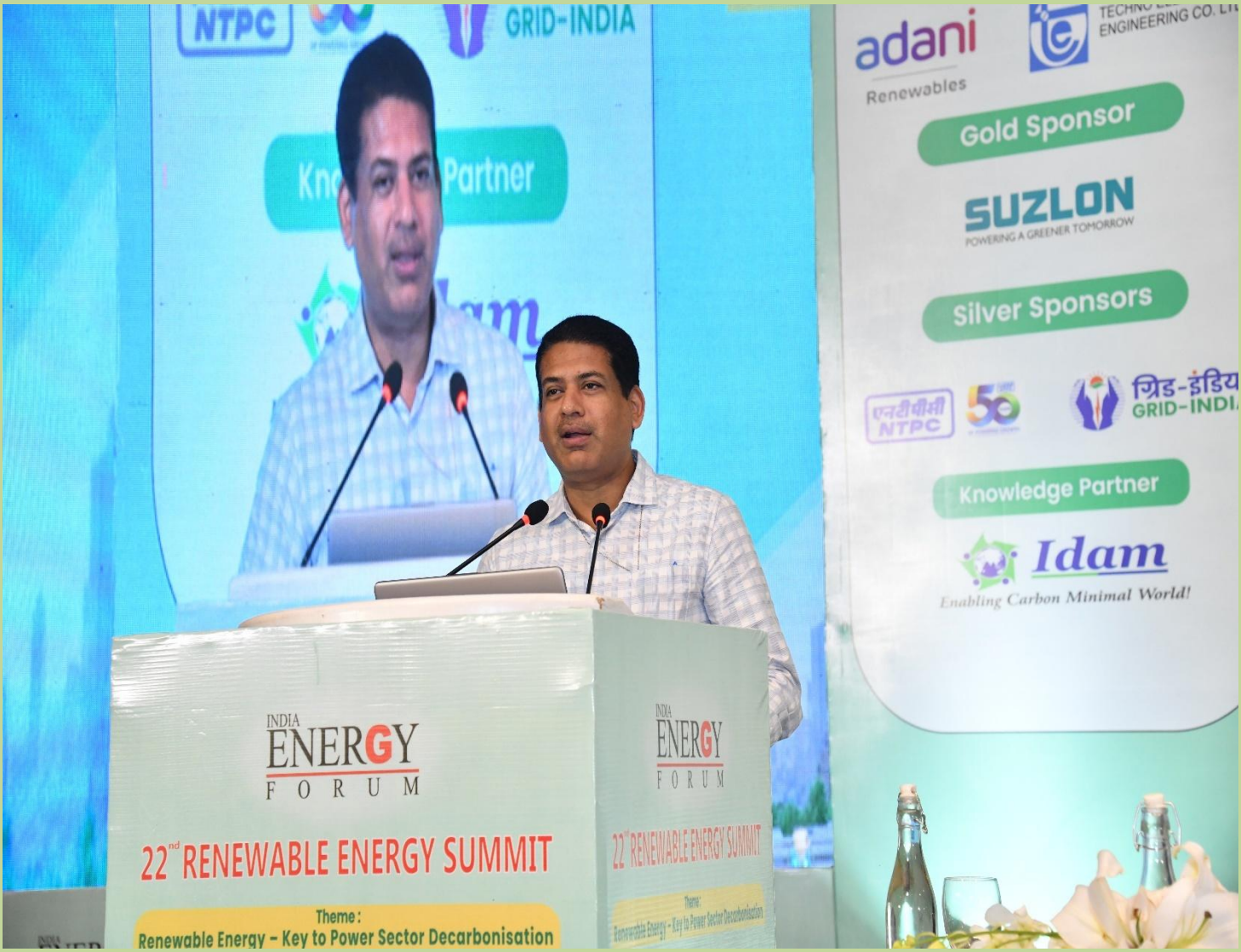
INDIA ENERGY FORUM

TOTAL ENERGY

Volume 19, Issue 4 July 2025



Shri S K Sarangi, Secretary, MNRE inaugurated 22nd Renewable Energy Summit

Battery Energy Storage: A Key Player in Energy Transition

R.V. Shahi

Battery Energy Storage System (BESS) has emerged extremely relevant for its wider and deeper applicability in the context of management of energy transition at global level, and more so, in the Indian context. As we all know, the technology and usage of battery is not new as most of us have encountered it since childhood. Whether it was the heavy batteries used in old radios or the small ones in watches, batteries have always been around. But now, with the energy transition underway across the world, battery energy storage has assumed a new and critical dimension. Its importance is largely driven by the solar energy revolution. Solar Power, as we know, is not available 24x7. So, when gigawatts of Solar Power become unavailable in evenings, we face a significant energy gap that needs support. This is where batteries—and other storage technologies like pumped storage - come into the picture.

Technologies in the entire renewable energy space, in general, are not necessarily new- most of them have been around for decades. What has changed is the affordability and improvement in technology, safety, and environmental aspects. For example, solar power technology existed since the 1960's, but continued to remain in the margin due to high costs. Today, technological improvements and falling prices have made them not only viable but overwhelmingly acceptable. The same may now be happening with batteries. Initially limited in application, batteries are now seen as a major player in energy storage and in management of transition. The costs are coming down, the safety issues are being addressed, and environmental concerns are being considered more seriously, and are being addressed. In India, there is a growing focus on pumped storage projects, with several states preparing DPRs. However, these projects have long gestation periods—typically five years and more, which contrasts batteries providing faster solution. Of course, there is always the dilemma that new technologies may emerge while we are investing in current ones. This leads to indecision, especially and quite often in Government planning process, when we keep waiting for the next best thing and end up taking no decision. But, there is growing recognition now that the response to the rapidly changing energy transition challenges, this cannot be the way forward.

Three years ago, battery was not considered as seriously as hydrogen, which was receiving a lot of attention. There has also been a gap in knowledge, but that is gradually closing. Yet, the concern that "something better may come soon" persists. In fact, just a week ago, a new idea surfaced: lifting heavy materials like sand, stone or steel to higher elevations during the day using solar power, to store energy, and then using their gravitational fall at night to generate electricity. This shows that new alternatives are always emerging, but again, cost becomes the key deciding factor. In the past year,

optimism around batteries has increased significantly. We are now asking whether battery has truly entered the domain of serious, large-scale application—particularly to support solar energy during non-generating hours and also to cater to the needs of rapidly increasing demands for Electric Vehicles.

Obviously, the importance of these aspects has to be recognised and responded well before the stage of facing consequences. While we may enthusiastically pursue battery storage, we need to recognise that equally important is to identify domestic sources of raw materials for manufacturing and rely only as interim measure on imports. China, reportedly, has secured most of the world's mineral reserves, pushing our costs higher. Hence, our energy security issue becomes more relevant if we scale up battery usage without addressing raw material sourcing and manufacturing capacity. So the key questions for a deeper analysis are: (A) Has battery truly become an affordable and reliable solution for large-scale deployment? (B) Can we manufacture it at scale domestically, given the current limitations in raw materials and infrastructure? (C) Are we prepared for the environmental impact and the challenge of disposal? These concerns also apply to solar modules, where we have large scale deployment needing appropriate attention and action. Solar Projects developers and manufacturers have made and are further making plans to adequately address these.

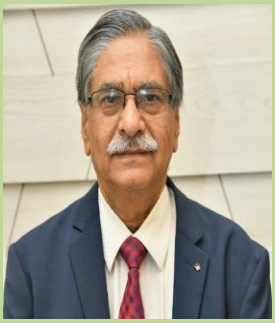
India's Solar Power Capacity projections are of the order of over 310 GW by 2030, 760 GW by 2040, and 1400 GW by 2050. Storage is a longstanding issue in our energy landscape—we had it in the form of hydro power storage and run-of-river projects. Our grid management has always had to deal with variable demand, especially with sharp evening peaks. What's new now is the scale—imagine 500 GW of solar suddenly becoming unavailable every evening. That's a huge gap. No single solution will work. India is wisely exploring multiple paths simultaneously. Pumped storage is a long-term, high-capex solution with benefits like longevity and lower long-term cost. Tariff back loading and long-term financing can make it viable. But its implementation timeline is long, so we need faster solutions like batteries. Even run-of-the-river hydro can offer flexibility due to associated small water reserve in the form of pondage. This needs to pursue for all Hydro power projects.

Till the time other long-term options are planned and made to materialise, for short and medium term, say for next 5- 15 years, Battery has emerged as an important option due to falling costs and significant global research efforts, especially in countries like China. Even if battery storage costs around ₹7/kWh and solar is at ₹2.50/kWh, we are still looking at an effective blended rate that is workable. Solar Thermal, as a parallel solution, is also an option though it does have its imperfections, which need to be worked at. Hydrogen, despite its current limitations, is also being pursued for niche energy usages. National Hydrogen Mission in India is working on this agenda and it may be expected that some breakthroughs would put in place this energy source for larger applications.

Domestic Manufacturing of Battery to cope with the scale of demand is definitely a major challenge. But we need to note that similar has been the experience in the case of Solar Power Modules. There has been good progress to gradually reduce import dependence from over 70 percent to less than 40 percent, and efforts to further reduce continue. In the initial phase, it will be necessary to allow with ease, and practically not much of import Duty, to get a critical mass of manufacturing facilities developed. Considering the strategic importance of creating sufficient capacities to back up the massive Solar Power, all such solutions including the Battery Energy Storage will need financial support to deliver the cost of production to keep a balance in the overall weighted average of Solar Power price together with the price of such systems. In this respect the savings that would accrue through proper development of Transmission System will also need to be kept in view. It is understood that out of many types of batteries the one with Lithium is expected to be more suited to the needs of the solar expansion. In absence of its availability, it will have to be imported. However, the impact of Lithium in the overall cost of production is supposed to be relatively much less. Lithium is available in a number of countries and, therefore, the price fluctuations would definitely be guided by the competitive character of supply from various sources. As mentioned earlier, batteries are needed, in a big way, also for the transport system. The initiatives on substitution of Petrol and Diesel driven transport to be replaced by Electric Vehicles will have and equally large demand for batteries. It may be that the type of batteries, out of many options, may be different from the one needed for the balancing of loads in the wake of challenges associated with Solar Power.

Initiative taken by the Ministry of New and Renewable Energy (MNRE) by way of Policy Guidelines has already led to the commercial process for inviting Tenders for BESS. Very soon the power generators would have the challenges and opportunities of responding to the requirements of integrated obligations of supplying Solar Power together with back up BESS as required depending on needs on case-to-case basis. All such efforts should be initiated with extensive consultations with stakeholders including the generators to ensure smooth and successful implementation. Apart from the support to be provided by the Government by way of avoidance of import duty burden in the initial stage until the time the domestic manufacturing comes to a reasonably satisfactory level in a period of three to five years, and the need for any further incentive during the first phase, it is equally important that the Regulatory mechanism is also supportive of this initiative. In this regard, an issue, which has come up, relates to the treatment of electricity which is needed for charging the battery. If the manufacturing process and its uses are burdened with the treatment of charging power as a purchase rather than treating it as an Auxiliary Power, the economics may go wrong. There appears to be a strong case that it is treated as an Auxiliary Power drawn from the Solar Power generation system. **

Dear Reader,



The July 2025 issue of Total Energy is with you now.

During the month of July 2025, we had two great events. The first was an online Webinar on "Improving Coal Quality for Improved Thermal Efficiency" organized on 22nd July. Besides IEF speakers, very elaborate coverage on the subject was made by distinguished speakers from Elitech Earth Sciences, Daniels GT India, Jindal Power and IASF Technologies. For our run up to de-carburization, contribution of non-fossil-based energy will keep on increasing at a fast rate. However, coal-based power generation will remain a substantial contributor with improved technologies resulting in higher thermal efficiency & heat rates. A detailed report will be presented in Aug issue of Total Energy.

