



**12th India - U.S. Track II Dialogue on Climate Change and Energy
April 17-19, 2023 | Washington, D.C.**

STATE OF PLAY - BACKGROUND PAPER U.S. & India
(As on 10th March, 2023)

STATE OF PLAY BACKGROUND PAPER U.S.

[Overview of Federal Climate Action](#)

[Federal Climate Legislation, NDC, Emissions, and Energy Trends](#)

The past year has seen the historic passage of the Infrastructure Investment and Jobs Act of 2021 (IIJA, also known as the Bipartisan Infrastructure Law, or BIL) and the Inflation Reduction Act of 2022 (IRA), representing the largest climate investments in U.S. history. These accomplishments, combined with anticipated regulatory action and state-level initiatives, puts the U.S. on a pathway to meet its [updated nationally determined contribution \(NDC\)](#), which as of 2021 sets an economy-wide target of reducing net GHG emissions by 50-52% below 2005 levels by 2030 and commits the U.S. to achieving net-zero emissions by 2050. This target is substantially enhanced from the previous NDC established during the Obama administration of decreasing national GHG emissions by 25% below 2005 levels by 2025, and though annual emissions slightly increased by [1.3% over the previous year, the GHG intensity of the U.S. economy declined overall](#). With President Biden's continued prioritization of ambitious climate goals, the U.S. is in a strong position to see a continued decline.

The Biden administration continues to develop its whole-of-government approach to tackling the climate crisis, attempting to improve collaboration between federal agencies, departments, and offices to design and implement policies and programs to decrease national GHG emissions while bolstering the domestic economy. Significant efforts have been made in transportation, energy, agricultural and building sectors, with significant investments promised for clean energy infrastructure, energy efficiency and weatherization measures in buildings and homes, and sustainable farming practices.

Emissions and Energy Trends

The share of renewable energy sources continues to grow in the U.S., with a [12% rise in 2022](#) over the previous year, such that it now comprises 22% of total utility-scale electric power. [In 2022, fossil fuels still made up 60.2% of this total power mix](#), with natural gas and coal comprising 39.8% and 19.5% respectively, but for the first time renewables surpassed coal with its growth to 22% of the energy mix. Nuclear energy sources also made up 18.2%, and renewables were broken down between 10.2% wind, 6.2% hydropower, and 3.4%. The U.S. Energy Information Administration (EIA) [expects renewables to provide 24%](#) total electricity generation in 2023, up even further from 20% in 2021. Energy-related CO₂ emissions rose by 6% in 2021 compared to 2020 levels, but were 5% lower than pre-pandemic levels in 2019.

The deployment of renewables must increase in the coming years to meet the Biden administration's target of 80% renewable energy generation by 2030 and a "clean electricity" power system by 2035. [Analysts are optimistic](#) that market forces will allow for the expanded penetration of long-duration energy storage (LDES) and technologies to enhance reliability. A [study](#) conducted by the National Renewable Energy Laboratory (NREL) in late 2022 evaluated several pathways to a net-zero power grid by 2035, identifying necessary actions to achieve this goal, including [but not limited to](#): rapid scale-up of technology deployment and continued research, development and deployment (RD&D) to bring emerging technologies into the market;¹ significant additional transmission capacity (requiring new energy infrastructure installments nationwide); and acceleration of electrification and increased efficiency in demand.

Domestic Political Landscape for Energy and Climate Action

With the success of the passage of IRA, the IIJA, and the CHIPS and Science Act, the Biden administration now faces the difficult task of implementation, with the additional challenge of a divided Congress that promises slower legislative action on partisan issues, as well as

¹ It was noted that further work is required to better understand what the manufacturing and supply chain implications will be amidst an unprecedented deployment of renewable energy sources, a contentious relationship with China, and the ongoing Russian war on Ukraine.

unfriendly [House oversight](#), which threatens to [undermine some of the measures](#) put forth in climate and energy initiatives.

Democrats currently hold a slim majority in the U.S. Senate, while Republicans regained a majority in the House of Representatives after the 2022 midterm elections, with Representative Kevin McCarthy elected Speaker of the House following a lengthy and contentious process. Some House Republicans support agenda items that advance bipartisan clean energy objectives, including those that decrease domestic dependence on foreign countries for critical supply chains and those that streamline permitting processes to accelerate construction of energy infrastructure. However, other Republicans in Congress are seeking to include climate and energy measures to boost domestic oil and gas production drilling. For example, [the Lower Energy Costs Act, introduced as H.R. 1](#) was identified as one of the top legislative priorities by Republicans and its provisions largely [exemplify their Party's positions on domestic energy priorities](#), including increases in domestic energy production by boosting production of sales of oil and gas, reforms to permitting processes that limit the timespan allowed for environmental impact statements for major projects, cuts in funding for climate projects and the elimination of incentives that target investments to disadvantaged communities.

In addition, H.R. 1 seeks to repeal several measures set forth in the IRA, including the methane fee, the electric home rebate program, and the Greenhouse Gas Reduction Fund. And while H.R.1 is currently characterized as “dead on arrival” in the Senate, the provisions in this Bill will in all likelihood be offered again for consideration during the upcoming debt ceiling negotiations. And lastly, it is notable that the House Oversight Committee has already [launched a probe into the U.S. Department of Energy climate spending](#) via the IIJA, IRA, and the CHIPS and Science Act, in late March 2023, indicating an already high level of scrutiny from House Republicans.

[Infrastructure Investment and Jobs Act](#)

The [Infrastructure Investment and Jobs Act](#) (IIJA, also known as the Bipartisan Infrastructure Law, or BIL) was signed into law in November 2021, with a record-setting \$1.2 trillion dedicated to improving and developing domestic infrastructure, and [billions dedicated to low-carbon or clean energy infrastructure development](#) in key sectors such as transportation, buildings, and energy transmission, in addition to investments in climate resiliency, water infrastructure, and legacy pollution. [Estimates](#) predict the IIJA will fund \$864 billion in spending over five years, authorizing over 400 programs throughout the U.S. government to oversee funding to various state and local entities, with approximately \$591 billion going towards transportation programs and \$54 billion towards drinking and clean water programs via the US EPA.

Over a year since the passage of IIJA, the U.S. government is tracking subnational funding and projects, publishing [state-by-state fact sheets](#) and a [“map of progress”](#) to illustrate already announced infrastructure funding. While the majority of IIJA implementation falls under the executive branch of the U.S. government, annual appropriations from a currently divided Congress have the potential to influence future size and scope of programs under the IIJA.

Inflation Reduction Act

Signed into law on August 22, 2022, the Inflation Reduction Act (IRA) is the largest single step that Congress has ever taken to address climate change. It includes [nearly \\$370 billion](#) in investments in disadvantaged communities, prioritizing projects that repurpose retired fossil fuel infrastructure and employ displaced workers, setting the U.S. on a course toward a fair, equitable and economic clean energy transition. The IRA has the potential to decrease national emissions by [42 percent](#) by 2030 compared to 2005 levels. This, in conjunction [with complementary regulations from the executive branch and aggressive action at the state level](#), puts the United States on the path toward reaching its commitment to reduce emissions by 50-52% by 2030.

