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Report

The US should treat climate policy as economic policy

Jonas Nahm and Johannes Urpelainen Tuesday, April 12, 2022

Editor's Note:

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The United States and China jointly account for more than 40 percent of global greenhouse gas emissions, putting these two nations at the center of efforts to address the climate crisis. Yet cooperation on climate policy between Washington and Beijing has stalled in recent years, reflecting a broader deterioration in the U.S.-China relationship. After decades of increasing dependence on imports from China, the pandemic highlighted the vulnerability of global supply chains to external shocks and strengthened calls for national self-sufficiency both in China and the United States.

The stakes and opportunities of such a move are nowhere higher than in clean energy sectors, where China currently dominates global manufacturing. China makes roughly two-thirds of the world's solar panels, nearly half of global wind turbines, and three quarters of lithium-ion batteries needed for electric vehicles and on-grid energy storage. To date, the U.S. federal government has not done enough to improve the competitive position of domestic clean energy sectors, which could provide an alternative to the current reliance on China. In the absence of policies to support these industries domestically, tariffs—the main U.S. government response to China's rise—have made clean energy technologies more expensive but have not drastically improved the competitive position of American firms.

Other economies have taken a different approach. Partly in response to China's dominance in clean technology industries, European policymaking now treats climate change as an economic imperative, as governments seek to expand shares for domestic firms in growing global clean energy technologies markets and hope to meet a growing share of domestic

demand with home-grown technologies. From offshore wind turbines to hydrogen and battery technologies, Europe has combined economic and climate objectives in strategic initiatives to support the growth of domestic clean energy industries. For instance, the EU established the European Battery Alliance to reduce dependence on China for the highest value components in electric vehicle manufacturing. Its goal is to position domestic firms along the entire battery supply chain for economic and security reasons, with the alliance taking on a coordinating function to bring the required industrial actors together. The EU's push to self-sufficiency in the use of clean energy technologies has taken on new urgency since Russia's invasion of Ukraine, as the continent seeks to reduce its dependence on imports of Russian fossil fuels.

The United States needs to treat climate policy as economic policy or risk falling behind other economies that have made clean energy industries a domestic priority. Not just since the beginning of the Ukraine crisis, the Biden administration has looked for ways to boost the domestic production of clean energy technologies. Yet the use of tools such as the Defense Production Act alone won't be sufficient to secure the domestic production of clean energy technologies that are needed more than ever for energy security and to protect the United States from a volatile global price environment. To strengthen the competitive position of domestic clean energy sectors, the United States should (i) improve financing for domestic clean technology industries through the creation of a national lending institution, (ii) create a stable domestic market environment for low-carbon technologies to reduce investment uncertainty, and (iii) renew investments in vocational training to create a workforce ready to tackle the clean energy challenge. Without a clear strategy to support the growth of domestic clean energy sectors, calls for greater economic separation from China will likely jeopardize climate goals while ceding economic gains to nations with more comprehensive green growth strategies.

Why Climate Policy is Economic Policy

Historically, governments have often prioritized economic growth over climate policy, particularly during periods of economic hardship. Yet the view that emissions reductions and good economic policy are irreconcilable is increasingly outdated. In 2021, global markets for renewable energy and electric vehicles soared to USD $366 and USD $273

billion, respectively; global investment in the clean transition topped USD $755 billion. Global clean energy markets are now roughly equivalent to the GDP of Switzerland and roughly three times the size they were ten years ago.

In light of rapidly growing markets for clean energy technologies, policymakers around the world have begun to promise new jobs, industries, and sources of prosperity in the transition to a zero-carbon economy. In addition to creating service-sector jobs in the installation and maintenance of clean energy technologies and infrastructure for the electrification of the transportation sector, policymakers have argued that climate policy will lead firms to invest in technological innovation and ultimately co-locate manufacturing to commercialize and produce clean energy technologies domestically. Among policy options to address climate change, those that pursued the dual objective of achieving emissions reductions while creating new sources of economic growth have been easier to implement politically. Such economic benefits have also helped justify growing public investments in the clean energy transition.

Yet economic co-benefits from climate policy have not been achieved everywhere. Although governments worldwide have connected climate policymaking to the broader premise of "green growth," not all economies have successfully built large industrial sectors in support of decarbonization. One reason green sources of economic growth have proven elusive has been the political opposition of industries invested in fossil fuels. Clean energy sectors—wind, solar, storage, and electric vehicles, among others—continue to compete with an existing fossil fuel-based energy system. Utility companies, car manufacturers, and traditional energy providers have mounted political opposition to the clean energy transition. In many cases, such opposition has undermined policies to create markets for clean energy technologies and prevented state support for firms seeking to develop zero-carbon alternatives. This is true even if in many parts of the world new energy technologies are now cheaper than those they are seeking to replace.

