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INSPIRES ACTION FOR GREEN ENERGY

Capacity Market for Indian Power Sector

R.V. Shahi

In recent months two important issues have been under discussion in the context of rapidly changing profile of Indian Power Sector, aimed primarily at managing energy transition over next few decades. These are - "Capacity Market" and Resource Adequacy". The genesis seems to be the "Report on Market Design for Capacity Market in India" prepared under Indo-German Energy Programme (GIZ).

It is important to understand the rationale behind the study and relevance of these concepts in the context of Indian Power Sector. It is equally important to appropriately understand the present character of the power market which has evolved particularly post Electricity Act 2003. A complete reading of the Report indicates that the study has not fully captured, in minute d the existing components and characteristics of the Indian Power Market as it has evolved over decades and is still further dynamically changing suited to the needs.

It is relevant to mention the definition of capacity markets as has been brought out in the GIZ Report "A capacity market is an additional market created alongside the existing electricity market where only the maintenance of capacity is traded and is explicitly remunerated. They are developed with an aim to balance generation and demand in the Grid. Capacity markets provide an additional incentive which price signals alone in electricity market do not provide for capacity developers." Obviously, this definition does not clearly reflect the proper understanding of Indian Power Market, if the intention is to suggest that the existing market should shift to capacity market as emphasized by the study. In a recently organised Webinar by India Energy Forum the Author made the following observations.

- The expansion of power generation capacity, in a significant manner, commenced from late 90's, but more so post Electricity Act 2003. The power market has all along been, as a matter of fact, capacity market. The Power Purchase Agreements became the anchor document around which commercial arrangements were put in place. "Availability Based Tariff" emerged as the most important element of tariff structure. Except for a small percentage of renewables, the power sector profile largely covers Thermal and Hydro Power. In both of these the commercial arrangements have been such that these broadly led to capacity market.

- Even the present power sector profile, in terms of capacity, and more so in terms of power generation, is constituted largely by Thermal and Hydro Power Projects, with commercial arrangements anchored on capacity market structure. Though in terms of installed capacity Solar and Wind constitute now a significant proportion, in terms of electricity generation the proportion is much lower.

- The mechanisms of Power Trading and Energy/Power Exchanges were put in place post Electricity Act 2003 to provide a scope for electricity based market to occupy a visible proportion and emerge as a critical mass influencing significantly the power market structure. This continues to be work-in-progress in the initial phase of Power Trading mechanism as an instrument to emerge as an important contributor to development of power market, the inhibiting factor was long term PPA valid for around 25 years and Short Term Trading in the range of one year or below. In order to provide answers to various segments of power demands, subsequently the Regulatory

mechanism rightly provided for different period slots for Short Term Trading. As a result, this mechanism did support the market structure to shift from very long validity period to shorter terms. However, in most of these cases also the structure largely remained capacity based, though it did provide flexibility in power procurement process.

- One of the Policy instruments, which was notified, relates to merchant capacity in the overall power sector profile to be around fifteen percent. This was also supported by making a provision for allocation of fuels to facilitate such power generating plants to be established. This again met with limited success in view of excessive Open Access Surcharge decided by various Regulatory Commissions making the whole arrangement not so cost effective either for industrial or commercial consumers.

- Despite best efforts market based transactions of electricity, has remained highly conservative in the range of not more than seven to ten percent. With an objective to enhance the influence of market structure shifting toward being electricity based rather than capacity based, the two important interventions – one by way of legal provision and another by way of a Policy Guideline, have remained grossly dormant in implementation. Electricity Act 2003 provided that the Regulatory Commissions would ensure Open Access to electricity consumers requiring 1 MW and above power supply, Open Access to Transmission/Distribution infrastructure with a view to introducing competition in the market. The Act provides for this to be introduced within a period of five years that is by the year 2008. Open Access needed to be provided to all consumers. These provisions have remained, by and large, unimplemented or partially implemented. Therefore, contribution toward the electricity market to develop remained lukewarm.

