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"China's Climate Change Strategy and U.S.-China Competition"

A Testimony by:

Nikos Tsafos

James R. Schlesinger Chair for Energy and Geopolitics

Energy Security and Climate Change Program

Center for Strategic and International Studies (CSIS)

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Vice Chairwoman Glas, Commissioner Friedberg, and distinguished members of the US-China Economic and Security Review Commission, I am grateful for the opportunity to appear before you today to testify about China's climate change strategy and its impacts on U.S.-China competition.

China sees the energy transition as an opportunity to lead in technologies and products not currently dominated by the West. In pursuing this ambition, China will rewire the energy system: it is already drawing commodities like oil, natural gas and coal; and it totally dominates the markets for the critical minerals that will enable the energy transition. These developments present two interlinked challenges for U.S.-China relations.

First, it is an industrial challenge. China already dominates the global supply chain for solar photovoltaics, is a major player in lithium-ion batteries, and has a strong, but lesser position, in wind manufacturing. As the energy transition unfolds, this list will grow. Western economies will depend on China for key products, with all the complications that such dependencies entail. Other countries will also turn to China for solutions to meet their energy needs in a low-carbon world. China will secure jobs, exports and be a source of international investment. China is well positioned to be the central node in the multi-trillion-dollar green economy.

Second, it is a commodity challenge. As the world's largest energy consumer, China is both subject to market forces and a shaper of those forces. A slowdown or an acceleration in Chinese demand could mean the difference between crashing and booming prices in markets like oil or liquefied natural gas (LNG). But these commodity markets are still governed by Western structures—China plays by the rules set by others. Over time, this will change as demand for hydrocarbons decreases and demand for critical minerals increases. The market for critical minerals, in particular, is far less developed. China can shape it—and in doing so, secure a foundation for its industrial ambitions as well as spark conflict, spread corruption, and cause immense environmental harm.

The Industrial Challenge

The energy transition is an industrial transition—one led by Chinese firms. China shipped two-thirds of global solar photovoltaic (PV) shipments in 2020, and its true market share is higher given the presence of Chinese firms in Southeast Asia.[1] Chinese firms are among the top manufacturers of wind turbines, although Western firms continue to lead.[2] And China leads the mid and downstream value chains for batteries, with market shares that near 80 percent.[3]

This leadership is, in part, a product of long-standing features of Chinese industrial policy. But it is also tied to deployment. In 2010, the United States was a bigger market than China for solar, wind and electric vehicles. By 2020, China had 3.4x more installed capacity in solar and 2.4x in wind.[4] In electric vehicles, China's registrations in 2021 were 3.4 million compared to 0.7 million in the United States.[5] China's rapidly growing market for low-carbon energies is a centerpiece of its industrial strategy for manufacturing.

China's position presents several challenges for the United States. For one, it ties U.S. energy priorities to Chinese industrial practices and location-specific shocks. In 2020, floods and an

explosion at a Chinese plant cut polysilicon production for months, raising prices sharply.[6] In 2021, it became clear that the solar PV value chain almost certainly included products made by forced labor in Xinjiang. This presented a peculiar problem for the United States.

China's central role in the solar value chain limited the options available to U.S. policymakers to deal with human rights abuses. The United States could not independently verify which products included forced labor given that Chinese firms controlled the first steps in the supply chain. And China's market size meant that China could reshuffle shipments, choosing what to send to the United States, while continuing its practices in Xinjiang.[7] This was a not a good position for the United States.

The most important challenge, however, is industrial. The energy transition presents a massive economic opportunity. The market for low-carbon goods is impossible to quantify precisely, but spending on low-carbon goods already tops $500 billion—with most money going to renewable energy generation and electric vehicles.[8] As the energy transition accelerates, this number will increase substantially. The market for electric vehicles and charging infrastructure, for instance, could reach $7 trillion by 2035 according to a forecast by BloombergNEF's.[9] Similar growth rates are expected in other markets.

Who will capture these markets? This is a high-stakes question. So much of U.S. industrial strength has been built on technologies related to the energy—from oil and natural gas, to electricity, automobiles and aerospace. What happens if future technologies are invented or matured in China? What are the implications for U.S. prosperity? Can the United States maintain its technological and military edge if it lags in the technologies that power the world? It's a hard question to answer, but one that should be asked more often.

