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Climate Is the Future of the U.S.-India Trade Relationship

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Introduction and summary

This report is a collaboration between the Center for American Progress and the Council on Energy, Environment, and Water.

The existential threat of climate change has prompted governments around the world to deploy a broad suite of policy tools to reorient their economies toward zero- and low-carbon manufacturing, electricity generation, transportation, and agriculture. These efforts—in conjunction with growing confidence in the cost competitiveness of clean technologies—have both created new demand for goods and services essential to a green transition and kick-started a global race to capture the gains from projected growth in sustainable industries. One consequence of this shift has been fresh thinking about how trade policy can support “green trade”: the pivot to a decarbonized economy by lowering barriers to procuring inputs into renewable energy and clean technology supply chains; strengthening the competitiveness of low-carbon goods in trade-exposed industries; and harmonizing regulatory systems to create common markets for recyclable materials, sustainable fuels, and other climate-friendly products.

The United States and India, although facing different pathways to net zero, both seek to transform their decarbonization ambitions into engines of economic growth and energy security. In conjunction with these plans, both countries have begun recalibrating their trade policies and establishing new trade relationships with partners to build resilient supply chains, support domestic clean energy industries, hedge against economic coercion and disruption, and generate export opportunities. Given these overlapping approaches; the large size and emissions profile of both economies; and the broader deepening of U.S.-India ties over the past decade through such mechanisms as the Quadrilateral Security Dialogue¹ (Quad), there is a compelling climate and geopolitical logic to collaboration between Washington and New Delhi around green trade.

Despite the United States being one of India's largest trading partners, trade has historically been an irritant in U.S.-India relations rather than a constructive area of cooperation. That is changing as Prime Minister Narendra Modi's administration has made trade diplomacy a core element of its economic strategy in order to attract overseas investment, support its industrial policies, integrate into global supply chains, and lessen dependence on Chinese imports in key sectors. Meanwhile, the United States in recent years has sought to build strategic trade partnerships outside the usual channels of conventional free trade agreements (FTAs), with greater emphasis on using trade to support climate ambition, onshoring of jobs and manufacturing, and addressing Chinese nonmarket practices. These shifts have allowed New Delhi and Washington to settle seven World Trade Organization (WTO) cases² between the two countries and to conduct high-level meetings around trade and technology issues.³

This rapprochement and growing alignment on trade and industrial policy questions creates opportunities for a more sustained and consequential trade partnership between the United States and India than seen to date. Among those opportunities, the most promising is an enhanced U.S.-India green trade partnership.

To build such a green trade partnership, the United States and India should:

- Pursue interoperability of sustainability standards, carbon accounting, customs nomenclature, and green procurement
- Develop shared principles around green subsidies
- Agree on endorsing clean energy subsidies along with joint investment
- Enhance transparency and information exchange to build supply chains based on complementary strengths
- Consider a green goods and services list
- Pursue a bilateral sectoral agreement that ties market access to carbon intensity
- Explore a climate peace clause
- Deepen cooperation around critical minerals
- Host constructive discussions around border carbon adjustments
- Promote diffusion of next-generation climate technologies

Such a partnership would contribute to both countries' economic, climate, and national security objectives by magnifying ongoing investments by Washington and New Delhi to decarbonize their economies and build resilient and interdependent supply chains for clean technology products. Just as importantly, such a partnership would provide a much-needed example for the rest of the world of how cooperative trade policy can build energy security and address climate change.

Glossary

European Free Trade Association (EFTA): An intergovernmental regional trade organization established in 1960. Current members include Iceland, Lichtenstein, Norway, and Switzerland.

Foreign direct investment (FDI): A category of cross-border investment, in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise resident in another economy.

Free trade agreements (FTAs): International treaties between two or more countries where the countries agree on certain obligations that reduce or remove trade barriers between them.

Indo-Pacific Economic Framework for Prosperity (IPEF): The Biden administration launched the IPEF in 2022 to modernize trade negotiations by including essential topics such as supply chains, climate change, and anti-corruption, structured around four flexible pillars – trade, supply chains, the clean economy, and the fair economy. Current members include Australia, Brunei Darussalam, Fiji, India, Indonesia, Japan, the Republic of Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand, the United States, and Vietnam.

Inflation Reduction Act (IRA): A comprehensive U.S. federal law passed in 2022 that aims to lower the federal deficit, reduce health care costs, and invest in domestic energy production while promoting clean energy.

Lithium-ion battery (LIB): Rechargeable energy storage devices that use lithium ions as a key component in their electrochemical processes. LIBs are widely used in consumer electronics, electric vehicles, and renewable energy storage systems. They have become essential for advancing technology and addressing energy challenges.

Make in India: A campaign launched by the government of India in 2014 to encourage domestic and foreign companies to manufacture products in India.

Production Linked Incentive (PLI) Scheme: A strategic initiative launched by the government of India to boost the manufacturing sector and to reduce imports. It gives companies incentives on incremental sales from products manufacture in domestic units.

Quadrilateral Security Dialogue (Quad): A strategic forum comprising Australia, India, Japan, and the United States that aims to enhance regional security and cooperation in the Indo-Pacific region. Established in 2007 and revived in 2017, the Quad focuses on issues such as maritime security, counterterrorism, infrastructure development, and climate change.

Regional Comprehensive Economic Partnership (RCEP): A free trade agreement among the Asia-Pacific countries of Australia, Brunei, Cambodia, China, Indonesia, Japan, South Korea, Laos, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, Thailand, and Vietnam.

Solar photovoltaic (PV): A nonmechanical technology that converts sunlight directly into electricity – it is commonly called a solar cell or solar panel.

World Trade Organization (WTO): The world's largest intergovernmental economic organization, with 166 members, which regulates and facilitates international trade.

U.S. and Indian trade policy: A strategic convergence

For much of the history of the modern trading system, the United States and India have found themselves at odds over the terms of trade liberalization. Both countries were founding members of the 1948 Global Agreement on Tariffs and Trade (GATT), the precursor to the WTO that facilitated the lowering of tariffs and other trade barriers in successive negotiation rounds over five decades. Since the establishment of the WTO in 1995, New Delhi and Washington have been among the most influential members in setting WTO policy and shaping WTO negotiations. In both the GATT and WTO eras, India has served as a de facto leader⁴ of a large contingent of developing countries that viewed with ambivalence and distrust⁵ economic integration on the terms proposed by wealthy countries such as the United States.

For decades, the United States advocated⁶ for lowering barriers to the free movement of goods and capital across national lines—what has been called globalization or the Washington Consensus. In response, India and other developing, postcolonial countries expressed skepticism⁷ that they could protect their sovereignty; address key socioeconomic challenges such as food insecurity and poverty reduction; and grow domestic industry by heeding the calls of developed states to open their economies to foreign competition and curb export restrictions and subsidies to domestic farmers and firms. Such tensions reached their height during the last major round of multilateral negotiations, the Doha Round, which collapsed in 2015 largely because of unbridgeable differences⁸ between New Delhi and Washington over tariffs on—and subsidies for—agricultural goods as well as the movement of people. More generally, India has been a prominent voice among other developing countries, such as South Africa, in demanding different treatment under trade rules as a reflection of their limited economic means, of which the most notable recent example was a campaign⁹ to relax intellectual property rights around COVID-19 vaccines at the height of the pandemic.

Over the past decade, Indian and U.S. trade policy has shifted in striking ways. These shifts have brought Washington and New Delhi into greater alignment over trade policy than at any previous point in the bilateral relationship, even as major differences remain. Three areas in particular deserve emphasis: development of bilateral and plurilateral trade relationships, trade as an enabler of industrial policy, and attitudes toward China.

Trade relationships

India has traditionally been among the most reluctant¹⁰ of major economies to seek FTAs. In the half-century between India's independence and the founding of the WTO, India concluded only one such agreement. Prime Minister Manmohan Singh (2004–2014) broke with this pattern by seeking deepened trade ties¹¹ with a number of economies, including a plurilateral agreement with the Association of Southeast Asian Nations. These deals generated significant backlash¹² from farmers and domestic industry, with the result¹³ that New Delhi did not pursue new trade agreements between 2011 and 2021. Until very recently, Indian trade diplomacy was almost exclusively focused on regional partners and other developing countries: Of India's FTAs concluded prior to 2022, all but one is with other Asia-Pacific countries, and all but two—those with Japan and Korea—are with low- or middle-income economies. By contrast, India demurred¹⁴ to joining the largest FTA in history, the Regional Comprehensive Economic Partnership, which links the largest economies in Asia.

Over the past two years, the Modi administration has signaled a renewed interest in building trade ties and has sought new FTAs¹⁵ with more than a dozen partners around the world, including wealthy Western economies such as the United Kingdom and the European Union. This effort has resulted in agreements with Australia¹⁶ and, most recently, the four non-EU European states¹⁷—Norway, Switzerland, Iceland, and Lichtenstein—that make up the European Free Trade Association (EFTA). From an external perspective, this pivot has been so sharp that the World Economic Forum described¹⁸ India as being “on an FTA-signing spree that is quickly transforming the country into one of the most FTA-engaged countries in the world.”

The United States, meanwhile, has pivoted in recent years toward a “worker-centric”¹⁹ trade policy that takes a cautious approach to granting market access (i.e., lowering tariffs and other trade barriers). In practice, this approach has meant the United States has pursued its trade policy objectives outside of

conventional FTAs and the WTO, favoring instead narrowly scoped sectoral agreements²⁰ focused on specific commodities such as steel and critical minerals or partnerships such as the Indo-Pacific Economic Framework²¹ (IPEF) that do not touch tariffs but rather seek to strengthen supply chains, improve coordination and transparency, promote overseas investment, and enhance trade facilitation. It has also meant using trade barriers more assertively, such as the Biden administration's recent imposition of tariffs on a range of Chinese products,²² including solar panels, electric vehicles (EVs), and steel and aluminum.

The United States' current trade outlook means that a U.S.-India FTA is highly unlikely for the foreseeable future. But such an agreement was always going to be a heavy lift given the complex domestic politics of trade in both countries. Looking beyond the traditional trade toolbox, though, the recent evolution in both U.S. and Indian trade policy means that opportunities for trade cooperation have never been riper. New Delhi's newfound enthusiasm for FTAs has not changed the fact that the country views trade as a means to achieve specific policy goals rather than as an article of faith—and will not rush to conclude²³ trade deals if they do not confer a clear and tangible benefit for Indian citizens and firms. This inclination can be seen in the content of the FTAs India signed with Australia and the EFTA states, which exclude a broad range of goods considered politically sensitive to New Delhi (largely agricultural goods) and contain provisions atypical of FTAs, such as increased Indian eligibility²⁴ for Australian student visas and a binding pledge by EFTA states to invest \$100 billion²⁵ in the Indian economy.

This strategic inflection in Indian trade policy aligns well with the United States' current approach to trade, which is similarly focused on discrete policy outcomes realized through innovative and bespoke trade arrangements. Both Washington and New Delhi have demonstrated a flexibility and creativity in their approach to strengthening trade ties—and both seem prepared to take a patient approach to finding mutually acceptable terms with trading partners rather than settle for a conventional FTA that jeopardizes other policy priorities. Whether this convergence can be translated into concrete outcomes in the bilateral relationship remains to be seen, but other recent developments give reason for optimism.

