JA Solar	\$191 million	19.1%	\$101 million	12.2%
Jinko Solar	\$205.2 million	19.3%	\$179.7 million	10.0%

That non-market tack presents a fundamental risk for firms competing with China’s State-supported champions: They are fighting not against privateer peers bound by market realities, but against the People’s Republic of China. This, in turn, presents a direct affront to global economic norms. And it presents a challenge for US industry and policy makers: The once-in-a-generation effort to engender a renaissance in American manufacturing is challenged to appear as economically viable and competitive. But that effort faces anything but a level playing field. China’s entrants have a State-backed advantage; democratic markets have yet to muster a proper defense of the norms and regulations that allow the global trading system to function.

China’s approach threatens the integrity of the American industrial base and the policy system intended to support it. Chinese companies are not only competing from China or with Chinese government resources. The PRC also deploys a strategy of “localization” through which Chinese companies establish footholds internationally, through which they can not only subvert foreign markets but also benefit from foreign, including US, policy measures.

And China has accelerated its localization strategy over recent years - in part in response to US policy intended to restore the US industrial base and support non-Chinese alternatives. As a result, that policy risks not only failing, but in fact bolstering Chinese companies. As a 2023 article in China’s Security Times explained:

The change in the international situation is also an important reason for Chinese photovoltaic manufacturing enterprises to set up factories in the United States, and take this as a strategy to avoid risks. In the past year or two, the export of Chinese enterprises to the United States has not been smooth. The promotion of production expansion in the United States can enable better implementation of the corresponding business plan.¹⁰

Through support and guidance from the Chinese government, Beijing’s preferred solar champions have established significant presences in the United States. That presence, in turn, allows Beijing to neuter US trade remedies. It also allows China to benefit directly from US investments, tax credits, and preferential market access. In essence, Chinese State-backed players serve as beachheads behind adversary lines. Their well-honed

⁹ Reflecting the sum of “government subsidies included in the current profit and loss” and values reported for “government incentives” and “VAT deductions” using the annual average exchange rate between RMB and USD.

¹⁰ “Chinese photovoltaic enterprises choose to invest in the United States: to cope with the impact of overseas manufacturing capacity improvement, global layout may be the only way out,” [中国光伏企业抉择赴美投资：应对海外制造能力提升冲击 全球化布局或是唯一出路] Securities Times, April 19, 2023, https://www.sohu.com/a/668248170_115433.

approach tends to focus on localizing only the lowest value-add segments of the supply chain - all while retaining upstream supply links to China and leaving high value-add segments of the value chain in China or lower cost third party jurisdictions. This appears to be the case with the likes of LONGi and Trina plans to focus on only module assembly at their announced US facilities.¹¹

But, regrettably for American policy, those actors are far from undetected zero-day exploits or even Trojan horses; rather, they are actively supported by American government intervention, welcomed and celebrated by state and local government officials, and provided relatively unfettered access to the US market. For example, Bila Solar, a new US-based offshoot of Shanghai-based Sunman,¹² has been praised by Indiana's governor, the Mayor of Indianapolis, and promised tax breaks - with no mention of the company's links to China.¹³

“Indiana’s entrepreneurial ecosystem is strong, and we’re excited to welcome Bila Solar to our growing network of innovators advancing products that power the world,” said Governor Eric J. Holcomb. “With Bila’s new Indianapolis manufacturing operation, Indiana’s skilled workforce will be making solar energy more accessible and powering our growing clean energy sector to new heights.”

The sections of this report that follow document the logic that propels the current positioning of Chinese solar giants in the United States and the State ties that coordinate their efforts. The report concludes with a discussion of policy approaches necessary for restoring the role of market forces governing energy supply chains and the scope of the strategic opportunity presented by today’s energy transition.

¹¹ Keith Bradsher, “How China Came to Dominate the World in Solar Energy,” The New York Times, March 7, 2024, <https://www.nytimes.com/2024/03/07/business/china-solar-energy-exports.html>.

¹² See the company profile at: <https://www.enfsolar.com/sunman>

¹³ “Solar Energy Innovator Launches US Headquarters, Manufacturing in Indiana,” Indiana for the Bold, August 29, 2023, <https://iedc.in.gov/events/news/details/2023/08/29/solar-energy-innovator-launches-us-headquarters-manufacturing-in-indiana>.

State Direction to Subvert Global Markets

China's "State led, Enterprise driven" economic model applies non-market tactics to seize global market share and to sow asymmetric economic interdependence globally.

Beijing intends for global markets to depend on China more than China depends on them.¹⁴ This playbook has been refined over the past thirty years. It relies on State support for "bringing in" inputs, whether technological or raw material, and State guidance of the "go out" of international fronts of China's industrial might. This program's success can be seen in a variety of capital-intensive industries that neatly align with China's enduring comparative advantages.¹⁵

In particular, Beijing's strategy - and the industrial policy animating it -- prioritize two main types of sectors: First, those that sit upstream of global production, or on which other critical sectors depend. For example, semiconductors are necessary inputs into the entire computing economy; energy is a necessary input into everything. Second, Beijing prioritizes areas of industrial and technological transition. Those offer the opportunity to capture the initiative in new markets - and unseat incumbent powers. The result is an existential threat to industrial bases, market norms, and national and economic security globally.

The legacy response to China's non-market strategy has been trade remedies. However, those have proved ill-equipped for the challenge.¹⁶ Part of the failure of traditional trade remedies owes to Beijing's ability to guide firms toward strategies that circumvent place-based targeting of tariffs and other trade tools.

Such circumvention in the solar market has long been executed through beachheads in Southeast Asia.¹⁷ In short, Chinese companies establish presences there, and then export from those, third party countries, into the United States and other markets with protections against PRC entities.

But increasingly, China is also circumventing US trade remedies through the United States itself. The allure of Inflation Reduction Act funding has spurred a spate of "localization" efforts by Chinese-domiciled and -aligned operations launching facilities in the United States.

This owes to a simple, strategic calculus from the Chinese perspective: China dominates global solar supply; efforts by countries that consume China's solar supply to invest in their own domestic production constitute a

¹⁴ Emily de La Bruyère, "China's 'Dual Cycle' development model and the digital revolution," Hinrich Foundation, September 21, 2021, <https://www.hinrichfoundation.com/research/wp/digital/china-dual-cycle-development-model-and-digital-revolution/>.

¹⁵ For the long-run implications, see Nigel Cory, "Heading Off Track: The Impact of China's Mercantilist Policies on Global High Speed Rail Innovation," ITIF, April 2021, <https://www2.itif.org/2021-high-speed-rail.pdf>.

¹⁶ Noi Mahoney, "Auto parts executive slams China's alleged end run around US tariffs China-based manufacturers have been dodging US tariffs for decades by transshipping through Mexico, experts say," Freight Waves, August 22, 2024, <https://www.freightwaves.com/news/auto-parts-executive-slams-chinas-alleged-end-run-around-us-tariffs>.

¹⁷ Garrett Hering, "US finds Chinese solar producers evading tariffs via factories in Southeast Asia," S&P Global, August 18, 2023, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/us-finds-chinese-solar-producers-evading-tariffs-via-factories-in-southeast-asia-77116827>.

threat to that dominance; China has to neutralize that threat; localization is a means to do so. As one China media treatment put it:

Important background for Chinese photovoltaic enterprises to invest in the United States is that many overseas countries or regions have made the strengthening of local photovoltaic manufacturing capabilities a policy goal ... At the same time, the overseas market is the main destination of China's photovoltaic products.¹⁸