The Inflation Reduction Act builds on the initial climate funding opportunities passed into law in the IIJA to support the build out of electric vehicle (EV) charging stations and power infrastructure, as well as climate resilience. The legislation provides new funding to accelerate the growth of clean energy and support consumer rebates for home electrification, as well as tax credits for EVs and direct fiscal support for domestic manufacturing, including provisions that support labor and energy, and environmental justice communities.

The IRA extends [two tax credits](#) which support renewable energy systems: the investment tax credit (ITC) which reduces federal income tax liability on a percentage of the cost of a new system that is installed during the tax year, and the production tax credit (PTC) which is a per kilowatt-hour (kWh) tax credit for electricity generated by qualifying technologies for the first 10 years of a system's operation. The PTC also applies to "applicable critical minerals" which constitute clean energy components, and reduces the federal income tax liability and is adjusted annually for inflation. The ITC and PTC require projects to adhere to wage and apprenticeship requirements in order to receive the full credit amount. If wage and apprenticeship requirements are met, there are several [credit enhancements](#) that projects can receive. There is a bonus credit of +10% of the cost incurred if domestic content requirements are met, and another +10% bonus credit if the project is sited in an energy community that has historically been reliant on fossil fuels (see below). Both of these tax credits will become technology-neutral in 2025, and apply to all zero-carbon electricity sources.

Among all the provisions in the IRA, the EV tax credits requirements have raised the greatest [concern among U.S. trading partners](#) because it is the only provision in the IRA that mandates a certain percentage of domestic content. This provision provides financial incentives for purchasing an EV including a maximum \$7,500 [clean vehicle tax credit](#) for the purchase of a new electric vehicle. However, half of the EV tax credits are contingent on a threshold percentage of [critical minerals used in the batteries](#) having been extracted or processed in the U.S. or in a country with which the U.S. has a free trade agreement or having been recycled in North America.² The other half of the tax credit focuses on the [battery component requirement](#)

² Starting in 2023, at least 40% of the critical minerals used in the battery must be extracted or processed. In the case of a vehicle placed in service after the proposed battery guidance date and before January 1, 2024, the

wherein the value of the components contained in a clean vehicle's battery must meet the law's percentage requirements for manufacturing or assembly in North America.³ Lastly, starting in 2024, tax credits will not be available under the law for vehicles that have any battery components sourced from a foreign entity of concern, and starting in 2025, tax credits will not be available for EV batteries with any critical minerals sourced from a foreign entity of concern – including China.

The IRA opens up opportunities to support [environmental justice and just transition efforts](#) at home through the provision of [enhanced ITCs and PTCs](#) for projects built in low-income communities, as well as energy communities that are heavily reliant on fossil fuels as their major economic driver, or communities where coal has been an economic driver, or in disadvantaged communities where the unemployment rate was at or above the national average in the previous year. The law includes a \$3 billion allocation for environmental and climate justice block grants, which can be used for community-led monitoring and remediation to mitigate the effects of urban heat islands and facilitate community engagement in federal and state policymaking. The IRA also establishes a Greenhouse Gas Reduction Fund – a [\\$27 billion green bank](#) – that provides funding to support rapid deployment of low- to zero-emission technologies.

Implementation Status and Permitting

Building renewable energy and transmission projects in the U.S. to match the speed and scale of the climate crisis will require reforms to the way they are sited and permitted at the federal, state and local levels. For the U.S. to achieve power sector decarbonization by 2035 and mitigate the worst impacts of climate change, the U.S. must [double or triple](#) the level of renewable energy deployment and [double the expansion of transmission](#). With the passage of the IRA, the need to streamline permitting and siting processes, and the ways through which climate smart investments are mobilized, have become salient political issues, with permitting reform shaping up to be a key bipartisan issue in the 118th Congress.

Congress and the administration are focused on clean energy permitting reform at the federal level, most notably those that involve inter-regional transmission and power lines that extend across states, which have historically been very challenging to build. The IIJA made a number of policy changes to expedite permitting and siting, particularly for transmission and offshore wind projects. These provisions included financing assistance for transmission projects and efforts to clarify and strengthen the backstop siting authority of the Federal Energy Reform Commission

applicable percentage is 40%. In the case of a vehicle placed in service during the calendar years 2024, 2025, and 2026, the applicable percentage is 50%, 60%, and 70%, respectively. In the case of a vehicle placed in service after December 31, 2026, the applicable percentage is 80%.

³ In the case of a vehicle placed in service after the proposed battery guidance date and before January 1, 2024, the applicable percentage is 50%. In the case of a vehicle placed in service during the calendar years 2024 or 2025, the applicable percentage is 60%. In the case of a vehicle placed in service during the calendar years 2026, 2027, and 2028, the applicable percentage is 70%, 80%, and 90%, respectively. In the case of a vehicle placed in service after December 31, 2028, the applicable percentage is 100%.

(FERC) for interstate transmission lines within certain corridors (known as National Interest Electric Transmission Corridors). These changes allow FERC to issue permits if states fail to complete the permitting process within one year for a transmission line within these priority corridors. While this was an important step forward, significant barriers to building interstate transmission remain that could result in years or delay in the building of new interstate transmission lines, most notably the myriad of factors that impact the financing and building of interstate transmission such as siting and cost allocation.

The most visible Congressional effort to expedite permitting is the currently stalled Manchin permitting reform [proposal](#). This bill would create a streamlined permitting system for energy assets, including renewable energy and fossil fuel projects, and authorize construction or completion of specific projects like the Mountain Valley gas pipeline. The proposal also would authorize the U.S. Department of Energy (DOE) to designate transmission lines in the national interest and enable FERC to allocate the costs of these projects to ratepayers across the region who would benefit from them. While this bill contained controversial provisions and ultimately stalled, transmission issues are understood to be a critical area of needed reform that must be addressed. Debates on this issue are expected to continue in the 118th Congress.

Key to any reforms are mechanisms for early and effective community engagement, as well as consideration of the cumulative impacts within communities. A recent Data for Progress [memo](#) found high support for community benefits as part of renewable energy project development, such as funding for the cleanup of polluted sites, funding for community centers, and programs for youth and seniors. As a result, policymakers are being strongly encouraged to create forums for local stakeholder engagement as part of any centralized permit review process including efforts to facilitate early meetings between communities and project developers.⁴

CHIPS and Sciences Act

Signed into law on August 9th, 2022, the [“Creating Helpful Incentives to Produce Semiconductors \(CHIPS\) and Science Act”](#) aims to directly address U.S. supply chain vulnerabilities by [providing funding and incentives](#) to increase semiconductor manufacturing within the U.S., while also [barring investment in high-tech investments in China](#) or “other countries of concern” for the next decade. The CHIPS and Science Act provides \$52.7 billion for domestic semiconductor R&D, manufacturing, and “workforce development,” with \$39 billion dedicated to manufacturing incentives, and \$500 million to provide for international information communications technology security and semiconductor supply chain activities.