Other governments have begun to strategically position their domestic economies to benefit from rapidly growing investment in clean energy. Nowhere is this more the case than in China, which has rapidly established itself as the dominant manufacturer in industries central to addressing greenhouse gas emissions. Over the past two decades,

China has increased its share of global solar photovoltaic production from less than 1 percent to over 60 percent of the world's solar panels. For 15 of the past 17 years, China has added more production capacity for crystalline solar cells than any other country in the world. China is also one of the world's largest producers of and market for electric vehicles. It now commands roughly 75 percent of global production capacity for non-consumer batteries, which are the highest value component in electric vehicles and critical for on-grid electricity storage. China dominates most individual steps in the supply chain, including in the mining and production of Nickel, Cobalt, and Lithium, in the manufacturing of cathodes and anodes, and lithium-ion cell manufacturing. In 2020, China accounted for 58 percent of global production capacity for wind turbine nacelles, primarily for its large and growing domestic market. In addition to producing components for domestic turbine assembly, China produces gearboxes and generators that are used by turbine manufacturers around the world.

China's dominance in the production of low-carbon energy technologies has national security implications in the United States and elsewhere. Without investments in alternative supply chains from raw materials to final assembly, meeting global climate goals could mean trading dependence on Russian fossil fuels for reliance on China for electric vehicle batteries and renewable energy products. As the Ukraine crisis has demonstrated, such interdependencies are easily weaponized.

China's rise to dominance in clean energy industries was not accidental, but the result of strategic and aggressive government support for R&D and manufacturing. No other economy has devoted a similar level of resources to the expansion of production capacity and manufacturing R&D in clean energy sectors central to reducing greenhouse gas emissions.

This has especially been the case since 2006, when the central government began encouraging "indigenous innovation" to reduce dependence on foreign technologies through increased domestic R&D efforts. Efforts further accelerated under President Xi's Made in China 2025 initiative, which designated the development of domestic low-carbon emitting technology sectors as a strategic national priority. China's provincial and municipal governments, meanwhile, brokered bank loans and provided land, facilities, and

tax incentives to manufacturers in wind, solar, and battery industries. It is estimated that between 2010 and 2012 alone, wind and solar firms received credit lines of USD $47 billion by Chinese banks; the China Development Bank, one of three state-owned policy banks, reportedly extended USD $29 billion in credit to the 15 largest wind and solar firms.

In part in response to China's rise in clean energy industries, the European Union has increasingly treated climate policy as economic policy. The EU's "Fit for 55" proposal seeks to marry climate and economic goals by investing in low-carbon industries that guarantee jobs and prosperity as Europe pushes emissions reductions. Such goals are also noticeable in Europe's transportation sector, where the EU has proposed reducing new vehicles' average emissions by 55 percent in 2030 and 100 percent in 2035. This amounts to an outright ban of internal combustion engine vehicles by 2035, expanding on policies that have already passed in individual member states including France.

The EU proposals send a strong signal to European firms that they need to participate in the transition away from fossil fuels or be left behind in a global industrial policy competition with China. In combination with promises to expand renewable energy capacity and charging infrastructure, increase taxes on conventional fuels, and develop low-carbon sources of hydrogen, these policies for clean energy industries build on ongoing efforts to close key gaps in industrial supply chains. As mentioned above, the EU has already funded a European Battery Alliance to establish a competitive European battery industry that would reduce Europe's dependence on China.

All this fits with a broader shift to push back globalization and create domestic sources of growth, particularly in strategic clean energy sectors with rapidly growing global markets and domestic security implications. More than forty percent of Europe's pandemic stimulus package is dedicated to projects that further both economic competitiveness and address greenhouse gas emissions through support for green industries. The pace and level of support of the creation of domestic low-carbon industries has only accelerated since Russia's invasion of Ukraine.

The problem with U.S. policies for low-carbon industries

As China began to dominate global supply chains for clean energy technologies, the U.S. responded with a series of trade barriers against Chinese imports. Initially targeting Chinese wind turbine towers, tariffs were expanded to Chinese solar panels under the Obama administration. Tariffs were renewed in 2018 under the Trump administration, again targeting Chinese solar cells despite vocal opposition from the domestic solar industry which feared the impact of rising prices in the large U.S. solar installation and maintenance industry.