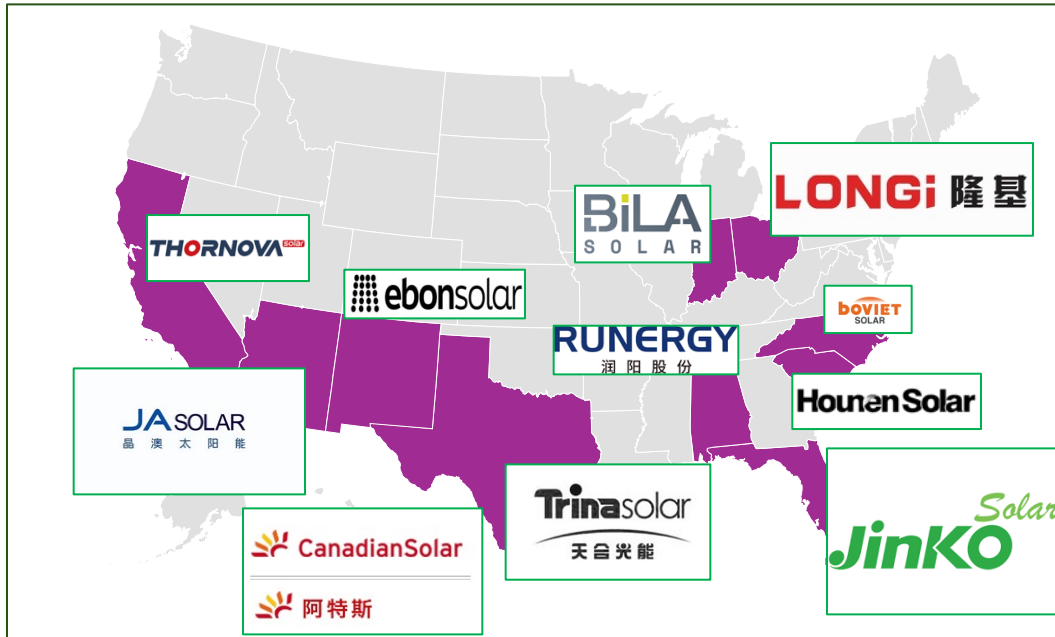
And neutering the threat of alternate supply comes with tactical benefits, too. Chinese companies that localize production in the United States can benefit from preferential domestic market treatment in the form of tax credits. They can also garner capacity to influence subnational politics and policy.¹⁹ And as long as American policy aims to reshore production without sufficient protective guardrails, localizing in the United States offers China an avenue to counter the forces of anti-globalization. As Jiang Zhuoye of the Beijing University of Science and Technology puts it, “faced with the return of the US manufacturing industry, China should actively follow the trend. While enhancing the competitiveness of domestic enterprises, it encourages capable enterprises to actively go out and invest in the US to set up factories.”²⁰

¹⁸ “Chinese photovoltaic enterprises choose to invest in the United States: to cope with the impact of overseas manufacturing capacity improvement, global layout may be the only way out,” [中国光伏企业抉择赴美投资：应对海外制造能力提升冲击 全球化布局或是唯一出路] Securities Times, April 19, 2023, https://www.sohu.com/a/668248170_115433.

¹⁹ Nathan Picarsic and Emily de La Bruyère, “All Over the Map,” Foundation for the Defense of Democracies, November 21, 2015, <https://www.fdd.org/analysis/2021/11/15/all-over-the-map/>.

²⁰ 蒋卓晔 [Jiang Zhuoye]. 制造业回流美国背景下我国产业面临的压力及其应对 [The pressure China's industry faces and its countermeasures against the background of manufacturing industry returning to the United States], 社会科学家 [Social Scientist], 2018.

Select States with Chinese-tied Solar Facilities in the United States



Localization as a Long-Standing Playbook

China's localization playbook is not new. It is a long-standing approach that owes to State guidance and backing, and that has been refined over the past decade plus - and previous iterations of US investment intended to support domestic industry.

China's commercial champions invest in US production facilities to cement access - to US R&D resources and to the US market. And Chinese Communist Party-tied actors and entities are explicit in explaining this logic. For example, the *Journal of Party and Government Cadres* explains that Chinese companies invest overseas in order to “bypass tariff and non-tariff barriers of importing countries” while increasing material and technological resources. That argument points to a historical example to prove the point: Haier constructed an industrial park in South Carolina and an R&D center in Indiana in order to access US technological resources and to utilize US production plants, sales operations, and financing “effectively to solve the problems of consumer resistance to foreign brands and of non-tariff barriers in the target market.”²¹

The *Journal of Party and Government Cadres* calls for “this Haier model to be promoted.”²²

²¹ 张佰英 [Zhang Baiying], 王丽娜 [Wang Lina]. 后危机时代美国贸易保护主义的应对之策 [Countermeasures of American trade protectionism in the post-crisis era]. 党政干部学刊 [Journal of Party and Government Cadres], July 16, 2011.

²² Ibid.

As that guidance underscores, the localization playbook is not a new one. Chinese industrial policy and the government forces guiding Chinese overseas investment have been refining and promulgating their approach focused on the United States for over a decade. For example, a 2012 article by three authors from the Chinese Ministry of Commerce highlights the opportunities provided by the US Recovery and Reinvestment Act: “The US government plans to invest 787.2 billion USD from 2009 to 2019…But external capital is needed…Chinese companies are encouraged to invest in US infrastructure projects.”²³ Yin Zhongxia of the People’s Bank of China echoes the point: “The US infrastructure upgrade plan provides a good opportunity for Chinese companies to enter the US market.” He explains that in the short term, engaging with the US market serves as a foundation to dump China’s “excess capacity”²⁴ overseas.

Those cases are from the post 2008 period, when the imperative of leveraging investments in industry to restore US economic functioning was recognized but the threat of China’s overcapacity was not. Today, US policymakers are aware of both the imperative and the threat. But they have still not developed effective policies to respond; policies that can overcome the localization tactic through which the PRC both exports its overcapacity²⁵ and takes advantage of foreign industrial investments.

Beijing is well aware that the global diversion of China’s subsidized overcapacity comes at the expense of US industry - and that the tools the United States has at its disposal to respond are trade remedies. “There is no doubt that the industries of developed countries will be greatly affected,” wrote Zhong Chunping of the Chinese Academy of Social Sciences in 2019:

In the traditional manufacturing industry, factories in developed countries may suffer bankruptcy due to the impact. In order to protect their own interests, they may raise trade disputes. Developed countries, under pressure from trade unions, may initiate anti-dumping investigations and impose higher tariffs on Chinese products. In this regard, we should have our own position and should not ignore our own interests.²⁶

**Chinese companies
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in the target market.**

²³ 金锐 [Jin Rui], 何明明 [He Mingming], 辛灵 [Xin Ling]. 投资欧美基建 实践转型升级——中国企业参与合作的模式探索 [Investing in European and American Infrastructures, Practicing Transformation and Upgrading—Exploring the Mode of Chinese Enterprises Participating in Cooperation]. 国际经济合作 [Economic Cooperation], 2012.

²⁴ This point about overcapacity resolution is common. For example, Liu Jianjiang et al of Changsha University of science and Technology explain that: “From 2013 to 2014, China’s high-speed rail “going out” strategy…promoted the development of Chinese companies’ overseas investment and at the same time eased the pressure on the domestic steel industry’s excess capacity.” (刘建江 [Liu Jianjiang], 罗双成 [Luo Shuangcheng], 凌四立 [Ling Sili]. 化解产能过剩的国际经验及启示 [International Experience and Enlightenment of Eliminating Overcapacity]. 经济纵横 [Economic Aspect], 2015.)

²⁵ David Lawder, “Yellen says global concerns growing over China’s excess industrial capacity,” Reuters, April 5, 2024, <https://www.reuters.com/business/yellen-launches-contentious-meetings-chinese-excess-production-threat-2024-04-05/>.

²⁶ 钟春平 [Zhong Chunping]. “去产能”与“产能过剩”辨析 [Discrimination of “Capacity Reduction” and “Overcapacity”]. 征信 [Credit Information], 2019.

Beijing has also recognized that investments overseas allow it to neutralize those trade remedies. And so, part of China staking out its own position involves developing a presence in the United States.

Localization as a Tool of Circumvention

Chinese companies leverage localization in the United States to stymie US trade restrictions, take advantage of US preferential policy, and in doing so neutralize US attempts to support non-Chinese alternatives. This localization is supported by Chinese government policy.