The second event was a physical seminar "22nd Renewable Energy Summit"- with theme of Power Sector De-Carburization. It was held in Delhi on 31st July and was very widely participated and most of the stake holders including Secretary MNRE, Chairman CEA, Chairman IREDA, senior representatives of Industry-ADANI Green, NTPC Renewables, BHEL, Suzlon, Greenco, BSES, Westinghouse, Quant Solar etc participated in panel discussions and presentations. These were focused on Accelerating Power Deployment, RE Integration Challenges and Distributed RE and Innovative RE Technologies etc. A theme paper on the subject prepared by Idam Infra was released and summary presented by Idam Infra. The theme paper exhaustively covers India's current energy status, challenges in accelerating it and highlights Innovative RE technologies.

It is very creditable development that the target of RE power generation capacity of 50% of total power generation has been achieved five years ahead of target date.

The development of power sector is crucial to the national mission of de-carburising and achieving net zero by the year 2070. IEF has drawn an elaborate program of online webinars and physical seminars covering entire gamut of Total Energy to debate current status, challenges in growth needed for meeting energy demand and simultaneous decarburizing towards Net Zero. In these interactions, we shall be focusing on challenges in Grid Management, Flexibility issues, built up of Domestic Manufacturing Capacity, Transmission and Regularity issues, Financing, Development & enhancing Storage capacity and Energy Security etc. If the awaited bill on Nuclear Sector privatization is introduced in the current session of Parliament, this subject will also be debated with the industry stalwarts who have already shown interest. IEF remains focused & pro-active on debating Total Energy aspects thru Webinars, Energy Debates and Seminars/ Conclaves

The next physical seminar is being organized on Pumped Storage on 30th Aug.2025 at IIC.

SM Mahajan

Non-fossil power hits 50% of India's installed capacity; ₹4 lakh crore saved in 2024: Joshi

India's renewable energy capacity has exceeded 245 GW, comprising 116 GW of solar and 52 GW of wind power, Union Minister for New & Renewable Energy Pralhad Joshi said, highlighting the government's strategic push for clean energy transition. He stated that over 50 per cent of the country's installed power capacity now comes from non-fossil sources, five years ahead of its Nationally Determined Contribution (NDC) deadline.

Addressing the Mercom India Renewables Summit in the national capital, the minister outlined five key government priorities—strengthened power purchase agreements (PPAs), robust grid and storage infrastructure, domestic manufacturing, land-use optimisation, and improved access to finance.

According to Joshi, these reforms are aligned with India's 2030 target of 500 GW of non-fossil fuel-based power capacity. Citing a recent International Renewable Energy Agency (IRENA) report, he said that India saved nearly ₹4 lakh crore in 2024 through reduced fossil fuel imports and health-related costs, which includes $14.9 billion in fossil fuel savings, 410.9 million tonnes of CO_2 avoided, and $31.7 billion worth of air pollution and health-related benefits.

Rooftop solar, BESS and green hydrogen push
The Minister said that the government's rooftop solar initiative, PM Surya Ghar: Muft Bijli Yojana, has received over 58.7 lakh applications and led to 17.2 lakh installations so far. In parallel, a ₹5,400 crore Viability Gap Funding (VGF) scheme has been launched for 30 GWh of Battery Energy Storage Systems (BESS), projected to attract ₹33,000 crore in investments.

He informed that a comprehensive transmission plan has been drawn up in coordination with the Ministry of Power, the Central Electricity Authority (CEA), the Central Transmission Utility (CTU), and POWERGRID for evacuating 500 GW of non-fossil power by 2030.

PLI, ALMM and land-use reforms
To boost domestic manufacturing, Joshi said that the ₹24,000 crore Production Linked Incentive (PLI) scheme is promoting Aatmanirbharta in solar and wind manufacturing. He also announced the expansion of the Approved List of Models and Manufacturers (ALMM), with List-II for solar PV cells set to be implemented from June 2026.

The Ministry is encouraging innovation in land utilisation by supporting floating solar, canal-top solar, agrivoltaic installations, and deployment in tribal and remote areas. MSMEs and startups are being supported to scale clean energy innovations.

Green hydrogen mission rollout
Joshi said the National Green Hydrogen Mission is progressing with an outlay of ₹19,744 crore. So far, 3,000 MW of electrolyser manufacturing capacity has been allocated and over 8.6 lakh tonnes per annum of green hydrogen production approved.

The minister said the sector continues to benefit from enabling policy initiatives to support its long-term sustainability.

Union Minister Pralhad Joshi Highlights Five Pillars Driving India's Clean Energy Transformation

Highlighting the Government of India's focused push for a resilient and self-reliant renewable energy sector, Union Minister for New & Renewable Energy, Shri Pralhad Joshi, recently outlined five key priorities driving India's clean energy transition-strengthened power purchase agreements (PPAs), robust grid and storage systems, domestic manufacturing, land-use optimisation, and enhanced access to finance.

Addressing Mercom India Renewables Summit in New Delhi, the Minister said that these strategic reforms are propelling India towards its 2030 target of 500 GW non-fossil capacity. Shri Joshi said that under the leadership of Prime Minister Shri Narendra Modi India is not only delivering on its commitments but accelerating them.

The Minister informed that India has already crossed 50% of its installed power capacity from non-fossil

sources, five years ahead of its Nationally Determined Contribution (NDC) timeline. The current installed renewable energy capacity exceeds 245 GW, with 116 GW solar and 52 GW wind. The Minister cited the latest International Renewable Energy Agency (IRENA) study, noting that India's renewable energy expansion in 2024 helped the country save nearly ₹4 lakh crore by avoiding fossil fuel imports and pollution-related costs. This includes $14.9 billion in fossil fuel savings, 410.9 million tonnes of CO_2 avoided, and $31.7 billion worth of health and air pollution benefits.

The government is facilitating this growth through landmark initiatives such as the PM Surya Ghar: Muft Bijli Yojana, which has received over 58.7 lakh applications and resulted in 17.2 lakh completed rooftop solar installations. To ensure financing and stability in the sector, a ₹5,400 crore Viability Gap Funding (VGF) scheme for 30 GWh of Battery Energy Storage Systems (BESS) has been launched, expected to draw ₹33,000 crore in investments.

A comprehensive transmission plan for evacuation of 500 GW of non-fossil capacity by 2030 has been formulated in coordination with the Ministry of Power, CEA, CTU, and POWERGRID. The Minister also announced expansion of the Approved List of Models and Manufacturers (ALMM) and the upcoming implementation of List-II for solar PV cells from June 2026. The ₹24,000 crore Production Linked Incentive (PLI) scheme is enabling India to build Aatmanirbharta in solar and wind manufacturing.

To promote innovation and responsible land use, the Ministry is supporting floating solar, canal-top solar, agrivoltaics, and projects in tribal and remote regions. MSMEs and startups are also being empowered to drive clean energy innovations at scale. Further, the National Green Hydrogen Mission is progressing rapidly, with ₹19,744 crore outlay, allocation of 3,000 MW electrolyser capacity, and approval of over 8.6 lakh tonnes per annum of green hydrogen production.

India's Renewable Rise: Non-Fossil Sources Now Power Half the Nation's Grid

India has achieved a landmark in its energy transition journey by reaching 50% of its installed electricity capacity from non-fossil fuel sources—five years ahead of the target set under its Nationally Determined Contributions (NDCs) to the Paris Agreement. This significant milestone underscores the country's steadfast commitment to climate action and sustainable development, and signals that India's clean energy transition is not only real but also accelerating under the leadership of Prime Minister Shri Narendra Modi.

Union Minister of New and Renewable Energy Shri Pralhad Joshi said "In a world seeking climate solutions, India is showing the way. Achieving 50% non-fossil fuel capacity five years ahead of the 2030 target is a proud moment for every Indian. Prime Minister Shri Narendra Modi's leadership continues to drive Bharat's green transformation — paving the path towards a self-reliant and sustainable future."

Policy-Driven Progress Fuelling Clean Energy Growth

This achievement reflects the success of visionary policy design, bold implementation, and the country's deep commitment to equity and climate responsibility. Flagship programmes such as PM-KUSUM, PM Surya Ghar: Muft Bijli Yojana, solar park development, and the National Wind-Solar Hybrid Policy have laid a strong foundation for this transformation. The bioenergy sector, which was once on the margins, has now become an important contributor to both rural livelihoods and clean energy generation.

The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) has empowered lakhs of farmers by providing solar-powered pumps, enabling energy-secure and sustainable agriculture. The scheme has also opened avenues for agrovoltaics and feeder-level solarisation. The PM Surya Ghar scheme, launched in 2024, has brought about a rooftop revolution by making solar energy accessible to one crore households, fostering decentralised energy generation and empowering citizens as energy owners.

Expanding Renewable Base with Co-Benefits

Solar parks across the country have facilitated utility-scale renewable energy installations at record-low tariffs. Wind energy, particularly in states such as

Gujarat and Tamil Nadu, continues to play a vital role in meeting the country's evening peak power demand. The bioenergy sector has advanced considerably, contributing to circular economy objectives and providing significant employment opportunities in rural areas.
These initiatives have not only decarbonised the power sector but have also delivered widespread co-benefits—enhanced energy access, employment generation, reduced air pollution, better public health outcomes, and stronger rural incomes. India's clean energy revolution is as much about inclusive growth and social justice as it is about reducing emissions.

India's Global Leadership in Climate Action
India's progress assumes greater significance in the global context. Despite having one of the lowest per capita emissions globally, India remains among the few G20 countries that are on track to meet—or even exceed—their NDC commitments. At international platforms such as the G20 and the Conference of Parties (COP) to the United Nations Framework Convention on Climate Change, India has consistently advocated for climate equity, sustainable lifestyles, and low-carbon development pathways.

By achieving the 50% non-fossil milestone well ahead of schedule, India further reinforces its leadership as a clean energy frontrunner, demonstrating that economic growth and environmental stewardship can go hand in hand.

Towards a Modern, Inclusive Energy Future
This early achievement provides an opportunity to aim even higher. The next phase of India's energy transition must prioritise quality, equity, and resilience in clean energy access. Key focus areas include doubling per capita clean electricity consumption, especially in rural and underserved regions, by promoting distributed renewable systems and energy-efficient appliances. There is a need to build a robust, digitally integrated electricity grid that can effectively manage high levels of renewable energy penetration, demand fluctuations, and two-way power flows.

Expanding the deployment of Battery Energy Storage Systems (BESS) and pumped hydro storage will be critical to ensure grid reliability and round-the-clock power availability. Simultaneously, promoting circularity in the lifecycle of solar panels, wind turbine blades, and batteries will support sustainable and responsible material use. Accelerated investments in green hydrogen as a future-ready industrial fuel will also play a vital role in deepening decarbonisation across sectors.Technology as the Force Multiplier

AI and Digitisation in Renewable Energy
Artificial Intelligence (AI) is set to emerge as the backbone of India's future energy infrastructure. AI will play a central role in demand forecasting, predictive maintenance, automated grid management, and system efficiency enhancement. With AI-driven platforms, rooftop solar, electric vehicles, and smart meters will function within intelligent energy marketplaces, enabling consumers to become active energy producers—so-called 'prosumers'.

At the same time, increased digitalisation brings new challenges. As the power sector becomes increasingly reliant on data and digital infrastructure, cybersecurity must be prioritised. Protecting critical infrastructure from cyber threats, data breaches, and algorithmic manipulation is integral to ensuring a secure and resilient energy system.

Road Ahead
India's achievement of 50% non-fossil fuel installed capacity ahead of the target year is a testament to its ambition, innovation, and commitment to sustainable development. It affirms that development and decarbonisation are not contradictory goals, but can in fact reinforce each other.

As the country moves toward the goal of 500 GW of non-fossil capacity by 2030 and net-zero emissions by 2070, the path forward must be bold, inclusive, and technology-driven. India has already lit the lamp. The time has now come to let it shine brighter—for the nation and for the world.