Industrial policy

Industrial policy has been a foundational element of India's economic policy and statecraft from the country's earliest days.²⁶ Since 1980, and especially after joining the WTO, Indian authorities have taken a progressively lighter touch²⁷ in insulating domestic manufacturing from market forces, including a sharp reduction in many tariffs—which are still high in comparison with developed economies and China—and greater openness to foreign investment in Indian firms. Like in many economies, this relative opening contributed to a decline in manufacturing and a rise in imports of finished goods, especially from China.²⁸ Partly in response to this offshoring of production, and partly out of a recognition that India has under-industrialized²⁹ relative to its potential in its economic trajectory, the Modi administration launched a Make in India³⁰ campaign in 2014 with the aims of making India a more attractive investment environment; encouraging greater domestic consumption of Indian-made goods; and positioning the country as a manufacturing hub. A core feature of this campaign is the development of industrial corridors³¹ distributed around the country.

Industrial policy has likewise become a focus of U.S. economic policy since the COVID-19 pandemic, reversing a decades-long trend of limited state involvement in the manufacturing sector. Through landmark laws such as the CHIPS and Science Act and the Inflation Reduction Act (IRA), the United States has deployed hundreds of billions of dollars to create jobs and build resilient supply chains in sectors such as transportation, energy, and semiconductors—and to encourage investment in renewable power generation, green hydrogen, and electric vehicles. This industrial policy has national dimensions, but its focus³² has been on communities that have seen underinvestment in the industrial sector or lost manufacturing jobs over the past two decades.

Both India and the United States have used trade tools to implement and reinforce their industrial policies. Make in India has raised market barriers³³ on sectors targeted for development such as electronics and on financial incentives that reward domestic manufacturing and import substitution in sectors ranging from textiles to solar panels to medical devices. Likewise, the IRA conditioned eligibility for electric vehicle tax credits authorized under the law to exporters from a country with which the United States has an FTA. Both countries have also sought out new trade relationships to enhance access to key inputs to supply chains. For example, the India-Australia FTA lowered tariffs on lithium and other critical minerals vital to the clean energy transition.³⁴ The United

States, meanwhile, is negotiating narrowly scoped critical mineral agreements³⁵ (CMAs) that would facilitate non-FTA countries' integration into electric vehicle supply chains and has proposed³⁶ creating a protected market of low-carbon steel and aluminum with the European Union to promote continued decarbonization of those industries—referred to as the Global Arrangement on Sustainable Steel and Aluminum (GASSA).

China

Strategic rivalry with China has become a defining feature of many areas of U.S. domestic and foreign policy, including international economic policy. As far back as the George W. Bush administration,³⁷ the United States has taken issue with a variety of Chinese industrial and trade policies. Over successive³⁸ administrations,³⁹ these concerns broadened into a more generalized concern with China's trade surplus and nonmarket industrial practices that manifested in a broad range of tariffs on Chinese goods and a retreat from the multilateral trading system.

President Joe Biden has largely sustained Trump-era tariffs⁴⁰ on China, and in some cases expanded them, as with his recent decision⁴¹ to double tariffs on Chinese solar panels and quadruple those on electric vehicles. In this same spirit, the White House's proposed green steel and aluminum arrangement with Europe aims to enlist Europe in raising tariffs on carbon-intensive Chinese exports of these commodities. IPEF, meanwhile, seeks U.S. economic engagement with Indo-Pacific countries as a counterweight to China's deepening economic connectivity in the region, which Beijing has pursued through FTAs such as the Regional Comprehensive Economic Partnership (RCEP). Last, but not least, a primary goal of the Biden administration's industrial policy has been to lessen dependence on Chinese inputs into critical supply chains and to limit opportunities for Chinese economic coercion. This has carried over into the administration's trade agenda in the negotiation of a CMA with Japan and in a supply-chain coordination agreement under the aegis of IPEF.

India's economic posture toward China is more nuanced, but over the past decade, it has moved toward derisking and overt competition with its neighbor. Beijing and New Delhi are often aligned⁴² in seeking special rights as developing countries under trade rules at the WTO and in other international institutions, yet at the same time, India has been among the most assertive countries globally in pursuing anti-dumping actions against China. It has opened nearly

150 investigations⁴³ since 2014 alone, resulting in a broad suite of higher tariffs on Chinese goods. (India opened 34 cases against the Republic of Korea, 20 against the European Union, and seven against the United States during this same period.)

Such actions have dovetailed with tightened norms⁴⁴ on hundreds of products and other nontariff measures aimed at limiting Chinese imports and reducing India's trade deficit with China. These moves have come as the Modi administration has sought to position India as the next engine of global economic growth and an export powerhouse and stand in striking contrast to India's pursuit of FTAs with European and Middle Eastern states. Reluctance to allow further economic integration with China is likely a key factor driving India's disinterest⁴⁵ in joining RCEP, which China was instrumental in creating, and the Comprehensive and Progressive Trans-Pacific Partnership,⁴⁶ another large multilateral trading bloc.

Shared concerns about China's trade practices do not guarantee cordial trade relations, of course: The Trump presidency saw a flaring of trade tensions⁴⁷ between Washington and New Delhi over some of the same goods, such as steel, that took center stage in Trump's trade wars with China. But by the same token, the convergence of U.S. and Indian attitudes toward economic competition with China reflects common goals of diversifying supply chains; onshoring jobs and manufacturing; incubating nascent industries; and moving proactively to address predatory and unfair trade practices. In the context of deepening security cooperation and strengthened diplomatic relations, these overlapping interests can lay a foundation for constructive dialogue on trade between the two countries.

State of play of U.S.-India trade relations and the climate opportunity

Under President Biden and Prime Minister Modi, U.S.-India ties have improved to perhaps their strongest state in the history of the bilateral relationship. Security cooperation, animated primarily by concerns about Chinese assertiveness in the Indo-Pacific, has anchored this revitalized partnership, but the rapprochement has extended to domains including trade. Over the past year, Washington and New Delhi settled all outstanding WTO disputes between them, which covered traded goods ranging from steel to solar panels to poultry—a sharp turnabout from the mini-trade wars of the Trump administration. On the affirmative side of the agenda, India has joined all three of the pillars of the U.S.-championed IPEF that concluded, and in 2023, U.S. and Indian officials held an inaugural Strategic Trade Dialogue⁴⁸ focused on cooperation around advanced technologies. These new trade arrangements and convenings build on other, more established channels of communication such as the U.S.-India Commercial Dialogue.⁴⁹

Viewed against the longer history of U.S.-India trade relations, these recent developments mark a notable step forward in establishing trust and constructive dialogue between two countries that, for decades, found little to agree on when it came to setting the terms of global commerce. Even so, economic cooperation between India and the United States remains relatively shallow.

Despite India importing more goods and services from the United States than from any other country, U.S. exporters to India face the highest tariffs⁵⁰ of any major economy⁵¹ and a host of import restrictions and product standards. In turn, while the Biden administration pared back tariffs on Indian steel and aluminum in connection with the resolution of related WTO disputes, it has not reversed the Trump administration's removal of India⁵² from the currently expired Generalized System of Preferences, which conferred zero-tariff rates on a broad range⁵³ of Indian exports. In areas of technical collaboration and trade facilitation such as harmonization of customs nomenclature; interoperability of product and performance standards; and joint approaches to carbon accounting,

U.S.-India cooperation lags far behind that between the United States and industrialized economies, particularly Europe.⁵⁴ IPEF, while a welcome platform to advance the shared interests of the United States and its partners in the Indo-Pacific, has yet to meaningfully affect economic rulemaking in the region.

There is, therefore, considerable room for maneuver in pursuing a more robust and market-shaping U.S.-India trade partnership than what exists today. To date, the United States has prioritized the exchange of advanced technologies in trade diplomacy with India, consistent with the broader emphasis on national security issues in the bilateral relationship. Given the existential threat of climate change and the similar ways in which Washington and New Delhi are seeking to benefit from the predicted massive growth in green industries and clean technologies, there is an equally compelling logic for reorienting U.S.-India trade cooperation around the transition to a net-zero economy.

Such a focus presents clear synergies with the recent shifts in how India and the United States are approaching trade. The range of goods and services relevant to green trade are a small subset of those covered in most FTAs and avoid some of the most contentious issues—such as agriculture—in the U.S.-India trade relationship. This narrow scope of green trade lends itself to tailored, creative trade cooperation that both Washington and New Delhi are pursuing—including arrangements that enhance access to the U.S. market, as the proposed U.S.-EU steel and aluminum deal would do. Green trade can likewise serve a critical role in enabling both U.S. and Indian industrial policy by strengthening supply chains, stimulating innovation, and broadening export opportunities in the sectors promoted through the IRA and Make in India. Finally, green trade would mitigate U.S. and Indian concerns about Chinese unfair trade practices, excess capacity, and economic coercion by diversifying access to the raw materials, industrial inputs, and finished products for which China has or is seeking a dominant market position.

Several areas of shared interest between India and the United States in particular offer pathways to cooperation around green trade.

India and the United States are both investing in a clean economy at an unprecedented scale

The nearly \$400 billion in tax credits, grants, and loan guarantees for clean energy production, manufacturing, and innovation under the IRA are by far the largest industrial policy expenditures to occur during the Biden presidency and are the most significant investment in climate mitigation in U.S. history. These expenditures include not only incentives for renewable power generation and EV purchases but also tax credits for green hydrogen production, carbon capture and direct air capture technologies, sustainable aviation fuel, energy storage, and heat pumps. Under the Make in India campaign, the Modi administration has similarly instituted billions in “production-linked incentives”⁵⁵ (PLIs)—effectively subsidies—to build up green hydrogen production and manufacturing of solar panels and cells, advanced battery technologies, EVs, hydrogen-powered vehicles, and electrolyzers. Both the IRA and PLI schemes contain credits and subsidies that extend only to goods that are manufactured locally or that contain a certain percentage of domestic inputs, also known as domestic content requirements. Some of these domestic content requirements are linked⁵⁶ to tariffs⁵⁷ on imports of the same goods.

The IRA and Make in India both entail unprecedented macroscale public investment to support economic activities associated with decarbonization under the banner of low-carbon development (Make in India) or climate action and job creation (IRA). These investments will have powerful market-shaping influences beyond both countries’ borders, with direct implications for trade policy. With limited exceptions, domestic content requirements and subsidies that advantage domestic firms and goods are disfavored under a strict reading of trade rules. By unapologetically using such measures to stimulate manufacturing, reshore production, and shape consumer preferences in ways that advance sustainability goals, both Washington and New Delhi have staked out a position that trade institutions and norms should be permissive of green industrial policy.

India and the United States cannot meet their climate targets and green industrial plans with domestic resources alone

The U.S. National Renewable and Energy Lab (NREL) assesses⁵⁸ that the United States will need to add approximately 500 to 900 gigawatts (GW) of installed solar power capacity; 600 to 1,200 GW of installed wind power capacity; 100 to 300 GW of energy storage capacity; and substantial deployment of hydrogen-fueled combustion turbines and carbon capture technologies that are currently under development to achieve 100 percent clean electricity by 2035. This represents a scaling up of clean technologies by many multiples beyond what is currently deployed in the U.S. market.

India, meanwhile, has targeted 50 percent installed power capacity from nonfossil-fuel-based sources by 2030 in its most recent National Energy Plan⁵⁹ (NEP), which translates to an increase from a 2023 capacity of 167 GW to at least 500 GW by the end of the decade. To realize this target, the NEP calls for increasing installed solar capacity from 54 to 365 GW; wind from 40 to 122 GW; and hydropower from 51 GW to 94 GW. Such increases will require around 30 percent annual increases in solar capacity and 40 percent annual increases in wind capacity through at least 2028.

A study⁶⁰ by Ember, a European think tank, assessed that to meet the International Energy Agency's net-zero pathway, India would need to add an additional 83 GW of solar power on top of the targets set out in the NEP. India's journey to net zero will eventually need far-higher levels of solar (5630 GW) and wind (1790 GW) power capacity, according to a CEEW study,⁶¹ raising concerns about the long-term security of minerals, materials, components, and finished products in the clean energy supply chains.