Despite these trade barriers, manufacturing did not "come back" to the United States as both Democratic and Republican administrations had argued. Tariffs instead led to relocation of production capacity to other Asian economies, including to Vietnam and Malaysia, but they did not forge a reorganization of the solar industry in the United States or promote the expansion of domestic manufacturing capacity. China continues to account for roughly two-thirds of global production capacity in the solar sector, and most U.S. panels are imported.

More recently, the Biden administration launched a broad investigation into gaps in domestic supply chains from both economic and security perspectives in the context of China's dominance in key industrial sectors. But the administration has thus far continued to primarily rely on tariffs implemented under previous administrations as its main tool to improve the competitiveness of domestic firms. The Strategic Competition Act, which seeks authorization to assist U.S. companies with supply chain diversification away from China, proposes new investments in domestic infrastructure to compete with China and emphasizes the need to build alliances to counteract China's growing international influence. The bill remains stalled in Congress. The Infrastructure and Investment Jobs Act, which passed in November 2021 with bipartisan support, includes investments in the domestic grid and electric vehicle (EV)-related infrastructure, but does not directly address the competitiveness of domestic clean energy technology firms. Proposals such as the use of the Defense Production Act to accelerate domestic mining could increase the availability of raw materials needed for low-carbon technologies but do little to address

underlying structural problems of U.S. clean tech manufacturing. Meanwhile, the March 2022 launch of an investigation into possible tariff evasion by Chinese companies—and the prospect of new tariffs on Asian solar panels—has prompted protest by the U.S. solar industry which fears higher prices.

What the United States can do to build a clean energy manufacturing industry

The United States is uniquely equipped to lead the development of new energy technologies needed to meet global climate goals. However, China is on course to overtake the U.S. in R&D spending unless domestic efforts are accelerated. The U.S. has historically been the largest investor in clean energy R&D and continues to lead research and development for many key low-carbon technologies. U.S. companies remain at the forefront of developing next-generation technologies that could make decarbonization cheaper and more efficient, including next-generation solar technologies, advanced battery chemistries, new building materials, smart grid technologies, and software to manage complex energy systems.

Eventually, new technologies have to be commercialized and manufactured at scale, and currently little support exists for such activities domestically. U.S. startups, unable to fund or find domestic manufacturing capabilities, often work with foreign partners or are bought by multinational firms. Tariffs against Chinese imports or finger-pointing at China's industrial policies have done little to change the global division of labor in favor of domestic clean energy industries.

A three-pronged policy approach to support domestic clean energy industries as part of a national strategy for technological innovation could help America combine economic and climate objectives.

1. A national lending institution to help fund manufacturing

First, a government-established lending institution should finance clean energy firms that the U.S. financial system has been unwilling to fund. A key reason for the lack of domestic clean tech manufacturing in particular has been the scarcity of capital among clean

technology firms. Clean energy startups have struggled to raise sufficient funds to invest in domestic manufacturing capacity, as American financial institutions have prioritized industrial sectors—including software—that have historically yielded higher and faster returns. Proposals to establish a national climate bank have not included support for the clean technology industries needed to achieve climate goals.

A government-owned lending institution tasked with providing capital to manufacturing businesses in critical industries such as clean energy would address a financing problem that the private sector has been unable to solve. Although the United States has historically led in the development of new technologies as a result of large injections of public and private capital, long investment horizons, large upfront investment costs, and technological risks associated with the commercialization of new technologies have prevented private investors from supporting domestic manufacturing. This is particularly the case for technologies central to reducing greenhouse gas emissions, including renewable energy, batteries, and high-voltage transmission.

A national lending institution would not crowd out the private sector since private financial institutions have historically avoided lending to clean energy manufacturing firms. After a one-time capitalization through the U.S. government, a politically-independent, non-partisan, and not-for-profit lending institution would be self-sustaining, generating enough revenue to maintain and even grow its capital base. It would focus on supporting domestic supply chains in critical industries and promoting the commercialization of U.S.-developed technologies, and it would prioritize the capital needs of manufacturers in traditionally underfunded industrial sectors such as clean energy.

The creation of such an institution—modelled on U.S. intervention in home financing through the establishment of Fannie Mae and Freddie Mac or the government-owned EXIM Bank—would put clean energy manufacturing firms in the United States on equal footing with firms in other parts of the world, where such financing corporations already exist. China's state-owned development banks have already demonstrated that large loans for manufacturing business were central to China's rise in clean energy industries. Germany's KfW bank, one of the largest in the country, is another example of a

government-owned financial institution tasked with addressing the capital needs of underfunded sectors of the economy. Perhaps somewhat ironically, KfW's initial capitalization, in 1949, was made with U.S. funds dispensed through the Marshall Plan.