Annexure:

A.Installed Electricity Capacity by Source as on 30.06.2025 (RE + Large Hydro Combined)

Sector	Capacity (in GW)	Percentage
Thermal	242.04 GW	(49.92%)
Nuclear	8.78 GW	(1.81%)
RE (including Large Hydro)	234.00 GW	(48.27%)
Total	**484.82 GW**	**(100%)**

B.Installed Electricity Capacity by Source as on 30.06.2025 (Large Hydro and RE Shown Separately)

Sector	**Capacity (in GW)**	**Percentage**
Thermal	242.04 GW	(49.92%)
Nuclear	8.78 GW	(1.81%)
Large Hydro	49.38 GW	(10.19%)
RE	184.62 GW	(38.08%)
Total	**484.82 GW**	**(100%)**

C. Fossil vs Non-Fossil Energy Share in Installed Capacity as on 30.06.2025

Sector	**Capacity (in GW)**	**Percentage**
Thermal	242.04 GW	(49.92%)
Non-Fossil Fuel (RE+ LH+Nuclear	242.78 GW	(50.08%)
Total	**484.82 GW**	**(100%)**

Union Minister Shri Pralhad Joshi lauds the innovation of producing green hydrogen from bio-waste at the Indian Institute of Science, Bengaluru

Union Minister of New & Renewable Energy Shri Pralhad Joshi visited the prestigious Indian Institute of Science (IISc) in Bangalore recently, where he witnessed the innovative invention and experiment that produces environmentally friendly pure green hydrogen from agricultural waste. The honourable minister addressed prominent professors, researchers, and industry leaders during his visit. He emphasized the key role of IISc in shaping India's clean energy future and outlined the major challenges facing the scientific community.

In his address, Shri Joshi expressed happiness to be at the Indian Institute of Science, which is a source of 'global respect and national pride'. He thanked the IISc Director Prof. Rangarajan and praised the enthusiasm and hard work of the faculty members and researchers. The minister highlighted the century-old tradition of excellence that IISc has in Indian science. He especially praised the 'highly advanced green water generator production system' developed by Professor Dasappa and his team from bio-waste. Shri Joshi also stated, 'This system you have developed here is a prime example of what it means to transform fundamental science into effective technology.' He characterized it not just as a national achievement but as a 'global achievement'. This system can produce up to 5 kilograms of green hydrogen per hour using India's own agricultural residues with over 99% purity. Agricultural waste products are typically burned, or if left alone, they emit methane into the atmosphere. However, this invention demonstrates that it is possible to produce environmentally friendly fuel using these wastes. This invention is a 'truly self-sufficient innovation.' Uniquely, it is carbon-reducing research, as 'every kilogram of hydrogen produced here removes more than one kilogram of carbon dioxide from the atmosphere,' he said.

Minister Joshi directly linked this innovation to the "National Green Hydrogen Mission" launched under the leadership of Prime Minister Modi at a cost of ₹19,744 crore. He reiterated the ambitious goals of the project, including an annual production capacity of 5 million metric tons of green hydrogen; an additional renewable energy capacity of 125 gigawatts; a total investment of ₹8 lakh crore; the creation of over 6 lakh jobs, and a reduction of 50 million metric tons of carbon dioxide emissions each year. He mentioned that the funding has already been provided for an annual production capacity of 3,000 megawatts of electrolyzers and an allocation of a capacity for 8.6 lakh tons of green hydrogen production per year.

The minister stressed that "Any national program cannot succeed solely with financial assistance" and presented four national challenges before the educational and scientific community at 'IISC': Hydrogen conservation: It is difficult to store hydrogen. Keeping this in mind, it is very important to emphasize the need for serious and specialized research programs on safe and reliable hydrogen conservation solutions.

Cost reduction of electrolysis systems: The minister emphasized on reducing the costs of electrolysis systems, by stating, 'True progress comes not from subsidies, but from science'. He advised the Indian Institute of Science's 'CeNSE' (Center for Nano Science and Engineering) specialized in nanomaterials and thin films to work towards 'developing next-generation, more efficient, low-cost electrolysis units.

'Reducing the cost of hydrogen-powered vehicles: Shri Joshi highlighted the need to reduce the cost of hydrogen-powered vehicles and to develop accessible hydrogen fuel refuelling centres. He recognized the significant role of 'IISc' in developing high-efficiency, low-cost fuel cell technologies. He also mentioned that 5 pilot projects for 37 hydrogen-fuel vehicles and 9 fuel refuelling centres have already been provided under NGHM.

Reducing the price of green hydrogen: The minister stated that it is very urgent to reduce the current cost of green hydrogen from Rs. 300-400 per kg to Rs. 100. He recalled Shri Amitabh Kant's goal of bringing it down to 1 dollar per kg by 2030. Before concluding his speech, the minister presented another challenge and requested the IISc community to not only to lead India in green hydrogen research but also to make India a world leader in affordable, immense, and sustainable hydrogen technology." In this regard, he assured full support from his ministry. He promised collaboration for pilot projects, financial aid and industrial partnerships for scaling up. He concluded his remarks by calling out, "Together, let us make India a frontrunner in the green hydrogen economy."

India's Renewable Rise: Non-Fossil Sources Now Power Half the Nation's Grid

India has achieved a landmark in its energy transition journey by reaching 50% of its installed electricity capacity from non-fossil fuel sources—five years ahead of the target set under its Nationally Determined Contributions (NDCs) to the Paris Agreement. This significant milestone underscores the country's steadfast commitment to climate action and sustainable development, and signals that India's clean energy transition is not only real but also accelerating under the leadership of Prime Minister Shri Narendra Modi.

Union Minister of New and Renewable Energy Shri Pralhad Joshi said "In a world seeking climate solutions, India is showing the way. Achieving 50% non-fossil fuel capacity five years ahead of the 2030 target is a proud moment for every Indian. Prime Minister Shri Narendra Modi's leadership continues to drive Bharat's green transformation — paving the path towards a self-reliant and sustainable future."

SECI crosses milestone of 60 GW of Power Sale Agreements for Renewable Energy Projects, paving the way for India's Clean Power Transition

The Solar Energy Corporation of India Limited, a Navratna Central Public Sector Enterprise under the Ministry of New and Renewable Energy, Government of India, has achieved the milestone of executing over 60 Gigawatts (GW) of Power Sale Agreements (PSAs) of Renewable Energy (RE) capacity. This marks a pivotal step in the nation's progress toward a clean and sustainable energy future and indicates the positive trend of uptake of renewable energy across the country.

The Power Sale Agreements cover a diverse portfolio of solar, wind, and hybrid energy projects, collectively representing a significant share of India's rising RE capacity. Through these agreements, SECI guarantees long-term purchase of power generated, providing payment security to developers and investors while demonstrating the viability of renewable energy ventures in the country. Such long-term arrangements are critical to unlocking the full potential of India's RE sector. By securing off take

for renewable power, SECI strengthens the renewable energy market, attracting developers and financial stakeholders, and facilitating the flow of capital for India's low-carbon economy.

Shri Santosh Kumar Sarangi, Chairman and Managing Director of SECI, stated "The signing of 60 GW worth of Power Sale Agreements within just fourteen years of establishment marks a pivotal moment for SECI's journey. SECI continues to be at the forefront of ensuring that India stays on track to meet its ambitious clean energy targets. We are proud to contribute to the nation's transition towards a sustainable and low carbon future."

Future initiatives will focus on innovative energy storage solutions, strengthening the RE supply chain, advancing the production of green hydrogen and green ammonia, as well as innovative power supply models. These efforts will accelerate the renewable energy transition and support India's climate commitments.

BRICS nations generate 51% of global solar power in 2024; India logs 133 TWh: Ember

Ten BRICS nations accounted for 51 per cent of global solar electricity generation in 2024, a sharp rise from 15 per cent a decade ago, according to a new report by energy think tank Ember. The report, released ahead of the BRICS summit, positions the bloc as a key driver of the global energy transition.

The findings show that China, India, and Brazil were the top contributors to this growth. China remained the world's largest solar power generator with 834 terawatt hours (TWh), almost three times the output of the United States, which was ranked second. India generated 133 TWh in 2024, recording a fourfold rise from 2019 levels, while Brazil entered the global top five by surpassing Germany with 75 TWh.

In China, clean energy sources met 82 per cent of the increase in electricity generation in 2024, with solar alone contributing 41 per cent. From January to May 2025, China met all of its additional electricity demand using clean energy, leading to a decline in fossil-based power generation. India and Brazil also recorded year-on-year solar generation increases of 32 per cent and 35 per cent, respectively, from January to April 2025.

The report notes that progress remains uneven across BRICS nations. Russia's solar generation was still below 0.5 TWh in early 2025. In Indonesia, more than 75 per cent of electricity growth from 2014 to 2023 was sourced from fossil fuels, and Egypt continues to depend heavily on gas to meet rising electricity demand.

However, falling battery storage costs are making solar more competitive in countries like South Africa, with Ember pointing out that 24/7 solar power is now viable when paired with batteries.

The report concludes that with clean technologies becoming more cost-effective, BRICS nations have a strategic opportunity at the upcoming summit to advance their clean energy commitments while enhancing energy security and reducing fossil fuel imports.

EV sales show mixed trend in June; e-car segment rises 90% y-o-y, e-buses up 292%

India's electric vehicle market witnessed mixed trends in June 2025, with electric cars, two-wheelers, and buses registering growth while sales of passenger and cargo electric three-wheelers declined month-on-month, according to a report by JMK Research & Analytics.

Sales of high-speed electric two-wheelers (E2Ws) rose 5 per cent month-on-month to 1,05,282 units in June. The top three players continued to dominate the segment, accounting for about 65 per cent of the total registrations.

Passenger electric three-wheeler (E3W) sales stood at 51,698 units in June, showing a 7 per cent decline on a monthly basis. However, the segment grew 13 per cent year-on-year compared to June 2024. Mahindra Last Mile Mobility led with a 13 per cent market share, followed by Bajaj Auto at 12 per cent. The top eight players accounted for 43 per cent of the market.

India saved Rs 60,681 crore forex by cutting coal imports in 2024-25 : Minister

India has reduced its annual coal imports by around 20.91 million tonnes, enabling the country to save foreign exchange to the tune of Rs 60,681.67 crore during the FY 2024-2025 compared to FY 2023-24, Minister of Coal and Mines G. Kishan Reddy informed Parliament recently.

In a written reply to a question in the Rajya Sabha, the minister said that the total coal imported into the country during 2024-25 was 243.62 million tonnes (MT), whereas, in 2023-24, it was 264.53 MT.

He said that most of the requirement of coal in the country is met through indigenous production. The Ministry of Coal has set an ambitious domestic coal production target of about 1.5 billion tonnes by FY 2029-30. The focus of the Government is on increasing the domestic production of coal and reducing non-essential coal imports.

The Ministry of Coal also launched the Coal Logistic Plan and Policy in February 2024 to develop infrastructure for efficient coal evacuation in the country, considering increased coal production projection by FY 2029-30.

For reducing dependence on imported coal and promoting domestic production, the Government has facilitated allocation of coal blocks, encouraging private sector participation and streamlining the process for obtaining necessary approvals for coal mining projects. Additionally, the thrust is on increasing coal production by government coal companies by introduction of modern technologies like First Mile connectivity (FMC) and digitalisation, the minister explained.

He also said that in order to encourage consumption of domestic coal, an Inter-Ministerial Committee (IMC) was constituted for coal import substitution. IMC, through its various meetings, has identified Import Coal Based (ICB) plants where the supply of domestic coal may be examined. These plants have indicated their specific coal requirements and preferred CIL subsidiaries.

Besides, the government has been focusing on improving coal evacuation infrastructure. In line with Government of India directives, Coal companies have undertaken improvement in coal transportation and supply chain efficiency through construction of new Railway lines and First Mile Connectivity (FMC) projects in a phased manner.

He further stated that under the Government's Revised Shakti Policy, 2025, the Imported Coal Based (ICB) Plants are allowed to secure coal under Window-II of the Policy, which has helped to increase the consumption of domestic coal.