Making good on these renewable energy targets will require either major increases in domestic production of solar and wind infrastructure or more imports—or some combination of the two. On solar, the United States and India are both ramping up their domestic manufacturing but on significantly different scales. U.S. solar panel manufacturing capacity rose⁶² to 16 GW last year—a substantial increase, but still well short of the 40–56 GW in new capacity required for decarbonization under NREL's analysis. Up the supply chain, the United States produces virtually no silicon ingots, wafers, or cells essential to producing panels. Indian-made solar panel manufacturing capacity grew to 65 GW in 2023, and cell capacity to 6 GW, and is projected⁶³ to reach 150 GW and 75 GW capacity, respectively, by 2026.

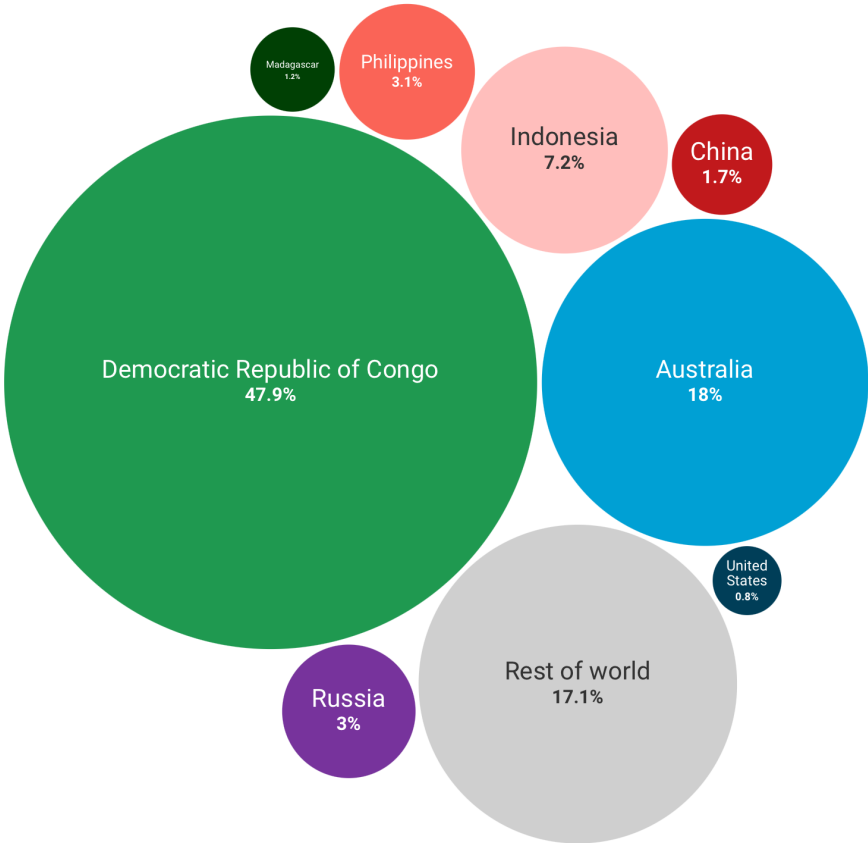
With respect to wind power, the United States has identified offshore wind as the primary source of additional capacity over the next decade, however, there is virtually no U.S. domestic supply⁶⁴ chain for offshore wind facilities, and the U.S. wind industry relies significantly on imports. Building a domestic wind supply chain has been a key industrial policy goal for the Biden administration.

15 countries are home to at least 55 percent of each critical mineral for low-carbon technologies

Countries with the highest share of critical mineral global reserves, 2022

Click buttons to filter by mineral type:

- Cobalt
- Copper
- Graphite
- Lithium
- Manganese
- Nickel
- Rare earth elements



Hover or click to see values.

Source: Akanksha Tyagi and others, "Addressing Vulnerabilities in the Supply Chain of Critical Minerals" (New Delhi: Council on Energy, Environment and Water, Paris: International Energy Agency, Davis, CA: University of California, Davis; Mumbai: World Resources Institute India, 2023).

Chart: Center for American Progress

India's wind power manufacturing capacity barely satisfies its deployment rate, however, a recent analysis⁶⁵ projected that, as the industry grows, India will become an export hub of onshore wind installations within five years. Like the United States, India lacks a viable domestic supply chain to meet its offshore wind targets.

Beyond renewable power generation, both the United States and India are grappling with rising global demand⁶⁶ for critical minerals to support the manufacturing of EV and grid storage batteries, wind turbines, solar panels, and other technologies central to both countries' decarbonization plans. Of the most commonly used minerals in these applications—lithium, copper, nickel, cobalt, manganese, graphite, and certain rare earth metals—the United States has substantial reserves only of lithium and nickel⁶⁷. India has no operational source⁶⁸ of any critical minerals but has identified⁶⁹ lithium deposits in the states of Jammu, Kashmir, and Chhattisgarh. In July 2023, India released an official list of 30 critical minerals.⁷⁰

Some of this demand can be managed through advances in recycling and innovations that reduce the quantity of critical mineral inputs needed to produce a given item—for example, next-generation wind turbine batteries that require less of the chemical element neodymium than current models. But for the foreseeable future, both the United States and India will need to look beyond their borders to satisfy their critical mineral needs.

These domestic supply chain limitations across wind, solar, and minerals have clear trade policy implications. Local demand that cannot be met with local production necessitates foreign sourcing. Ultimately, individual firms are responsible for their own supply chains, but trade policy can lower market barriers; reduce regulatory frictions; bring predictability and transparency to border duties; streamline customs paperwork; and facilitate technology transfer and sharing of best practices. Some of the supply-side limitations facing low-carbon industries in India and the United States may be alleviated by increased trade in relevant goods and services between the two countries, which trade policy can enable. Other challenges, particularly those relating to critical minerals, require engagement with third parties, which Washington and New Delhi may be able to pursue more effectively through a joint cooperative framework rather than individual negotiations.

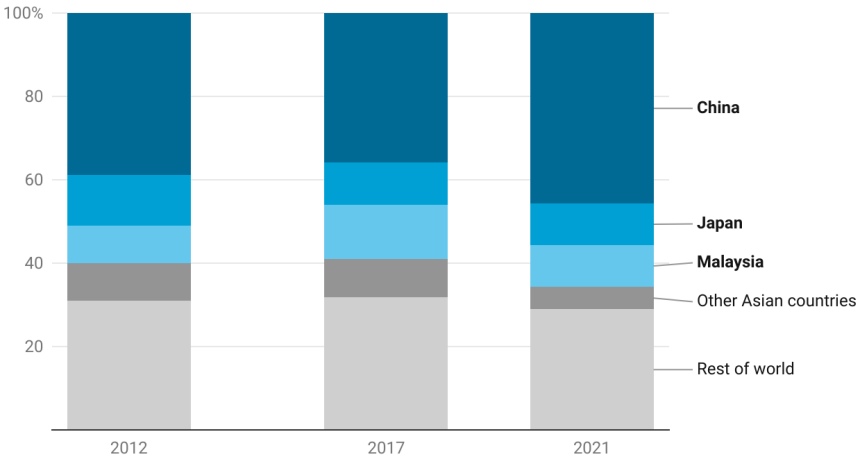
The United States and India both seek to transform climate investments into export opportunities

U.S. and Indian green industrial strategies are not just a story about meeting domestic climate and energy security goals: Both New Delhi and Washington see their investments in clean technology and renewable energy as a means of creating export opportunities for their firms and enhancing competitiveness in foreign markets.

Increasing exports has been an explicit goal⁷¹ of the Make in India campaign, with solar exports in particular identified⁷² as a growth area. This focus is not unjustified: Over the past few years, India has emerged as a significant exporter of solar products. In 2023, Indian firms exported more than \$1 billion in solar panels, nearly all of which to the United States, a more than 200 percent increase from the prior year. This growth is impressive, but it is still a small fraction of the total solar export market, which is dominated by China, with Japan, Malaysia, and Germany—and, more recently, Thailand and Vietnam—accounting⁷³ for most of the remaining share.

Since 2012, China, Japan, and Malaysia have led in solar photovoltaic (PV) exports

Solar PV exports from top suppliers compared with the rest of the world and with total exports, 2012–2021



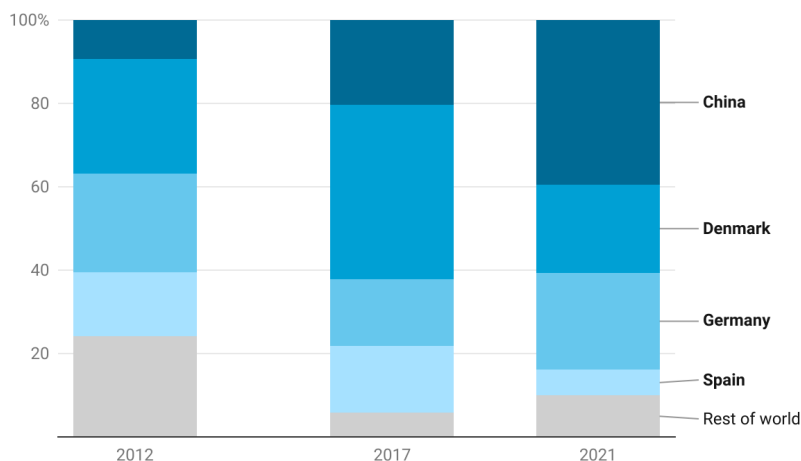
Hover or click to see values.

Source: Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition" (New Delhi: Council on Energy, Environment and Water, 2023).

Chart: Center for American Progress

Since 2012, China, Germany, and Denmark have led in global wind generator exports

Global wind generator exports from top suppliers compared with the rest of the world and with total exports, 2012–2021



Hover or click to see values.

Source: Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition" (New Delhi: Council on Energy, Environment and Water, 2023).

Chart: Center for American Progress

The same is true in exports of wind power generators and turbines, where Indian exports have doubled⁷⁴ in the past year but are still dwarfed⁷⁵ by incumbents⁷⁶ from China, the United States, and Europe.

Further development of the solar and wind power industries under the Make in India campaign will likely increase India's exports in these sectors both in absolute terms and as a share of global trade. But the dominant position of the major exporting countries in both wind and solar products along with domestic energy needs make it unlikely that India will emerge in the near term as a leading exporter of either category of goods. That being said, should other countries follow the United States' lead in imposing formidable market barriers on Chinese solar panels—which have severely curtailed direct Chinese penetration of the U.S. solar market—India would be well positioned to fill some of the resulting market gaps. A recent CEEW study⁷⁷ of clean tech components finds that India has relative export competitiveness in six clean energy-related products, such as synthetic graphite, aluminum foil, solar wafer, polysilicon, ethylene vinyl acetate, and diamond wire saw. Such analysis on a component-by-component basis could increase India's role as a reliable partner in diversifying clean tech supply chains while increasing mutual interdependence between India and the United States.

India is comparatively better positioned to establish a prominent perch in the emerging green hydrogen sector as well as in exports of low-carbon steel and other industrial goods for which green hydrogen is the most promising path to decarbonization. The Modi administration's standing up of a National Green Hydrogen Mission,⁷⁸ which aims to make India the "Global Hub for production, usage and export of Green Hydrogen and its derivatives," reflects the scale of its ambition. The initiative encompasses subsidies for green hydrogen production and electrolyser manufacturing alongside pilot products into hydrogen transportation and green steel.