- Post Electricity Act 2003, the concerns of all the stakeholders have been identical inasmuch as all of them felt the need for Indian power market structure to shift substantially from the present heavily loaded capacity market to electricity market, without discarding altogether the need for capacity based market also to continue. The present debate, therefore, to emphasize upon capacity market somehow appears difficult to appreciate. Emergence of Renewable Power expanding at a rapid pace and likely eventualities of dispatches from renewable capacities getting adversely affected, particularly when these capacities reach the level of above 500 GW, is an issue which needs attention. A solution has to emerge since the commercial arrangement is based not on capacity but on KWhr./MWhr. The solution has to be a more responsible way of making commercial arrangement for sale, giving due regard to all the possible risk factors not only covering the weather conditions but also a more realistic assumption of dispatches being restricted as the capacities of renewables keep expanding. The only solution is that all possible risk factors are appropriately kept in view while determining and making agreement on tariff.

- On balance, even though Solar and Wind Power would grow rapidly, leading to a significant proportion of power in the system, which is essential in securing a reasonable energy transition objective, it is unlikely that in coming ten to fifteen years the established capacity based market will undergo a major change. The desirable objective should be that we do shift towards electricity based market rather than capacity based market, for which all the existing instruments, discussed earlier in this paper, must be given encouraging response. Besides these, the unimplemented provisions of Electricity Act and Policies to bring competition at the Distribution and Supply level should be pursued with actions leading to development of electricity market in the true sense. The challenges faced by Solar, Wind, and other such

renewables, where the commercial transactions are based on electricity market structure, the risk factors of dispatch related issues need to be addressed in appropriate manner as briefly mention earlier.

- Resource Adequacy is another subject which has come up for discussions and debate in the recent past. We need to recognise that Electricity Act 2003 and the National Electricity Policy cover this requirement adequately. Electricity Act has obligated the Central Electricity Authority to prepare National Electricity Plan for a period of five years which could be reviewed from time to time. According to Section 3 (4) the Authority shall prepare a National Electricity Plan in accordance with National Electricity Policy and notify such Plan once in five years. The National Electricity Policy contains detailed provisions relating to National Electricity Plan to be prepared by the Central Electricity Authority. These provisions are so comprehensives that anything that can be expected under resource adequacy is well covered. As a matter of fact, the Central Electricity Authority has been consistently working on these, and the National Electricity Plan becomes an important reference document for implementations by various stakeholders. The provisions expect widespread consultations, which are carried out while preparing these Plans. Getting inputs from Distribution Companies on demand projections cannot expected to cover fully the expected demands. Consultations to get inputs from various Ministries, Corporates, and various other power demand segments, to secure their medium and long term projections on electricity demand has to be an organised and institutionalized process. This is what is being followed. Lately, among Distribution Companies a perception has got created that the expectations from them for a comprehensive demand projection is misplaced inasmuch as the economic and industrial Policies of the Governments and various corporate entities with new projects and schemes emerge periodically so frequently that such demands would be difficult to capture by the Distribution Companies. Obviously, this appears to be a valid point and hopefully it would be duly appreciated in the process of preparing National Electricity Plan.

- In the power sector, any contemplated Policy changes do create an apprehension among developers and financial institutions. Historically the financial sustainability in the entire value chain has remained a matter of serious concern among developers and Banking sector in view of the financial stresses experienced by the distribution sector. The risk factors are perceived in a significant way at a higher pitch the moment any new Policy changes are talked about. Though it is true for all the sectors of economy, the power sector is viewed with greater concern regarding the Policy and Regulatory changes. It is, therefore, necessary that the new ideas are brought about with the caution that is deserved in the light of the higher degree of concerns in the sector. Experiences indicate that not only Developers and Banking sector get concerned when such changes are contemplated, but particularly at the State level the Distribution Companies and others quite often postpone their actions considering that Policy changes are in the offing. There are examples that this type of problem did have adverse effect so far as the growth of the sector is concerned.