PRC discourse is explicit about this playbook. As researchers from the China Development Bank write:

Chinese companies should develop projects in the United States and adapt to local markets, laws, and government requirements...Therefore, the Chinese government conducts policy guidance and planning for companies investing in the US and encourages Chinese companies to cooperate with US companies to invest in US infrastructure projects so as to lower US market barriers.²⁷

They - and a litany of other Chinese sources - lay out two means of doing so. The first means involves setting up a direct US presence, especially by building assembly plants and factories. The China Development Bank researchers describe Chinese companies circumventing US regulatory barriers by “acquir[ing] local enterprises or invest[ing] in local factories.”²⁸

The second approach is to invest in or partner with US actors. “Single is easy to break, but joining forces makes you indestructible,” notes Huang Yongfu of the National Development and Reform Commission (NDRC). “Chinese ‘Go Out’ companies should avoid going at it alone and cooperate with enterprises in developed countries to form joint forces, jointly carry out M&A, jointly develop markets, and jointly meet challenges to reduce investment risks.”²⁹ This tack can be seen on explicit display in the way that Chinese solar suppliers have established their operating presence in newly launched US joint ventures.³⁰

Wang Yupeng of China’s Foreign Economics and Trade University stresses the importance of subtlety in the process. He notes that companies can “adjust their investment methods” by “acquiring small, unobtrusive small and medium-sized enterprises as ‘invisible champions’ through joint ventures or consortia.”³¹ Local companies are particularly ripe because, as ICBC researchers point out, “CFIUS clearly defines the scope of transactions for

²⁷ 刘勇 [Liu Yong], 刘卫平 [Liu Weiping]. 中美基建合作:中美经贸新的增长点 [Sino-US Infrastructure Cooperation: A New Growth Point for Sino-US Economic and Trade Relations]. 人民论坛·学术前沿 [People's Forum Academic Frontier], 2018.

²⁸ 刘勇 [Liu Yong], 刘卫平 [Liu Weiping]. 中美基建合作:中美经贸新的增长点 [Sino-US Infrastructure Cooperation: A New Growth Point for Sino-US Economic and Trade Relations]. 人民论坛·学术前沿 [People's Forum Academic Frontier], 2018.

²⁹ 黄永富 [Huang Yongfu]. 西方加强外资国家安全审查对中国企业的影响及对策 [The Impact of Strengthening Foreign Security National Security Review in Western Countries on Chinese Enterprises]. 中国发展观察 [China Development Watch], 2019.

³⁰ “Invenery, Longi tie up in 5-GW solar panel production JV in Ohio,” Renewables Now, March 20, 2023, <https://renewablesnow.com/news/invenery-longi-tie-up-in-5-gw-solar-panel-production-jv-in-ohio-817814/>.

³¹ 王宇鹏 [Wang Yupeng]. 欧美加严外资安全审查的趋势特点和分析建议 [Trend characteristics and analysis suggestions for the tightening of foreign investment security review in Europe and America]. 国际贸易 [International Trade], 2018.

review as those where business entities are ‘trans-state operations.’”³² Local companies therefore offer an opportunity for less heavily scrutinized transactions. So, too, do partnerships that guarantee equal or minority ownership for PRC-domiciled actors.

Wang and others caution that Chinese companies should work to keep their activity “invisible.” That means reducing the equity proportion of any single M&A deal, and then “gradually increasing holdings to control business operations.”³³ Chinese companies should also keep a low public profile: “Avoid hype,” writes Wang, “in the host country’s media while opportunistically announcing the contribution of the company’s investment to local employment and taxation, as well as outstanding achievements in social responsibility.”³⁴

PRC historical discussions of these approaches cite CRRC, Haier, Hisense, and Shandong Weida.³⁵ But those historical examples pale - in number and implications - next to the recent spate of contemporary, cleantech analogues. Those include the likes of LONGi’s joint venture Illuminate USA as well as smaller players, like the arrangements pursued by Runergy and its American Hyperion Solar subsidiary.

Chinese companies make no secret, in carrying out this localization activity, of their intentions. Take a 2017 interview with the Chairman of State-owned China Building Materials, Song Zhiping, on “why Chinese companies go to the US to build factories.”³⁶ Song argues that “going abroad to build factories can reduce the effect of trade protectionism on us. Over the years, the US and European Union have launched anti-dumping cases against Chinese companies, and we have lost many of our original markets.”³⁷ Wanhua Chemical’s 2018 announcement of a 1.25 billion USD Methylene diphenyl isocyanate (MDI) project in Louisiana explains that “localized production and operation in the US are conducive to reducing the risks of international trade policies and tariffs,” namely

“Developed countries, under pressure from trade unions, may initiate anti-dumping investigations and impose higher tariffs on Chinese products. In this regard, we should have our own position and should not ignore our own interests.”

³² 樊志刚 [Fan Zhigang], 王婕 [Wang Jie]. 美国国家安全审查制度对中国企业拓展美国市场的启示——基于华为、中兴通讯被美调查事件 [The Enlightenment of the US National Security Review System on the Expansion of the US Market by Chinese Enterprises——Based on Huawei and ZTE’s Investigation into the US]. 国际经济评论 [International Economic Review], 2013.

³³ 王宇鹏 [Wang Yupeng]. 欧美加严外资安全审查的趋势特点和分析建议 [Trend characteristics and analysis suggestions for the tightening of foreign investment security review in Europe and America]. 国际贸易 [International Trade], 2018.

³⁴ Ibid.

³⁵ 蒋卓晔 [Jiang Zhuoye]. 制造业回流美国背景下我国产业面临的压力及其应对 [The pressure China’s industry faces and its countermeasures against the background of manufacturing industry returning to the United States], 社会科学家 [Social Scientist], 2018.

³⁶ China Building Materials subsidiary, China Jushi, invested 300 million USD in a glass fiber production line in Richland, South Carolina in 2016.

³⁷ 中国建材董事长：中国企业为什么去美国建工厂？我们有话说 [Chairman of China Building Materials: Why do Chinese companies build factories in the United States? We have something to say], Sohu News, February 23, 2017.

301 tariffs.³⁸ Press releases from State-owned rail champion CRRC in 2017 declare that it has “completed Trump’s US localization requirements…All vehicle projects meet the requirements of ‘Buy America… The rate reaches more than 60 percent and is assembled locally.”³⁹

“In 2012,” writes Zhang Yuanpeng of the Jiangsu Academy of Social Sciences, “the US announced that it will levy anti-dumping duties and countervailing duties on Chinese-made crystalline silicon photovoltaic cells and modules. Suntech Power and Wanxiang Group will invest in solar panel assembly plants in the US.”⁴⁰ These investments ensure that US goods and production are fueled by China’s domestic, subsidized, key inputs. Anti-dumping duties or not, Chinese champions will produce the polysilicon, ingots, and wafers for Suntech Power and Wanxiang Group.

PRC solar companies’ localization in the United States has accelerated since the passage of the Inflation Reduction Act. After the IRA passed, Chinese PV companies immediately began investigating opportunities to enter the US market, whether through joint ventures or directly. Companies commonly grouped as Chinese companies - Canadian Solar, JA Solar, LONGi Solar, and Trina Solar - all have PV factories announced or actively under construction in the United States. JinkoSolar has operated an assembly facility in Jacksonville, Florida since 2019. The company was awarded a ten-year, \$2.3 million grant by the Jacksonville City Council in 2023 to support its planned \$52 million capacity expansion project, which was announced after the Inflation Reduction Act was signed into law. Jinko’s US factory and a sales office were raided by the Homeland Security Investigations arm of the Department of Homeland Security in May 2023. While details were not released, DHS noted that the search warrants were part of a federal investigation.

And Chinese companies are building new PV facilities in the Middle East, Indonesia, and Laos. These facilities promise continued access to the US market, even as the United States actively works to protect against the risk of China’s market dominance. They also promise Chinese players access to preferential US policies: In total, based on already-announced solar projects in the US, Chinese companies are projected to benefit from some 125 billion USD in federal tax credits under the IRA.⁴¹

Flying a Flag of Convenience?

Chinese solar companies are actively following the playbook honed by PRC companies and described by PRC discourse over the past decade plus. PRC discussion of “localization” emphasizes finding US employees and intermediaries with connections to relevant government agencies: “Staff, especially the localization of management, is of great significance for Chinese companies,” wrote a team of researchers from ICBC in 2013.

³⁸ 万华化学关于在美国建设MDI一体化项目的公告 [Announcement of Wanhua Chemical on the construction of MDI integration project in the United States], November 17, 2018.