Seeking not only to bolster national security by developing domestic production of critical technologies, the Act also emphasizes the creation of millions of new semiconductor manufacturing jobs, as well as an overarching sentiment that Americans must become leaders in the tech space. To these ends, the law creates a \$10 billion fund to invest in regional innovation and technology hubs across the country as a way to spur innovation at subnational

⁴ Content extracted from [WRI Insights](#) by Lori Bird and Katrina McLaughlin, February 2023.

levels. U.S. Secretary of Commerce, Gina Raimondo, has described the program as [foremost a national security initiative](#), seeking to redistribute the manufacturing of semiconductors onto U.S. soil and to decrease U.S. dependency on foreign manufacturers that currently produce more than 90% of the world's most advanced chips. While competition for CHIPS funding is robust, it is expected that the bulk of available resources will be allocated to leading manufacturing companies, such as Taiwan's TSMC (that has already built a [facility in Arizona](#)), Samsung, Micron, and Intel.

Over the next five years, the CHIPS and Science Act has the potential to direct an [estimated \\$67 billion](#) toward accelerating the growth of zero-carbon industries and climate related research, [including nanotechnology, clean energy, quantum computing, AI, and disaster-resilient research](#).

International Climate Engagement and Challenges

COP28 and the Global Stocktake

For parties to the Paris Agreement, COP28 will mark the first [global stocktake \(GST\)](#), a 2-year comprehensive review process to assess collective progress toward meeting the long-term goals set forth in the Agreement. Designed to be one element of a larger climate ambition cycle, holding parties accountable while seeking to raise ambition, the 2023 GST is expected to give a landscape view of where nations stand and evaluates international efforts to limit the rise of global temperature to well below 2°C (ideally 1.5°C).

In addition to the GST, [fossil fuel phasedown](#) is expected to be a top priority for countries at COP28, following upon the COP26 Glasgow Climate Pact agreement to phase down coal, and [India's push at COP27](#) for parties to agree to phase down all fossil fuels—including oil and gas—which ultimately failed to pass and was excluded from the cover text [package of decisions](#). The EU has publicly stated that parties are [considering a potential agreement](#) around fossil fuel phasedown as part of their overall climate diplomacy efforts prior to COP28. It's currently unclear what the U.S. stance is on such a phasedown agreement.

Despite unprecedented action underway domestically, the U.S. has underdelivered on international climate finance commitments. The 2009 pledge made by developed nations to provide \$100 billion annually to support developing countries in reducing emissions and adapting to climate change remains unmet, falling short by delivering \$83.3 billion by the original end-year, 2020. While the pledge has been extended to 2025, the wealthiest nations—and some of the largest historical emitters, including the U.S.—continue to [contribute well below their "fair share."](#) While President Biden has pledged an overall \$11.4 billion in climate finance per year by 2024, it seems unlikely that the [currently divided Congress will approve of this level of funding](#). The President's Budget for fiscal year 2022 and 2023 requested around \$7 billion in climate finance, however Congress only appropriated approximately \$1 billion/year.

Meanwhile, the [Loss and Damage Fund](#), which was agreed to [at COP27](#) remains in flux, as parties continue to discuss how this fund will be operated, and how much funding wealthy nations will provide. The U.S., initially hesitant to commit during early talks on the creation of a L&D fund at the COP, ultimately signed on. However, U.S. contributions to the fund will likely be very limited due to lack of awareness and support in Congress.

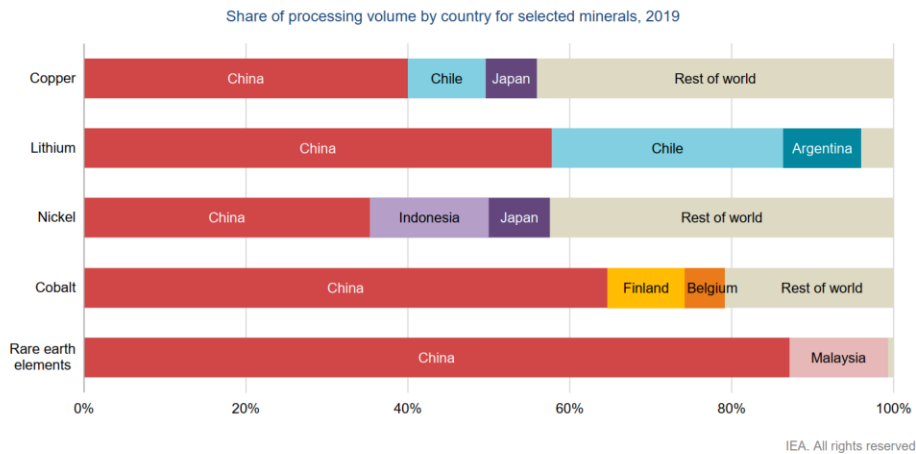
U.S.-China Tensions, Supply Chains, and Trade

U.S. domestic climate and energy ambitions to accelerate economy-wide decarbonization while creating millions of jobs for Americans are influencing—and impacted by—ongoing geopolitical, supply chain, energy security, and trade dynamics.