The United States faces steep challenges in developing domestic solar and wind supply chains to meet its renewable energy targets and is therefore unlikely to be in a position to export solar and wind power products in significant quantities in the near term. Likewise, the EV-related subsidies in the IRA are focused on onshoring manufacturing and shaping U.S. consumer choices rather than promoting competitiveness in foreign markets. But U.S. officials see the catalytic investments of the IRA as supercharging⁷⁹ U.S. productivity and innovation in clean technology, which will in turn give U.S. producers a leading edge in supplying advanced technologies to the world. In a recent report,⁸⁰ the Rhodium Group identified three "earlier-stage emerging climate technologies" (ECTs) whose development and global deployment will be substantially accelerated by the IRA: direct air capture technology, green hydrogen, and sustainable aviation fuel. The report estimated that the cost-declines resulting from IRA investments could lead to widespread adoption of these technologies similar to what German feed-in tariffs accomplished for solar panels 20 years ago and that "much of the potential emissions benefits of these incentives will likely occur after 2030 and outside the US."

Trade policy has a crucial role in optimizing the export opportunities created by U.S. and Indian investments in net-zero industries. Solar and wind markets are highly price sensitive and therefore responsive to tariff rates, as reflected by the shallow penetration of Chinese solar products in the U.S. market in stark contrast to most of the rest of the world. In addition, harmonized standards and customs nomenclature will be vital for cross-border sales and transport of green hydrogen and related products like low-carbon steel and hydrogen fuel cell batteries. Alignment of green procurement rules and standards can unlock major contracts with governments and state-owned enterprises. Finally, robust trade enforcement measures can prevent a foreign competitor from dominating a prospective export market through dumping and other anticompetitive practices.

Both countries are seeking to deconcentrate renewable energy supply chains and respond to Chinese excess capacity in clean technologies

India and the United States share a concern about China obtaining or preserving a dominant position in their respective domestic supply chains for solar and wind power, EV batteries and finished EVs, and critical minerals. Such concerns reflect China's outsized share of global manufacturing capacity and highly competitive prices in these industries, which have been made possible by a vast and pervasive system of subsidies⁸¹ and national economic policy that favors overproduction and export-driven growth⁸² over domestic consumption. Chinese firms now account for 80 percent of all solar manufacturing⁸³ and 80 percent of global solar panel exports; 65 percent of lithium-ion battery manufacturing⁸⁴ and 80 percent of lithium-ion exports; and 60 percent of wind turbine manufacturing⁸⁵ and 50 percent of wind turbine exports. China is also responsible for 90 percent of global refinement of rare earths (of which China possesses 60 percent of natural deposits) and 60 percent to 70 percent of lithium and cobalt refining.⁸⁶

The United States and India have to different degrees sought to limit the reach of Chinese exports of some of these goods into their domestic markets. For more than a decade, successive U.S. administrations have imposed or extended tariffs on Chinese solar cells and modules (now 25 percent) as well as wind turbines and towers (as high as 26 percent depending on the exporting firm). Chinese lithium-ion batteries also now face significant tariffs (25 percent). In 2021, the U.S. Congress passed a law prohibiting imports of solar panels made with forced labor in the far-western Chinese province of Xinjiang. The IRA's domestic content tax credits for solar and wind manufacturing and critical minerals in EV batteries add additional barriers to Chinese imports.

These duties and restrictions have led to near total exclusion of solar panels produced in China from the U.S. market in recent years, in stark contrast to Europe which now accounts for around half⁸⁷ of Chinese solar exports.

This narrative of a successful U.S. defense against cheap Chinese solar exports is somewhat misleading, however. According to recent findings⁸⁸ by the U.S. Department of Commerce, Chinese-produced solar panels are reaching the United States via circumvention through Southeast Asian countries. A recent analysis⁸⁹ estimated half of U.S. solar panel imports in 2023 were of Chinese origin.

Wind offers a more compelling narrative of U.S. management of Chinese industry dominance. U.S. domestic production of wind towers and turbines now accounts for more than half⁹⁰ of newly installed onshore wind capacity. Imported wind products originate from a small number of European and non-Chinese Asian countries, of which India is the largest supplier. European firms have been the primary bidders for offshore wind projects in the United States, which remain at an early stage of development.

By contrast, China is still, by far, the largest supplier of EV batteries to the U.S. market, increasing from around three quarters to nearly nine-tenths of imports between 2022 and 2023.⁹¹ This lopsided imbalance may change as IRA incentives and the new Section 301 tariffs make non-Chinese EV batteries economically competitive.

India, meanwhile, has imposed even higher tariffs⁹² (40 percent on panels and 25 percent on cells) than the United States on all solar imports with a stated goal of limiting Chinese imports. As a result, India is the only major importer of Chinese solar parts to see a significant decline in import volumes since 2018. As with the United States, there are credible concerns⁹³ about circumvention through Southeast Asian countries, particularly those with which India has FTAs.

In contrast to solar, most turbines and other components of onshore wind facilities are produced locally in India, however, a few key products are imported mostly from China, such as hub and blade castings. Tariffs on imported wind products are de facto low thanks to customs duty concessions, although the government is reportedly considering revoking⁹⁴ some of those concessions in emulation of its approach to solar imports.

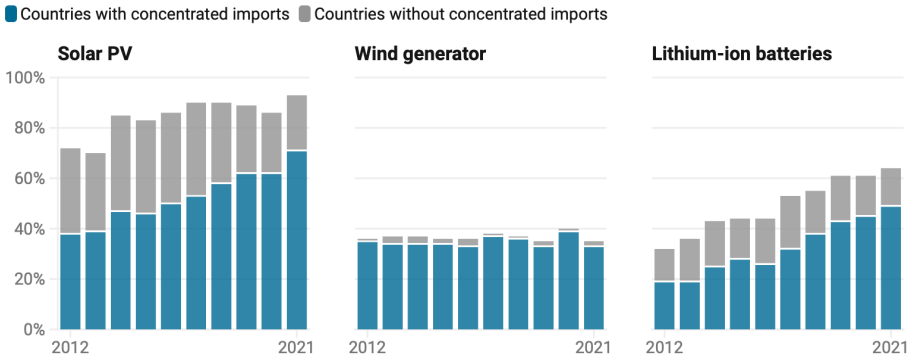
Like the United States, China is the main supplier of lithium-ion batteries to the Indian market. Also as with the United States, this seems unlikely to change in the near term. However, the Indian government recently announced a PLI⁹⁵ aimed at boosting domestic manufacturing of the advanced chemistry cells used in EV batteries.

India is not alone among emerging markets and developing economies in facing rising Chinese imports for clean energy products. A CEEW study,⁹⁶ officially commissioned during India's G20 presidency in 2023, found that the number of countries with concentrated imports of solar PV increased from 38 to 71 between 2012 and 2021 and from 19 to 49 for lithium-ion batteries during the same period. The share of high-income countries with concentrated imports

for solar PV and lithium-ion batteries increased from just lower than 50 percent to just higher than 60 percent. But the share of countries facing concentrated imports hovers upwards of 80 percent for upper middle-income economies and above 90 percent for lower middle-income economies. Highlighting the challenges of such concentration, India used its G20 presidency to push the concept of energy security for “fuels for the future.”

Since 2012, the share of countries with concentrated solar photovoltaic (PV), wind generator, and lithium-ion battery imports has increased

Percentage of countries with and without concentrated imports, 2012–2021



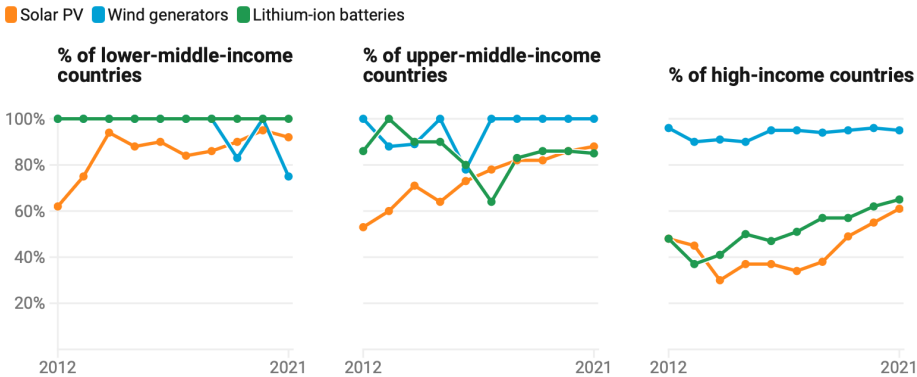
Hover or click to see values.

Source: Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition" (New Delhi: Council on Energy, Environment and Water, 2023).

Chart: Center for American Progress

Since 2012, clean energy supply chains have been highly concentrated across country income levels, with middle- and high-income countries seeing increased concentration

Percentage of countries with concentrated imports of solar photovoltaics (PVs), wind generators, and lithium ion batteries, 2012–2021



Hover or click to see values. Click on legend to isolate by category.

Source: Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition" (New Delhi: Council on Energy, Environment and Water, 2023).

Chart: Center for American Progress

Critical minerals present different challenges for the United States and India given natural limitations on domestic supply in both countries. The United States has sought to leverage IRA subsidies and more recently imposed tariffs to discourage the use of Chinese-sourced critical minerals in EV batteries sold into the U.S. market and has pursued supply chain arrangements with countries rich in lithium and copper such as the Democratic Republic of the Congo,⁹⁷ Zambia,⁹⁸ and Indonesia.⁹⁹ India has incorporated critical minerals into its trade priorities, for example in its FTA with Australia, which will enhance its access to lithium and other minerals, and is encouraging state-owned mining groups to seek concessions in South America and Africa. Both India and the United States are seeking greater coordination around critical mineral supply chain development through the Minerals Security Partnership (MSP), which excludes China. India was the first non-G7 country to join the MSP.

Overall, New Delhi and Washington can claim partial success in using mutually reinforcing trade and industrial policy interventions to reduce or prevent dependency on Chinese-made goods essential to the clean energy transition. But even this partial success is at risk of faltering in the face of China's sheer cost advantage as it seeks to dump its excess manufacturing capacity¹⁰⁰ on the world. It bears noting that both the Indian and U.S. approaches to derisking the wind and solar sectors have centered around support for domestic industry and raising market barriers on Chinese firms. Neither country has seriously pursued new trade relationships to fill anticipated supply gaps. Critical minerals are a different story, but here too the level of bilateral and multilateral cooperation has been well short of what is likely required to ensure reliable and equitable allocation of these scarce resources in the face of surging global demand.

An answer to skeptics

Beyond the practical benefits described above, enhanced U.S.-India cooperation around green trade would also lend credibility to both countries' visions for economic growth and industrial transformation.

For India, such cooperation would offer a counterexample to the common complaint¹⁰¹ that New Delhi is overly focused on an export-led development model—what one commentator recently called¹⁰² “manufacturing fetishism”—at the expense of the services sector and small and medium enterprises. Such criticism generally centers on India's overall poor record on industrial policy and the belief that there is insufficient foreign demand to support a new global manufacturing hub in Asia. These claims are not easily dismissed. The Make in India campaign has fallen short of its targets¹⁰³ for job creation and expansion of the manufacturing sector, a seeming echo of the many failures of India's pre-liberalization era of central planning. Meanwhile, governments around the world are grappling¹⁰⁴ with China-driven excess supply across numerous sectors and are taking measures to build their own domestic supply chains.

The actual picture, however, is more nuanced. Even though industrialization has not proceeded at the audacious pace Indian authorities set out, the PLI schemes attracted around \$12 billion in investment¹⁰⁵ in 2023, about one-quarter of which went to the solar sector. In addition, many of the country's leading firms¹⁰⁶ are capitalizing¹⁰⁷ on PLIs and other incentives to make large-scale investments¹⁰⁸ in clean technologies,¹⁰⁹ which has coincided with surging FDI¹¹⁰ into electricity generation and transmission projects. With respect to export opportunities, China's overproduction relative to global demand may have the ironic consequence of increasing demand for Indian goods as importing jurisdictions seek to offset¹¹¹ the market gaps created by protective tariffs. The other growth opportunity is in India's dynamic startup ecosystem (by some claims, the third largest in the world¹¹²) that is seeking to capitalize on the digital and decarbonization trends in India. Startups will need more sources of venture capital,¹¹³ not just public subsidies, to innovate and position themselves within clean tech supply chains.