³⁹ 中国中车完成特朗普美国本土化要求 [CRRC completes Trump’s US localization requirements], March 28, 2017.

⁴⁰ Ibid.

⁴¹ Michael Stumo, “Will the Inflation Reduction Act Benefit American or Chinese Solar Companies?” August 15, 2023. <https://prosperousamerica.org/will-the-inflation-reduction-act-benefit-american-or-chinese-solar-companies/>

“These agencies better understand how to deal with the US Congress and government agencies.”⁴² Eleven years later, that is precisely what PRC solar companies are doing. LONGi, for example, has counted among its lobbyists former members of the House of Representatives as well as an Under Secretary of Commerce for International Trade.⁴³

Those lobbying efforts, though, are shrouded by the fact that LONGi’s US presence is delivered through a joint venture, Illuminate USA. Illuminate’s lobbying filings note that LONGi holds a 49 percent stake in the Illuminate joint venture. And that Illuminate’s lobbying focuses on policy issues like the implementation of the Inflation Reduction Act, from which it stands to benefit to the tune of \$350 million per year simply by assembling solar panels with imported components, including cells. It also advocates against US trade measures to address the flood of photovoltaic cells and modules being imported from One Belt, One Road countries in Southeast Asia, where Chinese solar companies, including LONGi have extensive manufacturing operations.

Illuminate describes itself as “an American advanced manufacturing company” and touts the jobs it has created in Ohio, even securing a congratulatory note from Governor Mike DeWine of Ohio in a company press release, all without openly advertising LONGi’s role as co-owner. In response to a Reuters query related to US factories owned by Chinese companies, an Illuminate spokesperson stressed that “Illuminate USA is an American company, majority owned by Invenery, who owns both the facility and the land…”

Illuminate also benefits from the reach of Invenery, which holds a 51 percent stake. Li Wei, professor at the School of International Relations at Renmin University of China and director of the Center for American Studies, praised LONGi’s decision to partner with Invenery to establish Illuminate describing it as a wise choice “because sole ownership will only make the company a ‘fish on the chopping board’, and adopting a way of sharing the benefits equally can instead resolve the resistance of the company to entering the US market…”

Invenery is a Chicago-based renewable energy developer; its political activity includes having sponsored both the Republican and Democratic national conventions in 2024⁴⁴ and its CEO appears to have close ties to the Biden White House, even being included on the guest list for May 2024 State Dinner for the President of Kenya. With approximately \$3 million spent on lobbying expenditures in 2022 and 2023, Invenery counts trade and tariffs as key issues.

Its joint venture with LONGi means that its interests - and policy influence - are more likely to be aligned with LONGi’s, which is reflected in its public criticism of solar manufacturers seeking a US investigation into allegations of dumping of imported photovoltaic solar cells, and market distorting behavior by Chinese solar manufacturers operating in Cambodia, Thailand, Vietnam, and Malaysia. LONGi operates in both Vietnam and Malaysia. And

⁴² 樊志刚 [Fan Zhigang], 王婕 [Wang Jie]. 美国国家安全审查制度对中国企业拓展美国市场的启示——基于华为、中兴通讯被美调查事件 [The Enlightenment of the US National Security Review System on the Expansion of the US Market by Chinese Enterprises——Based on Huawei and ZTE’s Investigation into the US]. 国际经济评论 [International Economic Review], 2013.

⁴³ See, for example, the February 2024 lobbying registration form associated with Illuminate USA LLC, which lists LONGi Green Energy Technology Co., Ltd. as a relevant foreign entity: <https://lda.senate.gov/filings/public/filing/a199328a-b590-4696-b84f-b7627e084c87/print/>.

⁴⁴ Bowdeya Tweh, “Dems Giving Friendly Ear on Supporting Renewable Energy,” Wall Street Journal, August 23, 2024, <https://www.wsj.com/livecoverage/dnc-harris-speech-election-2024/card/dems-giving-friendly-ear-on-supporting-renewable-energy-IJpTt57tqoebvqflzQuZ>.

that amounts to a formidable force consistent with Huang Yongfu of the Chinese NDRC's⁴⁵ guidance to Chinese businesses looking to gain well defended access to US markets: "Joining forces makes you indestructible."

Zhong Baoshen, deputy to the National People's Congress and chairman of LONGi Green Energy Technology



LONGi, of course, benefits from significant support from and close ties to the Chinese State. The company registered over \$189.4 million in subsidies - approximately 12.7% of its profits - in 2023, representing a year-on-year increase of 36.5% from the \$138.7 million it benefitted from in 2022.

LONGi is also enmeshed in the Chinese political system. The company's chairman, Zhong Baoshen is a deputy to the 14th National People's Congress and has been recognized with provincial and municipal awards, including the Xi'an Mayor Special Award and inclusion on the Shaanxi Provincial Labor Model list.

⁴⁵ 黄永富 [Huang Yongfu]. 西方加强外资国家安全审查对中国企业的影响及对策 [The Impact of Strengthening Foreign Security National Security Review in Western Countries on Chinese Enterprises]. 中国发展观察 [China Development Watch], 2019.

But Longi's Party ties are not simply recent or a matter of good business. Chinese press reporting underscores the depth of Party theory and support that is core to LONGi's culture. Company officials are quoted as stating that:

The company attaches great importance to the leading role of party building in the development of enterprises, improving the quality of party building work, and strengthening the management and education of party members.⁴⁶

Putting an even finer point on LONGi's Party adherence is a reported story of the company's naming.

According to Li Wenhua, the name of Longji Co., Ltd. comes from Jiang Longji, the old president of Lanzhou University. "President Jiang is an excellent party member who has made important contributions to the Chinese revolution and the education of the motherland. Zhong Baoshen, the chairman of the company, and I are fellow students of Lanzhou University. We will adhere to the spirit of the ancestors and hope to make positive contributions to the development of the global energy transformation and the new energy industry.

Though the company presents as a normal profit-seeking enterprise just like any other international business, it is clear that its ideological foundation and ties to the Chinese Communist Party influence its operations in China as well as overseas.

The Solar State

As the case of Longi and Zhong Baoshen begin to make clear, the PRC's contemporary solar localization gambit is government guided and backed. It is a part of the CCP's larger prioritization of solar - a future energy source that China aims to control.

That government prioritization of the sector is reflected in a steady sequence of references in industrial planning documents that emphasize controlling energy supply chains, generally, and the solar supply chain, specifically. The government's prioritization is also reflected in the resource allocations that have enabled China's solar PV industry dominance: subsidies and other forms of non-market backing and preferential policies for Chinese companies, low environmental regulations on solar PV manufacturers, protections for the Chinese market, and evasion and manipulation of international trade law.⁴⁷

In the early 2000s, the Chinese government began its campaign to develop domestic solar PV production, fueled by state support and foreign technology and capital. After the 2008 financial crisis, China moved from

⁴⁶ Jiao Yueyin Gaofeng, "Photovoltaic leader Longji Co., Ltd.: Inherit the red culture and strive to be the vanguard of carbon neutrality," Securities Daily, June 28, 2021, <https://cj.sina.com.cn/articles/view/2311077472/89e03e6002001ofkn>.

⁴⁷ Seaver Wang, Suzel Lloyd, and Guido Núñez-Mujica, "Sins of a Solar Empire," Breakthrough Institute, November 15, 2022, <https://thebreakthrough.org/issues/energy/sins-of-a-solar-empire>.

competing with international solar producers to focusing on overwhelmingly controlling the entire solar PV value chain and its downstream markets. In 2010, Beijing launched the “Golden Sun Project,” “the strongest industrial policy support in the history of China’s PV industry;”⁴⁸ at the same time, Beijing began aggressively subsidizing upstream polysilicon producers and relaxing environmental regulations on their operations to ensure dominance at the starting point of the value chain.

Firm-level realities underscore the scope of Beijing’s intervention and guidance of the sector. For example, LONGi has received PRC government subsidies including “special funds for industrial and information development to build 5GW monocrystalline silicon ingots,” “functional development of single crystal silicon growth digital platform for big data integration and analysis,” “fixed asset investment subsidies,” and “national robotics project” funding. PRC solar companies also benefit from and support PRC industrial policy programs broader than just direct subsidy streams - including preferential policies, priority treatment, and access to research and development. For example, Sungrow operates a National Industrial Design Center and has been recognized as a “single champion” by the PRC’s Ministry of Industry and Information Technology.