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Dear Total Energy Readers

I write this note with a very heavy heart having lost our very accomplished Secretary General Sh Kuljit Singh Popli Ji, at a young age of 65 years due to cardiac arrest on 18th April 2025. All members of IEF are grief stricken on his untimely departure. We pray to Wahe Guru, The Almighty to provide solace to the family. May his soul rest in peace!

During the month of April 25, IEF organized a largely attended Seminar on the theme of "Optimizing Coal Production & Productivity-Coal Pricing and Financing, on the 9th April 25. It was heartening to note that the Coal Production in India reached the one-million-ton mark in last FY. The seminar was followed by a well-attended interesting Webinar on "Capacity Markets for India" on 26th April, 2025. Full proceedings and recommendations of both the programs will be published in the next issue.

The forthcoming physical program include RE Conference now rescheduled for mid July 2025 on the theme of "Renewable Energy – Key to Power Sector Decarbonisation". It will dwell upon on the issues of (i) Accelerating RE Deployment – Challenges and Solutions; (ii) RE Integration Challenges; and (iii) DRE and Innovative RE Technologies. It will be followed by Seminar on Pumped Storage.

On April 28, 2025, a massive power outage plunged Spain, Portugal, and parts of France into darkness, marking one of the most significant blackouts in European history. The disruption affected tens of millions, halting transportation, suspending flights, and forcing hospitals and emergency services to rely on backup generators. A 15 gigawatt power outage occurred in Spain in a matter of seconds, causing severe grid instability. Portugal and portions of France were able to experience the disturbance due to the interconnectedness of the European power grid. IEF will discuss the issues of outages in a Webinar when the initial reports of the causes and its impact are available.

India is looking for substantial increase in power generation capacity from Non Fossil Fuels. Nuclear energy is getting a renewed thrust ever since the Govt. announced its plans to set up generation capacity of 100 GW of Nuclear Power by 2047 and setting up the Nuclear Energy Mission. So far, NPCIL has been the sole agency for setting up and operating Nuclear Power Plants. By forming a joint venture with NPCIL, NTPC has already entered this sector. Four PHWR units of 700 MW each are being set up by the joint venture company. The Government has announced its intent to amend the Atomic Energy Act and the Civil Liability for Nuclear Damage Act. Once the acts are amended to allow private sector to participate, the Nuclear Power Generation capacity could see rapid growth. Besides the three 700 MW PHWRs already commissioned, 13 more are under various stages of construction and planning. NPCIL recently announced that it is seeking approval for a batch of another 10x700 MW PHWRs. All this augurs well for the Nuclear Energy Sector growth. IEF will organize webinars and seminars to discuss these developments

However, we are also noticing a spurt in the orders for coal based power plants in recent times, despite focus on RE and Nuclear Power. This is necessitated by more demand for electricity for the industrial growth. Technologies for enhancing operational efficiency and reducing emission levels will need to be adapted. IEF is planning to discuss these measures as also relevance of FGDs

We have drawn a program of series of webinars and seminars during the year covering all the seven verticals of IEF, viz Power, RE, Nuclear, Distribution & Transmission, Energy Regulations, Petroleum and Natural Gas, etc. We shall share these details in the next issue

I call upon all members of IEF to take active part in the activities and programs of IEF on all the seven verticals. We also need to involve more and more stake holders for sharing their domain knowledge and guiding the Energy Programs being conducted by IEF

S M Mahajan

India on Track to Meet 500 GW Non-Fossil Fuel Target by 2030, Including 292 GW Solar: Union Minister Joshi

Marking a major advancement in India's renewable energy capabilities, Union Minister for New and Renewable Energy Shri Pralhad Joshi, inaugurated the PV Module Testing and Calibration Lab at the National Institute of Solar Energy (NISE), Gwal Pahari, Bandhwari, Haryana. Speaking at the occasion, the Minister stated that the new lab will set global benchmarks in solar R&D, testing, training, and policy support while marking a bold step towards self-reliance, innovation, and global excellence.