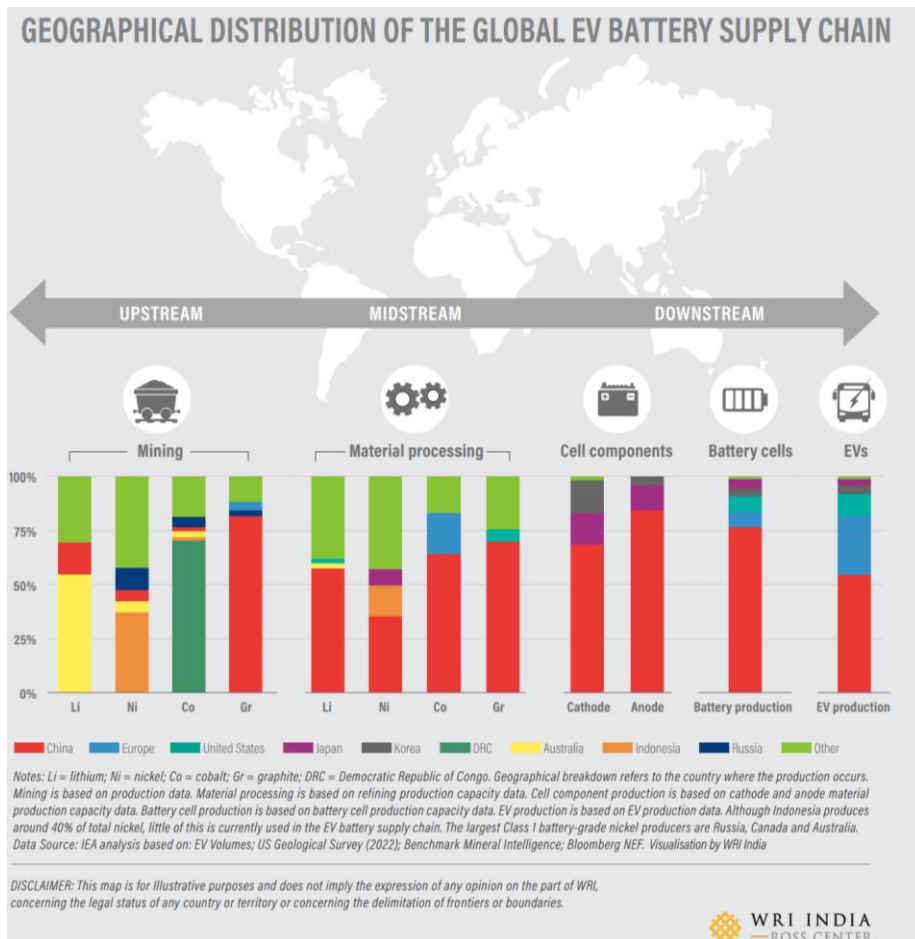
China’s monopoly on much of the global refining and processing of materials critical to the production of EV and renewable energy technologies has come to the fore as an area of significant concern for domestic energy transition efforts, and increasingly – in part due to wider U.S. government relations with the Chinese government— national security concerns. U.S.-China relations remain strained, exacerbated by ongoing [tensions related to the Russian invasion of Ukraine](#), claims over Taiwan and the presence of Taiwanese politicians in both [China](#) and [the U.S.](#), and potential implications of [the TikTok case](#). In light of these tensions, the U.S. desire to “decouple” clean energy supply chains from China pervades most domestic supply chain rhetoric. While truly decoupling from China remains unrealistic, the facts that China oversees the majority of global lithium and cobalt refining (responsible for 80% and 66%, respectively), as well as 66% of global aluminum refining and smelting processes and 80% of global graphite production and refinement, have prompted the U.S. to seriously reevaluate domestic supply chain vulnerabilities. To this end, several efforts are underway, including:

- The development of minerals clubs such as the U.S.-led [Minerals Security Partnership](#) among the U.S., Australia, Canada, Finland, France, Germany, Japan, Korea, Sweden, the U.K., and the EU and the recently announced U.S.-Canada one-year [Energy Transformation Task Force](#) to accelerate cooperation on critical clean energy supply chains including renewable energy and EV supply chains and critical minerals.
- Joint mapping efforts to locate resources and reserves, e.g., the Critical Minerals Mapping Initiative ([CMMI](#)) which seeks “to undertake research to develop a better understanding of critical mineral resources in known deposits, determine the geological controls on critical mineral distribution for deposits currently producing by-products, and identify new sources of supply through mineral prospectivity mapping and resource assessment.”
- Critical minerals specific free trade agreements (FTA) such as the recent [U.S.-Japan Critical Minerals Agreement](#) (though there was some [pushback](#) against this action). It is anticipated that the [minerals club](#) envisioned in the recent [Joint Statement by President Biden and President von der Leyen](#) will set the stage for a similar FTA.

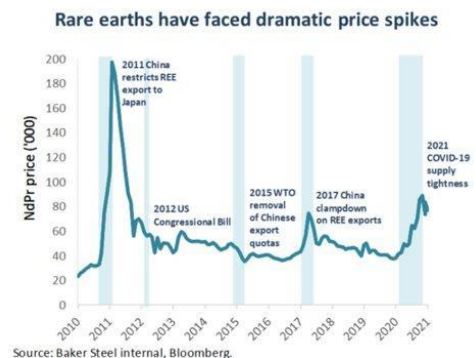
To meet the demand created by the IRA, in conjunction with policies in other countries that are encouraging a similar green transition, the rate of mining will need to increase significantly in the short term. At present, [the U.S. does not mine or produce significant quantities](#) of any of the relevant critical minerals, but mineral exploration is on the uptick in the U.S. and it is believed that at least for [lithium](#), the U.S. has the potential to supply a significant portion of its needs. Currently though, the U.S. remains [100% net import reliant](#) for 12 critical minerals and 50% net import reliant for another 31 critical minerals. Australia mines 52% of all lithium and Chile mines another 22%; Indonesia mines 33% of all nickel, China mines 64% of all graphite; the Democratic Republic of Congo mines 69% of all cobalt; and China mines 60% of all rare earth elements. While China corners the market in production of only two of these minerals, the [processing](#) situation is very different, with China processing over 80% of all rare earth elements, over 60% of all cobalt, over 50% of all lithium, and over 30% of all nickel.



When looking at the EV battery supply chain, China may not dominate in the mining space for the majority of minerals, but it clearly dominates in minerals processing and battery cell manufacturing.



The dominance of China in this field is seen as a significant threat to the supply chain of these minerals, as China has proven itself willing to [wield this dominance as a political tool](#). For instance, in 2019, with the U.S.-China trade war intensifying, China threatened to cut off exports of rare earths to the U.S. and in 2010, in retaliation for Japan’s holding of a Chinese fishing boat captain who was fishing in disputed waters, China blocked exports of rare earths to Japan. These politically driven sales restrictions have resulted in price spikes.



In considering how to address China’s dominance as well as the strictures of the IRA, the U.S. should look for opportunities to support increased processing facilities in the U.S. and [Free Trade Agreement partners](#). Among those high-producing nations with whom the U.S. has FTAs are Australia, Chile, and Peru.

STATE OF PLAY - BACKGROUND PAPER INDIA

Nationally Determined Contributions

At COP26 in 2021, Prime Minister Narendra Modi pledged that India would:

- Raise the non-fossil fuel based energy capacity of the country to 500 GW by 2030
- Meet 50% of the country's energy requirements using renewable energy sources by 2030
- Reduce the total projected carbon emission by one billion tonnes between now and 2030
- Reduce the carbon intensity of the economy to less than 45% by 2030
- Become carbon neutral and achieve net zero emissions by 2070.

In August 2022, the Indian cabinet approved India's updated NDCs. An overview:

Quantified Goals	Non-Quantified Goals
To reduce the emissions intensity of its GDP by 45 per cent by 2030, from the 2005 level.	To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change.
To achieve about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of the transfer of technology and low-cost international finance including from the Green Climate Fund (GCF).	To adopt a climate-friendly and cleaner path than the one followed hitherto by others at the corresponding level of economic development.

To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.	To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, the Himalayan region, coastal regions, and health and disaster management.
	To mobilize domestic and new & additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.
	To build capacities, create a domestic framework and international architecture for quick diffusion of cutting-edge climate technology in India and joint collaborative R&D for such future technologies.