Government Guidance and Industry Coordination: The Role of Industry Associations

Subsidy streams and preferential policies constitute tactical, point-specific examples of the PRC’s solar prioritization translating to company resources and behavior. Industry associations provide systems-level examples of this process, and how it is operationalized. PRC industry associations translate government guidance, serving as sinew between policy and firm-level outcomes. This process is largely overlooked in analyses of China’s industrial policy. That oversight risks under-appreciating the importance of Chinese Communist Party ties and alignment in the solar sector.

The China Photovoltaic Industry Association (CPIA) was established ten years ago. Its mission has since then been to “carry out various activities to serve enterprises, industries and the government; promote international exchanges and cooperation, organize the industry to actively participate in international competition, and coordinate **the response to trade disputes**.”⁴⁹ That mandate has seen CPIA take a center stage role in ushering along the Chinese solar industry’s internationalization and localization strategy. A 2018 conference convened by CPIA demonstrates this well:

In order to help enterprises understand the overseas investment environment and better assist enterprises to open up overseas photovoltaic markets, the China Photovoltaic Industry Association plans to hold the 2018 China Photovoltaic Overseas Investment and Development Forum inviting leaders and experts from government departments, research institutions, financial and insurance

⁴⁸ 袁瑛 [Yuan Ying], “扭曲的‘金太阳’工程 [The Twisted ‘Golden Sun’ Project],” China Dialogue, April 14, 2011.

⁴⁹ “Association Profile,” China Photovoltaic Industry Association, http://www.chinapv.org.cn/association_profile.html.

*institutions, overseas power investment enterprises and photovoltaic enterprises to study the overseas photovoltaic market together.*⁵⁰

That session was focused on supporting Chinese solar enterprises in formulating their “go out” strategies. The conference featured CPIA leadership. It also involved participation from the Ministry of Foreign Affairs, the Ministry of Industry and Information Technology, and China’s National Energy Administration.⁵¹ Government-linked bodies that aid companies with overseas expansion funding and regulatory issues also participated, including China Construction Bank and the China Export Credit Insurance Corporation.⁵² The conference neatly encapsulates the process by which “go out” and localization guidance is translated from industrial policy edicts into firm-level decision making.

CPIA’s membership illustrates the breadth of industry impacted by that process of translation. At present, the membership roster features over 880 representatives that cover “the backbone of China’s photovoltaic industry.”⁵³ This roster covers the entire value chain in China’s solar sector. As a Deputy Secretary General of the CPIA has summarized: “From auxiliary materials and accessories to a full set of equipment, from single production to system integration, today’s China’s photovoltaic industry has become an end-to-end independent and controllable strategic emerging industry.”⁵⁴

The CPIA’s “vice chairmen” play a vital role in the organization’s broader objectives. The vice chairman rank of membership is restricted to sixteen representatives. They reflect the end-to-end ambition. At present, those roles are filled by China’s module and panel champions, like LONGi and Jinko, as well as upstream leaders, like those responsible for a significant share of China’s polysilicon production, including Tongwei and GCL. Inverter champions are also reflected in this set of Vice Chairman, namely by Huawei, which further demonstrates the ties of China’s solar sector to actors identified as risk factors by US policy.⁵⁵

Unlike the majority of analogues in the United States, the CPIA works with the imprimatur of the government. In defining the organization’s scope of activities, the CPIA declares that its mandate includes “implementation of relevant government policies and regulations and putting forward advice and suggestions on the development of the industry to the competent government departments and relevant departments.” Its mandate also includes “carrying out evaluation, selection, commendation and other activities in the industry with the approval of relevant government departments.”⁵⁶

And the CPIA participates in Chinese Communist Party and Chinese government activities to guarantee alignment with the official vision for industrial policy and for the role of industry associations in promulgating

⁵⁰ “Notice on holding the 2018 China Photovoltaic Overseas Investment and Development Forum,” China Photovoltaic Industry Association, <http://www.chinapv.org.cn/registration/669.html>.

⁵¹ “2018 China Photovoltaic Overseas Investment Development Forum Preliminary meeting schedule,” China Photovoltaic Industry Association, <http://www.chinapv.org.cn/Uploads/File/2018/09/20/u5ba377637c9e0.pdf>.

⁵² Ibid.

⁵³ “Member List,” China Photovoltaic Industry Association, http://www.chinapv.org.cn/member_name/1403.html.

⁵⁴ Ye Zi “The performance is eye-catching. China’s photovoltaic industry leads the world and benefits the world,” [表現亮眼 中國光伏產業領跑全球惠及世界] People’s Daily, April 10, 2024, <https://m.chinanews.com/wap/detail/cht/zt/r10195730.shtml>.

⁵⁵ “Member List,” China Photovoltaic Industry Association, http://www.chinapv.org.cn/member_name/1403.html.

⁵⁶ “Association Profile,” China Photovoltaic Industry Association, http://www.chinapv.org.cn/association_profile.html.

government guidance to firms. CPIA works closely with the Ministry of Industry and Information Technology, which is a keystone in defining and executing Chinese industrial policy.⁵⁷

Industry associations in China have a mandate that extends even beyond industrial policy as well - and reaches into proliferating Party thought as well. CPIA's website features a recent example of direct coordination with Party and government actors. In April 2024, the Chinese government's Central Social Work Department convened a session for translating the Xi Jinping thought, Party building guidance, and the outcomes of the Second Plenary Session of the Central Committee. These Party links provides an explicit example of the direct tie that exists between the solar sector and the Chinese Communist Party, including its organs tasked with discipline.

American Analogues

The coordinating role of industry associations in China may well be more government-directed and resources than elsewhere. But industry associations also play a vital role in the policy process in the United States. And those nodes of the private sector present prime targets for promulgating narrative and action aligned with Chinese industrial policy. Influence directed through these third-party bodies - whether directed at the federal or subnational level - appear to meet the preference for invisible champions spelled out by China's localization playbook. The laundering of Chinese preferences further risks muddying perceptions of supply chain and other commercial and security risks.

These risks have been socialized in Washington, DC, policy circles.⁵⁸ But they have yet to be fully appreciated by the business communities that are besieged or reflected in any concrete action from policy makers. Various lobbying firms, for example, dropped Chinese domiciled clients that had been designated as military companies in 2024.⁵⁹ And technology industry associations took initial steps to follow suit with NetChoice dropping TikTok from its membership roster in May 2024.⁶⁰ Still, countless high-profile and influential industry associations feature large, State-backed Chinese industrial champions among their ranks.

The Solar Energy Industry Association (SEIA) is a prime example. SEIA's Board of Directors includes representatives from Chinese-owned or -invested entities as well as from those international players that are joint venture and customer partners of China's solar module and panel giants.⁶¹ SEIA represents the entire value chain of the solar sector. As such, its parochial interests logically adhere to the bottom lines of its members. That means that the institution is generally inclined to support access to the US market for Chinese

⁵⁷ See, for example, discussion of a MIIT designee as an "honorary chairman": "Association Profile," China Photovoltaic Industry Association, http://www.chinapv.org.cn/association_profile.html.

⁵⁸ See, for example, Caitlin Oprysko, "The anti-China pressure hits DC trade groups," Politico, June 18, 2024, <https://www.politico.com/news/2024/06/18/anti-china-congress-blacklist-dc-trade-groups-00163786>.

⁵⁹ Daniel Lippman and Caitlin Oprysko, "Lobbyists dump Chinese clients after blacklist threats," Politico, February 21, 2024, <https://www.politico.com/newsletters/politico-influence/2024/02/21/lobbyists-dump-chinese-clients-after-blacklist-threats-00142523>.

⁶⁰ Daniel Lippman and Brandon Bordelon, "Facing Hill pressure, tech group kicks out TikTok," Politico, May 9, 2024, <https://www.politico.com/news/2024/05/09/facing-hill-pressure-tech-group-kicks-out-tiktok-00157229>.