Shri Joshi also said that NISE is now equipped to offer comprehensive testing, calibration, and certification services, particularly for photovoltaic modules and technologies where no established standards currently exist. He termed the lab a pioneering facility for India and further highlighted that as Indian companies scale up the production of large modules, this lab will ensure that products meet the highest quality standards. Shri Joshi noted that the lab also aligns with BIS standards and will provide a major boost to the Production Linked Incentive (PLI) scheme and support India's aspiration to become a global manufacturing hub.

The Minister also underlined the importance of NISE as a training ground for government officials, industry professionals, and international delegates. He appreciated NISE's efforts in training over 55,000 Suryamitra technicians and for installing more than 300 solar air dryer-cum-space heating systems in Leh, which are being used by farmers to dry apricots. He said such initiatives strengthen technical capacity and foster collaboration among government, industry, and academia. Shri Joshi also stated that with the new facility, NISE will significantly improve its efficiency, quality, and research in accordance with global benchmarks.

Tremendous Growth in RE Sector

Highlighting the exponential growth under the leadership of Prime Minister Shri Narendra Modi, the Minister said that India's installed solar capacity increased from 2.82 GW in 2014 to crossed 106 GW now, marking a growth of over 3700%. In terms of manufacturing, solar module production has increased from 2 GW in 2014 to 80 GW today, with a target of reaching 150 GW by 2030. Alongside solar progress, the Minister also underscored the achievement of 50 GW in wind energy capacity.

Emphasising the government's ambitious targets, Union Minister Shri Pralhad Joshi said that India is firmly on track to achieve the 500 GW non-fossil fuel energy target by 2030, including 292 GW of solar energy, as envisioned by Prime Minister Shri Narendra Modi.

The Minister said that NISE should reflect the transformation India's renewable energy sector has seen in the last 11 years under Prime Minister Modi's leadership. He also urged the institute to step up efforts in global research impact and patent generation.

Emerging Technologies and Scalable Innovations

Union Minister Joshi highlighted the need for deep research, innovation, and global collaboration. He advised NISE to build partnerships, develop talent, and push boundaries so that its work resonates across laboratories, manufacturing units, and solar farms worldwide.

He also acknowledged that NISE is already working on advanced technologies like Perovskite Solar Cells and Bifacial Panels. Going forward, he said, NISE should undertake initiatives for mass adoption of innovations such as AI for Solar Power Forecasting, Building-Integrated Photovoltaics (BIPV), and Solar-Driven EV Charging Stations. He added that enabling sustainable EV charging through solar is a part of Prime Minister Modi's vision and should be explored by NISE at scale.

Strengthening Global Solar Cooperation

The Minister also chaired a meeting to review the progress of the International Solar Alliance (ISA), along with MNRE Secretary Shri Santosh Kumar Sarangi, ISA Director General Shri Ashish Khanna and other senior officials. He emphasized the need for collaborative global efforts in solar energy adoption.

Union Minister Pralhad Joshi Visits World's First Integrated Renewable Energy Storage Project in Andhra Pradesh

Union Minister of New and Renewable Energy & Consumer Affairs, Shri Pralhad Joshi, visited pioneering, world-first and largest GW-scale Integrated Renewable Energy Project at Pinnapuram near Kurnool in Andhra Pradesh recently and applauded its scale and rapid progress.

A 4.2 billion USD Project includes 4000 MW of solar, 1000 MW of wind and 1680 MW of pumped hydropower generation, is set up by Greenko, a world's leading energy transition and decarbonization solutions company. With a storage capacity of 10,080 MWh per day in a single cycle, the dispatchable, carbon-free energy generation, the Pinnapuram project supports green steel, green aluminum, and green hydrogen production industries.

Speaking on the occasion, Minister Shri Pralhad Joshi said, "Witnessing an Integrated Renewable Energy Storage Project at Pinnapuram in action — the world's first and largest of its kind, right here in our country — is a matter of pride and a shining example of India's green energy potential under the visionary leadership of Prime Minister Narendra Modi". The Minister also commended the State Government of Andhra Pradesh, under Chief Minister Shri N. Chandrababu Naidu, for its progressive policies that have made this pioneering effort possible.