Efforts to Reduce Coal Import Dependency

The coal is kept under the Open General License (OGL) and consumers are free to import coal from the source of their choice as per their contractual prices on payment of applicable duties. The steps taken by the Government to reduce coal import dependency are as under:

i. The Annual Contracted Quantity (ACQ) has been increased upto 100% of the normative requirement, in cases where ACQ was either reduced to 90% of normative requirement (non-coastal power plants) or where ACQ was reduced to 70% of normative requirement (coastal power plants). Increase in ACQ would result in more domestic coal supplies, thereby, reducing import dependency.

ii. Vide the amendment to the Non-Regulated Sector (NRS) linkage auction policy introduced in 2020, the tenure of coking coal linkages in the NRS linkage auction has been revised for a period upto 30 years. Increase in tenure of coking coal linkages in the NRS linkage auction for a period upto 30 years is

expected to have a positive impact towards coal imports substitution.

iii. Government has decided in 2022 that the coal to meet the full Power Purchase Agreement (PPA) requirement of all the existing linkage holders of Power Sector shall be made available by the coal companies irrespective of the trigger level and ACQ levels. This decision of the Government of meeting the full PPA requirement of the linkage holders of the Power Sector shall reduce the dependence on the imports.

iv. An Inter - Ministerial Committee (IMC) was constituted in the Ministry of Coal on 29.05.2020 for the purpose of coal import substitution. On directions of IMC, an Import Data System has been developed by Ministry of Coal to enable the Ministry to track import of coal. As per Foreign Trade Policy governing import of goods, coal is freely importable without any restrictions. However, with effect from December, 2020, the same has been revised from "Free" to "Free subject to compulsory registration in Coal Import Monitoring System (CIMS) Portal". Efforts are being made on a continuous basis to ensure more domestic supplies of coal. Thus, the entire substitutable imported coal is expected to be met by the country and no import other than the very essential should happen. A Strategy Paper on Coal Import Substitution has been released.

v. A new sub-sector 'Steel using Coking coal through WDO route' has been created in March, 2024 under the NRS linkage auctions which shall lead to increase in the domestic coking coal consumption and shall increase the availability of washed coking coal in the country, thereby, reducing coking coal imports.

vi. Coking Coal Mission has been launched to enhance coking coal supply to the Steel Sector to reduce imports of coking coal. Initiatives have been taken to enhance coking coal production.

vii. Imported Coal Based (ICB) Plants have been allowed to secure coal under the Revised SHAKTI Policy, 2025. The coal availability for ICB Plants under the Revised SHAKTI Policy is expected to reduce the dependence of these ICB plants on the imported coal.

viii. Existing Fuel Supply Agreement (FSA) holders have been allowed to secure coal under the Revised SHAKTI Policy, 2025 after procuring 100% of the ACQ coal under existing FSA. Coal availability beyond the ACQ to the existing FSA holders will benefit the power producers to meet the full requirement of the power plants.

The steps taken by the Government to increase the coal production in the country are as under:

i. Regular reviews by Ministry of Coal to expedite the development of coal blocks.

ii. Enactment of Mines and Minerals (Development and Regulation) Amendment Act, 2021 [MMDR Act] for enabling captive mines owners (other than atomic minerals) to sell up to 50% of their annual mineral (including coal) production in the open market after meeting the requirement of the end use plant linked with the mine in such manner as may be prescribed by the Central Government on payment of such additional amount.

iii. Single Window Clearance portal for the coal sector to speed up the operationalization of coal mines.

iv. Project Management Unit (PMU) for hand-holding of coal block allottees for obtaining various approvals / clearances for early operationalization of coal mines.

v. Auction of commercial mining on revenue sharing basis launched in 2020. Under commercial mining scheme, rebate of 50 % on final offer has been allowed for the quantity of coal produced earlier than scheduled date of production. Further, incentives on coal gasification or liquefaction (rebate of 50 % on final offer) have been granted.

vi. Terms and conditions of commercial coal mining are very liberal with no restriction on utilization of coal, allowing new companies to participate in the bidding process, reduced upfront amount, adjustment of upfront amount against monthly payment, liberal efficiency parameters to encourage flexibility to operationalize the coal mines, transparent bidding process, 100% Foreign Direct Investment (FDI) through automatic route and

revenue sharing model based on the National Coal Index.

In addition to the above, coal companies have also taken the following steps to increase domestic coal production:

i. Coal India Limited (CIL) has adopted a number of measures to increase coal production. In its Underground (UG) mines, CIL is adopting new and modern technologies like Mass Production Technologies (MPT) with the deployment of Continuous Miners (CMs), Longwall (LW) and Highwall (HW) wherever feasible. In its Opencast (OC) mines, CIL already has State-of-the-Art technology in its high-capacity Excavators and Dumpers. Standardization of Heavy Earth Moving Machinery (HEMM) has been done in opencast mines. Surface Miners are also deployed in opencast mines for efficient and eco-friendly mining. Digital transformation has been implemented on pilot scale in 7 of its mega mines.

ii. Regular liaison is being undertaken by Singareni Collieries Company Limited (SCCL) for expediting the grant of permissions and clearances for grounding of new projects and operation of existing projects. SCCL has initiated action for developing infrastructure for evacuation of coal like Coal Handling Plants (CHPs), Crushers, Mobile Crushers, Pre-weigh-bins etc.

During the FY 2024-25, total coal imported in the country was 243.62 Million Tonnes (MT), whereas, in FY 2023-24, it was 264.53 MT. Due to reduction of around 20.91 MT in coal imports, there has been a Forex saving of around ₹60,681.67 Crores during the FY 2024-2025 compared to FY 2023-24.

Most of the requirement of coal in the country is met through indigenous production/ supply. Ministry of coal has set an ambitious domestic coal production target of about 1.5 BT by FY 2029-30. The focus of the Government is on increasing the domestic production of coal and to reduce non-essential coal imports. Ministry of Coal has launched the Coal Logistic Plan and Policy in February, 2024 to develop infrastructure for efficient coal evacuation in the country considering increased coal production projection by FY 2029-30.

This information was given by Union Minister of Coal and Mines Shri G. Kishan Reddy in a written reply in Rajya Sabha recently.

Monthly Production and Dispatch from Captive and Commercial Mines in June 2025

Coal production from captive and commercial mines for the month of June has been recorded at 15.57 million tonnes (MT), and dispatches at 17.31 million tonnes (MT).

The first quarter of the financial year 2025–26 showed strong year-on-year growth, with production increasing by 16.39% and dispatches by 13.03% compared to the same period last year. This reflects improved efficiency and better utilization of mining capacity.

The attached graph clearly illustrates the consistent performance improvement across three consecutive years of ending of Q1, with both production and dispatch showing strong gains.

Key Developments in June 2025

- Mine Opening Permission was granted for Utkal A Mine, having a Peak Rated Capacity of 25 MT.

- Vesting orders were issued for three coal blocks, raising the total number of coal blocks allocated by the Ministry of Coal to more than 200. This increase ensures a reliable supply of coal to key industries such as power generation, steel manufacturing, and cement production, thereby reinforcing the backbone of India's industrial infrastructure. These milestones underscore the Ministry's focused efforts to enhance domestic coal production, contributing significantly to the vision of a resilient and self-sustaining India.

Sustainable Coal Production

The details of the coal production during the last three years are as under:

[Figures in Million Tonnes]

Year	Production of Coal
2022-23	893.191
2023-24	997.826
2024-25	1047.50 (provisional)

To promote environmental sustainability in coal mines in the country, various sustainable & environment friendly initiatives have been taken such as plantation/ bio-reclamation, mine water utilization for community use, development of eco-parks and adoption of energy efficiency measures.

Further, as per the provision of the Coal Mine/ Block Development and Production Agreement (CMDPA/CBDPA) executed with coal blocks allocattees, the successful bidders are required to use mechanized methods by adopting modern technologies for coal extraction, transport and evacuation in order to minimize carbon emissions, reduce environmental pollution, and promote sustainability following Good Industry Practice. The successful bidders are also encouraged to make necessary arrangements for mechanized loading and establishing First Mile Connectivity for transportation of coal from the pithead to reduce environmental pollution.

Ministry of Coal has set an ambitious domestic coal production target of about 1.5 BT (billion tonnes) by 2030.

The following activities have been undertaken by the coal companies to reduce carbon emissions from coal mines:

i. Creation of carbon sink through plantations.

ii. Restoration of degraded land.

iii. Adoption of clean coal technologies including extraction of Coal Bed Methane (CBM) and Coal Gasification.

iii. Minimizing road transportation and enhancing mechanized coal loading and transportation including First Mile Connectivity projects.

iv. Implementing Energy Efficiency measures.

vi. Undertaking Renewable energy projects including solar, wind, pumped storage projects, geo-thermal, etc.

The following steps have been taken by the Government to increase coal production in the country:

i. Regular reviews by Ministry of Coal to expedite the development of coal blocks.

ii. Enactment of Mines and Minerals (Development and Regulation) Amendment Act, 2021 [MMDR Act] for enabling captive mine owners (other than atomic minerals) to sell up to 50% of their annual mineral (including coal) production in the open market after meeting the requirement of the end use plant linked with the mine.

iii. Single Window Clearance portal for the coal sector to speed up the operationalization of coal mines.

iv. Project Management Unit (PMU) for hand-holding of coal block allottees for obtaining various approvals/ clearances for early operationalization of coal mines.

v. Auction of commercial mines on revenue sharing basis was launched in 2020. Under this scheme, rebate of 50 % on final offer has been allowed for the quantity of coal produced earlier than scheduled date of production. Further, incentives on coal gasification or liquefaction (rebate of 50% on final offer) have been granted.

vi. Terms and conditions of commercial coal mining are very liberal with no restriction on utilization of coal, allowing new companies to participate in the bidding process, reduced upfront amount, adjustment of upfront amount against monthly payment, liberal efficiency parameters to encourage flexibility to operationalize the coal mines,

transparent bidding process, 100% Foreign Direct Investment (FDI) through automatic route and revenue sharing model based on the National Coal Index.

In addition to the above, coal companies have also taken the following steps to increase domestic coal production:

i. In its Underground (UG) mines, Coal India Limited (CIL) is adopting new and modern technologies like Mass Production Technologies (MPT) with the deployment of Continuous Miners (CMs), Longwall (LW) and Highwall (HW) wherever feasible.

ii. In its Opencast (OC) mines, CIL already has State-of-the-Art technology in its high-capacity Excavators and Dumpers, standardization of Heavy Earth Moving Machinery (HEMM), deployment of Surface Miners. Digital transformation has been implemented on pilot scale in 7 of its mega mines.

iii. Regular liaison is being undertaken by Singareni Collieries Company Limited (SCCL) for grounding of new projects and operation of existing projects. SCCL has initiated action for developing infrastructure for evacuation of coal like Coal Handling Plants (CHPs), Crushers, Mobile Crushers, Pre-weigh-bins etc.

This information was given by Union Minister of Coal and Mines Shri G. Kishan Reddy in a written reply in Lok Sabha recently.

Coal and Lignite Gasification Initiative

The Government has taken the following initiatives to promote coal and lignite gasification in the public and private sectors

- On January 24, 2024, the Government has approved an incentive scheme for promotion of coal and lignite gasification projects for PSUs and private sector with an outlay of ₹ 8,500 crore.

- The Government has also approved investment by Coal India Limited (CIL) in joint ventures of Coal India Limited - Bharat Heavy Electricals Limited (CIL-BHEL) and Coal India Limited - Gas Authority of India Limited (CIL-GAIL) for undertaking coal gasification projects. Both JV companies have now been established.

- In 2022, a new sub-sector, "Production of Syngas leading to coal gasification," was created under the Non-Regulated Sector (NRS) linkage auctions policy to support coal gasification initiative.

- The Government has allowed coal supply to gasification projects under the NRS auction with a floor price at the notified price of the regulated sector, for the projects commissioning within the next seven years.

- 50% rebate in the revenue share for coal used in gasification has been introduced in commercial coal block auctions, provided that at least 10% of the total coal production is used for gasification purposes.

- A framework has been established for granting waivers from registration for Transfer of Technology (ToT) from land-border-sharing countries on a case-by-case basis. Waiver to one application has been granted.

The aforesaid ₹8500 crore financial incentive scheme has the following three categories against which a total of 7 (seven) projects have been approved–

- Category I - with a provision of ₹4,050 crores under which only PSUs were entitled to apply, a total of three projects with Government assistance of ₹1,350 crores each have been approved.

- Category II - with a provision of ₹3,850 crores under which both private sector and PSUs were entitled to apply, a total of three private sector projects with Government assistance amounting to ₹1,983.06 crores have been approved.