⁶¹ A current listing of the organization's Executive Committee and Board representatives can be found at: <https://www.seia.org/executive-committee-and-board-directors>.

supply lines and for the Chinese companies that count among its members. That access may well be understood to carry short-term commercial benefit for other downstream importer and developer business interests also represented by SEIA. But that logical preference obscures related impacts. Human rights organizations, for example, have highlighted how SEIA's influence has reportedly been leveraged to push back against the implementation of legislation like the Uyghur Forced Labor Prevention Act. One such criticism noted that:

In fact, following the passage of the UFLPA, the Solar Energy Industries Association (SEIA) CEO released a statement criticising the legislation for “hindering” the solar industry with “unnecessary supply bottlenecks and trade restrictions”, disre- garding the importance of building sustainable supply chains and reinforcing the silo between human rights and climate impacts.⁶²

That human rights-focused critique further stressed that SEIA's supply chain tracing protocol was deficient on several fronts, including with regard to any explicit recognition of the reality of Uyghur forced labor. SEIA's protocol, by this standard, may be imperiled by the “lack of specificity on Uyghur forced labour” to that point that it cannot “effectively shape good practice in the industry.”⁶³ Given the Chinese government's establishment of a “counter foreign sanctions” legal regime, it is valid to question where and how Chinese domiciled multinationals may have concerns about tools like supply chain traceability protocols and how those concerns may influence their localization tactics, including their interactions with foreign industry associations.⁶⁴

From Weak to Strong: How Government Guidance Propels Enterprise Development

Ultimately, the an industry association's impact is realized through its member units. Government guidance and industry coordination become dangerous when they translate into Chinese government investments and corporate strategy. Trina, one of China's solar champions, offers a case study of this process playing out: Of a Chinese company receiving support from the Chinese government, engaging closely with the Chinese Party State, and then using the edge that that support and those ties provide to make inroads in the United States.

Trina is actively investing in the United States right now. In Wilmer, Texas, the company claims to offer efficient production and jobs. Trina is investing approximately \$200 million in a 5-gigawatt assembly plant, located in a leased facility, that is projected to potentially net it \$350 million in taxpayer-funded 45X tax credits per year under the Inflation Reduction Act for assembling solar panels using foreign-origin components.⁶⁵

⁶² “Respecting Rights in Renewable Energy,” Anti-Slavery International, January 2024, <https://www.antislavery.org/wp-content/uploads/2024/01/ASI-HCIJ-IAHR-Investor-Guidance.pdf>.

⁶³ Ibid.

⁶⁴ “China's Anti-Foreign Sanctions Law: A warning to the world,” MERICS, June 24, 2021, <https://www.merics.org/en/comment/chinas-anti-foreign-sanctions-law-warning-world>.

⁶⁵ Bridget Reis, “Global Solar Energy Provider Trina Solar Leases Huge DFW Industrial Facility, Will Create 1,500 Jobs,” D Magazine, February 1, 2024, <https://www.dmagazine.com/commercial-real-estate/2024/02/global-solar-energy-provider-trina-solar-leases-huge-industrial-facility-south-of-dallas/>.

“When completed, the facility will provide 1,500 local jobs.”⁶⁶ In reality, what Trina is promising is a risk of dependence on Beijing and a business partnership with the Chinese government.

This risk is evident in Trina’s leadership’s ties to the Chinese government, the subsidies the company receives from the Chinese government, and the investments it has received from Chinese government-backed entities.

Gao Jifan, the Chairman and General Manager of Trina, is an Honorary Chairman at the CPIA. He is also a representative to the 14th National People’s Congress and to the Standing Committee of the Central Committee of the Democratic Construction Committee.⁶⁷ He is generally recognized by Chinese press and industry observers as a titan of the industry and is celebrated as a success of Chinese industrial policy. His story and that of Trina’s global rise is cited as an example of the process of moving from “small to large” and from “weak to strong.”⁶⁸

That process should be understood by external observers as one that requires coordination between companies; their leaders; intermediaries, like the CPIA; and the Chinese government itself. Such coordination grants Chinese actors a non-market edge internationally.

Gao demonstrates that clearly. He is described in PRC media as one of China’s original “light chasers” for having been involved in the industry’s 30-year trajectory. Press profiles of Gao note that he has seen each stage of China’s solar sector: the era of “catching up,” the phase of “running,” and, now, an era of “leading.”⁶⁹ That process hit a turning point in 2008 as China’s champions accelerated their “go out” amid global economic downturn. Gao himself has highlighted that moment, describing the boon it provided for PRC market share:

When the international financial crisis broke out in 2008, some customers in Europe had cash flow problems and wanted to install photovoltaics, but suffered from lack of funds. On the fifth day of the Chinese New Year that year, Gao Jifan led a team to visit Europe and spent a week visiting more than 30 customers in 7 countries. After understanding their actual situation, Gao Jifan decided to give customers a longer payment cycle and more flexible payment methods to help them get through difficult times.⁷⁰

The growth that followed as Trina moved into a world leading position is reflected in traditional business metrics, like patents and the 25 times that the company has “set an industry record for optoelectronic conversion and component output.”⁷¹

Trina’s growth is also reflected in the company’s links to prestigious research and development recognitions in China: For example, in 2021, Gao was awarded the “National Technology Invention Award” by the Chinese

⁶⁶ “Trina Solar US Bringing PV Manufacturing Facility and Jobs to Wilmer, Texas,” Trina Solar, September 11, 2023, <https://www.trinasolar.com/us/resources/newsroom/Trina-Solar-US-PV-Manufacturing-Facility-Jobs-Wilmer-Texas>.

⁶⁷ See Trina’s 2023 Annual Report.

⁶⁸ Ye Zi “The performance is eye-catching. China’s photovoltaic industry leads the world and benefits the world,” [表現亮眼 中國光伏產業領跑全球惠及世界] People’s Daily, April 10, 2024, <https://m.chinanews.com/wap/detail/cht/zw/ft10195730.shtml>.

⁶⁹ Ibid.

⁷⁰ Ibid.

⁷¹ Ibid.

State Council, which is the first national technological invention award in the field of photovoltaic technology in China.⁷² Other Trina affiliates have contributed to projects that have one national- and provincial-level prizes, including the second prize of scientific and technological progress of the All-China Federation of Industry and Commerce (in 2016), the second prize of science and technology in Jiangsu Province (in 2018), the first prize of scientific progress of the China Renewable Energy Society (in 2020), and the second prize of science and technology in Jiangsu Province (in 2020). Trina was recognized as a Single Champion enterprise in 2017.⁷³ This stretch of accomplishments has been hailed as Trina's claim to have "led the formulation of the first international standard for China's photovoltaic industry."⁷⁴

But Trina's coordination with the Chinese government and with Beijing's deliberate industrial policy is not limited to research and development support. Gao's ties directly to the government apparatus further underscore the depths of coordination that propel a company like Trina to the top ranks of Chinese State support.

Gao Jifan at the 14th National People's Congress



⁷² See Trina's 2023 Annual Report.

⁷³ For context on this industrial policy program's importance and links to the Ministry of Industry and Information Technology, see Karen Hao, "China Seeks Global Tech Edge With Focus on 'Little Giants' and 'Single Champions'" Wall Street Journal, March 16, 2023, <https://www.wsj.com/articles/china-cultivates-thousands-of-little-giants-in-aerospace-telecom-to-outdo-u-s-97ef9bdb>.

⁷⁴ "Gao Jifan appeared in the first "representative channel" of the National Two Sessions," March 7, 2024, https://mj.changzhou.gov.cn/html/czmj/2024/KOACPLJK_0307/6314.html.

Gao, who held a 16.2% stake in Trina at the end of 2023 and was its top shareholder,⁷⁵ has served as a member of the National Congress of the Democratic National Construction Association; as Vice Chairman of the Ninth Committee of the Jiangsu Democratic National Construction Association; and as vice chairman of the China Chamber of Commerce for Import and Export of Machinery and Electronic Products. He has personally been recognized with government awards including “excellent builder of the cause of socialism with Chinese characteristics in Jiangsu,” and “excellent proposal award of the 11th Chinese People’s Political Consultative Conference of Jiangsu Province.” Gao currently serves as a “deputy” to the 14th National People’s Congress where he contributed to discussions about “nationalism” and “common development.”⁷⁶

Gao Jifan Speaking on the First “Representative Channel” of the Second Session of the 14th National People’s Congress on March 7, 2024⁷⁷



⁷⁵ See the English language summary of the company’s 2023 annual report: <https://pages.trinasolar.com/rs/567-KJK-096/images/Trina%20Solar%202023%20Annual%20Report%20English%20Summary.pdf?version=0>.