Explaining technical aspects of the project, Shri. Anil Chalamalasetty, Group CEO & MD of Greenko, said the groundbreaking initiative, combining solar, wind, and pumped storage power, will make a vital contribution to global efforts to decarbonize hard-to-abate industries. He said, the project would drive economic growth in the region, foster the development of ancillary industries, and create employment opportunities.

The project will help in clean energy generation avoiding 3.3 million tonnes of carbon emissions annually and enhance India's energy security. Greenko has Intelligent RE Cloud Storage Platform, combined with India's One Nation, One Grid policy, facilitates production of the world's lowest-cost green molecules and driving the acceleration of global economies' decarbonization.

Earlier, the Union Minister Pralhad Joshi took an aerial tour of the facility and visited various components of the mega integrated renewable energy project.

India Achieves Historic Milestone in Renewable Energy Capacity Addition in FY 2024-25

The Ministry of New and Renewable Energy (MNRE) achieved historic milestone in the renewable energy sector for the financial year 2024-25. Under the leadership of Prime Minister Shri Narendra Modi, the country has added an unprecedented 25 GW of renewable energy capacity, marking an increase of nearly 35% over the previous year's addition of 18.57 GW.

Solar Sector Drives Renewable Surge
India's solar power sector led the renewable energy growth, with capacity additions soaring from 15 GW in FY24 to nearly 21 GW in FY25, a remarkable 38% increase. The country also achieved the significant milestone of surpassing 100 GW of installed solar capacity this year.

Domestic Solar Manufacturing Scales New Heights
In a strong push towards Atmanirbharta, India's solar module manufacturing capacity nearly doubled from 38 GW in March 2024 to 74 GW in March 2025, while solar PV cell manufacturing capacity tripled from 9 GW to 25 GW. Additionally, the country's first ingot-wafer manufacturing facility (2 GW) commenced production in FY25. Under the Production Linked Incentive (PLI) Scheme for High-Efficiency Solar PV Modules, investments worth ₹41,000 crore have been made, generating direct employment for approximately 11,650 people.

PM Surya Ghar Muft Bijli Yojana Sees Widespread Impact
The PM Surya Ghar Muft Bijli Yojana witnessed impressive progress, benefiting over 11.01 lakh households by March 31, 2025. Under the scheme, ₹5,437.20 crore has been disbursed as Central

Financial Assistance to 6.98 lakh beneficiaries, significantly promoting the adoption of rooftop solar.

Green Hydrogen Sector Gains Momentum
India's Green Hydrogen sector also saw significant developments. Incentives worth ₹2,220 crore were awarded for 1,500 MW per annum of electrolyser manufacturing, while an additional ₹2,239 crore was allocated for 4,50,000 tons-per-annum (TPA) of Green Hydrogen production. Under the National Green Hydrogen Mission, seven pilot projects were funded with ₹454 crore for decarbonizing the steel sector. Additionally, five pilot projects in the transport sector, with ₹208 crore in funding, will introduce 37 hydrogen-fueled vehicles and nine hydrogen refueling stations.

Record Progress Under PM-KUSUM Scheme
The PM KUSUM Scheme witnessed record progress. In Component B, 4.4 lakh pumps were installed in FY25, a 4.2-fold increase over the previous year. In Component C, 2.6 lakh pumps were solarized, 25 times more than in FY24. The total number of solar pumps installed/solarized under the scheme has now exceeded 10 lakh. Financial expenditure for PM-KUSUM surged to ₹2,680 crore, a 268% increase from the previous year.

The Indian Renewable Energy Development Agency (IREDA) continues to play a crucial role in financing clean energy projects. In FY25, IREDA recorded a 27% increase in loan sanctions, reaching ₹47,453 crore, while loan disbursements rose by 20% to ₹30,168 crore.