For the United States, cooperation with India would demonstrate that Washington is bringing a strategic lens to the diversification of clean energy supply chains that takes an expansive view of “friendshoring” to include emerging manufacturing powers. Negative¹¹⁴ reactions¹¹⁵ to the Biden administration’s recent 301 tariffs on Chinese goods have emphasized their probable chilling effect on the deployment of clean energy infrastructure in the United States and the absence of a complementary trade strategy to compensate for domestic production limitations and to keep costs down.

As with concerns over Indian industrial planning, these criticisms have more than a grain of truth. The IRA has stimulated substantial investment in the U.S. clean energy and EV sectors, but not at a scale¹¹⁶ needed to meet climate targets.¹¹⁷ Additionally, imminent tariffs¹¹⁸ on non-Chinese solar panels and forthcoming¹¹⁹ steps¹²⁰ to crack down on circumvention¹²¹ are likely to constrain imports of clean energy goods and commodities from Mexico and East and Southeast Asia. These moves, alongside stringent limits¹²² on Chinese investment in suppliers hoping to qualify for IRA tax credits, mean the United States will need to look beyond the usual suspects to supply the materials for its green transition. To date, Washington’s efforts at building these new relationships—confined to a few attempts at negotiating critical minerals agreements—have been anemic at best.

Properly managed, a strategic U.S.-India green trade partnership will give New Delhi a story to tell about how its industrial policy set the conditions for a deepened commercial relationship with the world’s largest economy that could lead to an expanded footprint in global clean energy supply chains. It will also reassure skeptics of U.S. green industrial policy that Washington is not blind to the supply chain challenges presented by the new Section 301 tariffs and is open to new sources of finished and intermediate goods necessary to its decarbonization goals. Of course, such a partnership by itself will not solve U.S. clean energy deployment needs—nor will it guarantee India’s global manufacturing ambitions. But it will send a positive signal about both countries’ pragmatism and resolve in meeting these challenges.

Recommendations

As described above, more synergies exist between the U.S. and Indian approaches to trade now than at any earlier point in the bilateral relationship. Still, the United States and India do not see eye to eye on every trade policy question, with the most notable divergence being the desirability of broad-scope FTAs. Cooperation around green trade would be more effective and impactful if New Delhi and Washington sought out creative partnerships focused on specific areas of shared interest. In that spirit, this report offers 10 recommendations for elevating climate and clean energy in the U.S.-India trade relationship.

■ **Pursue interoperability of sustainability standards, carbon accounting, customs nomenclature, and green procurement.** A constructive, trust-building first step in strengthening U.S.-India cooperation around green trade is pursuing more robust forms of the kind of “soft” cooperation that has been the main focus of U.S. trade diplomacy in recent years. Soft cooperation refers to nonbinding discussions aimed at ensuring differences in regulatory systems, product and performance standards, and scientific measurement frameworks do not impede trade and technology transfer that is in the mutual interest of trading partners. Some of this soft cooperation occurs between the United States and India under IPEF and in high-level technology dialogues, but much more could be done to build a rules-based architecture around clean technology, renewable power, green hydrogen, and low-carbon-intensive goods. Priority areas for soft cooperation between New Delhi and Washington include:

- Developing joint approaches to carbon accounting for use in product standards, border carbon measures, and public procurement
- Updating customs nomenclature to better reflect reverse supply chains and the circular economy and distinguish between low- and high-carbon versions of the same good
- Harmonizing standards and regulatory definitions for clean technologies, such as green hydrogen and carbon capture and storage, for maximal emissions-reduction performance

- Sharing best practices around green public procurement
- **Develop shared principles around green subsidies.** Both the United States and India are using targeted financial support schemes, including domestic content requirements, to boost domestic manufacturing, create jobs, and reduce dependence on Chinese imports in a range of clean technology goods such as solar panels, wind turbines, and EV batteries. Such subsidy schemes have historically been a source of tensions between trading partners, including between the United States and India. Yet given their mutual interest in using all available policy tools to achieve a green transition and strengthen energy security, New Delhi and Washington would be well-served by mutually recognizing the legitimacy of such subsidy schemes and by developing shared principles and best practices relating to their design, implementation, and duration. (Such an idea was proposed more than a decade ago¹²³ when the first set of clean energy subsidies related disputes emerged between the two countries.) The outcome of recent negotiations between the EU and Japan on unifying subsidy rules¹²⁴ could serve as a point of departure.
- **Agree on endorsing clean energy subsidies along with joint investment.** The Office of the U.S. Trade Representative and the Indian Ministry of Commerce and Industry could ink an agreement endorsing subsidies for clean energy industries, something that current trade rules generally do not allow. To make such subsidies more palatable to both countries, the agreement could also promote joint *investments in each other's markets* and clean tech industries. This kind of agreement has precedent: India and the European Free Trade Association (comprising Iceland, Liechtenstein, Norway, and Switzerland) already established a similar arrangement¹²⁵ earlier this year, establishing a trade and economic partnership that provided for European investments into India of around \$100 billion.
- **Enhance transparency and information exchange to build supply chains based on complementary strengths.** Lack of awareness and data about global decarbonization projects, investments, technologies, and resources is a major obstacle to building new clean energy supply chains. To address this challenge, the United States and India should collaboratively develop a mechanism to track such information and share it with investors, firms, and other private-sector actors to identify and mobilize finance around new clean energy supply chain relationships. The focus of such collaboration should be on leveraging U.S. and Indian respective comparative advantages—for example, India's strong tradition of technical education and comparatively low labor costs and

expansive U.S. public investment in innovation in clean technologies. These efforts could include partnerships between U.S. and Indian institutions to codevelop technologies relevant to clean technology supply chains; conduct periodic assessments of emerging technologies such as green hydrogen; and collect relevant data on existing technologies relating to their efficacy, suitable applications, and availability.

- **Consider a green goods and services list.** Proposals for a list of “environmental goods” for low- or zero-tariff treatment have been on the international trade agenda for many years, most recently in failed negotiations around an “Environmental Goods Agreement” at the WTO. Such proposals have foundered on broad and subjective definitions of what makes a good “environmental,” which in turn has encouraged governments to pursue nakedly self-interested approaches in negotiations by seeking to include as many of their export products as possible in the agreed list of items—even where they have, at best, a tenuous relationship to sustainability.

These obstacles notwithstanding, the general concept of encouraging trade in goods with positive sustainability impacts remains sound. One likely more effective approach would be to deputize a panel of independent experts to identify a set of goods and services most important to the clean energy transition and industrial decarbonization, which could then be taken up by negotiating parties. Such a “green goods and services” list is more likely to see the light of day in a bilateral or small plurilateral context than in the WTO given the number of competing perspectives and difficult negotiating conditions of the latter. To that end, the United States and India—which face overlapping but distinct supply-side challenges in meeting the material needs of their green industrial policies and emissions-reductions targets—could collaborate on the development of such a list with a view toward targeted tariff reductions in some or all of the identified goods. From there, the two countries could seek to expand this green goods and services club to like-minded countries such as the other Quad members, the European Union, or the United Kingdom.

- **Pursue a bilateral sectoral agreement that ties market access to carbon intensity.** The low probability of a U.S.-India FTA for the foreseeable future does not mean new market access arrangements between Washington and New Delhi are presumptively off the table. As demonstrated by the U.S.-initiated GASSA negotiations with the European Union, the United States is open to the creative use of tariffs and import restrictions to encourage decarbonization of industry and trade in clean technologies and low-carbon commodities. Just as with

GASSA, compelling environmental and economic grounds exist for a sectoral agreement between the United States and India that recognizes the investments both sides are making in decarbonization and mitigates the market-distorting effects of Chinese excess capacity. A green goods and services list, described above, could be the basis for such an agreement, but it may be more feasible to focus on a specific industrial ecosystem such as green hydrogen and low-carbon steel, lithium and EV batteries, or carbon capture technology and low-carbon cement clinker.

There is also an opportunity to create minilateral platforms for cooperating on technology co-development and manufacturing in specific sectors. Such an approach recognizes that clean technology products are rapidly evolving and negotiations solely on market access for existing technologies hide the potential for collaborating on creating and expanding markets for incremental and breakthrough technological advances.

- **Explore a climate peace clause.** The settling of seven WTO disputes between India and the United States in the past two years, two of which related to clean energy, could serve as a foundation for a broader entente between the two countries on trade matters. A recent discussion paper¹²⁶ by two U.S. nongovernmental organizations—the Sierra Club and the Trade Justice Education Fund—set out the policy rationale and design features of “climate peace clauses,” defined in the paper as “a time-bound, self-enforcing commitment from governments to refrain from using dispute settlement mechanisms in international trade agreements to challenge other countries’ climate mitigation and/or clean energy transition measures.” Such peace clauses could be tailored to match the shared interests of the parties, for example, by applying only to explicitly enumerated goods such as solar products or to specific legal regimes such as the GATT. For the United States and India, a bilateral climate peace clause would not only serve as a helpful adjunct to other forms of trade cooperation but would also signal the importance of creating policy space for ambitious green industrial planning.
- **Deepen cooperation around critical minerals.** There is no shortage of discussion of critical minerals in diplomatic settings—including between Washington and New Delhi—but to date, these conversations have produced few concrete steps to ensure stable and predictable supply chains or to reduce material intensity in clean technologies. India and the United States should accordingly pursue greater cooperation around critical minerals both bilaterally and through the Quad. Areas for collaboration include:
 - Tools to encourage end-of-life recycling of batteries, solar panels, and other minerals-intensive goods, including facilitating trade in waste across borders

- Joint investment in new technologies to explore and mine critical minerals
- Coordinated research and development and use of public procurement to incubate and commercialize alternative, material-efficient technologies
- Establishment of a critical minerals strategic stockpile as a safety net for unexpected supply chain disruptions

■ **Host constructive discussions around border carbon adjustments.** The European Union’s introduction of its Carbon Border Adjustment Mechanism (CBAM), which applies a fluctuating fee to imports based on their embodied carbon content, has generated mixed and often passionate reactions around the world. New Delhi has indicated it has not ruled out challenging the EU CBAM in the WTO, even as it is considering measures to minimize the competitive disadvantage carbon tariffs would create for its exports. For their part, the U.S. policymakers are also considering some form of border carbon adjustment (BCA), which if enacted, would likely be substantially different from the EU CBAM in its design and scope.

The politics of BCAs make it unlikely that Washington and New Delhi will see eye to eye on these issues. Even so, there is an opportunity to avoid the intense acrimony generated by the EU CBAM—which is partly a result of inconsistent and condescending messaging from Brussels—and partly a function of design elements that much of the Global South views as unnecessarily provocative and coercive, such as allocation of CBAM revenues to the general EU budget and a myopic focus on carbon pricing to the exclusion of other forms of climate ambition. Constructive, closed-door conversations among U.S. and Indian officials about BCA design and implementation, including discussion of reduced fees for developing countries and offsetting investments in industrial decarbonization, could prevent an eventual U.S. BCA from spoiling broader U.S.-India cooperation on climate and trade.

■ **Promote diffusion of next-generation climate technologies.** India and other developing countries remain concerned about the concentration of clean tech intellectual property. A CEEW study¹²⁷ found that 20 countries owned about 85 percent of published renewable energy patent applications between 2000 and 2023, within which group Japan, the United States, Germany, China, and the Republic of Korea accounted for 85 percent of the published applications. The Rhodium Group has predicted that the IRA’s catalytic investments into emerging climate technologies could contribute to major emissions reductions outside the United States in five to 10 years. As these technologies mature,

the United States and India should discuss measures to speed their diffusion and commercialization in India to open new decarbonization pathways for the country. Such measures could include using public procurement to provide a stable market for such technologies, compulsory licensing arrangements to facilitate technology transfer, and enhanced market access for U.S. exports.