⁷⁶ “Gao Jifan, a deputy to the National People’s Congress, set off for Beijing to go to the “Spring Grand Dance,” Trina Solar, March 3, 2024, <https://www.trinasolar.com/cn/resources/newsroom/sun-03032024-2052>.

⁷⁷ “Gao Jifan appeared in the first “representative channel” of the National Two Sessions,” March 7, 2024, https://mj.changzhou.gov.cn/html/czmj/2024/KOACPLJK_0307/6314.html.

Gao's story underscores the degree to which Trina is enmeshed in the PRC government apparatus and aligned with the strategic ambitions of Chinese industrial policy.

Gao Jifan at the 14th National People's Congress



Trina is heavily subsidized, allowing it to respond to the PRC's strategic ambitions rather than profit. That reality helps to explain firm-level flexes, like Gao's 2008 era relaxation of payment terms in interactions with European customers.

Trina's corporate records further validate the company's ties to the Party State. Trina Solar has also featured a number of State-backed and State-owned entities as investors over the past decade, including Dangtu Reliance Emerging Industry Fund and Shanghai Xingjing Investment Management Co., Ltd. Trina touts its role as a part of China's One Belt One Road (OBOR) international strategy and the importance of that alignment with industrial policy as a part of its "go out" strategy. For example, the company participated in the 2019 Belt and Road International Cooperation Summit Entrepreneur Conference and is described in PRC press as having "participated very early in the construction of new energy projects in countries along the Belt and Road." On Trina's website, the company directly advertises "leveraging One Belt One Road to open up international markets." Trina also works alongside other State-backed and -guided champions in China to integrate its new energy projects into the emerging information technology architecture. In 2017, for example, Trina established a New Energy Internet of Things Industry Innovation Center. To that end, Trina actively cooperated with Huawei, as well as other high profile PRC players.

Dating back to the company's transition from listing as a public company on the New York Stock Exchange (from 2006 to 2017) to privatizing and eventually re-listing in China, Chinese commentaries on Trina make clear that State-backing was a necessity in Trina's rise. Representative excerpts are highlighted below:

“Trina Solar: Half of the Profits are Tax Incentives and Government Subsidies, Big Customers are Suspicious,” IPO News, September 6, 2019.

- “After ten years of listing in the US, Trina Solar completion the privatization transaction in 2017 and officially delisted from the New York Stock Exchange. After a series of restructurings and adjustments, Trina Solar launched an application on the [Shanghai] Sci-tech Innovation Board in 2019. However, Trina Solar, which rushed the first steps, suspended its application for listing on the Sci-tech Innovation board on July 31, and has not resumed its review as of September 6.”
- “Trina solar, which returned from ‘study abroad,’ seems to have a ‘jet lag’ in performance, with ups and downs...half of the profit is tax incentives and government subsidies.”

“Trina Solar: Accounts receivable accounted for relatively high gross profit decreased year by year, government subsidies ranked first,” Public Security News, May 24, 2019.

- “The Shanghai Stock Exchange Website” disclosed on the evening of May 16 that Trina Solar Co., Ltd has been accepted for listing on the Sci-Tech Innovation Board, making it the 110th accepted company...In 2018, the company received 127 million RMB in government subsidies, ranking it the most subsidized in the 110 accepted companies.”
- “It is worth noting that the company’s gross profit margins in the past three years were 19.27 percent, 18.38 percent, and 15.92 percent, showing a downward trend year by year.”

But Trina has also seized on the localization playbook in its approach to the US market. Trina's effort to establish a 5-gigawatt assembly operation in a leased industrial facility in Wilmer, Texas, has been presented to US Congress in partnership with US-based lobbyists.⁷⁸ And it has been socialized via Trina's participation in US-based industry associations. Trina has a representative on the “Board At-Large” leadership team of the Solar Energy Industry Association in the US.⁷⁹ Trina's operations in Wilmer, Texas, are positioning to be covered as a Foreign Trade Zone (FTZ) under Texas and Federal regulation. That designation would carry immediate benefits, including “faster US Customs clearance, a reduction in Customs duties, reduced US Customs processing fees.”⁸⁰ Trina's operations were proposed for FTZ coverage by the Dallas/Fort Worth Airport FTZ, a

⁷⁸ See reference to “Issues involving manufacturing facility in Texas” cited in a 2024 lobbying disclosure: <https://lda.senate.gov/filings/public/filing/a6d8ae58-4da1-4ede-9753-1bcd6ddb27ba/print/>.

⁷⁹ “Executive Committee and Board of Directors,” SEIA, <https://www.seia.org/executive-committee-and-board-directors>.

⁸⁰ Kelly Pickerel, “More solar companies apply to work in Foreign Trade Zones,” Solar Power World, April 2, 2024, <https://www.solarpowerworldonline.com/2024/04/more-solar-companies-apply-to-work-in-foreign-trade-zones/>.

local authority with incentives to encourage short-term commercial activity. Trina’s FTZ status remains “not authorized” by the relevant Federal authority, the Commerce Department’s Foreign-Trade Zones Board.⁸¹ But the gambit stands as a clear signal that additional levers of the localization playbook are being activated by China’s solar giants in the US.

By Any Other Name

Those solar giants making rapid in-roads by localizing in the United States include more than just Trina.

Take for example another of Trina’s peers on the Board at SEIA in the United States⁸² that also holds a spot on the CPIA Vice Chairman roster in China. That company is known as Artes Sunshine Power Group Co., Ltd - the legal entity represented on the CPIA leadership chart. Artes is hardly a household name in the United States or in the global renewable energy ecosystem. But it is one of China’s oldest solar leaders and one of the earliest photovoltaic enterprises in the world.

In fact, Artes is often cited as a “leading manufacturer of photovoltaic modules and large-scale energy storage system products.” Internationally, the operations of Artes are better known as Canadian Solar, Inc. or CSI. The company’s ties to China are consistent from its founding over 20 years ago to today.

Qu Xiaohua (瞿晓铤 | Shawn Qu) is the founder and chairman of Artes. He graduated from Tsinghua University, located in Beijing, China, in 1986. He pursued graduate studies in Canada and worked early in his career in Canada and in France. A Wikipedia entry on Canadian Solar notes that Qu founded his company in 2001 in Guelph, Canada.⁸³ A variety of Chinese sources discussing Qu’s background, however, note that “in 2001, he returned to China to establish Artes Sunshine Power Group.”⁸⁴ Canadian Solar’s official founding timeline indicates that the company was initially formed in Ontario, Canada, in October 2001 and, subsequently, established a wholly owned subsidiary in China, CSI Solartronics (Changshu) Co., Ltd., in November 2001.⁸⁵ That potential confusion about the company’s founding locale aside, Canadian Solar’s initial public offering prospectus from 2006 offers an underlying clarification from the time: “We are incorporated in Canada and conduct all of our manufacturing operations in China.”⁸⁶ This decades-old nominal use of “Canadian” appears to be an early nod to the need to localize in the West.

Canadian Solar currently operates a web of subsidiaries in China including CSI Solartronics (Suzhou), CSI Solar Technologies, CSI Cells, Canadian Solar Manufacturing (Luoyang), CSI Solar, Canadian Solar Manufacturing

⁸¹ “Production Activity Not Authorized; Foreign-Trade Zone (FTZ) 39; Trina Solar US Manufacturing Module 1, LLC (Trina Solar); (Solar Panels); Wilmer, Texas,” July 8, 2024, <https://www.federalregister.gov/documents/2024/07/08/2024-14793/production-activity-not-authorized-foreign-trade-zone-ftz-39-trina-solar-us-manufacturing-module-1>.

⁸² “Executive Committee and Board of Directors,” SEIA, <https://www.seia.org/executive-committee-and-board-directors>.

