Planetary Security INITIATIVE

IPCS
INSTITUTE OF PEACE AND CONFLICT STUDIES
INNOVATIVE RESEARCH • INDEPENDENT ANALYSIS • INFORMED OPINION

Policy Brief

Dr. Niharika Tagotra

FEBRUARY 2023

How Renewables are Shaping the India-China Relationship

Special Report #215

Energy security and climate change intersect foreign policy at the juncture of national security. India and China, as the world's largest emitters of greenhouse gases (GHGs), have committed to global climate change mitigation by announcing a substantial upscaling of renewable energy (RE) in their total energy mix. China, however, continues to dominate the production chains for rare earths, minerals like lithium and cobalt, and low-cost RE technologies. This Policy Brief explores the evolution of RE supply and value chains and how their increasing vulnerability impacts energy security, against the backdrop of the deteriorating India-China bilateral relationship. It addresses the following question: *How do ongoing efforts at scaling the use of RE in India and China, within the context of climate change mitigation and bilateral competition, impact the overall RE security landscape and bilateral ties between the two countries?*

Three key takeaways are taken from the analysis—two competitive and one cooperative—that necessitate closer policy scrutiny due to long-term implications for Indian energy security and geopolitical decision-making:

1. China's control over critical mineral supply chains negatively impacts India's RE security
2. India is taking steps to strengthen its RE security through indigenisation and diversification, but it needs to ramp up these measures to better offset Chinese monopoly
3. Despite growing energy security competition, there is potential for cooperation on climate change mitigation.

Introduction

The urgency around climate change mitigation has gained further salience with rising temperatures and drastically changing weather patterns that threaten human livelihoods. GHG emissions from the energy sector, particularly fossil fuels, contribute significantly to a rapidly changing climate. It is in this context that sustainability and accessibility of energy supplies form a key pillar of energy security. It has led to countries intensifying efforts to scale-up the share of RE sources in their total energy mix. Given, however, the vulnerability of renewable supply chains to monopolisation and disruption on a global scale, the scramble for clean energy technologies could also potentially have severe geopolitical implications for many countries.

This is particularly true in the case of India and China, which are two of the world's largest energy consumers. They have emerged as key players in the RE sector, with their large RE deployments and fast emerging domestic markets. This emergence coincides with the

two countries also competing for geopolitical positioning, especially in South Asia. While their border dispute predates their role in global energy markets, India's dominance in its traditional sphere of influence in the South Asian region has been increasingly challenged by China over the past two decades. China's establishment of diplomatic, economic, and military relationships with smaller countries in the region has raised security concerns in India and heightened the Sino-Indian rivalry.

This policy brief asks, and answers, one primary question: How do ongoing efforts at scaling the use of RE in India and China, against the backdrop of climate change mitigation and bilateral competition, impact the overall RE security landscape and bilateral ties between the two countries?

The Renewable Energy Landscape in India and China

As energy transitions pick up pace, renewables are increasingly powering various sectors of the economy, including electricity generation, transportation, and industries. Nearly eight out of the world's top ten economies have already declared their net zero targets. Between 2004 and 2014, with concerted efforts towards climate change mitigation, the global renewable power capacity saw a jump from 800 gigawatts (GW) in 2004 to 1560 GW in 2014.[1] It increased to 2378 GW in 2018, accounting for over a third of global power capacity.[2] Of all RE sources, solar and wind energy technology deployments had the maximum growth in this period.[3]

In terms of capacity, China has led the global transition, such that it alone added about 240 GW of RE capacity between 2004 and 2014.[4] In the same period, India added about 30 GW of RE capacity.[5] In 2018, renewables accounted for 728 GW of RE capacity in China, accounting for 38.3% of its total installed power capacity.[6] It stood at about 118.83 GW for India, with a share of 34.2% of India's total installed capacity.[7]

India and China have committed to greatly increasing the RE share in their total energy mix to meet net zero targets. China has committed to achieving net zero by 2060, whilst pledging to increase its installed capacity of wind and solar power to nearly 1200 GW by 2030.[8] It has further pledged to increase the consumption of non-hydro renewables in its total primary energy consumption to 25% by 2030[9]. India has updated its Nationally Determined Contribution (NDC) on emissions, committing to producing nearly 50% of its total electric power from non-fossil fuel-based energy sources by 2030.[10] India and China's commitments could also have geopolitical ramifications as they continue to increase power consumption in proportion to rising economic activities and support for domestic RE industries.