- Category III - with a provision of ₹600 crores for demonstration or small-scale projects, one private sector project with ₹100 crores of Government assistance has been approved.

This information was given by Union Minister of Coal and Mines Shri G. Kishan Reddy in a written reply in Rajya Sabha recently.

Strategies for Coal Sector Sustainability and Competitiveness

India has the world's 5th largest coal reserves to contribute to the country's energy security and it accounts for 55% of the country's energy needs. India's energy mix is diverse, but dominated by coal, which fuels a significant portion of the country's electricity generation. While renewable energy sources like solar and wind are growing rapidly, they still constitute a smaller share of the overall energy mix compared to coal. The country is actively working to diversify its energy sources and increase its reliance on renewables to meet rising energy demands and address climate change concerns.

Considering the global shift towards cleaner energy sources and the need to reduce carbon emissions, Government has undertaken the following strategic initiatives to ensure the long-term sustainability and competitiveness of country's coal sector –

• Greening Initiatives— Bio-Reclamation/Plantation: The Coal/Lignite PSUs have been constantly making efforts to minimize the footprints of coal mining through sustained reclamation and afforestation of areas in and around their operating mines.

• Energy Efficiency Measures: Coal and Lignite PSUs have been taking various energy conservation and efficiency measures over the years to reduce carbon intensity such as replacement of conventional lights with LED lights, installation of energy-efficient air conditioners, super fans, deployment of Electric Vehicle (EVs) and installation of efficient water heaters, energy-efficient motors for pumps, auto timers in street lights etc.

• Efficient utilization of mine water: Mine water after the application of appropriate treatment methods is utilized for various purposes such as - community supply for domestic and irrigation purposes, industrial use for dust suppression, plantation, firefighting, machinery washing, sprinkling in underground workings, creation of recreational areas, fish farming, and groundwater recharge etc. Coal and Lignite PSUs have also entered into an MoU with the respective State Governments for community water supply.

• Gainful Utilization of Overburden: Extracting sand from Over Burden (OB) for construction and stowing material supports sustainable development by providing affordable sand and reducing the land required for OB dumps. As of March 2024, Coal and Lignite PSUs have commissioned 4 OB processing plants and 5 OB to M-Sand Plants. This initiative not only helps reduce environmental pollution, improve the riverine ecosystem, enhance water flow, and boost groundwater recharge, but also provides a cheaper alternative for construction sand.

• Green Credit Programme: Coal PSUs are also participating in extensive plantation under Green Credit Program launched by MoEF&CC.

• First Mile Connectivity (FMC) projects: The Coal PSUs have taken steps to upgrade the mechanized coal transportation and loading system under 'First Mile Connectivity' projects. Commissioning of FMC projects in coal mining areas reduces consumption of diesel significantly and therefore reduces carbon emissions.

• Deployment of blast-free technology in coal mining: Coal companies are deploying modern equipment having environment-friendly features, like Surface Miner, Continuous Miner in coal mining, which eliminates the drilling, blasting and crushing operations in coal and hence, in turn, obviates pollution caused due to these operations. Rippers are also being deployed for blast-less removal of overburden in some mines.

• Renewable Energy and clean coal initiatives: Coal PSUs have also started commissioning Renewable Energy power projects. Additionally, they are venturing into various clean coal technologies like Coal gasification, Coal Bed methane (CBM) etc.

As per the current import policy, coal is kept under Open General Licence (OGL) and consumers are free to import coal from the source of their choice as per their contractual prices on payment of applicable duties. Due to concerted efforts of the government,

the import of coal has reduced from 264.5 MT in 2023-24 to 243.6 Mt in 2024-25.

For reducing dependence on imported coal and promoting domestic production, the Government has taken the following measures: -

i. Reducing the reliance on imported coal by boosting domestic production- This was done by facilitating allocation of coal blocks, encouraging private sector participation and streamlining the process for obtaining necessary approvals for coal mining projects. Additionally, the thrust is on increasing coal production by government coal companies by introduction of modern technologies like First Mile connectivity (FMC) and digitalization.

ii. Encouraging the domestic coal consumption- Towards this, an Inter-Ministerial Committee (IMC) was constituted for coal import substitution. IMC, through its various meetings, has identified Import Coal Based (ICB) plants where the supply of domestic coal may be examined. These plants have indicated their specific coal requirements and preferred CIL subsidiaries.

iii. Focusing on improving coal evacuation infrastructure/ coal supply chain- In line with Government of India directives, Coal companies have undertaken improvement in coal transportation and supply chain efficiency through construction of new Railway lines and First Mile Connectivity (FMC) projects in a phased manner.

iv. As regards fiscal measures, under the Revised Shakti Policy, 2025, the Imported Coal Based (ICB) Plants are allowed to secure coal under Window-II of the Policy.

This information was given by Union Minister of Coal and Mines Shri G. Kishan Reddy in a written reply in Rajya Sabha recently.

Coal India production drops 6% in April-July period

State-owned Coal India on Friday reported a 6% drop in production at 229.8 million tonnes (MT) in the April-July period of the current financial year even as the government is making efforts to increase the output to cut imports. The company had produced 244.3 MT of coal in the corresponding period of the previous fiscal, Coal India Ltd (CIL) said in a filing to BSE.

The coal behemoth did not give reasons for the decline in production. However, industry analysts attribute the production dip to typical monsoon-related disruptions, which can hinder mining operations and dispatch to power plants.

The coal behemoth did not give reasons for the decline in production. However, industry analysts attribute the production dip to typical monsoon-related disruptions, which can hinder mining operations and dispatch to power plants.

CIL accounts for over 80 per cent of domestic coal output.

Coal production in July also dropped to 46.4 MT from 55 MT in the corresponding month of previous fiscal.

Coal Minister G Kishan Reddy had earlier said that the country will not face any shortage of coal in the upcoming monsoon season, as the government is well prepared to meet the demand across various sectors, including the power sector.

The coal ministry had earlier said that it remains committed to achieving sustainable growth, improving coal availability, and reducing dependence on imports.

With the positive momentum, the coal sector continues to play a pivotal role in powering India's growth story.

Coal India Ltd is targeting a production of 875 million tonnes and an offtake of 900 MT in 2025-26.

Private Sector to Invest ₹77,000 Crore in Thermal Power by FY28: Crisil

In a major development for India's energy sector, the thermal power industry is set to witness an investment surge of ₹77,000 crore from private sector players between FY26 and FY28, according to a report by Crisil Ratings. This marks a significant shift as private firms like Adani Power, Tata Power, JSW Energy, and Vedanta Power take the lead in strengthening the country's thermal power capacity, largely through brownfield projects that sidestep land acquisition challenges.

Doubling of Thermal Power Investment

- Total investment in the thermal power sector, including both public and private projects, is expected to double to ₹2.3 lakh crore over the next three years.
- The private sector's share, which was earlier limited to just 7–8 per cent, will now rise to nearly one-third of total investments.
- This reflects a revival of private interest in coal-based projects after a decade of stagnation.

Factors Driving Private Sector Participation

Long-Term Power Purchase Agreements (PPAs)

- For the first time in 10 years, four state power distribution companies (Discoms) have signed 25-year PPAs with private thermal producers.
- These agreements reduce financial risks for investors.
- They ensure stable revenue flows and improve the viability of thermal projects.

Rising Power Demand

- India's power demand is projected to reach 366 GW by 2031–32.
- Renewable sources like solar and wind are expected to meet about 70% of this demand, but their intermittency makes thermal power crucial for round-the-clock supply.
- The government has announced plans for 80 GW of new coal-based thermal capacity by 2032, of which 60 GW has already been initiated.

Major Private Sector Contributions

Focus on Brownfield Projects

Most of the new capacity will come from brownfield expansions, which,

- Avoid land acquisition delays.
- Utilize existing infrastructure and pit-head linkages, ensuring faster project execution.

Key Players

- Adani Power, Tata Power, JSW Energy, and Vedanta Power are at the forefront of this expansion.
- Together, they are investing in projects that combine financial viability with operational efficiency.

Vedanta Power's Strategic Expansion

Demerger and Growth Plan

- Vedanta Power is preparing for a demerger to operate as a standalone entity.
- Its long-term plan includes adding 15 GW of capacity, primarily through brownfield projects.

Revival of Existing Portfolios
Reviving a 2,200 MW portfolio, which includes,

- 1,200 MW at the Chhattisgarh Thermal Power Plant (formerly Athena).
- 1,000 MW at Meenakshi, both with pit-head advantages and existing linkages.

Financial Viability
Upcoming projects will operate under a tariff structure of ₹5.5–₹5.8 per unit.

The two-part tariff system ensures,

- 60% fixed charges for stable returns.
- The remainder based on cost-plus pricing.
- The projects are designed to yield an internal rate of return (IRR) of 15%, making them financially attractive and executable on schedule.

Progress of Hydro Pumped Storage Projects (PSP)

The Government of India has taken various initiatives to promote development of hydro pumped storage projects (PSPs), viz :-

i. Budgetary support towards cost of enabling infrastructure, i.e. roads, bridges, ropeways, railway siding, communication infrastructure and transmission line from power house to the nearest pooling point, including upgradation of pooling substations of State or Central Transmission Utility.

ii. The Ministry of Power in April, 2023 issued guidelines to promote development of PSPs. These guidelines provide various methods of allotment of PSP sites, exemption from free power obligation/Local Area Development Fund, rationalization of Environmental Clearance process and utilization of exhausted coal mines etc.

iii. Waiver of Inter State Transmission System (ISTS) charges for PSPs for which construction work is awarded on or before 30.06.2028.

iv. Central Electricity Authority (CEA) has published revised Guidelines for formulation and concurrence of Detailed Project Reports (DPR) of PSPs. Under the revised guidelines, the timeline for concurrence of DPR has been reduced from 90 days to 50 days for all type of PSPs.

v. CEA has launched the “Jal Vidyut DPR” portal for monitoring Survey and Investigation (S&I) activities of HEPs and PSPs. The portal enables real-time tracking of workflows and pending tasks across appraising agencies and developers, helping to identify and address delays effectively.

vi. To provide a transparent, fair, standardized procurement framework based on open competitive bidding with appropriate risk-sharing between various stakeholders, Ministry of Power has notified TBCB guidelines for procurement of storage capacity/ stored energy from pumped storage plants.

vii. Ministry of Environment, Forest & Climate Change (MoEF&CC), on 18.05.2023, has notified to appraise PSPs under B2 category subject to certain conditions.

viii. The MoEF&CC, on 14.08.2023, issued specific TOR for the proposals involving off steam PSPs wherein collection of baseline data for one season (other than monsoon) is prescribed for off steam closed loop PSPs and collection of baseline data for two seasons (pre-monsoon & post-monsoon) is prescribed for off stream open loop PSPs.

ix. The MOEF&CC, in August 2024, has allowed the provisions for drilling investigations in forest area extended to PSPs at par with mining activities.

As on 30.06.2025, the status of hydro pumped storage projects (PSPs) is as under:

i. 10 number of PSPs with aggregate installed capacity of 6.2 GW have been commissioned.

ii. 8 number of PSPs with aggregate capacity of 8.5 GW are under construction.

iii. 5 number of PSPs with aggregate capacity of 5.8 GW have been concurred by CEA.

iv. 46 number of PSPs with aggregate capacity of 64.8 GW are under Survey & Investigation for preparation of DPRs.

This information was given by the Minister of State for Power, Shri Shripad Yesso Naik, in a written reply in the Rajya Sabha recently.

Govt races to build transmission firms amid push to meet 2030 clean energy goal

The government has accelerated efforts to upgrade India’s electricity transmission backbone, which had been slacking amid a growing need to integrate the

country's rapidly expanding green power capacity to the grid.

In the first half of 2025, more than 30 power sector firms—mostly transmission companies and infrastructure investment trusts—were incorporated, ministry of corporate affairs data show. The number of power sector enterprises established this year by the Union government jumped from two in February to 10 in June. India has made rapid progress in adding renewable power capacity—its non-fossil fuel capacity of 242.8 GW accounts for about half of the total installed capacity of 484.8 GW—but the transmission infrastructure has not kept pace. India is targeting 500 GW of clean energy capacity by 2030.