Union Minister of New and Renewable Energy, Shri Prahlad Joshi, said, "India may have already become or will soon become the third-largest renewable energy capacity holder in the world. This milestone is a testament to Prime Minister Modi's vision for a sustainable and self-reliant energy future."

These remarkable achievements reaffirm India's commitment to its clean energy transition and its leadership in the global renewable energy sector.

Evren signs 300 MW PPA with NTPC, to build 1 GW hybrid renewable capacity

Evren, a renewable energy platform launched by Brookfield in India, has signed a power purchase agreement (PPA) with NTPC Limited for the supply of 300 MW of firm and dispatchable renewable energy (FDRE). The agreement will involve the development of nearly 1 GW of renewable energy capacity, including solar, wind, and battery energy storage systems.

The hybrid plant has been designed to combine solar, wind, and storage technologies to supply reliable renewable power during peak hours. The firm and dispatchable structure is intended to support power distribution companies in aligning renewable supply with demand curves and fulfilling renewable energy consumption and storage obligations.

Suman Kumar, CEO,Evren, said, "The FDRE tender marks a great milestone for Evren. We are proactively investing in a large pipeline of high-quality resources, comprising of interconnect approvals and data-mapped land, thereby enabling us to provide decarbonization solutions at scale. We are firmly placed to contribute to India's renewable energy transition at scale." The project is expected to contribute to grid stability and energy transition efforts by offering consistent clean energy availability and supporting power utilities in meeting their energy transition goals.

India allows extension for commissioning of certain solar power projects until December

India's Ministry of New & Renewable Energy (MNRE) has granted a nine-month extension for the commissioning of certain solar projects by two government agencies, pushing the deadline to the end of December 2025 due to multiple challenges, a document seen by Reuters showed.

In a letter to the Solar Energy Corporation of India (SECI) and the Indian Renewable Energy Development Agency (IREDA), the MNRE cited limited availability of domestically made photovoltaic solar modules, transmission infrastructure issues, and tender-related delays as reasons for the extension.

The SECI and IREDA had requested the extension for projects tendered under the federal government's Central Public Sector Undertaking (CPSU) Scheme Phase-II.

The scheme aims to set up 12 gigawatts of solar projects by state-run entities, using domestically manufactured solar PV cells and modules, with financial support from the Indian government.

The extension underscores the struggles faced by India's renewable energy sector as the country targets at least 500 GW of non-fossil power capacity by 2030, up from 172 GW currently.

The sector is grappling with several obstacles, including weak demand for tenders, land acquisition challenges, delays in power purchase agreements and project cancellations.

The country also fell short of its earlier goal of adding 175 GW of renewable energy capacity by 2022, with fossil fuels still accounting for more than two-thirds of total power generated last year.

India's energy storage sector to attract ₹4.79 lakh crore investment by 2032: IESA

India’s energy storage sector is projected to expand fivefold between 2026 and 2032 with an estimated investment requirement of ₹4.79 lakh crore, industry body India Energy Storage Alliance (IESA) said.

The projections were released during the fifth edition of the Stationary Energy Storage India (SESI) 2025 conference held in Gandhinagar, Gujarat.

According to the National Electricity Plan, India will require 73.93 GW of energy storage capacity by 2031-32, comprising 26.69 GW from pumped storage plants (PSP) and 47.24 GW from battery energy storage systems (BESS), with a total energy storage capacity of 411.4 GWh.

The storage capacity requirement by 2026-27 is projected at 16.13 GW, with 82.37 GWh energy storage, comprising 7.45 GW PSP and 8.68 GW BESS.

Speaking at the event, S J Haider, Additional Chief Secretary, Government of Gujarat, said the state has set a renewable energy target of 100 GW by 2030. “Gujarat is positioning itself as a national frontrunner in integrated renewable energy and energy storage deployment, with a strategic focus on climate resilience, infrastructure investments, and grid stability,” he said.

Arun Mahesh Babu M.S., Managing Director, Gujarat Power Corporation Limited, said, “We are already seeing good participation in 2-hour and 4-hour tenders, and 8-hour tenders are expected soon. Gujarat currently contributes over 30 GW of renewable energy.”