Policy Takeaway #1: China's control over critical mineral supply chains negatively impacts India's RE security

Critical and rare earth minerals, including lithium, cobalt, copper, gold, uranium, among others, form the backbone of the global RE technology manufacturing industry. These minerals are used

1 REN21 (2014), *The First Decade: 2004-2014*, Renewables Now: Paris.
2 REN21 (2019), *Renewables 2019: Global Status Report*, Renewables Now: Paris.
3 REN21 (2019), *Renewables 2019: Global Status Report*, Renewables Now: Paris.
4 REN21 (2014), *The First Decade: 2004-2014*, Renewables Now: Paris.
5 REN21 (2014), *The First Decade: 2004-2014*, Renewables Now: Paris.
6 Reuters (2019), "China's 2018 renewable power capacity up 12 percent on year", *Reuters*, 28 January 2019.
7 *PIB (2018), Press Information Bureau, Government of India, Year End Review 2018-MNRE, 10 December 2018.
8 Reuters (2020), "China's Xi targets steeper cut in carbon intensity by 2030", Reuters, December 13, 2020, China's Xi targets steeper cut in carbon intensity by 2030 | Reuters.
9 Xie, Echo (2021), "Climate change: China's energy regulator proposes target of 40 per cent renewables by 2030", *South China Morning Post*, 10 February 2021.
10 HT (2022), "Cabinet okays India's climate commitments", Hindustan Times, August 3, 2022.

in the production of solar panels, wind turbines, and storage batteries.[11] Rare earth elements (REE), comprising a group of 17 metals, are key inputs to produce electric vehicles, magnets, and other technologies that are essential to the RE industry.[12] Monopolising the production and supply chains of these critical minerals has become part of China's energy security strategy.[13]

In 1990, the Chinese government declared REEs a "protected and strategic mineral,[14]" which prohibited foreign investors from mining rare earths or participating in their smelting or separation projects, except in joint ventures with China's companies. Domestic rare earth producers and those in joint ventures with foreign companies are issued separate rare earth export quotas.[15] Chinese government policies encourage exports of "high value downstream products[16]" while discouraging exports of rare earth minerals as raw materials. This has translated into China accounting for nearly 57.57% of the total global rare earth production, amounting to 1,40,000 metric ton in 2020.[17] REE production monopoly has allowed China to weaponise their exports such that in 2021, in view of its ongoing trade war with the US, China announced curbs on the production and export of the 17 REE crucial to the production of American F-35s, electric vehicles, and wind turbines, amongst other items.[18]

Chinese monopoly over REEs extends to other minerals critical to renewable energy production technologies, such as lithium, indium and cobalt. Whilst Australia is the largest producer of lithium, a large portion of it is exported to China as spodumene, which goes into the manufacturing of batteries for electric vehicles.[19] Lithium-producing companies in Australia are partially owned by Chinese firms, with Chinese Tianqi Lithium owning a stake in Australian and Chilean lithium-producing companies and controlling 46% of global lithium production.[20] With this, China effectively dominates lithium-ion battery production, producing about "73% of the 316 Gigawatt-hours (Gwh) of global lithium cell manufacturing capacity."[21] Another material critical to lithium-ion battery production is graphite, of which China accounts for 70-80% of the total global production and nearly 100% of natural graphite.[22]

RE is an important component of China's Belt and Road Initiative (BRI) and based on the strengths of its domestic RE industry. In 2020, over half of China's BRI energy investments went into the RE sector, accounting for 57% or USD 11 billion of China's total energy investments.[23] This had gone up from the previous figure of 38% recorded in 2019.[24] China's domestic solar industry has also witnessed a remarkable rise. By 2021, eight of the top ten solar companies in the world were Chinese, dominating global solar supply chains.[25]