A wider and robust transmission network is required also because the addition of renewable power such as solar and wind energy increases chances of grid instability and largescale power outages as these are intermittent sources of power.

In 2024-25, 8,830 circuit kilometres (ckm) of transmission network was added, nearly 38% lower than the 14,203 ckm added in FY24, show data from the Central Electricity Authority (CEA).

Smart Meters Installed Under RDSS

Under the Revamped Distribution Sector Scheme (RDSS), 20.33 crore smart meters have been sanctioned in 28 States/ UTs, out of which 2.41 crore smart meters have been installed as on 15.07.2025. For the state of Gujarat, 1.67 crore smart meters have been sanctioned under RDSS, out of which 20.94 lakh smart meters have been installed as on 15.07.2025.

Smart meters help the distribution utilities in improving their billing efficiency as below:

i. Provide real-time data, eliminating the need for estimated readings, which can lead to billing inaccuracies.

ii. Automated data collection process minimizes human error associated with manual meter reading and billing.

ii. Help identify and prevent electricity theft, ensuring that utilities recover revenue for all energy consumed.

As reported by the utilities of the State of Gujarat, the smart meter installations are currently in its initial implementation phase and complete saturation of divisions are under progress. The improvement in the operational parameters of the Gujarat utilities can be assessed once the saturation in specific areas is complete.

Government of India (GoI) has been supporting the States/ distribution utilities to improve their performance through various initiatives. Some of the key initiatives taken are as under:

i. Revamped Distribution Sector Scheme (RDSS) was launched with the objective of improving the quality and reliability of power through a financially sustainable and operationally efficient Distribution Sector. The release of funds under the scheme is linked to States/ distribution utilities taking necessary measures for improving their performance against specified parameters including the Gap between average cost of supply and average revenue realized i.e. ACS-ARR Gap and the Aggregate Technical & Commercial (AT&C) losses.

ii. Allowing additional borrowing space of 0.5% of GSDP to the State if the distribution utility implements loss reduction measures.

iii. Additional Prudential Norms have been specified for sanctioning of loans to State owned Power Utilities which is contingent on performance of Power Distribution Utilities against prescribed parameters.

iv. Rules for implementation of Fuel and Power Purchase Cost Adjustment (FPPCA) and cost reflective tariff to ensure all prudent costs for supply of electricity are passed through and are timely realised.

Above reform measures are to be implemented by States/ distribution utilities as a whole including Tier-II and Tier-III towns falling under the utility area. As a result of reform measures undertaken, the AT&C losses of distribution utilities at the national level have reduced from 21.91% in FY21 to 16.12% in FY24 and ACS-ARR Gap from Rs 0.69/ kWh in FY21 to Rs 0.19/ kWh in FY24.

This information was given by the Minister of State for Power, Shri Shripad Yesso Naik, in a written reply in the Lok Sabha recently.

Coupling of power markets to begin by January 2026

The Central Electricity Regulatory Commission (CERC) recently said it has decided to initiate the process for implementing power market coupling. To begin with, the implementation of the coupling of 'day-ahead market' (DAM) of the power exchanges is to be in a 'round-robin' mode by January 2026.

This comes after months of deliberations with various stakeholders in the power sector. Market coupling helps achieve price convergence between different electricity markets, according to industry officials. Coupling means electricity prices in different regions become more aligned, reducing price disparities and creating a more consistent pricing structure.

"Based on the submissions made by Grid-India and various consultations held...the Commission has decided to initiate the process for implementing market coupling in a phased manner," it said in an order.

Domestic power consumption grows by 2.6% in July

India's power consumption in July saw a marginal year-on-year increase of 2.6 per cent, reaching 153.63 billion units (BU), according to news agency PTI. This modest growth, up from 149.65 BU in July 2024, is largely attributed to reduced usage of cooling appliances across the country due to widespread and heavy monsoon downpours.

Experts suggest that the active monsoon season impacted both power consumption and demand throughout July. The highest daily power supply (peak power demand met) in July dipped slightly to approximately 220.59 GW, compared to around 226.63 GW in July 2024.

This comes after peak power demand hit an all-time high of about 250 GW in May 2024, surpassing the previous record of 243.27 GW set in September 2023. Government estimates had projected peak power demand to reach 277 GW during the summer of 2025. However, the record peak demand during the current summer season (from April onwards) was 242.77 GW in June.

According to the Indian Meteorological Department (IMD), the monsoon arrived on the Kerala coast on May 24, 2025, eight days earlier than expected. This early onset led to widespread rains across the country, consequently reducing electricity consumption, particularly from cooling appliances like desert coolers and air conditioners throughout June.

The IMD had previously forecast hotter-than-usual temperatures from April to June 2025, with an increased number of heatwave days expected in Central and Eastern India, as well as the Northwestern plains. Minimum temperatures were also predicted to be higher than usual across most of the country, with a few exceptions in the Northwest and Northeast.

India witnesses renewed spurt in oil and gas exploration: Petroleum Minister Hardeep S Puri

India is witnessing a renewed surge in oil and gas exploration, particularly in offshore regions, underscoring the country's vast untapped hydrocarbon potential. In a written reply to a starred question in the Rajya Sabha, Union Minister for Petroleum and Natural Gas, Hardeep Singh Puri, stated that the opening of nearly one million square kilometres of erstwhile 'No-Go' offshore areas in 2022 has been a landmark development. This move has unlocked significant exploration frontiers, especially in deepwater and frontier regions such as the Andaman-Nicobar (AN) offshore basin, and has been instrumental in triggering the current momentum in offshore activity.

Since 2015, Exploration and Production (E&P) companies operating in India have reported 172 hydrocarbon discoveries, including 62 in offshore areas. The Minister highlighted the geological significance of the AN basin, which lies at the junction of the Andaman and Nicobar Basins within the Bengal-Arakan sedimentary system. The tectonic setting, located at the boundary of the Indian and Burmese plates, has led to the formation of numerous stratigraphic traps that are conducive to hydrocarbon accumulation. This geological promise is further amplified by the basin's proximity to proven petroleum systems in Myanmar and North Sumatra. The region has attracted renewed global interest following significant gas discoveries in South Andaman offshore Indonesia, underlining the geological continuity across the region.

While the favourable geology sets a strong foundation, Shri Puri emphasized that the real breakthrough has come from the government's strategic policy interventions and a new exploration approach. The revised strategy has enabled aggressive acquisition of seismic data, initiation of both stratigraphic and exploratory drilling, and increased engagement with international exploration partners, several of whom have shown keen interest in the newly accessible frontier blocks.

National Oil Companies have planned to drill four offshore stratigraphic wells, including one in the AN basin. These scientific wells are designed to test geological models, validate the existence of petroleum systems, and help de-risk future commercial exploration. Although commercial accumulations have not yet been confirmed, these efforts mark a major step forward in systematic and knowledge-driven hydrocarbon exploration.

In a significant development, ONGC and Oil India Ltd (OIL) have launched an ambitious exploration campaign in the Andaman ultra-deepwater region. For the first time, drilling operations are targeting depths of up to 5000 metres. One such wildcat well, ANDW-7, drilled in a carbonate play in the East Andaman Back Arc region, has yielded encouraging geological insights. These include traces of light crude and condensate in cutting samples, heavy hydrocarbons like C-5 neo-pentane in trip gases, and the presence of reservoir-quality facies. These findings establish, for the first time, the existence of an active thermogenic petroleum system in the region, comparable to those in Myanmar and North Sumatra. While commercial reserves remain to be established, this campaign has validated the presence of a working petroleum system and laid the foundation for focused exploration in the area.

Providing an overview of the exploration outcomes so far, the Minister informed that ONGC has made hydrocarbon discoveries in 20 blocks, with an estimated reserve of 75 million metric tonnes of oil equivalent (MMTOE). OIL, on its part, has made seven oil and gas discoveries over the past four years, with reserves estimated at 9.8 million barrels of oil and 2,706.3 million standard cubic meters of gas.

Referring to the Hydrocarbon Resource Assessment Study (HRAS) of 2017, which estimated the AN basin's hydrocarbon potential at 371 MMTOE, the Minister stated that a 2D broadband seismic survey covering approximately 80,000 Line Kilometres (LKM) of India's Exclusive Economic Zone, including the AN offshore region, was completed in 2024. Additionally, OIL acquired 22,555 LKM of 2D seismic data during the Deep Andaman Offshore Survey conducted in 2021–22. Several promising geological features have emerged from this data, which are now

being validated through ongoing drilling campaigns by ONGC and OIL.

Shri Puri underscored that the current momentum in offshore and frontier exploration is a result of a series of progressive policy reforms introduced since 2014. These include the transition from the Production Sharing Contract (PSC) regime to the Revenue Sharing Contract (RSC) model in 2015, the launch of the Hydrocarbon Exploration and Licensing Policy (HELP) and the Open Acreage Licensing Programme (OALP) in 2016, the establishment of the National Data Repository in 2017–18, and the deregulation of crude oil marketing in 2022. Together, these measures have fostered a liberal, investor-friendly exploration environment backed by targeted incentives for frontier exploration, stratigraphic drilling, and data acquisition.

These reforms have enabled the kind of bold, risk-informed and scientific exploration now underway in the Andaman-Nicobar basin and other deepwater regions, offering the potential to significantly boost India’s energy security and self-reliance.

Natural gas consumption in India likely to reach 103 bcm per year by 2030

Overall natural gas consumption in India is estimated to reach 103 billion cubic meters (bcm) per year by 2030, representing a near 60 per cent increase from current levels, a top government official said recently. In his address at an event, organised by the Chintan Research Foundation (CRF), Praveen Mal Khanooja, Additional Secretary, Ministry of Petroleum and Natural Gas, said that under the accelerated policy support (faster CGD rollout, LNG adoption in transport, higher gas-fired power plant utilisation), demand could rise to 120 bcm per year by 2030, approaching South America's current consumption.

India has committed to achieving net-zero emissions by 2070. A crucial component of this transition is the strategic use of gas as a bridge fuel, enabling a phased shift from carbon-heavy fuels like coal to a lowcarbon future.

"With relatively lower carbon and particulate emissions, gas has been recognised and used globally as a fossil fuel that can securely bridge the energy transition. Although green hydrogen, compressed biogas and coal-bed methane are emerging, India remains largely dependent on regasified LNG as the primary means to grow the share of gas in her energy mix," Khanooja told the gathering.

The share of gas in India's primary energy mix is 6.8 per cent -- well below the 15 per cent target set for 2030. Recent analysis, including from the IEA's 'India Gas Market Report', suggests that under businessas-usual conditions, India may only achieve an 8-9 per cent share by 2030.

To significantly expand the gas consumption and mark even a 10 per cent share in the energy mix, India must address critical challenges. The Ministry of Petroleum and Natural Gas released an updated demand forecast for the 'India Gas Vision' programme, showing rapid growth across key sectors fuelled by infrastructure scale-up and policy reforms.

Suresh P. Manglani, Executive Director and Chief Executive Officer of Adani Total Gas Limited (ATGL), said that they are closely observing what China is doing.

"If you visit there, you can clearly see how aggressively China is promoting LNG for transportation - especially for trucks and long-haul freight movement. If India is serious about moving away from highspeed diesel (HSD), we need to consider similar strategies. Even if we assume an incremental demand of 70 to 200 million cubic meters of LNG, and distribute around 300 LNG stations across 30 to 35 logistics hubs, it will still only cover the conventional demand segment," Manglani highlighted.

"But we must look beyond that. We should actively encourage entrepreneurship focused on nonconventional uses of natural gas - whether in industrial clusters, remote regions, or emerging sectors. We already have several such opportunities spread across the country," he emphasised.

The implementation of GST has already helped India become a single, unified market.