⁸³ That entry is accessible here: https://en.wikipedia.org/wiki/Canadian_Solar.

⁸⁴ Those references appear to trace back to the line included in the entry for Qu on Baidu’s Baike encyclopedia page:

https://baike.baidu.com/item/瞿晓铤/8477985?fromModule=lemma_inlink.

⁸⁵ That sequence is provided in the “Corporate Structure” section of the company’s 2006 prospectus filed with the Securities and Exchange Commission of the United States: <https://www.sec.gov/Archives/edgar/data/1375877/000114554906001583/h00554b4e424b4.htm#115>.

⁸⁶ “Prospectus Summary,” <https://www.sec.gov/Archives/edgar/data/1375877/000114554906001583/h00554b4e424b4.htm#115>.

(Changshu), Suzhou Sanysolar Materials Technology, Changshu Tegu New Material Technology, CSI New Energy Development (Suzhou), CSI Solar Technologies (JiaXing) and Canadian Solar Photovoltaic Technology (Luoyang). Many of these companies are classified as High and New Technology Enterprises (HNTEs) by the Chinese government. HNTEs are eligible to receive preferential policy support that may include relaxed tax rates and other industrial policy benefits.

In SEC filings, Canadian Solar notes the risks and uncertainties associated with its operations in China including “uncertainties with respect to the Chinese legal system, as well as changes in any government policies, laws and regulations,” “actions by the Chinese government to exert more oversight and control over offerings that are conducted overseas,” and the risk that the Chinese government could “intervene or influence the operations” of its PRC subsidiaries at any time.⁸⁷

Today, in the United States, Canadian Solar is setting up shop outside Dallas, Texas, just some 20 miles from Trina’s facility. The company announced a \$250 million investment in a 5-gigawatt assembly plant, housed in a leased facility, that is expected to generate \$350 million in US taxpayer-funded tax credits per year under Section 45X of the Inflation Reduction Act.⁸⁸ Just like Trina, Texas officials have been cited by the company in celebrating Canadian Solar’s pursuit to localize in America. The company’s press release about the project outside Dallas cite US Senator Ted Cruz, Texas governor Greg Abbott, and Mesquite mayor Daniel Aleman, Jr.⁸⁹

"Canadian Solar's new \$250 million manufacturing plant in Mesquite will bolster Texas' status as the energy capital of the world and secure our leadership as a global tech hub," said **Governor Greg Abbott**. "I thank Canadian Solar for choosing Texas for their next U.S. business investment and for creating 1,500 new jobs in the region to help boost the community for generations to come."

United States Senator Ted Cruz expressed his enthusiasm for the project stating, "Texas is an energy production powerhouse, and we embrace an all-of-the-above energy strategy. It's great to see this incredible investment in Mesquite, which will create 1,500 good-paying jobs in Texas. This kind of investment in the Lone Star State is the reason people are flocking to our great state. I will continue to fight for Texas innovators and job creators in the U.S. Senate."

Mesquite Mayor Daniel Aleman, Jr. added, "We are very proud to have a company like Canadian Solar in Mesquite and appreciate their investment in our city. We look forward to a great partnership with them and the impact they will make on our community."

That support is notable for extending beyond the subnational level and capturing a supportive quote from a sitting US Senator. That Federal reach should come as no surprise given that Canadian Solar’s project announcement was also touted by the Treasury Department’s Deputy in a memorandum summarizing the Inflation Reduction Act’s success.⁹⁰ Canadian Solar’s efforts clearly include courting favorable attention in Washington, DC, including through the services of a former US Senator paid to lobby on the company’s behalf on “solar trade and policy issues.”⁹¹

⁸⁷ See the Annual Report filing for the year ending December 2023:

<https://www.sec.gov/Archives/edgar/data/1375877/000110465924052464/csiq-20231231x20f.htm>.

⁸⁸ “Texas Town Lassos Three Canadian Company Expansions in Clean Energy and Automotive Industries,” January 8, 2024, <https://mesquiteecodev.com/news/texas-town-lassos-three-canadian-company-expansions-in-clean-energy-and-automotive-industries>.

⁸⁹ “Canadian Solar Announces US Module Manufacturing Facility in Mesquite, Texas.” Canadian Solar, June 15, 2023, <https://investors.canadiansolar.com/news-releases/news-release-details/canadian-solar-announces-us-module-manufacturing-facility>.

⁹⁰ Deputy Secretary Wally Adeyemo, “Inflation Reduction Act – Year One,” US Treasury Department, August 16, 2023, <https://home.treasury.gov/system/files/136/8-16-23-Deputy-Secretary-of-the-Treasury-Inflation-Reduction-Act-One-Year-Anniversary-Interested-Parties-Memo.pdf>.

⁹¹ See a 2024 Q2 lobbying disclosure report: <https://lda.senate.gov/filings/public/filing/9cea1ad1-8405-4e50-9e98-3cc98879ed48/print/>.

And while being feted in Texas and DC, Canadian Solar’s Artes entity continues to be backed by the Chinese State. The company’s 2023 Annual Report notes over 150 million RMB in subsidies received from the Chinese government for 2023 after registering over 350 million RMB in 2022 and over 220 million RMB in 2021. Discussion of risk factors in that same annual report notes that Artes and its Chinese peers have established an “absolute leading position” that is at risk of being challenged by US policy:

As photovoltaic power generation is increasingly becoming an important part of the global renewable energy and even the overall energy supply system, Chinese photovoltaic enterprises have occupied an absolute leading position in terms of both business scale and technology accumulation. The United States, Europe and other countries and regions have introduced various trade barrier measures, hoping to curb the momentum of Chinese enterprises dominating the photovoltaic industry and promoting the development of photovoltaic manufacturing and technology research and development in the region.⁹²

Canadian Solar’s localization in the United States is a hedge against efforts to “curb the momentum” of China’s solar giants. For that hedge to be effective, it likely will draw on the support and influence of actors across the US political spectrum, including subnational leaders, and the coordinating role of industry associations in both China and the United States.

Conclusion

If the solar supply chain is any indication, the industrial policy competition between the United States and China is set to be over before it begins.

US policy needs a corrective. That must begin by defending effectively against foreign entities of concern and the non-market support that allows them to localize in the United States and to flood the US market with overcapacity.

That defense is a necessary but insufficient means for competing with China.⁹³ The opportunity of the moment is unprecedented: America has a chance to restore its manufacturing base while securing a generational bid for energy independence. Such an effort requires an approach that is right-sized, updated for the adversarial environment, and based on a proactive vision for industrial victory.

⁹² Annual Report 2023, Artes Sunshine Power Group, April 27, 2024.

⁹³ Emily de la Bruyère and Nathan Picarsic, “A new war fought with old arms: The limits of economic statecraft,” Hinrich Foundation, May 21, 2024, <https://www.hinrichfoundation.com/research/wp/trade-and-geopolitics/the-limits-of-economic-statecraft/>.

Several policy recommendations flow naturally from this framing and the risk that China poses in the current moment:

- Foreign entity of concern prohibitions associated with US federal spending and tax incentive programs need to be updated for the reality of China's approach: FEOCs should be defined in a way that captures the scope of China's industrial policy (e.g., by leveraging indicators defined in the 1260H entity listing process defined in the 2019 National Defense Authorization Act) and enforced in a way that moves beyond place-based targeting.
- Scrutiny of foreign investments needs to account for the risk posed by investment schemes that allow Chinese-backed players and Chinese-dominated upstream supply lines proximity to critical technology, infrastructure, and data in the United States. Covered transaction thresholds, non-notified review processes, and CFIUS scope should be updated to account for the foundational technology role that clean technologies play in today's US-China grand strategic competition.
- Federal procurement funds should proactively be guided by domestic content requirements that guarantee that the downstream value of the US development and energy markets serve as reliable demand signals and revenue generators for products built in America in a way that benefit American workers and communities. US federal authorities should generate and share detailed information on foreign ownership, investment, and supply chain ties with private and subnational investors into and buyers of renewable energy.
- US research and development, human capital, and broader regulatory and permitting policies and investments should be positioned to support the long-run innovative capacity of America's solar sector.