11 Office of Energy Efficiency and Renewable Energy (2022), Critical Minerals & Materials | Department of Energy.
12 Hart, Kerri (2018), "Rare earth metals and their role in renewable energy – benefits and challenges", Renewables Consulting Group.
13 Vekasi, Kristin (2019), "China's Control of Rare Earth Metals", *The National Bureau of Asian Research*, Washington DC.
14 Tse, Pui-Kwan (2011), "China's Rare-Earth Industry", US Geological Survery: Virginia.
15 Tse, Pui-Kwan (2011), "China's Rare-Earth Industry", US Geological Survery: Virginia.
16 Tse, Pui-Kwan (2011), "China's Rare-Earth Industry", US Geological Survery: Virginia.
17 Statista (2021), "Major countries in rare earth mine production worldwide 2020", Statista, n.d. Accessed on March 06, 2021.
18 Yu, Sun and Demetri Sevastopulo (2021), "China targets rare earth export curbs to hobble US defence industry", *Financial Times*, February 16, 2021.
19 Rathi, Akshat (2018), "One Chinese company now controls most of the metal needed to make the world's advanced batteries", *Quartz*, May 30, 2018.
20 Rathi, Akshat (2018), "One Chinese company now controls most of the metal needed to make the world's advanced batteries", *Quartz*, May 30, 2018.
21 Rapier, Robert (2019), "Why China Is Dominating Lithium-Ion Battery Production", *Forbes*, August 04, 2019.
22 Northern Graphite (2021), "The Graphite Supply Problem", Northern Graphite, n.d. Accessed on March 15, 2021.
23 Shepherd, Christian (2021), "China pours money into green Belt and Road projects", Financial Times, January 26, 2021.
24 Shepherd, Christian (2021), "China pours money into green Belt and Road projects", Financial Times, January 26, 2021.
25 Rapoza, Kenneth (2021), "How China's Solar Industry Is Set Up To Be The New Green OPEC", Forbes, March 14, 2021.

By the same year, China controlled nearly 64% of the global production of the polysilicon material, which is key to the manufacturing of solar ingots and wafers, and a total 100% production capacity of solar ingots and wafers themselves.[26] Cumulatively, China controlled 80% of the global solar cell manufacturing capacity by the end of 2020.[27]

This near-monopolisation of RE production and supply chains has significant repercussions for India's energy security. India has already declared its intention of moving towards clean energy, committing to producing nearly 500 GW of energy from clean fuels by 2030.[28] The country's domestic RE industry is being positioned to lead this energy transition. As per International Energy Agency (IEA) estimates, the electricity demand in India will rise to 3433 terawatt hours (Twh) by 2040.[29] Of this, 2413 Twh is expected to be met via renewables, which will need to have an installed capacity of nearly 1189 GW.[30] Around 800 GW of this will be generated by solar photovoltaic (PV), while offshore wind will contribute 30 GW.[31] Additionally, for its power sector alone, India will need a battery storage capacity of nearly 195 GW.[32] In the transport sector, nearly 40% of automobiles will be electric vehicles (EVs) by the year 2030.[33]

These requirements translate to a heightened demand for technologies, for which India intends to rely largely on its domestic industry.

26 Rapoza, Kenneth (2021), "How China's Solar Industry Is Set Up To Be The New Green OPEC", Forbes, March 14, 2021.
27 Rapoza, Kenneth (2021), "How China's Solar Industry Is Set Up To Be The New Green OPEC", Forbes, March 14, 2021.
28 PIB (2022), "India's Stand at COP-26", Press Information Bureau, Government of India.
29 India Energy Outlook (2021), by the International Energy Agency.
30 India Energy Outlook (2021), by the International Energy Agency.
31 India Energy Outlook (2021), by the International Energy Agency.
32 India Energy Outlook (2021), by the International Energy Agency.
33 India Energy Outlook (2021), by the International Energy Agency.

To strengthen its domestic industry, the Indian government announced production-linked incentive (PLI) schemes to manufacture of high efficiency solar PV modules and advanced chemistry cell batteries in 2020.[34] The manufacturing of these technologies will however require steady and affordable supplies of raw materials including critical minerals such as lithium, cobalt, copper, and certain rare earth minerals, which are under Chinese control.

Policy Takeaway #2: India is taking steps to strengthen its RE security through indigenisation and diversification, but it needs to ramp up these measures to better offset Chinese monopoly

Within clean energy technologies, Chinese dominance over raw materials and RE technology supply chains are a point of concern globally. China's near-monopoly over the production and supply chains of critical and rare earth minerals has already rung alarm bells in US policy circles. It will also have significant repercussions for India's RE programme, which is vulnerable because of its massive dependence on imported raw materials. Clean energy could become India's next oil problem.