"Now we must build on that momentum to streamline transportation, enhance logistics efficiency, and create a more business-friendly ecosystem that ultimately benefits both the economy and the end consumer," said Manglani. Rajesh Kumar Mediratta, Managing Director and CEO of Indian Gas Exchange (IGX), said that we must aim to build our own robust and self-sustaining gas market. "India has the potential to become one of the largest demand centres in Asia - comparable to, or even exceeding, countries like Japan and South Korea. With this scale of demand, we should be in a position to negotiate global contracts more confidently, on our own terms, rather than relying heavily on intermediaries or spot markets," he stressed.

India Charts Bold Upstream Energy Strategy at Urja Varta 2025

Minister of Petroleum and Natural Gas Minister Puri laid out India's comprehensive strategy for strengthening upstream exploration and production (E\&P), energy resilience, and international cooperation while speaking in a fireside chat session organised on sidelines of Urja Varta 2025.

Addressing questions on India's energy security posture amid global geopolitical disruptions such as the Russia-Ukraine conflict and tensions in the Middle East, Shri Puri stated that India had proactively expanded its crude import sources from 27 to 40 countries. This diversification, he said, is a key measure to ensure uninterrupted energy access during periods of global turbulence. On the topic of Russian oil imports, he clarified that Russia remains one of the world's top oil producers with an output exceeding 9 million barrels per day. He warned that a sudden removal of this supply from the global market—out of a total of approximately 97 million barrels per day—would have created chaos, pushing prices to between $130–$200 per barrel. Shri Puri categorically stated that India has never purchased any sanctioned cargo and that Russian oil was not under global sanctions but only a price cap, carefully structured to reflect ground realities of the international energy supply chain. He credited PM Modi's leadership for India's proactive and balanced approach, which has made the country a net stabilising force in global energy markets.

Shri Puri highlighted a series of transformative policy reforms introduced over the last decade to make India's upstream sector globally competitive. Among the major changes, he mentioned the reimagined exploration framework under the Oilfields Regulation and Development Act (ORDA), characterised by a co-designed approach, a single lease and approval mechanism, transparent operational rules, and the introduction of a "no-sit" clause to eliminate inactive acreage. These measures, integrated with the revised Petroleum and Natural Gas Rules (PNG Rules 2025) and the Model Revenue Sharing Contracts (MRSC), aim to simplify business operations and attract private investment. The Minister acknowledged that the Hydrocarbon Exploration and Licensing Policy (HELP) and amendments to the ORD Act have opened nearly 1 million square kilometres of previously inaccessible "No-Go" areas to exploration, thereby unlocking significant resource potential.

Reaffirming India's ambitions in offshore energy, Shri Puri spoke of the significant hydrocarbon potential of the Andaman Basin, drawing comparisons with the prolific Guyana basin. He expressed strong optimism, stating, "I am positive we will find several fields of the size of Guyana, particularly in the Andaman Sea." This confidence is rooted in India's expanding access to high-quality geoscientific data, robust regulatory support, and policy incentives aimed at de-risking exploration investments. He underscored India's goal of becoming the next credible frontier for deepwater oil and gas exploration by leveraging scale, demand continuity, and global partnerships.

The Minister elaborated on India's focus on enhancing subsurface intelligence through the expansion and modernisation of the country's seismic database. He highlighted the government's thrust on conducting extensive seismic surveys, adopting advanced technologies, and democratising data access through the National Data Repository. These efforts, he said, are central to ensuring greater investor confidence and fostering transparent, data-driven decision-making in exploration.

Responding to concerns around long-term supply security in light of ongoing sanctions on Iran and Venezuela, Shri Puri questioned the permanence of such restrictions and drew attention to the emergence of new sources of oil from countries like Brazil, Guyana, and Canada. He asserted that the global oil market is gradually becoming more diversified and resilient, and reassured stakeholders that India is well-prepared to manage any volatility or disruptions that may arise.

On the domestic front, Shri Puri underlined the crucial role played by State governments in facilitating energy development projects. He called for mutual accountability and stronger Centre-State cooperation, adding that States that enable faster energy infrastructure should be celebrated as models of good governance.

The second edition of Urja Varta 2025, India's premier upstream oil and gas conclave, was held recently at Bharat Mandapam, New Delhi. Organised by the DGH (DGH) under the patronage of the MoPNG (MoPNG), the event brought together over 700 participants including Union and State Ministers, senior officials, global industry leaders, domain experts, and media professionals. With the theme "Collaborate, Innovate, Synergize," the conclave served as a dynamic platform for dialogue, technical exchange, and strategic visioning around India's energy roadmap.

A series of major announcements and launches marked the event. Shri Puri unveiled the revised PNG Rules and MRSC, aimed at enhancing policy clarity, boosting investor confidence, and furthering Ease of Doing Business. He also announced the commencement of Hydrocarbon Resource Assessment Studies using globally benchmarked methodologies to better estimate India's resource base. Key MoUs were exchanged during the conclave, including one between bp and ONGC for stratigraphic well studies to deepen understanding of India's subsurface geology, and another between DGH and NIC to establish a cloud-based National Data Repository for transparent and centralised upstream data management. The Minister also released the India Hydrocarbon Outlook 2024–25, the 32nd edition of DGH's flagship report, which provides data-driven insights for shaping future E\&P strategies and investment decisions.

As part of the conclave's innovation showcase, Shri Puri visited the Exhibition Gallery and Innovation Center, which featured over 50 technical posters and more than 15 innovative solutions presented by E\&P operators, start-ups, and academic institutions. He interacted with several participants and acknowledged the importance of continuous technological innovation in shaping the future of India's upstream industry.

Inter-Ministerial Round Table with Partner States Held on Sidelines of Urja Varta 2025

Reflecting the true spirit of cooperative federalism under the visionary leadership of PM Modi, an Inter-Ministerial Round Table was organised on the sidelines of Urja Varta 2025 to explore energy sector opportunities across states. Ministers and senior officials from 22 States and Union Territories participated in the deliberations.

Speaking at the Round Table, Union Minister of Petroleum and Natural Gas Minister Puri underlined the central role of states in driving India's energy transformation. "Our states are the core of India's energy transformation and transition," he said. Highlighting the rising energy demand and the vast scope for investment, the Minister noted, "In the last five years, India has contributed 16% to the global increase in oil demand and is expected to account for nearly 25% of the incremental global energy demand through 2045. Our demand is not only large—it is structured, predictable, and responsible."

Shri Puri further informed that India has invested over ₹4 lakh crore in energy infrastructure over the past decade. "These investments have not only strengthened national capacity but also created tangible value at the state level," he said. With an envisaged investment of ₹30–35 lakh crore over the next 10 years, the coming decade will be pivotal for energy infrastructure development across the country.

Between 2025 and 2035, India is expected to witness significant investments across the entire hydrocarbons value chain. "These investments will require leadership and proactive participation from states. While the Centre remains committed to supporting these efforts through funding, policy, and

coordination, we must collectively address recurring challenges," Shri Puri emphasised.

Urja Varta 2025 reaffirmed India's steadfast commitment to building a robust, transparent, and investor-friendly upstream energy ecosystem. Through sustained reforms, international collaboration, advanced technology, and visionary policymaking, India continues to position itself as a global energy leader under the leadership of PM Modi.

Pathbreaking Reforms in Petroleum & Natural Gas Sector: Draft PNG Rules aims modernisation of India's upstream oil and gas framework

As part of our focus to accelerate oil & gas exploration under the leadership of Prime Minister Shri Narendra Modi Ji, we are bringing in a series of pathbreaking policy reforms to promote exploration and production. These reforms, including the Draft Petroleum & Natural Gas Rules, 2025, will significantly enhance the ease of doing business for our E&P operators," said Shri Hardeep Singh Puri, Minister of Petroleum and Natural Gas. The Minister urged all stakeholders—industry leaders, experts, and citizens—to share their feedback on the Draft Petroleum & Natural Gas Rules, the revised Model Revenue Sharing Contract (MRSC) and the updated Petroleum Lease format by 17th July 2025 at png-rules@dghindia.gov.in. The consultation process will culminate at Urja Varta 2025 scheduled at Bharat Mandapam, New Delhi on 17th July.

The Draft Petroleum & Natural Gas Rules, 2025, aim to modernise India's upstream oil and gas framework with several major reforms. Key among them is the introduction of an investor-friendly stabilisation clause, designed to protect lessees from adverse impacts of future legal or fiscal changes, such as increases in taxes, royalties or other levies, by allowing compensation or deductions. To reduce infrastructure duplication and encourage smaller players, the draft mandates that lessees declare underutilised capacity in pipelines and other facilities, and provide third-party access on fair terms, subject to government oversight.

For the first time, the draft rules permit operators to undertake integrated renewable and low-carbon projects—including solar, wind, hydrogen, and geothermal energy—within oilfield blocks, provided they meet safety standards and do not interfere with petroleum production. Strengthening environmental stewardship, the draft introduces detailed requirements for monitoring and reporting greenhouse gas emissions, establishes a regulatory framework for carbon capture and storage (CCS), and mandates site restoration funds with post-closure monitoring for a minimum of five years.

In terms of data governance, all operational data and physical samples generated during exploration and production will belong to the Government of India. Lessees can use this data internally, but any export or external use requires government approval, with confidentiality protections lasting up to seven years. The draft rules also propose the creation of a dedicated Adjudicating Authority, not below the rank of Joint Secretary, empowered to enforce compliance, resolve disputes, and impose penalties. Additional provisions include clearer processes for lease mergers, extensions, and unitisation of reservoirs spanning multiple blocks, aimed at improving operational flexibility.

These reforms replace the outdated Petroleum Concession Rules, 1949 and Petroleum and Natural Gas Rules, 1959, and follow the recent amendment of the Oilfields (Regulation and Development) Act, 1948.

Alongside the draft rules, the Ministry has released a revised Model Revenue Sharing Contract that aligns with the new framework, particularly regarding unitisation, merged lease areas, and infrastructure sharing obligations. The revised Petroleum Lease format clarifies processes on lease relinquishment, reservoir extension and cancellation triggers, thereby providing greater operational certainty.

As Shri Hardeep Singh Puri emphasised, "It has never been easier, faster and more profitable to explore oil & gas in India. We look forward to constructive engagement to shape a modern, investor-friendly regime." Stakeholders are encouraged to submit their feedback by 17th July 2025 to png-rules@dghindia.gov.in. The government's efforts aim to create a transparent, efficient, and sustainable exploration and production environment, aligned with India's broader energy transition goals.

Govt greenlights 10 new reactors; 13.7 GW nuclear boost by 2032 in the works

India's nuclear power capacity is projected to increase from 8,780 MW to 22,480 MW by 2031-32, driven by the commissioning of eight reactors under construction and 10 more sanctioned projects, Union Minister Jitendra Singh informed the Lok Sabha.

At present, India operates 24 nuclear reactors with an installed capacity of 8,780 MW. Additionally, eight reactors with a total capacity of 6,600 MW are under construction. These include 700 MW Pressurised Heavy Water Reactors (PHWRs) such as RAPP-8 and GHAVP-1&2, the 500 MW Prototype Fast Breeder Reactor (PFBR) implemented by BHAVINI, and Light Water Reactors (LWRs) built under foreign cooperation including KKNPP-3&4 and KKNPP-5&6.

Ten reactors with a projected capacity of 7,000 MW are at the pre-project activities stage. These include Kaiga 5&6, GHAVP 3&4, Chutka 1&2, and Mahi Banswara 1 to 4—all PHWRs. Upon the progressive completion of these ongoing and sanctioned reactors, the total installed capacity is expected to reach 22,480 MW by 2031-32.

"The specific measures outlined to reach this goal involve a multi-faceted approach, leveraging both indigenous development and international collaboration," Singh stated in a written reply.

Future expansion includes development of Indigenous Fast Breeder Reactors (FBRs), aligned with India's three-stage nuclear programme designed for efficient utilisation of limited uranium and abundant thorium resources. These efforts will be supported by a closed fuel cycle approach.

Deployment of Bharat Small Reactors (BSRs) is also being pursued to decarbonise hard-to-abate industrial sectors. Additionally, plans are in place for the development of Small Modular Reactors (SMRs), including Indian SMRs of different capacities and Indian-designed LWRs.

The government has launched a Nuclear Energy Mission with an outlay of ₹20,000 crore to support research and development of SMRs. The plan also includes increasing international cooperation on SMRs and nuclear fuel, along with potential exports of reactors, services, and supplies.