Conclusion

No matter how the United States and India cooperate on green trade, their partnership is likely to reverberate well beyond the bilateral relationship. At a time when global trade rules and institutions are at risk of obsolescence and climate-related trade measures have attracted fierce criticism from the Global South, a deal between New Delhi and Washington would send a strong message that developed and developing countries can work together to prosper in a global economy defined by transformative industrial policy, great power competition, and the rise of clean energy industries. Rather than fall back into old patterns, the United States and India should embrace this message and exercise global leadership on trade at a moment when it is sorely needed.

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Endnotes

- 1 Sheila A. Smith, "The Quad in the Indo-Pacific: What to Know," Council on Foreign Relations, May 27, 2021, available at <https://www.cfr.org/in-brief/quad-indo-pacific-what-know>.
- 2 Office of the United States Trade Representative, "What They Are Saying: USTR Resolves Last Outstanding WTO Dispute with India," Press release, September 11, 2023, available at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/september/what-they-are-saying-ustr-resolves-last-outstanding-wto-dispute-india>.
- 3 Embassy of India, "Launch of India-US Strategic Trade Dialogue," available at <https://www.indianembassyusa.gov.in/News?id=249871> (last accessed October 2024).
- 4 T. N. Srinivasan and Suresh D. Tendulkar, "India in the GATT and the WTO," in *Reintegrating India with the World Economy*, (Washington, DC: IIE Press, 2003), available at https://www.pie.com/publications/chapters_preview/98/3iie2806.pdf.
- 5 Eric Neumayer, "Developing countries in the WTO: support or resist the 'millennium' round?," *Development in Practice* 9 (5) (1999): 592-595, available at <https://www.tandfonline.com/doi/abs/10.1080/09614529952710>.
- 6 United State International Trade Commission, "U.S. Trade Policy since 1934," available at https://www.usitc.gov/publications/332/us_trade_policy_since1934_ir6_pub4094.pdf.
- 7 Anupam Manur, "From Protectionism to Global Integration: India's Trade Policy Before and After 1991," (Fairfax, VA: The 1991 Project, 2022), available at https://the1991project.com/sites/default/files/2022-05/Manur_India-Imports-1991.pdf.
- 8 Jayati Ghosh, "India faces criticism for blocking global trade deal, but is it justified?," *The Guardian*, August 22, 2014, available at <https://www.theguardian.com/global-development/poverty-matters/2014/aug/22/india-criticism-blocking-global-trade-deal>.
- 9 Ann Danaiya Usher, "South Africa and India push for COVID-19 patents ban," *The Lancet* 396 (10265) (2020): 1790-1791, available at [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)32581-2/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32581-2/fulltext).
- 10 Biswajit Dhar, "Analysing India's FTA Policy Shifts," Madhyam, June 5, 2024, available at <https://www.madhyam.org.in/analysing-indias-fta-policy-shifts/>.
- 11 Sanjaya Baru, "India and the World – Economics and Politics of the Manmohan Singh Doctrine in Foreign Policy" (Tower Block, Singapore: National University of Singapore, 2008), available at https://www.isas.nus.edu.sg/wp-content/uploads/media/isas_papers/Working%20Paper%2053%20-%20Email%20-%20India%20and%20the%20World%20-%20Manmohan%20Singh%20Doctrine.pdf.
- 12 Via Campesina, "India, Farmer's and Trade Unions Protest against the EU India FTA," International Peasants Movement, March 5, 2013, available at <https://viacampesina.org/en/india-farmer-s-and-trade-unions-protest-against-the-eu-india-fta/>.
- 13 Mihir Sharma, "View: India is losing faith in free-trade agreements," *The Economic Times*, April 10, 2017, available at <https://economictimes.indiatimes.com/news/economy/foreign-trade/view-india-is-losing-faith-in-free-trade-agreements/articleshow/58101274.cms>.
- 14 Surupa Gupta and Sumit Ganguly, "Why India Refused to Join the World's Biggest Trading Bloc," *Foreign Policy*, November 23, 2020, available at <https://foreignpolicy.com/2020/11/23/why-india-refused-to-join-rcep-worlds-biggest-trading-bloc/>.
- 15 Global Trade Research Initiative, "India FTA outlook 2024" (New Delhi, India: 2024), available at <https://gtri.co.in/gtriFlagshipReports.asp?ID=26>.
- 16 Parth Sharma, "The Australia-India Trade Agreement: The Start of Something More for India?" September 28, 2023, *The Diplomat*, available at <https://thediplomat.com/2023/09/the-australia-india-trade-agreement-the-start-of-something-more-for-india%E2%80%AF/>.
- 17 Peter Hoskins, "India signs \$100bn free trade deal with four European nations," *BBC*, March 10, 2024, available at <https://www.bbc.com/news/world-asia-68531241>.
- 18 Amitendu Palit, "Decoding India's revived Free Trade Agreement rush," *World Economic Forum*, September 15, 2022, available at <https://www.weforum.org/agenda/2022/09/decoding-india-s-revived-free-trade-agreement-rush/>.
- 19 Office of the United States Trade Representative, "Remarks of Ambassador Katherine Tai Outlining the Biden-Harris Administration's 'Worker-Centered Trade Policy,'" *Press release*, June 2021, available at <https://ustr.gov/about-us/policy-offices/press-office/speeches-and-remarks/2021/june/remarks-ambassador-katherine-tai-outlining-biden-harris-administrations-worker-centered-trade-policy>.
- 20 Ryan Mulholland, Trevor Sutton, and Timothy Meyer, "Designing a New Paradigm in Global Trade," *Center for American Progress*, May 20, 2024, available at <https://www.americanprogress.org/article/designing-a-new-paradigm-in-global-trade/>.
- 21 Robert D. Atkinson, "Biden's Indo-Pacific Economic Framework Is a Paradigm Shift," *Foreign Policy*, July 1, 2022, available at <https://foreignpolicy.com/2022/07/01/biden-ipef-indo-pacific-trade-economics-china/>.
- 22 The White House, "FACT SHEET: President Biden Takes Action to Protect American Workers and Businesses from China's Unfair Trade Practices," *Press release*, May 14, 2024, available at <https://www.whitehouse.gov/briefing-room/statements-releases/2024/05/14/fact-sheet-president-biden-takes-action-to-protect-american-workers-and-businesses-from-chinas-unfair-trade-practices/#:~:text=The%20tariff%20rate%20on%20electric,2023%E2%80%94jeopardizing%20productive%20investments%20elsewhere>.
- 23 Nikunj Ohri, Shivaji Acharya, and Muralikumar, "India will not rush into signing free trade deals, says minister," *Reuters*, February 23, 2024, available at <https://www.reuters.com/world/india/india-will-not-rush-into-signing-free-trade-deals-says-minister-2024-02-23/>.
- 24 ICEF Monitor, "Major new trade agreement with India will help to further boost the recovery of Australia's foreign enrolment," January 11, 2023, available at <https://monitor.icef.com/2023/01/major-new-trade-agreement-with-india-will-help-to-further-boost-the-recovery-of-australias-foreign-enrolment/>.
- 25 Shruti Srivastava, Bastian Benrath-Wright, and Hugo Miller, "India Wins \$100 Billion Investment Pledge in EFTA Trade Deal," *Bloomberg*, March 10, 2024, available at <https://www.bloomberg.com/news/articles/2024-03-10/india-efta-bloc-sign-free-trade-pact-after-16-years-in-making>.

- 26 Aditya Bhattacharjea, "Industrial policy in India since independence," *Indian Econ Rev* 57 (2) (2022): 565-598, available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9940074/>.
- 27 Anupam Manur, "From Protectionism to Global Integration: India's Trade Policy Before and After 1991," (Fairfax, VA: The 1991 Project, 2022), available at https://the1991project.com/sites/default/files/2022-05/Manur_India-Imports-1991.pdf.
- 28 The Hindu, "China's share in India's industrial goods imports jump to 30% from 21% in last 15 years: GTRI," April 28, 2024, available at <https://www.thehindu.com/business/Economy/chinas-share-in-indias-industrial-goods-imports-jump-to-30-from-21-in-last-15-years-gtri/article68117064.ece>.
- 29 Institute for Studies in Industrial Development, "Towards Green Industrialization in India: Challenges and Opportunities," (New Delhi: 2022), available at <https://isid.org/wp-content/uploads/2022/07/PB2203.pdf>.
- 30 Make in India, "Home," available at <https://www.makeinindia.com/> (last accessed October 2024).
- 31 Make in India, "Industrial Corridor," available at <https://www.makeinindia.com/live-projects-industrial-corridor#:~:text=The%20corridor%20covers%20an%20overall,business%20capital%2D%20Mumbai%20of%20India.&text=The%20US%24%2090%20Bn%20project,receipts%20issued%20by%20Indian%20companies> (last accessed October 2024).
- 32 Aurelia Glass and David Madland, "Communities That Lost Manufacturing Jobs Are Main Beneficiaries of Biden Administration's New Industrial Policy," Center for American Progress, March 6, 2024, available at <https://www.americanprogress.org/article/communities-that-lost-manufacturing-jobs-are-main-beneficiaries-of-biden-administrations-new-industrial-policy/>.
- 33 Swaminathan S. Anklesaria Aiyar, "India's New Protectionism Threatens Gains from Economic Reform," CATO Institute, October 18, 2018, available at <https://www.cato.org/policy-analysis/indias-new-protectionism-threatens-gains-economic-reform>.
- 34 Arunabha Ghosh and Rishabh Jain, "Australia and India should partner up to accelerate the clean energy transition," Australian Strategic Policy Institute, May 8, 2024, available at <https://www.aspistrategist.org.au/australia-and-india-should-partner-up-to-accelerate-the-clean-energy-transition/>.
- 35 Office of the United States Trade Representative, "United States and Japan Sign Critical Minerals Agreement," *Press Release*, March 2023, available at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/march/united-states-and-japan-sign-critical-minerals-agreement>.
- 36 Catrina Rorke and Matthew C. Porterfield, "The Global Arrangement for Sustainable Steel and Aluminum & New Opportunities for Climate Cooperation," Climate Leadership Council, December 13, 2023, available at <https://clccouncil.org/report/gassa-new-opportunities/>.
- 37 Adam Davidson, "U.S. Takes Chinese Trade Complaints to WTO," National Public Radio, April 9, 2007, available at <https://www.npr.org/2007/04/09/9482797/u-s-takes-chinese-trade-complaints-to-wto>.
- 38 Edward Gresser, "Obama's Trade Policy Taking Shape – Part I," YaleGlobal Online, September 14, 2009, available at <https://archive-yaleglobal.yale.edu/content/obamas-trade-policy-taking-shape-part-i>.
- 39 Chad P. Brown, and Melina Kolb, "Trump's Trade War Timeline: An Up-to-Date Guide," Peterson Institute for International Economics, December 31, 2023, available at <https://www.piie.com/blogs/trade-and-investment-policy-watch/2018/trumps-trade-war-timeline-date-guide>.
- 40 Gary Hufbauer, "Biden–Trump lurch to tariffs a turning point in world economic history," East Asia Forum, June 2, 2024, available at <https://eastasiaforum.org/2024/06/02/biden-trump-lurch-to-tariffs-a-turning-point-in-world-economic-history/>.
- 41 The White House, "FACT SHEET: President Biden Takes Action to Protect American Workers and Businesses from China's Unfair Trade Practices," Press release, May 14, 2024, available at <https://www.whitehouse.gov/briefing-room/statements-releases/2024/05/14/fact-sheet-president-biden-takes-action-to-protect-american-workers-and-businesses-from-chinas-unfair-trade-practices/#:~:text=The%20tariff%20rate%20on%20electric,2023%E2%80%9494%20paradizing%20productive%20investments%20elsewhere>.
- 42 Till Schöfer and Clara Weinhardt, "Developing-country status at the WTO: the divergent strategies of Brazil, India and China," *International Affairs* 96 (6) (2022): 1937-1957, available at <https://academic.oup.com/ia/article/98/6/1937/6783062>.
- 43 Directorate General of Trade Remedies, "Anti-Dumping Cases," available at <https://www.dgtr.gov.in/anti-dumping-cases> (last accessed October 2024).
- 44 Rajeev Jayaswal, "Centre tightens norms on business with 'hostile countries' China, Pakistan," *Hindustan Times*, October 12, 2023, available at <https://www.hindustantimes.com/india-news/centre-tightens-norms-on-business-with-hostile-countries-china-pakistan-101697078675285.html>.
- 45 Matthew Tostevin, "World's biggest trade pact shapes up without India," Reuters, November 5, 2019, available at <https://www.reuters.com/article/idUSKBN1XF0YT/>.
- 46 Observer Research Foundation, "Why India is losing out on CPTPP," *Hindustan Times*, January 7, 2022, available at <https://www.orfonline.org/research/why-india-is-losing-out-on-cptpp>.
- 47 Chad P. Brown, "Trump's Mini-Trade War with India," Peterson Institute of International Economics, July 8, 2019, available at <https://www.piie.com/blogs/trade-and-investment-policy-watch/trumps-mini-trade-war-india>.
- 48 Indian Embassy, "Launch of India-US Strategic Trade Dialogues," available at <https://www.indianembassyusa.gov.in/News?id=249871> (last accessed October 2024).
- 49 U.S. Department of Commerce, "Joint Statement of India-U.S. Commercial Dialogue," Press release, March 14, 2023, available at <https://www.commerce.gov/news/press-releases/2023/03/joint-statement-india-us-commercial-dialogue>.
- 50 Global Trade Research Initiative, "India FTA outlook 2024" (New Delhi, India: 2024), available at <https://gtri.co.in/gtriFlagshipReports.asp?ID=26>.
- 51 Office of the U.S Trade Representative, "2023 National Trade Estimate Report on Foreign Trade Barriers," 2023, available at <https://ustr.gov/sites/default/files/2023-03/2023%20NTE%20Report.pdf>.
- 52 Office of the U.S. Trade Representative, "United States Will Terminate GSP Designation of India and Turkey," Press release, March 4, 2019, available at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2019/march/united-states-will-terminate-gsp>.