The Indian government is increasingly prioritising the need to move away from importing raw materials, including lithium and cobalt—termed "strategic mineral assets" by Indian government officials[35]—from China, and towards domestic manufacturing of RE technology. India's has taken domestic policy steps to safeguard its domestic renewable market from Chinese dominance. By 2018, China's prowess in the renewable sector resulted in the country accounting for nearly "89% of India's total solar cell imports in 2017-18".[36] The alarming

34 PIB (2020), "Cabinet approves PLI Scheme to 10 key Sectors", Press Information Bureau, Government of India.
35 BT (2018), "India looks to acquire lithium, cobalt mines abroad", Business Today, July 09, 2018.
36 BS (2018), "China accounts for 89% of India;s total solar cells imports in 2017-18", Business Standard, August 01, 2018.

dominance of Chinese solar cells and equipment in India's renewable market and its challenge to Indian renewable manufacturers prompted the Indian government to announce an imposition of basic custom duty on all imported cells, modules, and inverters, starting April 2022.[37] A 40% duty on solar modules and 25% on solar cells was intended to make imports costlier and incentivise domestic manufacturing of these components in India.[38] These duties were to effectively replace the 15% safeguard duty imposed on imports from Malaysia and China since 2018.[39] Combined with restrictions on investment from neighbouring countries, these measures were intended to safeguard the domestic RE sector from Chinese dominance and prevent possible Chinese control over Indian energy security.

In 2018, India also announced the formation of a joint venture (JV) between state-owned public sector undertakings (PSUs) in the mining sector, along the lines of ONGC Videsh Limited, to facilitate the acquisition of key mineral assets from abroad and building up a strategic reserve.[40] These minerals, including lithium and cobalt, are critical to India's RE future given their importance to battery storage, solar PV technologies and wind turbine manufacturing. A JV called Khanij Bidesh India Ltd. (KABIL) was set up in 2019.[41] By 2020, KABIL had already begun exploration activities in Lithium-rich countries in Latin America, including Argentina, Bolivia, and Chile.[42] In collaboration with private sector companies, the Indian government could announce several such exploration and production ventures in countries that have surplus raw materials.

In 2017, India joined Japan, Australia, and the US in revitalising the Quadrilateral Security Dialogue or Quad, with the proposed "quadrilateral anchoring the Indo-Pacific."[43] It has drawn serious criticism from China, with Chinese Foreign Minister Wang Yi calling it an "Indo-Pacific NATO."[44] By 2021, the Quad had evolved to focus on issue areas that included securing supply chains in critical areas such as semiconductors[45] and clean energy.[46] The 2022 Quad Dialogue focused on furthering "efforts on green shipping, energy supply chains, disaster risk reduction, and the exchange of climate information services."[47] It also included plans to connect Australia's critical mineral raw materials with processing facilities and markets in other Quad countries. A clean energy supply chain summit , the Indo-Pacific Clean Energy Supply Chain Forum, was hosted by Australia in July 2022.[48]

De-monopolisation of renewable technology production and supply chains, capacity-building in the domain of RE technologies through the exchange of technologies, and financing pathways could be proposed for discussion at forums such as the Quad, Shanghai Cooperation Organisation (SCO) and the G20.

37 Prasad, Gireesh Chandra and Utpal Bhaskar (2021), "Steep import duty on solar cells, modules from Apr '22", Livemint, March 11, 2021.
38 Prasad, Gireesh Chandra and Utpal Bhaskar (2021), "Steep import duty on solar cells, modules from Apr '22", Livemint, March 11, 2021.
39 Prasad, Gireesh Chandra and Utpal Bhaskar (2021), "Steep import duty on solar cells, modules from Apr '22", *Livemint*, March 11, 2021.
40 PIB (2019), "KABIL Set up to Ensure Supply of Critical Minerals", Government of India, New Delhi. 8.
41 PIB (2019), "KABIL Set up to Ensure Supply of Critical Minerals", Government of India, New Delhi.
42 Siddiqui, Huma (2020), "South-South Co-operation: India and Argentina ink a strategic agreement on Lithium", Financial Express, July 13, 2020.
43 Madan, Tanvi (2017), "The Rise, Fall and Rebirth of the 'Quad'", War on the Rocks, November 16, 2017.
44 *MoFA (2020), "Wang Yi: U.S. Indo-Pacific Strategy; Undermines Peace and Development Prospects in East Asia", Ministry of Foreign Affairs of the People's Republic of China, October 13, 2020.
45 ET (2021), "Quad alliance joins hands to secure semi-conductor, 5G tech supply chains", The Economic Times, September 26, 2021.
46 Reuters (2021), "Quad nations to focus on clean-energy supply chain, says Australia PM", Reuters, September 25, 2021.
47 The White House (2022), "FACT SHEET: Quad Leaders' Tokyo Summit 2022", Washington DC.
48 Australian Government (2022), Indo-Pacific Clean Energy Supply Chain Forum (The Sydney Energy Forum) | Department of the Prime Minister and Cabinet (pmc.gov.au).