Govt plans to open up the atomic energy sector like the space sector: P.K. Mishra

Measures similar to the successful opening up of the space sector are envisaged for the atomic energy sector as well, which is essential for clean energy and national security, said P. K. Mishra, principal secretary to Prime Minister Narendra Modi, recently.

The government is planning to expand nuclear power capacity to 100 gigawatt (GW) by 2047, Mishra said while speaking at the 68th graduation functionin the Bhabha Atomic Research Centre (BARC) Training School in Mumbai.

Mishra highlighted key announcements in the Union Budget 2024-25, including research and development support for Bharat small modular reactors, advanced nuclear technologies, and the planned nuclear power capacity addition with the proposed amendments to relevant legislation enabling private sector participation, an official statement said.

Mishra was referring to the proposed amendments to the Civil Liability for Nuclear Damage Act, 2010, with the aim of attracting private sector investment in the nuclear power sector.

Finance minister Nirmala Sitharaman, in her budget speech in 2024, said nuclear energy is expected to form a significant part of Viksit Bharat's energy mix.

The minister had said then that to pursue that goal, the government will partner with the private sector to set up small reactors, conduct research and development for Bharat small modular reactors, and develop newer nuclear energy technologies. The government's ₹1 trillion research fund announced in 2024 will finance these projects.

Mishra emphasized that nuclear energy presents a major opportunity for sustainable growth and clean power in response to climate challenges. India has 8.7GW of nuclear power generation capacity now.

Acknowledging the capital-intensive nature of nuclear energy projects, Mishra said timely completion, access to low-cost finance, and leveraging private sector capabilities are key to lowering tariffs and improving feasibility.

He encouraged researchers to innovate in cost-reduction strategies to make nuclear energy India's preferred power source.

Mishra underscored the importance of strengthening safety governance, citing the roles of the Atomic Energy Regulatory Board (AERB) and the BARC Safety Council.

He called for revisiting regulatory mechanisms and investing in further safety-related research, especially as private sector participation expands.

He emphasized that public confidence in safety standards must be a top priority.
Mishra referred to India's strengths, such as youth demographics, infrastructure expansion and technological achievements and highlighted the importance of the government's guiding principle—'reform, perform, and transform'—in transforming the country into a developed nation.

He said India's position as the third-largest startup ecosystem with over 100 unicorns, the scale of digital infrastructure, including UPI processing over 185 billion transactions in 2024-25, bold climate commitments, including 500GW non-fossil fuel capacity by 2030, and initiatives like the National Green Hydrogen Mission, are national achievements.

Underscoring nuclear energy's societal impact, Mishra cited the use of radio isotopes in cancer care and radiation technologies in wastewater treatment and agriculture storage.

Mishra urged the scientific community to commercialize spin-off technologies emerging from research labs.

BARC, NPCIL unveil India's first private test facility for depleted heavy water upgradation

State-owned Nuclear Power Corporation of India Limited (NPCIL) and the Bhabha Atomic Research Centre (BARC) have jointly inaugurated India's first private sector test facility for the upgradation of depleted heavy water commissioned by TEMA India, a manufacturer of specialised equipment. The facility was inaugurated by Rajesh V, director – technical, NPCIL, and K T Shenoy, director, Chemical Engineering Group, BARC. According to the official press release, the modules manufactured by the company are slated for delivery to critical nuclear power plant projects such as RAPP 8, GHAVP Units 1–4, and KAIGA Units 5 & 6.

"BARC has transferred the indigenous technology to TEMA to build the vacuum distillation columns for upgradation of depleted heavy water at its private test facility," it added. The new testing facility will help overcome the challenge of delayed deliveries by decentralising the nuclear supply chain, ensuring quality control, and reliability in components supplied to Indian nuclear utilities to accelerate the delivery and commissioning timelines of Pressurized Heavy Water Reactor (PHWRs). The technology transfer to TEMA India is a step towards narrowing the key infrastructure gap, overcoming the delayed deliveries and de-bottlenecking of nuclear facilities.

As India prepares for the big leap to leverage the indigenous PHWRs as a part of the three stage programme to reach 100 GW of installed nuclear capacity by 2047, the demand of distillation columns for depleted heavy water upgradation will increase, added the release. India is a major producer and global exporter of heavy water primarily used as coolant in nuclear reactors. Nuclear reactors are filled with heavy water at the time of construction and refueling. During the operation of nuclear reactors, it is critical to upgrade the depleted heavy water to maintain the content of Deuterium to ensure consistent and efficient supply to the nuclear reactors.

The process of producing reactor-grade heavy water involves ultra-high efficiency vacuum distillation columns that are specifically designed to handle the unique challenges of separating deuterium from

other isotopes in water to support the nuclear reactors through their entire lifecycle of 60-70 years.

The BARC has been instrumental in developing the indigenous technology for these vacuum distillation columns, including the design of efficient structured packings and has continued to supply to NPCIL across all the PHWRs installed in India.

Nuclear Power Generation

Presently nuclear power contributes about 3% to the total electricity generated in the country. In the year 2024-25, nuclear power plants generated 56681 Million Units (MUs) of electricity.

The Government is making efforts to increase the nuclear fuel sources both by augmenting domestic production and imports from diverse sources. The Government has announced an ambitious Nuclear Energy mission with a target of reaching a nuclear power capacity of 100 GW by 2047. In this regard, the Government has initiated the processes required for enabling large scale participation across the public and private sectors in nuclear power. The Government has also announced measures for enabling R&D in SMRs and new advanced technologies. The target is planned to be achieved by deploying reactors based on existing and new advanced technologies under development. Presently, the installed nuclear power capacity in the country comprises 24 reactors with a total capacity of 8780 MW (excluding RAPS-1 (100 MW) under extended shutdown). In addition, a total capacity of 13600 MW (including 500 MW PFBR being implemented by BHAVINI) is under different stages of implementation. On its progressive completion, the installed nuclear power capacity is expected to reach 22380 MW by the year 2031-32.

This information was given by Dr. Jitendra Singh, Union Minister of State (Independent Charge) for Science and Technology, Earth Sciences, MoS PMO, MoS Personnel, Public Grievances & Pensions, Department of Atomic Energy and Department of Space, in a written reply in the Lok Sabha recently.

Roadmap for India's Energy Sector Through Nuclear Power

The specific measures outlined to reach this goal involve a multi-faceted approach, leveraging both indigenous development and international collaboration. Key strategies include the continued deployment of Indigenous Pressurized Heavy Water Reactors (PHWRs), building upon the 24 reactors with 8780 MW capacity. There are also 8 reactors under construction contributing 6600 MW, which include indigenous 700 MW PHWRs like RAPP 8 and GHAVP 1&2, alongside the Indigenous Fast Breeder Reactor (FBR) PFBR, and Light Water Reactors (LWRs) with foreign cooperation such as KKNPP 3&4 and KKNPP 5&6. Furthermore, 10 reactors are at the pre-project activities stage (sanctioned), set to add another 7000 MW, encompassing PHWRs like Kaiga 5&6, GHAVP 3&4, Chutka 1&2, and Mahi Banswara 1&2 and 3&4. With the progressive completion of these projects, the nuclear power capacity in India is projected to reach 22480 MW by 2031-32.

Future plans also emphasize the development of Indigenous Fast Breeder Reactors (FBRs), which align with India's unique three-stage nuclear power program designed for optimal utilization of its modest uranium and abundant thorium resources through a closed fuel cycle. Additionally, the strategy includes the deployment of Bharat Small Reactors (BSR) for decarbonisation of hard to abate industries, development of Bharat Small Modular Reactors (SMRs), including indigenous SMRs of varying capacities, and Indian LWRs. Enhanced international cooperation is also envisioned, particularly concerning SMRs and fuel, alongside the export of reactors, services, and supplies.

The government has also launched a Nuclear Energy Mission with an outlay of Rs. 20,000 crore for research and development of Small Modular Reactors (SMRs). This information was given by Dr. Jitendra Singh, Union Minister of State (Independent Charge) for Science and Technology, Earth Sciences, MoS PMO, MoS Personnel, Public Grievances & Pensions, Department of Atomic Energy and Department of Space, in a written reply in the Lok Sabha recently.

22nd Renewable Energy Summit

31st July 2025, Hotel Le Meridien, New Delhi

Theme: Renewable Energy – Key to Power Sector Decarbonisation

India Energy Forum organized its annual flagship event, 22nd Renewable Energy Summit on 31st July 2025 at Hotel Le Meridien, New Delhi. The theme of the Conference was "Renewable Energy – Key to Power Sector Decarbonisation". Shri Santosh Kumar Sarangi, Secretary, Ministry of New and Renewable Energy was the Chief Guest and inaugurated the Summit and Shri Ghanshyam Prasad, Chairperson, CEA was the Guest of Honour. The Summit brought together industry leaders, policymakers, and RE experts and discussed key-issues like Make in India; Land Acquisition; Connectivity and Power Evacuation; Financing; Energy Storage and Hydrogen; Green Energy Corridor; Rooftop Solar; Virtual Net Metering; Peer to Peer Trading; Biogas; Floating Solar; Agri-voltaic and Power evacuation infrastructure etc. for accelerating renewable energy in the following three sessions: (i) Accelerating RE Deployment – Challenges including Domestic Manufacturing and Solutions; (ii) RE Integration Challenges – Planning and Storage Solutions; and (iii) Distributed Renewable Energy (DRE) and Innovative RE Technologies.

"Idam Infrastructure" is the Knowledge Partner in the Summit and in preparation of the Theme Paper. The Theme Paper has focused on the above various issues in good detail.

Glimpses of the 22nd Renewable Energy Summit are given below:

Inaugural Session: (L to R)
Shri R V Shahi, President, IEF and Shri S K Sarangi, Secretary, MNRE

Lighting of the Lamp (L to R) Shri SM Mahajan, Shri V S Verma, Shri R V Shahi and Shri Ghanshyam Prasad, Chairperson, CEA

Release of the Souvenir of the 22nd Renewable Energy Summit during the Inaugural Session. (L to R) Shri Balawant Joshi, MD, Idam Infra; Mr SM Mahajan, SG, IEF; Mr V S Verma, Chairman, RE, IEF; Mr RV Shahi, President, IEF; Mr S K Sarang, Secretary, MNRE; Mr Ghanshyam Prasad, Chairperson, CEA; and Dr Malti Goel, Convenor, RE, IEF

Session I on "Accelerating RE Deployment – Challenges including Domestic Manufacturing and Solutions" was chaired by Shri Pradip K Das, Chairman, IREDA (C). Other Distinguished Speakers were (L to R) Mr Ashish Khanna, CEO, Adani Green Energy; Mr Sarit Maheshwari, CEO, NTPC Renewable Energy; Mr Balawant Joshi, MD, Idam Infra; and Mr Vivek Srivastava, Vice President, Suzlon Energy

Session II (Technical Session I) on "RE Integration Challenges" was chaired by Shri IS Jha, Former CMD, PGCIL and Former Member, CERC. Other Distinguished Panelists were (L to R) Shri Alexander Hogeveen Rutter, Manager Research & Diligence - Third Derivative; Dr S K Chatterjee, Chief (Regulatory), CERC; Shri V S Verma, Shri IS Jha; Shri Ajit Pandit, Director & CEO, Idam Infra and Shri Sutripto De, General Manager (NREB), BHEL;

Session III (Technical Session II) on "Distributed Renewable Energy (DRE) and Innovative RE Technologies" was chaired by **Shri Hemant Jain**, Member (GO&D), CEA. Other Distinguished Panelists were (L to R) Shri Amit Kumar Parihar, Director, Shakti Foundation; Shri Satyajit Ganguly, Former MD, PXIL; Dr Alok Mishra, Director India Offers and Country Director Westinghouse India; Shri Pankaj Kumar, Co-Founder & Director, Quant Solar; Shri Bhairaw Kumar, Founder & CEO, Enerture Technologies Pvt Ltd and Shri Sunil Kumar, BSES Yamuna Power Ltd.

The Conference was attended in large number by energy professionals and policymakers.