- 53 Chad P. Brown, "Trump's Mini-Trade War with India," Peterson Institute of International Economics, July 8, 2019, available at <https://www.piie.com/blogs/trade-and-investment-policy-watch/trumps-mini-trade-war-india>.
- 54 European Commission, "EU-US Trade and Technology Council," available at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/stronger-eu-rope-world/eu-us-trade-and-technology-council_en (last accessed October 2024).
- 55 Dr. Priyanka Wandhe, "An Overview on Production Linked Incentive (PLI) Scheme by The Government of India," SSRN, January 12, 2024, available at [https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4693578#:~:text=The%20Production%20Linked%20Incentive%20\(PLI\),and%20reducing%20reliance%20on%20imports](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4693578#:~:text=The%20Production%20Linked%20Incentive%20(PLI),and%20reducing%20reliance%20on%20imports).
- 56 Ministry of New and Renewable Energy, "MNRE formulates policies to develop and facilitate domestic solar manufacturing capabilities," February 9, 2023, available at <https://pib.gov.in/PressReleasePage.aspx?PRID=1897774>.
- 57 Jennifer A. Dlouhy, Brian Eckhouse, and Justin Sink, "Biden Extends Trump's Solar Tariffs With Key Exemption," Bloomberg, February 4, 2022, available at <https://www.bloomberg.com/news/articles/2022-02-04/biden-extends-trump-solar-tariffs-with-key-exemption>.
- 58 Paul Denholm and others, "Examining Supply-Side Options to Achieve 100% Clean Electricity by 2035," U.S. National Renewable Energy Laboratory, 2022, available at <https://www.nrel.gov/docs/fy22osti/81644.pdf>.
- 59 Central Electricity Authority, "National Electricity Plan," May 2023, available at https://cea.nic.in/wp-content/uploads/notice/2023/06/NEP_2022_32_FINAL_GAZETTE_English.pdf.
- 60 Neshwin Rodrigues, "Beyond Tripling: India needs \$101bn additional financing for the net-zero pathway," EMBER, November 29, 2023, available at https://ember-climate.org/app/uploads/2023/11/Beyond-Tripling_India-needs-financing-to-reach-net-zero-2.pdf.
- 61 Vaibhav Chaturvedi and Ankur Malyan, "Implications of a Net-Zero Target for India's Sectoral Energy Transitions and Climate Policy" (New Delhi: Council on Energy, Environment, and Water: 2022), available at <https://www.ceew.in/publications/implications-net-zero-target-indias-sectoral-energy-transitions-and-climate-policy>.
- 62 Diana DiGangi, "US deployed a record 32 GW of solar generating capacity in 2023: SEIA," Utility Dive, March 6, 2024, available at <https://www.utilitydive.com/news/solar-installation-capacity-manufacturing-modules/709414/>.
- 63 EnergyTrend, "India's Solar Module Manufacturing Capacity Exceeds 64 GW," TrendForce Corporation, March 29, 2024, available at <https://www.energytrend.com/news/20240329-46235.html>.
- 64 U.S. Department of Energy, "Wind Energy: Supply Chain Deep Dive Assessment," February 24, 2022, available at <https://www.energy.gov/sites/default/files/2022-02/Wind%20Supply%20Chain%20Report%20-%20Final%202.25.22.pdf>.
- 65 Global Wind Energy Council India and MEC+, "India's Wind Energy Market Outlook 2023-2027" (New Delhi: 2023), available at <https://gwec.net/wp-content/uploads/2023/08/GWEC-India-Outlook-Aug-2023-1.pdf>.
- 66 International Energy Agency, "Critical Minerals Market Review 2023," July 2023, available at <https://www.iea.org/reports/critical-minerals-market-review-2023>.
- 67 Nicole Gentile and others, "Sustainable and Reliable: Securing Resources for the Clean Energy Future," Center for American Progress, September 28, 2023, available at <https://www.americanprogress.org/article/sustainable-and-reliable-securing-resources-for-the-clean-energy-future/>.
- 68 Akanksha Tyagi and others, "Addressing Vulnerabilities in the Supply Chain of Critical Minerals" (New Delhi: CEEW and Paris: IEA and Davis, CA: UC-Davis and New Delhi: WRI India, 2023) available at <https://www.ceew.in/publications/addressing-vulnerabilities-in-the-supply-chain-of-critical-minerals>.
- 69 Ibid.
- 70 Ministry of Mines, "Thirty Critical Minerals List Released," Press release, July 24, 2023, available at <https://pib.gov.in/PressReleasePage.aspx?PRID=1942027>.
- 71 Ani, "India to soon be ready for \$1 trn exports: Vaishnav on 'Make in India' goal," Business Standard, December 7, 2023, available at https://www.business-standard.com/economy/news/india-to-soon-be-ready-for-1-trn-exports-vaishnav-on-make-in-india-goal-123120700890_1.html.
- 72 Anindya Upadhyay, "PM Narendra Modi said to plan \$3.1 billion boost for India's solar factories," The Economic Times, October 18, 2016, available at <https://economictimes.indiatimes.com/industry/energy/power/pm-narendra-modi-said-to-plan-3-1-billion-boost-for-indias-solar-factories/articleshow/54913654.cms?from=mdr>.
- 73 Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition," (New Delhi: Council on Energy, Environment, and Water: 2023), available at <https://www.ceew.in/publications/developing-resilient-renewable-energy-supply-chains-for-global-clean-energy-transition>.
- 74 Saurav Anand, "Wind and solar exports surge: India's green manufacturing makes global mark," Energyworld, February 11, 2024, available at <https://energy.economictimes.indiatimes.com/news/renewable/wind-and-solar-exports-surge-indias-green-manufacturing-makes-global-mark/107873579>.
- 75 Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition," (New Delhi: Council on Energy, Environment, and Water: 2023), available at <https://www.ceew.in/publications/developing-resilient-renewable-energy-supply-chains-for-global-clean-energy-transition>.
- 76 Bloomberg News, "China's Wind Turbine Makers Extend Dominance as Vestas, GE Slip," March 27, 2024, available at <https://www.bloomberg.com/news/articles/2024-03-27/china-s-wind-turbine-makers-extend-dominance-as-vestas-ge-slip>.
- 77 Dhruv Warrior and others, "Strengthening India's Clean Energy Supply Chains," (New Delhi: Council on Energy, Environment, and Water: 2024), available at <https://www.ceew.in/publications/how-can-india-boost-clean-energy-supply-chains-to-build-manufacturing-competitiveness-in-energy-market>.
- 78 Ministry of New and Renewable Energy, "National Green Hydrogen Mission," available at <https://mnre.gov.in/national-green-hydrogen-mission/#:~:text=The%20National%20Green%20Hydrogen%20Mission,efficiently%20transport%20and%20distribute%20hydrogen>. (last accessed October 2024).
- 79 Brian Deese, John Podesta, and Jake Sullivan, "Brian Deese, John Podesta and Jake Sullivan on the Inflation Reduction Act," The Economist, January 24, 2023, available at <https://www.economist.com/by-invitation/2023/01/24/brian-deese-john-podesta-and-jake-sullivan-on-the-inflation-reduction-act>.