Policy Takeaway #3: Despite the burgeoning energy security competition between India and China, there is potential for cooperation on climate change mitigation

India-China energy security competition has been characterised by an increasing struggle for access to global oil and gas equity assets abroad and controlling sea lanes vital to their supplies. Over the past few years, the two countries have also been in competition to assume a leadership role in the global renewable manufacturing sector. Beyond this obvious competition, however, shades of cooperation are visible in the realm of global climate change mitigation. While the cooperation is limited and has done little to reduce their growing competition in the RE sector, it warrants separate examination because of its future potential to offset growing differences between India and China.

At COP15 in 2009, for example, New Delhi and Beijing came together to forge closer collaboration on the issue of balancing economic growth vis-à-vis international pressure to cut down back carbon emissions.[49] The Chinese insisted that this pressure was an attempt by Western countries to subvert developing countries' economic concerns, which required India and China alignment.[50] This collaboration came about even though the two were involved in another border standoff at the same time.[51] India-China cooperation and opposition to international pressure resulted in a significant hollowing out[52] of the Copenhagen Accord, marking a successful period in their bilateral relationship. At several climate forums, both countries have repeatedly found themselves demanding similar concessions and commitments from the developed countries over climate action. In 2015, for instance, leading up to the COP 21 negotiations, India and China released a joint statement on climate change,[53] which demanded the developed countries to take a lead "in reducing greenhouse gas emissions and providing finance, technology and capacity building support to developing countries."[54] The two countries reaffirmed their demand at the UN Summit in New York, where albeit in separate statements, both countries sought enhanced financial support from the developed countries.[55]

The bonhomie over climate change mitigation efforts, however, also faced frequent setbacks. Under the Xi Jinping presidency, for instance, China moved to sign the November 2014 joint announcement on climate change with the US.[56] This climate deal came as a surprise to the Indian establishment, which until then had expected to be on the same page as China on the issue of carbon emissions. The US-China climate agreement was said to have "pushed India into a corner" and "reduced the negotiating power of BASIC (Brazil, South Africa, India, and China) and G77 groups" by "robbing them of China's bargaining power."[57]

As a rejoinder to the Chinese announcement of 2014 and in a bid to secure for itself a leadership role in the global climate change mitigation efforts, India announced the launch of the International Solar Alliance (ISA) in 2015 at the COP-21.[58] It was significant because the ISA was the first intergovernmental organization

49 Bajoria, Jayshree (2009), "India's Climate Change Forecast", *Council on Foreign Relations*, September 21, 2009.
50 Saran, Shyam (2017), *How India Sees the World: Kautilya to the 21st Century*, Juggernaut Books.
51 Smith, Jeff M. (2009), "The China-India Border Brawl", The Wall Street Journal, June 24, 2009.
52 Lynas, Mark (2009), "How do I know China wrecked the Copenhagen deal? I was in the room", The Guardian, December 22, 2009.
53 MEA (2015), MEA | Statements : Bilateral/Multilateral Documents.
54 MEA (2015), MEA | Statements : Bilateral/Multilateral Documents.
55 Climate Home News (2019), "China and India demand cash for climate action on eve of UN summit".
56 Mukunth, Vasudevan (2014), "Why the US-China climate deal has pushed India into a corner", Scroll, November 13, 2014.
57 Mukunth, Vasudevan (2014), "Why the US-China climate deal has pushed India into a corner", Scroll, November 13, 2014.
58 UNCC(2015), "International Solar Energy Alliance Launched at COP21", International Solar Energy Alliance Launched at COP21 | UNFCCC.

to be headquartered in India, with an exclusive mandate to tackle climate change and fulfil Paris climate agreement ambitions through massive deployment of solar energy. The Prime Minister of India had also extended an invitation to China to join the initiative.[59] The Chinese side, however, had "neither responded to the invitation nor commented about ISA" for two years, until 2017 when China announced its plans to join the ISA.[60] This, however, did not bear fruit, as of 2022, China has not yet joined the alliance, despite the membership of nearly 100 countries.