2. Stable support for low-carbon technology markets

Historically, the share of domestically manufactured parts and components in clean energy technologies deployed in the United States have been lower than in other economies, including those in Europe with similar or higher cost of labor. A key obstacle to investments in domestic production has been the unstable regulatory environment and frequent changes or expirations of government incentives. Examples include the federal production and investment tax credits for wind and solar installations, which, although critically important for the financial viability of such projects particularly in early years of the industry, were often allowed to expire or renewed at the last minute. Such uncertainty deterred manufacturers (and their investors), which faced significant investments to build or retool domestic plants for the production of clean energy technologies with uncertain future markets. The lack of industrial coalitions in support of long-term climate policy in turn further undermined the establishment of a regulatory and market environment that would attract such firms in the first place, leaving U.S. climate policy exposed to political pressure from the fossil fuel lobby.

Long-term federal support for low-carbon technology markets, including through government procurement, caps on future auto emissions, and federal incentives for clean energy targets at the state level, could make it easier for firms to finance investments in U.S. production. The Biden administration has already announced federal procurement goals for electric vehicles, which prompted a number of manufacturers to explore the establishment of U.S. production facilities for EV batteries. But other measures would help. For instance, a number of key industrial economies with large domestic auto industries announced future bans of the internal combustion engine, both prompting their automakers to invest in electric vehicle technologies and ensuring them that domestic markets would reward such investments. The United States has not announced such plans at the federal level. Federal procurement goals for renewable energy, energy efficiency, and public support for clean hydrogen and other next-generation technologies would provide

additional motivation for the private sector to invest in the U.S. market. Long-term procurement contracts could provide some insulation against the political volatility that often comes with changes in presidential administrations. Russia's invasion of Ukraine and the repercussions for global energy markets may have opened new avenues for bipartisan support of domestic low-carbon industries, particularly if public investments are spread across both Republican and Democratic states.

3. Renewed federal investment in vocational training

Third, federal investments in vocational training programs are needed to meet the workforce needs of a growing clean energy manufacturing industry. Historically, large manufacturing corporations in the United States conducted much vocational training internally, with spillover effects for the economy as a whole. They also supported vocational schools in their communities to actively train a labor pool from which they could recruit. Long job tenures provided incentives for firms to invest in such training. Yet changes in the composition of the U.S. manufacturing sector has in many places ended such investments. At the same time, shortening of job tenures now means that firms worry that workers will undergo expensive training only to be poached by other firms. Vocational schools have closed in many parts of the country, as a declining community of local manufacturing businesses has reduced the demand for graduates and public funds have been cut.

The federal government should renew its investments in vocational training programs to train and retrain workers to meet the demand of clean energy industries. Federal grants could support vocational schools and community colleges in establishing dedicated clean energy manufacturing curricula in partnership with industrial partners. Federal support is also critical to overcome collective action problems in the establishment of a paid apprenticeship system, as companies are reluctant to invest in such training on their own for fear that their trainees will eventually be recruited by other firms. The federal government should complement and support state-level initiatives, which often have better information about local conditions, including demand from local businesses and strengths and weaknesses of existing training institutions. But, as the European approach to building a battery industry has demonstrated, training needs for entire new industrial

sectors are often greater than the capacity of individual states. The federal government is uniquely equipped to work with the private sector to establish training needs, coordinate such efforts along the entire supply chain, take advantage of network effects in education, and pool resources, particularly in areas with a weak fiscal base.

Such public support for vocational training and retraining is especially important in places that currently depend heavily on fossil fuel industries. Coordination with the private sector is critical to ensure that training meets the needs of clean energy manufacturers. The European Battery Alliance could serve as an example; a key objective of it has been to establish future workforce education needs through public-private collaboration. In the United States, many states have set up "Just Transition" programs with the goal of diversifying the economy, but their coverage is uneven, and they do not always specifically target workforce development for the clean energy industry. Historically, the United States has been outspent by other economies on government resources devoted to training and retraining initiatives, often preventing workers from transitioning to new industrial sectors.

Conclusion

The United States has traditionally been the largest investor in clean energy research and development and continues to lead in many areas critical for decarbonization. Yet the United States risks losing its leadership position as other economies, including China and the European Union, have made low-carbon industries a priority. To change this, the United States needs to treat climate policy as economic policy and begin improving conditions for segments of low-carbon energy supply chains that are currently not well-supported domestically. This also means investing in domestic manufacturing capabilities as part of a national strategy for technological innovation. Even then, it is unlikely that entire value chains for complex energy technologies would lie entirely within national borders. The United States should therefore not lose sight of the substantial domestic economic benefits from investments in decarbonization, even if a share of these low-carbon energy technologies is, for now, manufactured abroad.