The Commodity Challenge

In 2009, China became the world's largest energy consumer, a position that gives it influence in markets like oil and natural gas. From 2005 to 2019, excluding the impact of Covid-19, China accounted for 45 percent of the global growth in oil demand, and 23 percent of the global growth in gas demand.[10] Suppliers want to sell into the Chinese market, and China's choices can shape the demand for commodities. But the markets for these products are well-established. China must integrate itself and play along. That limits China's influence.

Consider the market for LNG. China started to import LNG in 2006. By 2021, it became the world's largest LNG importer, surpassing Japan, having accounted for 47 percent of the growth in LNG demand from 2015 to 2021.[11] But China's thirst for LNG has also limited its options. For years, Chinese companies avoided any purchase agreements with U.S. LNG projects, having finalized only one contract before 2021. In the last quarter of 2021, however, that restraint was eased. Chinese firms signed several contracts to buy U.S. LNG. The reason was simple: China needed LNG and the United States was one place it could find it.[12]

China's reliance on Australian LNG has been similarly difficult to shed. When China put economic pressure on Australia following the latter's demand for an investigation into the origins of Covid-19, it seemed like LNG from Australia might be hit too.[13] But Australia is the world's biggest LNG

supplier, and avoiding Australian LNG was not an option for China. In fact, China's imports from Australia grew in 2021. The United States and Australia together supplied almost half of China's LNG in 2021.[14]

The limits of China's influence can be seen in other ways. For years, China has sought to develop a domestic pricing benchmark for natural gas (and for oil too). By providing a price that reflects Chinese market fundamentals, China has aspired to import fuels with reference to that price, rather than international benchmarks. That effort began in the mid 2010s, and so far, it has produced limited results.[15] In Asia, the reference price remains the Japan-Korea Marker. Nor has China succeeded in replacingoil indexation, the standard mechanism for pricing natural gas. As a result, China is just as exposed to international prices as anyone else.[16]

In established markets, China has followed in the footsteps of Western firms. It signs the same contracts as those firms, with the same provisions, governed by the same laws, financed by the same banks, and priced in the same way.[17] From time to time, when an opportunity arises, China might do a deal that Western firms do not. But it still operates in a market designed and operated by Western institutions.

All this will change over time, and this will be especially true in critical minerals.[18] Demand for minerals like as copper, cobalt, graphite, lithium, manganese, nickel, and rare earth elements is expected to grow rapidly as the world reduces its greenhouse gas emissions, driven by the need for batteries and electricity networks.[19] These markets are still nascent. The market size for lithium, cobalt, rare earth elements and palladium is less than $10 billion (each).[20] By 2050, under one scenario, demand for manganese might increase by a factor of 22, for cobalt, nickel and graphite by a factor of around 30, and for lithium even more than that.[21]

China is already the driving force in the market for critical minerals. For some minerals, China is a major producer (rare earth elements, lithium, and copper).[22] But its influence comes chiefly from its position in processing. China turns commodities into products. China has a dominant market share in the processing of rare earths (over 80 percent), and a nearly dominant position in cobalt and lithium (circa 60 percent). Even in more diversified markets, like copper and nickel, China's processing share ranges around one-third.[23] These minerals are the foundation for the green industrial economy discussed below. But China's position presents other challenges too.

Mining can lead to conflict. There are hundreds of stories about cobalt in the Democratic Republic of the Congo.[24] Friction between mining companies and local stakeholders is felt in Chile, Portugal and the United States.[25] A permit for a lithium mine in Serbia was recently canceled in response to public protests.[26] Chile wants to rethink the basic governance structure for mining. Peru is seeking to raise taxes.[27] Indonesia wants investment in domestic processing and has often turned to export bans on raw nickel exports to force companies to invest (a call that Chinese firms have heeded by investing billions in the country).[28]

If China is the dominant investor and market for these commodities, how will these conflicts be managed? Will China pay the same attention to environmental, social and governance standards as Western firms do? Will local communities will be consulted and invited to partake in the benefits of mining? Will there be a similar commitment to transparency and to fighting corruption?

Will the revenues benefit local populations or end up in offshore bank accounts? What levers will the West have to manage these conflicts if all the transactions go through China or only involve Chinese players?