Source: PIB, Government of India

At COP27 in November 2022, India submitted its Long-Term Low Emissions Development Strategy (LT-LEDS) which provides a breakdown of initiatives by sector, but these do not go beyond current policies and general future direction.⁵

The salient features⁶ of the strategy are –

1. Rational utilization of national resources with due regard to energy security.
2. Increased use of biofuels, especially ethanol blending in petrol, the drive to increase electric vehicle penetration, and the increased use of green hydrogen fuel are expected to drive the low carbon development of the transport sector. India aspires to maximise the use of electric vehicles, ethanol blending to reach 20% by 2025, and a strong modal shift to public transport for passenger and freight.

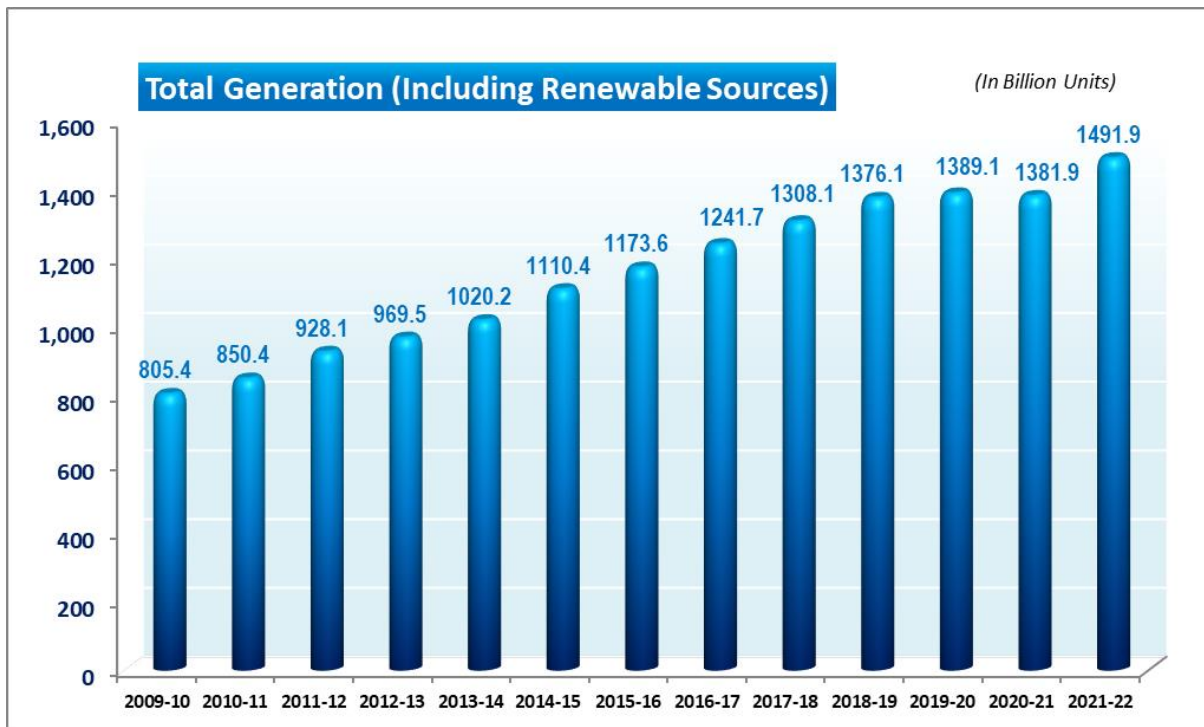
⁵ The Minister of State for Environment, Forest & Climate Change, Shri Ashwini Kumar Choubey in a written reply in Rajya Sabha. <https://pib.gov.in/PressReleasePage.aspx?PRID=1881755>

⁶ <https://pib.gov.in/PressReleasePage.aspx?PRID=1875816>

3. Urbanization will continue as a strong trend from our current relatively low base, future sustainable and climate resilient urban development will be driven by smart city initiatives.
4. India's industrial sector will continue on a strong growth path, in the perspective of 'Atma Nirbhar Bharat' and 'Make in India'. The focus will be on improving energy efficiency by the Perform, Achieve and Trade (PAT) scheme, National Hydrogen Mission, high level of electrification in all relevant processes and activities, enhancing material efficiency and recycling leading to expansion of circular economy, and exploring options for hard-to-abate sectors, such as steel, cement, aluminum and others.
5. India is on track to fulfilling its NDC commitment of 2.5 to 3 billion tonnes of additional carbon sequestration in forest and tree cover by 2030.

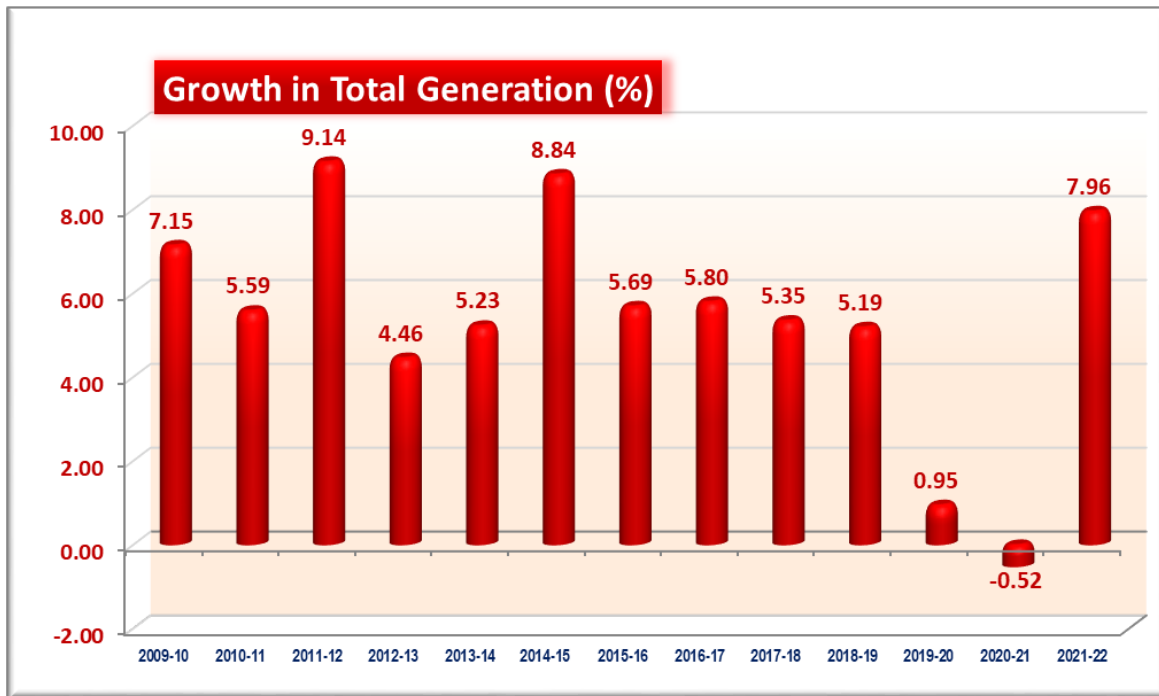
Energy Consumption, Capacity and Generation

Generation (Billion Units)



Source: <https://powermin.gov.in/en/content/power-sector-glance-all-india>

Generation Growth (%)



Source: <https://powermin.gov.in/en/content/power-sector-glance-all-india>

Coal is the most abundant fossil fuel in India. It accounts for 55% of the country's energy needs. The country's industrial heritage was built upon indigenous coal. Commercial primary energy consumption in India has grown by about 700% in the last four decades. The current per capita commercial primary energy consumption in India is about 350 kgoe/year which is well below that of developed countries. Driven by the rising population, expanding economy and a quest for improved quality of life, energy usage in India is expected to rise. Considering the limited reserve potentiality of petroleum & natural gas, eco-conservation restriction on hydel projects and geo-political perception of nuclear power, coal will continue to occupy the center-stage of India 's energy scenario⁷.