The climate change issue offers ample space for cooperation between the two countries, despite existing tensions. The cooperation can, however, be made more meaningful if the two countries can come to an agreement about their common areas of concern in the climate domain and identify the issue areas, in terms of technology and finance, where tangible benefits can be obtained through cooperation can be forged. To do this, however, both the countries will need to significantly recalibrate their ties. It remains noteworthy that the ties between the two countries are "characterized not by a security dilemma, but by fundamental conflicts of interest,"[61] which are "exacerbated or ameliorated"[62] by the dynamics of their respective domestic politics and the overall geo-strategic context. To this end, the two countries will need to work on a dynamic of give and take, which will allow their leaders/officials to get to know and trust each other more.[63]

Conclusion

This policy brief offers three takeaways that necessitate closer policy scrutiny because of their long-term implications for Indian energy security. It makes the three conclusions against the backdrop of the India-China bilateral relationship, which is already strained and will likely deteriorate further as energy insecurity is added to the mix.

Indian energy and economic security, which face a rising threat from China, could lead New Delhi to adopt harder balancing against China. This situation can be reversed if policymakers on both sides agree to cooperate on energy-related issues, but the incentives for any such cooperation, at least from a Chinese perspective, diminish as the economic gap between the two countries increases. Furthermore, bilateral legacy issues, such as the border disputes, will continue to undermine any meaningful cooperation in this domain. India-China ties are shaped by a set of endogenous and exogenous factors. On energy security, an exogenous situation that is a potential common threat to both—such climate change—could push them to cooperate. Unless a changing climate is perceived as an existential threat by both New Delhi and Beijing, however, cooperation on climate change mitigation will not be forthcoming.

59 Outlook (2015), "Modi Invites China to Be Part of Solar Alliance", The Newswire, Outlook, November 21, 2015.
60 Goswami, Urmi (2017), "India scores victory in climate talks, China announces plan to join International Solar Alliance", The Economic Times, November 20, 2017.
61 Raghavan, Srinath (2019), "The Security Dilemma and India-China Relations", *Asian Security*, 15(1), 60-72.
62 Raghavan, Srinath (2019), "The Security Dilemma and India-China Relations", *Asian Security*, 15(1), 60-72.
63 Bajpai, Kanti (2021), *India versus China: Why They are Not Friends*, Juggernaut Books.

About the Planetary Security Initiative
The Planetary Security Initiative sets out best practice, strategic entry points and new approaches to reducing climate-related risks to conflict and stability, thus promoting sustainable peace in a changing climate. The PSI is operated by Clingendael - the Netherlands Institute of International Relations.

www.planetarysecurityinitiative.org
psi@clingendael.org
+31 70 324 53 84

@PlanSecu
Planetary Security Initiative
Planetary Security Initiative
Newsletter

About the Institute of Peace and Conflict Studies
The Institute of Peace and Conflict Studies (IPCS) is an independent think-tank in India. It was founded in 1996 with the aim of developing an alternative framework for peace and security in South Asia and the extended neighbourhood. IPCS works to bring policy-relevant research into scholarly and public debate through events, capacity building of the next generation of thought leaders, and media and online outreach. Its research and policy recommendations do not subscribe to any particular political view or interest. This Policy Brief is part of the 2021 IPCS-Clingendael Institute collaboration on climate-security in Southern Asia.

About the Clingendael Institute
Clingendael – the Netherlands Institute of International Relations – is a leading think tank and academy on international affairs. Through our analyses, training and public debate we aim to inspire and equip governments, businesses, and civil society in order to contribute to a secure, sustainable and just world.

www.clingendael.org
info@clingendael.org
+31 70 324 53 84

@clingendaelorg
The Clingendael Institute
The Clingendael Institute
clingendael_institute
Clingendael Institute
Newsletter

About the author

Dr. Niharika Tagotra is the CLEAN Asia EDGE Fellow with the National Bureau of Asian Research (NBR) for the year 2021-22. She is a PhD in International Politics from the Jawaharlal Nehru University, and was previously working with the Ministry of External Affairs, Government of India, as a Policy Consultant. She is an expert in the fields related to the Geopolitics of Energy Security, Clean Energy Transition and Climate Change.