By 2050, one scenario by the International Energy Agency shows that the international trade in critical minerals could exceed, in the value, the trade in oil and gas.[29] In a low-carbon world, the "geopolitics of energy" will mean the geopolitics of critical minerals. Except, on current trends, this will be a world dominated and governed by China. How to prevent this from happening is a strategic challenge of the first order for the United States and its allies.

Recommendations

The United States has lost ground in the energy transition. But the transition itself is a multi-decade process. Existing markets will expand multifold and new markets await to be created. It is not too late for the United States to catch up. In a 2021 report on supply chain security, the Energy Security and Climate Change Program at the Center for Strategic and International Studies crystallized its recommendations around three themes: reshore, reroute, and rebalance.[30]

Reshore. There is great policy interest in reshoring. That makes sense—after decades of offshoring, attracting capital back into the United States is sorely needed. But reshoring can also be taken too far, a futile quest to subsidize industries where the United States is not competitive and never can be. Smart reshoring begins from understanding the industrial strengths of the country and mapping the linkages between established industries and those industries that will be needed in the energy transition. Reshoring requires a strong market pull, enabled by policy; and it requires a holistic supply push, from research and development, to demonstration, to tax and other policy that supports production and, crucially, to trade practices that support domestic companies and jobs. This is the kind of industrial policy that the United States has avoided for years. It is needed now.

Reroute. Not every factory must be built in the United States. In certain cases, like critical minerals, the ability to reshore is limited by geology. In others, lower labor costs and proximity to markets might make reshoring to the United States impractical. But this does not mean that the United States can do nothing. It can invest in allies and partners, helping them build their supply chains or mining industries. In 2020, the U.S. International Development Finance Corporation (DFC) invested in Techmet, a company with plans to produce nickel and cobalt in Brazil.[31] A year later, the DFC support First Solar's effort to build manufacturing capacity in India.[32] These are examples where public money can support diversification of supply chains. More such deals can support U.S. companies overseas and deliver economic security for the United States.

Rebalance. It is impossible to only trade with and depend on allies and partners. The United States, Europe and Japan have a long experience dealing with energy insecurity. The lessons they have learned in the process can be useful for the low carbon era. Countries have used domestic institutions to shape the behavior of suppliers (chiefly anti-trust policy). They have sought to create interdependencies that can act as ballast in case of a conflict. They have built institutions to promote transparency and strengthen governance. They have established buffers and other

strategic stocks for critical commodities. And they have used deterrence for threats that cannot be managed otherwise. This toolkit has relevance for confronting China during the energy transition.

In pursuing these strategies, the United States could benefit from two additional initiatives: a step-up in analytics; and a clearer focus on interdependencies.

Analytics. Over the past 50 years, advanced economies have built an extraordinary open-source infrastructure to monitor energy markets in order to manage the risks therein. Institutions like the International Energy Agency and the U.S. Energy Information Administration provide a foundation for robust public discourse in energy markets and related security matters. That infrastructure is nascent when it comes to low-carbon energies and critical minerals.

The U.S. Geological Survey, for example, provides excellent information on critical minerals, but the information could be much deeper and updated more frequently. Information on supply chains for clean energy exist in various publications by the National Labs and by the U.S. Department of Energy. But it is still scattered and not systematized (the periodic surveys by the National Renewable Energy Laboratory on the Solar Industry are a bright exception).

Managing the risks of the energy transition will require the creation of new mental models and maps. It will require policymakers to understand where supply chains and critical minerals exist and where they are being developed. At this point, that information is scattered around multiple locations and often relies on private information providers. The United States can provide an immense public service by stepping up its investment in open-source information related to the energy transition.

Interdependencies. China has a commanding position in the supply chains for clean energy. But it is also a major economy, and so it is impossible to imagine China not playing a role in supply chains. The United States needs to be find a balance and discover how much dependence on China it can live with. Right now, the United States is a major energy provider to China. That gives the United States some leverage—losing these flows would hurt China a lot.

It is possible to imagine the United States and China finding an acceptable level of interdependence in the energy system to mitigate the risks that each sees in depending on the other. Complete decoupling is not an option. It is also not desirable. And as the solar industry shows, having limited touchpoints along the supply chain can present massive risks for the United States. There must be some middle point between complete decoupling and unfettered cross-border investment. This is a prime area for serious thought leadership over the next few years.

Notes

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