In Washington recently, the Finance Minister said India's move away from coal will be hampered by the war in Ukraine. At the recently concluded Budget session, the Minister of Power said, "Despite push for renewables, the country will require base load capacity of coal-based generation for stability and also for energy security."

India's total renewable energy capacity, excluding large hydro and nuclear plants, reached 122 gigawatts in February 2023, the latest monthly report by the Central Electricity Authority (CEA) showed. This was an increase of almost 15% from February 2022, but still 30% short of the 175-GW target that the central government had aimed to reach by the end of 2022.

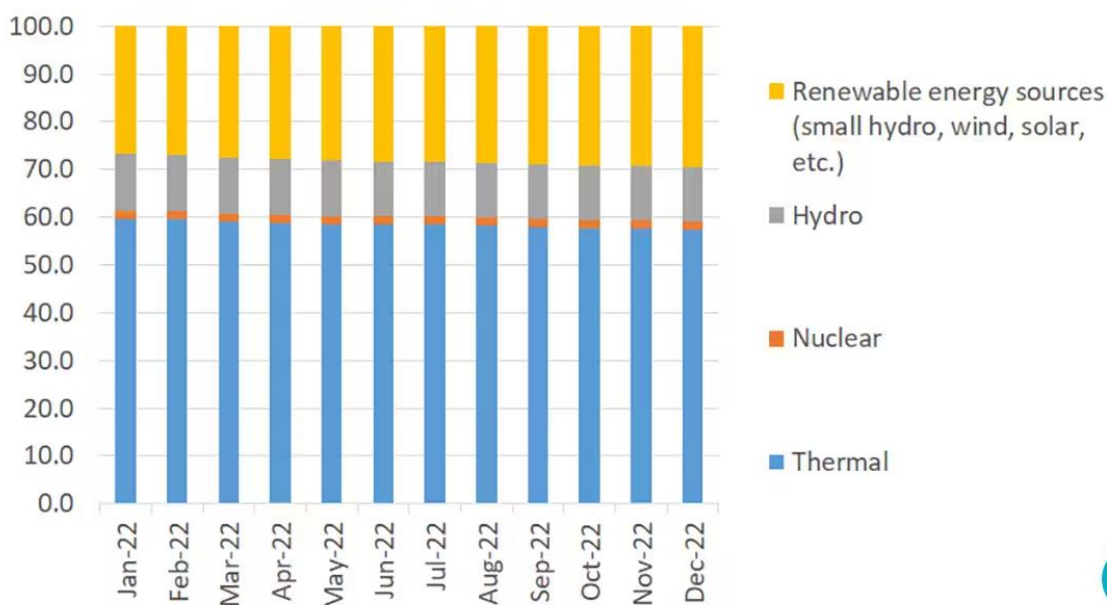
In pursuit of achieving 500 GW of installed electricity capacity from non-fossil sources by 2030, a total of 172.72 GW of capacity from non-fossil fuel sources has been installed in the

⁷<https://coal.nic.in/en/major-statistics/coal-indian-energy-choice#:~:text=Indian%20Energy%20Choice-Coal%20%E2%80%93%20Indian%20Energy%20Choice,in%20the%20last%20four%20decades.>

country as on 31.10.2022. This includes 119.09 GW RE, 46.85 GW Large Hydro and 6.78 GW Nuclear Power capacity. This has a share of 42.26% of total installed generation capacity in the country i.e. 408.71 GW⁸.

India stands 4th globally in Renewable Energy Installed Capacity (including Large Hydro), 4th in Wind Power capacity & 4th in Solar Power capacity (as per REN21 Renewables 2022 Global Status Report). A total of 14.21 GW of Renewable Energy (RE) capacity was added, during the period January to October 2022 as compared to capacity of 11.9 GW added during the period January to October 2021. A total of 151.94 BU have been generated from RE sources during the period January to September 2022 as compared to the 128.95 BU during the period January to September 2021.

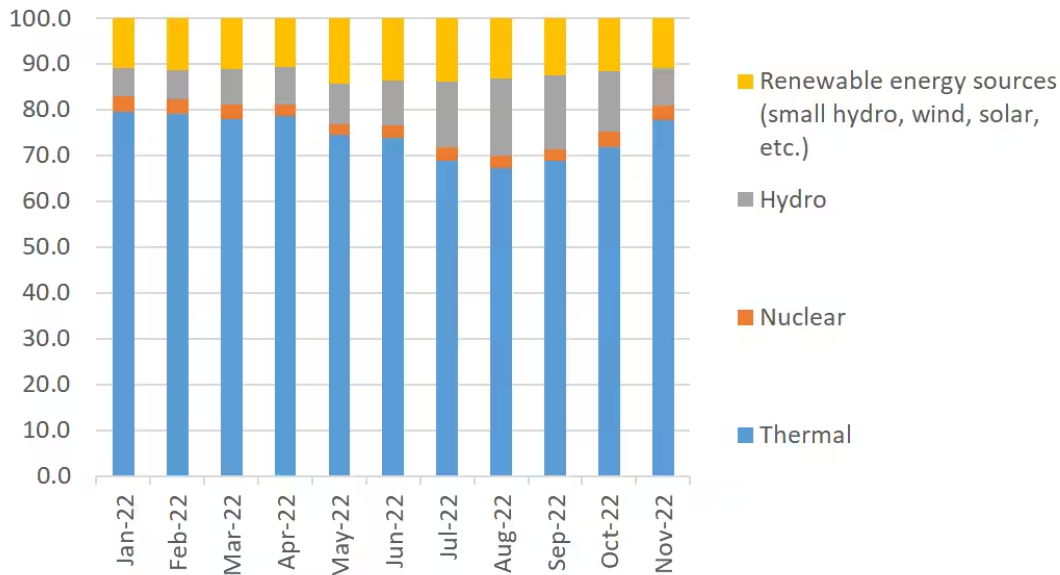
Chart 1: Share of sources in installed electricity capacity (%)



Source: <https://www.hindustantimes.com/india-news/budget-2023-35-000-crore-outlay-for-growth-in-green-energy-transition-101675305430478.html>

⁸[https://pib.gov.in/PressReleasePage.aspx?PRID=1885147#:~:text=This%20has%20a%20share%20of,Renewables%202022%20Global%20Status%20Report\).](https://pib.gov.in/PressReleasePage.aspx?PRID=1885147#:~:text=This%20has%20a%20share%20of,Renewables%202022%20Global%20Status%20Report).)