- 80 Kate Larsen and others, "Global Emerging Climate Technology Diffusion and the Inflation Reduction Act," (New York, NY, Rhodium Group, 2023), available at <https://rhg.com/research/emerging-climate-technology-ira/>.
- 81 Kiel Institute, "China's Massive Subsidies for Green Technologies," March 4, 2024, available at <https://www.ifw-kiel.de/publications/news/chinas-massive-subsidies-for-green-technologies/>.
- 82 Michael Pettis, "What Will It Take for China's GDP to Grow at 4-5 Percent Over the Next Decade?" Carnegie Endowment for International Peace, December 4, 2023, available at <https://carnegieendowment.org/china-financial-markets/2023/12/what-will-it-take-for-chinas-gdp-to-grow-at-4-5-percent-over-the-next-decade?lang=en>.
- 83 International Energy Agency, "Solar PV Global Supply Chains Executive Summary," available at <https://www.iea.org/reports/solar-pv-global-supply-chains/executive-summary> (last accessed October 2024).
- 84 International Energy Agency, "Energy Technology Perspectives 2023," (Paris:2023), available at <https://iea.blob.core.windows.net/assets/a86b480e-2b03-4e25-bae1-da1395e0b620/EnergyTechnologyPerspectives2023.pdf>.
- 85 Ibid.
- 86 Akanksha Tyagi and others, "Addressing Vulnerabilities in the Supply Chain of Critical Minerals" (New Delhi: CEEW and Paris: IEA and Davis, CA: UC-Davis and New Delhi: WRI India, 2023) available at <https://www.ceew.in/publications/addressing-vulnerabilities-in-the-supply-chain-of-critical-minerals>.
- 87 Sam Hawkins, "Solar exports from China increase by a third," (London: EMBER, 2023), available at <https://ember-climate.org/insights/research/china-solar-exports/>.
- 88 U.S. Department of Commerce, "Department of Commerce Issues Final Determination of Circumvention Inquiries of Solar Cells and Modules from China." Press release, August 18, 2023, available at <https://www.commerce.gov/news/press-releases/2023/08/department-commerce-issues-final-determination-circumvention-inquiries>.
- 89 Finlay Colville, "Chinese companies supplied half of US PV modules in 2023," PV Tech, March 20, 2024, available at <https://www.pv-tech.org/chinese-companies-supplied-half-of-us-pv-modules-in-2023/>.
- 90 U.S. Department of Energy, "Land-Based Wind Market Report: 2023 Edition," (Washington, DC: 2023), available at <https://www.energy.gov/sites/default/files/2023-08/land-based-wind-market-report-2023-edition.pdf>.
- 91 Garrett Hering and Anna Duquiatan, "US lithium-ion battery imports smash record in Q1 2023," S&P Global, May 30, 2023, available at <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/us-lithium-ion-battery-imports-smash-record-in-q1-2023-75942381>.
- 92 Outlook Business, "Chinese Firms Exploit FTA Loopholes To Import Of Cheaper Solar Modules," November 10, 2023, available at <https://www.outlookbusiness.com/news/chinese-firms-exploit-fta-loopholes-to-import-of-cheaper-solar-modules#:~:text=In%20April%202022%2C%20New%20Delhi,report%20by%20the%20Economic%20Times>.
- 93 Vinod Mahanta, "Import of cheaper solar modules on rise as China exploits loopholes," The Economic Times, December 7, 2023, available at <https://economictimes.indiatimes.com/industry/renewables/import-of-cheaper-solar-modules-on-rise-as-china-exploits-loopholes/articleshow/105104240.cms?from=mdr>.
- 94 Energyworld, "Solar-like duty structure for wind sector to check Chinese imports," Economic Times, August 1, 2020, available at <https://energy.economictimes.indiatimes.com/news/renewable/solar-like-duty-structure-for-wind-sector-to-check-chinese-imports/77295541>.
- 95 Dhiyanesh Ravichandran, "ACC PLI: It's official now, Ola, Hyundai, Reliance New Energy Solar, and Rajesh Exports qualify," Emerging Technology News, March 24, 2022, available at <https://etn.news/buzz/acc-pli-scheme-qualified-bidders-official-announcement-battery-manufacturing-india>.
- 96 Akanksha Tyagi and others, "Developing Resilient Renewable Energy Supply Chains for Global Clean Energy Transition," (New Delhi: Council on Energy, Environment, and Water: 2023), available at <https://www.ceew.in/publications/developing-resilient-renewable-energy-supply-chains-for-global-clean-energy-transition>.
- 97 Folashadé Soulé, "What a U.S.-DRC-Zambia Electric Vehicle Batteries Deal Reveals About the New U.S. Approach Toward Africa," Carnegie Endowment for International Peace, August 21, 2023, available at <https://carnegieendowment.org/research/2023/08/what-a-us-drc-zambia-electric-vehicle-batteries-deal-reveals-about-the-new-us-approach-toward-africa?lang=en>.
- 98 Ibid.
- 99 Trevor Hunnicutt and Ernest Scheyder, "Exclusive: US, Indonesia to discuss potential for deal on EV minerals," Reuters, November 12, 2023, available at <https://www.reuters.com/markets/commodities/us-indonesia-discuss-potential-deal-ev-minerals-sources-2023-11-12/>.
- 100 Stella Yifan Xie and Tom Fairless, "China Is Making Too Much Stuff – and Other Countries Are Worried," The Wall Street Journal, November 10, 2023, available at <https://www.wsj.com/economy/trade/china-is-making-too-much-stuff-and-other-countries-are-worried-f949cd27>.
- 101 Chang Woon Nam, "Lessons Learned from the Failure of 'Make in India' Industrial Reform Policy," *CESifo Forum* 23 (4) (2022): 57-61, available at <https://www.cesifo.org/DocDL/CESifo-Forum-2022-4-nam-make-in-india-july.pdf>.
- 102 Rohit Lamba and Raghuram Rajan, "Modi's Middling Economy," Foreign Affairs, May 28, 2024, available at <https://www.foreignaffairs.com/india/modis-middling-economy>.
- 103 M. Suresh Babu, "Why 'Make in India' has failed," The Hindu, January 20, 2020, available at <https://www.thehindu.com/opinion/op-ed/why-make-in-india-has-failed/article30601269.ece>.
- 104 Camille Boullenois, Agatha Kratz and Daniel H. Rosen, "Overcapacity at the Gate" (New York: Rhodium Group, 2024), available at <https://rhg.com/research/overcapacity-at-the-gate/>.
- 105 The Economic Times, "PLI schemes attract over Rs 1.06 lakh crore investment till Dec; pharma sector gets major chunk," March 31, 2024, available at <https://economictimes.indiatimes.com/news/economy/policy/pli-schemes-attract-over-rs-1-06-lakh-crore-investment-till-dec-pharma-sector-gets-major-chunk/articleshow/108913421.cms>.
- 106 Kalpana Pathak, "Reliance Industries Ltd rides PLI schemes to close in on \$1-1.5/kg Green H2 target," The Economic Times, January 23, 2024, available at https://m.economictimes.com/industry/renewables/reliance-industries-ltd-rides-pli-schemes-to-close-in-on-1-1-5/kg-green-h2-target/amp_articleshow/107061807.cms.

- 107 Sohini Das, "PLI will be among biggest sources of funds for EV biz next yr: Tata Motors," *Business Standard*, February 2, 2024, available at https://www.business-standard.com/amp/companies/news/pli-will-be-one-of-the-biggest-sources-of-funds-next-year-tata-motors-124020201377_1.html.
- 108 Rajesh Kumar Singh, "Tata Explores \$8.5 Billion Clean Energy Investment in India's South," *Bloomberg*, January 9, 2024, available at <https://www.bloomberg.com/news/articles/2024-01-09/tata-explores-8-5-billion-clean-energy-investment-in-india-s-south>.
- 109 Tata Motors Group, "Electric Vehicles," in 77th Integrated Annual Report, 2022, available at <https://investors.tata-motors.com/financials/77-ar-html/pdf/Electric-Vehicles.pdf>.
- 110 Abhijeet Kumar, "India's FDI inflows fell 3% to \$44 bn in FY24; manufacturing down 18%," *Business Standard*, May 30, 2024, available at https://www.business-standard.com/economy/news/india-s-fdi-inflows-drop-3-to-44-b-in-fy24-manufacturing-sector-down-18-124053001043_1.html.
- 111 Arvind Subramanian, "The Sino-American Trade War Benefits China's Competitors," *The Wire China*, May 26, 2024, available at <https://www.thewirechina.com/2024/05/26/the-sino-american-trade-war-benefits-chinas-competitors/>.
- 112 *Business Standard*, "India has world's third largest start-up ecosystem: PM at Startup Mahakumbh," March 20, 2024, available at https://www.business-standard.com/industry/news/india-has-world-s-third-largest-startup-ecosystem-pm-at-startup-mahakumbh-124032000287_1.html.
- 113 Deekshith Pinto, "Indian startups raise \$3.1 Billion in VC funding in four months even as funding winter continues in the West," *Business Insider India*, May 30, 2024, available at <https://www.businessinsider.in/business/startups/indian-startups-raise-3-1-billion-in-venture-capital-in-four-months-even-as-funding-winter-continues-in-the-west/articleshow/110551138.cms>.
- 114 The Editorial Board, "Tariffs against China hamstring the transitions to a clean energy future," *The Washington Post*, May 16, 2024, available at <https://www.washingtonpost.com/opinions/2024/05/16/china-tariffs-climate-evs-energy/>.
- 115 The Editorial Board, "Biden's EV Tariffs Will Delay an Essential Transition," *Bloomberg*, May 28, 2024, available at <https://www.bloomberg.com/opinion/articles/2024-05-28/biden-s-tariffs-on-china-evs-delay-clean-energy-worsen-climate-change>.
- 116 Nichola Groom and David Greoria, "Record US renewable energy investment not enough to meet climate goals -report," *Reuters*, February 21, 2024, available at <https://www.reuters.com/sustainability/climate-energy/record-us-renewable-energy-investment-not-enough-meet-climate-goals-report-2024-02-21/>.
- 117 Eric Weshoff, "Can the US manufacture enough solar panels to meet its surging demand?" *Canary Media*, June 7, 2023, available at <https://www.canarymedia.com/articles/solar/can-the-us-manufacture-enough-solar-panels-to-meet-its-surging-demand>.
- 118 Jack Quinn, Christian Robles, and Brian Dabbs, "Biden hikes solar tariffs, launches import probe," *E&E News Politico*, May 16, 2024, available at <https://www.eenews.net/articles/biden-hikes-solar-tariffs-launches-import-probe/>.
- 119 Josh Boak, "US suggests possibility of penalties if production of Chinese electric vehicles moves to Mexico," *Associated Press*, May 14, 2024, available at <https://apnews.com/article/biden-tariffs-ev-china-mexico-tai-809b0e27339d38dcd3834d2cbb14e1d1>.
- 120 Office of the U.S. Trade Representative, "USTR Launches Review of Trade in Automotive Goods Under the USMCA," Press release, November 29, 2023, available at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/november/ustr-launches-review-trade-automotive-goods-under-usmca>.
- 121 Alan Rappoport, "Solar Companies Seek New U.S. Tariffs on Asian Imports," *The New York Times*, April 24, 2024, available at <https://www.nytimes.com/2024/04/24/business/solar-us-tariffs-asian-imports.html>.
- 122 Kevin Brunelli, "China Hawks Are Putting the Green Transition at Risk," *Foreign Policy*, December 6, 2023, available at <https://foreignpolicy.com/2023/12/06/china-electric-vehicle-restrictions-biden-us-green-transition/>.
- 123 Arunabha Ghosh and Himani Gangania, "Governing Clean Energy Subsidies" (New Delhi: Council on Energy, Environment, and Water, 2012), available at <https://www.ceew.in/publications/governing-clean-energy-subsidies>.
- 124 Daishi Chiba, Takashi Tsuji, and Anna Nishino, "Japan and EU to unify subsidy rules for EVs, solar panels," *Nikkei Asia*, April 26, 2024, available at https://asia.nikkei.com/Spotlight/Environment/Climate-Change/Japan-and-EU-to-unify-subsidy-rules-for-EVs-solar-panels?utm_campaign=IC_JP_update_free&utm_medium=email&utm_source=NA_newsletter&utm_content=article_link&del_type=4&pub_date=20240426070000&seq_num=3&si=0db9ec13-72b4-4cab-b8e8-ed08bc84e484.
- 125 *The Economic Times*, "India inks pact with EFTA, gets \$100 billion commitment," March 10, 2024, available at <https://economictimes.indiatimes.com/news/economy/foreign-trade/india-inks-pact-with-efta-gets-100-billion-commitment/articleshow/108373376.cms?from=mdr>.
- 126 Trade Justice Education Fund and Sierra Club, "The Case for and Design for a Climate Peace Clause," (Washington, DC: 2002), available at https://tradejusticefund.org/wp-content/uploads/ClimatePeaceClausePaper.pdf?link_id=1&can_id=b645707b2a6858d667c1f090744bfb41&source=email-labor-groups-demand-transparency-in-ongoing-trade-negotiations-2&email_referrer=email_1753569&email_subject=new-analysis-on-climate-peace-clause.
- 127 Tulika Gupta, Shuva Raha, and Hemant Mallya, "The G20 Imperative for Global IP Reform To Facilitate Clean Energy Transitions" (New Delhi: Council on Energy, Environment, and Water, 2023), available at <https://www.ceew.in/publications/g20-imperative-for-clean-energy-intellectual-property-rights-and-tech-reforms>.



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