Chart 2: Share of sources in electricity generation (%)



Source: <https://www.hindustantimes.com/india-news/budget-2023-35-000-crore-outlay-for-growth-in-green-energy-transition-101675305430478.html>

Climate - Energy Legislation, Policies and Welfare Schemes in 2022 - 2023

1. India's Energy Conservation Act of 2001 underwent an [amendment in August 2022](#).⁹

Features:

- It empowers the central government to specify a carbon credit trading scheme.
- Designated consumers may be required to meet a proportion of their energy needs from non-fossil sources.
- The Energy Conservation Code for buildings will also apply to office and residential buildings with a connected load of 100 kilowatt or above.
- Energy consumption standards may be specified for vehicles and ships.

Key issues:

- Carbon credit trading aims to reduce carbon emissions, and hence, address climate change. The question is whether the Ministry of Power is the appropriate Ministry to regulate this scheme. A further question is whether the market regulator for carbon credit trading should be specified in the Act.

⁹<https://www.moneycontrol.com/news/opinion/energy-conservation-act-amended-india-net-zero-goals-9855591.html>

- The same activity may be eligible for renewable energy, energy savings, and carbon credit certificates. The Bill does not specify whether these certificates will be interchangeable.
- Designated consumers must meet certain non-fossil energy use obligations. Given the limited competition among discoms in any area, consumers may not have a choice in the energy mix.

2. Union Budget 2023

The Finance Minister listed “Green Growth” as one of the seven priorities of this year’s Budget. Some of the climate - energy provisions included in the budget were:

- INR 35,000 crore for priority capital investments towards net zero transition and energy security by the ministry of petroleum and natural gas.
- Support through viability gap funding, battery energy storage systems with capacity of 4,000 MWH and formulate a detailed framework for so-called pumped storage projects (those that facilitate storage of hydroelectric power).
- Creation of an interstate transmission system for evacuation and grid integration of 13 GW renewable energy from Ladakh with an investment of ₹20,700 crore of which ₹8,300 crore will be provided by the Centre.
- Green Credit Programme will be notified under the Environment (Protection) Act to incentivise environmentally sustainable and responsive actions by companies, individuals and local bodies, and help mobilize additional resources for such activities.
- PM PRANAM: Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth, a scheme that will be launched to incentivise states and union territories to promote alternative fertilizers and balanced use of chemical fertilizers.
- Around 500 new ‘waste to wealth’ plants will be launched under GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan) for promoting a circular economy. These will include 200 compressed biogas (CBG) plants at a total investment of ₹10,000 crore.
- MISHTI , Mangrove Initiative for Shoreline Habitats & Tangible Incomes’ which will focus on mangrove plantation along the coastline and on salt pans through convergence between Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and Compensatory Afforestation funds.
- The government will promote conservation techniques of local communities through Amrit Dharohar, a scheme that will be implemented over the next three years to encourage optimal use of wetlands, and enhance biodiversity, carbon stock, eco-tourism opportunities and income generation for local communities.
- Coastal shipping will be promoted as an energy efficient mode of transport through PPP mode with viability gap funding.

3. **Equity infusion of Rs.1,500 crore in Indian Renewable Energy Development Agency Limited (IREDA)¹⁰**

- Employment generation of approximately 10,200 jobs/year and CO2 equivalent emission reduction of approximately 7.49 Million Tonnes CO2/year
- To lend Rs.12000 crore approximately to the RE sector, thus facilitate the debt requirement of RE of additional capacity of approximately 3500-4000 MW.
- To enhance its networth which will help it in additional RE financing, thus contributing better to the Government of India targets for RE.
- To improve the capital-to-risk weighted assets ratio (CRAR) to facilitate its lending and borrowing operations.

4. **National Bioenergy Programme**

The National Bioenergy Programme which comprises the following Sub-schemes was launched on 2.11.2022:

- Waste to Energy Programme (Programme on Energy from Urban, Industrial and Agricultural Wastes/ Residues)
- Biomass Programme (Scheme to support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries)
- Biogas Programme: for promotion of family type Biogas plants

5. **Solar Parks Scheme**
To facilitate large scale grid-connected solar power projects, a scheme for “Development of Solar Parks and Ultra Mega Solar Power Projects” is under implementation with a target capacity of 40 GW capacity by March 2024.

6. **PM-KUSUM Scheme Extension**
Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahaabhiyan MNRE approved to extend the Scheme until 31.03.2026 with a few modifications. This scheme provides energy and water security, de-dieselises the farm sector and also generates additional income for farmers by producing solar power. It aims to add 30.8 GW of solar capacity with central financial support of over Rs. 34,000 Crore.

7. **National Green Hydrogen Mission’s first funding**
In the Union Budget 2023, a total outlay of Rs. 19,700 crore (\$2.3 billion) for the Green Hydrogen Mission was announced. For 2023-24, the first year of the seven-year mission, the government allocated Rs. 297 crore – the first-ever such allocation for boosting the production of green hydrogen in the country.

¹⁰ <https://pib.gov.in/PressReleaseFramePage.aspx?PRID=1790941>

International Climate Leadership

Building on her domestic action and credibility, India has emerged as a global leader on climate and energy transition action. The Government of India has launched two global climate change response initiatives:

1. [International Solar Alliance](#): The International Solar Alliance (ISA), launched at the UNFCCC COP in Paris in 2015, aims to address issues related to climate mitigation by managing energy access, security, and transition with solar projects. The ISA now has 110 member countries with nine active programmes promoting 10 GW of off-grid and grid-connected solar projects in developing countries to promote energy access and transition.
2. [Coalition for Disaster Resilient Infrastructure](#): CDRI brings together nations, multilateral agencies and public and private partners to address issues of infrastructure resilience more systematically and comprehensively.

Both these global initiatives strive for a new model of South-South cooperation and exchange of experience and knowledge of new development paradigms as developing nations mitigate and adapt to climate change while addressing their development imperatives, like poverty alleviation, food security, and economic growth. India has also played a leadership role in various UN Summits related to climate and energy, like [the India and Sweden co-leading Industry Transition track](#), and has committed to progressively enhance climate action in various plurilateral and bilateral agreements with major countries and economic blocks like [India-U.S.](#), and [India-EU climate agreements](#).

India's G20 Presidency

The G-20 theme for India's presidency in 2023 is "Vasudhaiva Kutumbakam," or "One Earth, One Family, One Future," which highlights the importance of adopting ecologically responsible and mindful choices, both in individual lifestyles and national development. Union Minister for Environment, Forest and Climate Change, Bhupender Yadav has said that India's G20 presidency aims to bring an integrated, comprehensive and consensus driven approach to address climate change and pursue sustainable growth.

The workstreams of the G20 presidency are split into: the Sherpa Track, the Finance Track and Engagement Groups. Energy security, transition, sustainability, disaster risk reduction, climate finance and green growth feature as focus areas under various working groups of all three workstreams.

The First Sustainable Finance Working Group Meeting SFWG took place in February 2023 with the aim to develop a G20 Sustainable Finance Technical Assistance Action Plan and discuss three priority areas:

- Mobilisation of timely and adequate resources for climate finance
- Enabling finance for the Sustainable Development Goals

- Capacity building of the ecosystem for financing toward sustainable development SFWG aims to mobilise sustainable finance to help ensure global growth and stability and promote the transition towards greener, more resilient, and inclusive societies and economies.

The 2nd Energy Transitions Working Group (ETWG) meeting under India's G20 Presidency commenced in Gandhinagar on 2nd April 2023. Six priority areas are the focus of the meeting including energy transition through addressing technology gaps, low-cost financing for energy transition, energy security and diversified supply chains, energy efficiency, industrial low carbon transitions, and responsible consumption, fuels for the future, and universal access to clean energy and just, affordable, and inclusive energy transition pathways.

ESG Regulations in India

The Securities and Exchange Board of India (SEBI) introduced the requirement of ESG reporting back in 2012 and mandated that the top 100 listed companies by market capitalization file a Business Responsibility Report. This was later extended to the top 500 listed companies by market capitalisation in 2015. On 10th May 2021, the SEBI introduced a new ESG reporting structure by the name Business Responsibility and Sustainability Report (BRSR). Under BRSR, listed entities (top 1000) need to provide an overview of the entity's material ESG risks and opportunities, approach to mitigate or adapt to the risks along with financial implications of the same. BRSR was introduced with the aim of making it mandatory for the top 1000 listed companies to report their sustainability performance in order to maintain transparency with stakeholders.¹¹

BRSR is a questionnaire-based reporting that is divided into 3 sections as follows:

- **Section A: General Disclosures:**
This section contains details of the listed entity; products/services; operations; employees; holding, subsidiary and associate companies (including joint ventures); CSR; transparency and disclosure compliances.
- **Section B: Management and Process Disclosures:**
It contains questions related to policy and management processes, governance, leadership and oversight.
- **Section C: Principle-Wise Performance Disclosures:**
Companies are required to report upon KPIs in alignment with the nine principles of the National Guidelines on Responsible Business Conduct (NGRBC). The section classifies KPIs into two sub-categories that companies are required to report upon: Essential Indicators (Mandatory) and Leadership Indicators (Voluntary).

¹¹<https://www.mondaq.com/india/securities/1196024/sebis-esg-disclosure-requirements-business-responsibility-and-sustainability-reporting>

While SEBI introduced the requirement of BRSR via its May 2021 circular, in order to give time to companies to adapt to the new requirements, SEBI mandated that the reporting would be on a voluntary basis for the financial year 2021-22. However, for the financial year 2022-23, BRSR is mandatory for the top 1000 listed entities.

On May 6, 2022, the Securities and Exchange Board of India (“SEBI”) constituted an ESG advisory committee (“EAC”), tasked with advising on a range of ESG-related matters. Based on the recommendations of the EAC, the SEBI has released the consultation paper on ‘ESG Disclosures, Ratings and Investing’ on February 20, 2023 (“Consultation Paper”), and has sought public comments on the regulatory framework for ESG disclosures, ESG ratings and ESG investing, on or prior to March 6, 2023.

[The key proposals of this consultation paper are linked here.](#)

Supply Chains and Critical Minerals

India is endowed with and produces over 85 minerals, some of the required critical mineral assets for the country’s manufacturing sectors (particularly of green technologies) are not yet ready to be mined. There are also some critical minerals of which there are no known resources within the country. India is not equipped to meet its green technology requirements through domestic mining alone. Imports of minerals for domestic manufacturing or imports of the final product (embedded in these minerals) will be needed to meet its policy agenda on climate change mitigation. Currently in India, a joint venture of three Central Public Sector Enterprises, Khanij Bidesh India Ltd. (KABIL), is taking charge of ensuring mineral security through facilitating supply chains, mine asset acquisitions, and G2G collaborations.

A notable achievement of KABIL was the signing of an MoU between the Indian and Australian governments for co-operation in the field of mining and processing of critical minerals. However, much more must be done to secure India’s global mineral supply chains, including the private sector involvement.

Clean technologies will require critical minerals in varying proportions. The approximate material intensities have been sourced from the relevant literature (Ashby, Attwood, & Lord, 2012). This table shows critical Minerals Used in Green Technologies against India’s geological potential for each.

Mineral	Clean Technology Uses	India's Geological Potential	Top Three Global Extractors
Chromium	Stainless steel alloys (wind turbines)	Yes	South Africa, Turkey, Kazakhstan
Cobalt	Steel alloys, batteries, pigment	Yes	DR Congo, China, Canada
Graphite	Electrical conductors	Yes	China, India, Brazil
Indium	Photovoltaic cells, display technology	None	China, South Korea, Japan
Lithium	Batteries	None	Australia, China, Chile
Manganese	Steel and aluminium alloys	Yes	South Africa, China, Australia
Molybdenum	Steel alloys	Yes	China, Chile, United States
Nickel	Stainless steel alloys	Yes	Indonesia, Philippines, Russia
Rare earth elements	Batteries, electronics, magnets	Some	China, United States, Myanmar
Silicon	Electronics, infrastructure	Yes	China, Russia, Norway

Sources: (Indian Bureau of Mines, 2015) and (U.S. Geological Survey, 2021)

There will be an increase in the demand for several critical minerals as India transitions towards renewable power generation and electric vehicles. The move to renewable energy will require increasing quantities of various minerals, including copper, manganese, zinc, and indium. Likewise, the move to electric vehicles will require increasing quantities of various minerals, including copper, lithium, cobalt, and rare earth elements. However, India does not have reserves of nickel, cobalt, molybdenum, rare earths, neodymium and indium, and the needs for copper and silver are higher than India's current reserves. Niobium, lithium, and strontium have relatively high economic importance, adjusted by their substitutability possibilities and GVA multipliers¹². Additionally, most minerals have some degree of substitutability, except for niobium and silver, for which no good substitutes have been found. The supply risk is relatively high for yttrium and scandium (heavy rare earths), followed by niobium and silicon. However, India does not have the recycling capacity for most minerals except aluminum, copper and steel.

Additional reading on the subject:

1. [Critical Minerals for India: Assessing their Criticality and Projecting their Needs for Green Technologies. September 2022. CSEP](#)
2. [Building Resilient Mineral Supply Chains for Energy Security. October 2022. CEEW](#)
3. [Addressing Vulnerabilities in the Supply Chain of Critical Minerals. April 2023. CEEW.](#)
This report was tabled at the recent G20 Energy Transition Working Group meeting.

¹² https://csep.org/wp-content/uploads/2022/09/Critical-Minerals-for-Green-Technologies_26-Aug-22.pdf