IESA estimates that India’s energy storage market will grow significantly, driven by government initiatives including Viability Gap Funding (VGF) for 13,200 MWh of BESS by 2030-31. Public sector companies such as SECI, NTPC, and SJVN, along with states like Gujarat, Uttar Pradesh, and Madhya Pradesh, have issued tenders for standalone storage and renewable energy dispatch solutions.

R P Gupta, Chairman and Managing Director, Solar Energy Corporation of India (SECI), said, “We aim for approximately 500 GWh by 2030 and around 5,000 GWh by 2047. These are huge numbers. All these show that there is great potential for investment and innovation.”

Ghanshyam Prasad, Chairperson, Central Electricity Authority (CEA), said, “The cost of energy storage systems has already seen a notable reduction, from ₹10 lakh per megawatt per month to approximately ₹2.5 lakh per megawatt over the past 2 to 2.5 years. We will soon release new BESS standards.”

Vinayak Walimbe, Managing Director, CES India, said energy storage supports India’s net zero transition. “It is an enabling technology that helps integrate renewable energy into the grid. We are working with central and state governments to deploy these technologies.”

The conference was organised under the Stationary Energy Storage India Council (SESI Council) and was attended by more than 200 industry leaders, government officials, and participants from over 10

partner countries. Delegates discussed energy storage policies, tender processes, and project developments.

Key stakeholders included the Ministry of New and Renewable Energy (MNRE), Central Electricity Authority (CEA), SECI, NTPC, Gujarat Energy Development Agency, Adani New Industries, JSW Energy, GUVNL, World Economic Forum, World Bank, and Envision Energy.

Biogas sector gets Rs 200 crore investment commitments at RenewX 2025: IBA

The biogas sector has received investment commitments of more than Rs 200 crore at renewable energy exhibition RenewX 2025, industry body Indian Biogas Association (IBA) said recently.

The three-day expo was held at the Chennai Trade Centre, Nandambakkam from April 23 to 25. The event, organised by Informa Markets, saw investment commitments of Rs 200 crore through various MoUs (memorandum of understandings) in the biogas industry, IBA sid in a statement. RenewX brought together stakeholders from across the bioenergy, solar, wind, energy storage, and management sectors, offering a platform for strategic collaborations and progressive discussions.

With a focus on bioenergy innovations, sustainable partnerships, and policy dialogue, the bioenergy sector attracted strong interest from industry, professionals, investors, and policymakers, the statement said. "This is the first time that we have showcased biogas sector capabilities in Chennai. Our interactions here have laid the groundwork for several new collaborations and have deepened interest in bioenergy solutions, especially in southern India," Gaurav Kedia, Chairman of IBA, said in the statement.

IBA President A R Shukla noted, "RenewX 2025 showcased a unique blend of technology, grassroots innovation, and policy alignment. It is clear that bioenergy can play a pivotal role in reshaping India's energy future especially when supported by the right regulatory and financial ecosystem."

Founded in 2011 and revitalised in 2015, the IBA has been at the forefront of advancing bioenergy solutions across India. Collaborating with international bodies like the German Biogas Association, IBA advocates for sustainable waste management and clean energy generation through biogas.

Green hydrogen adoption may delay as price gap with grey to persist: Crisil Ratings

The transition to green hydrogen may face a roadblock as the price differential between the grey and green hydrogen is likely to persist, according to a report by Crisil Ratings.

As per the report, the price gap is expected to come down from its current level of $2.0-2.5 per kg, but it is expected to remain at $1.0-1.5 per kg over the next three fiscals, resulting in delaying offtake mandates and elevating project risk.

Green hydrogen production, which involves splitting water using renewable energy via an electrolyser, is a capital-intensive process. Crisil highlights that the cost is largely divided between the round-the-clock (RTC) renewable energy plant with storage (nearly two-thirds) and the electrolyser itself (about onethird).

Achieving cost competitiveness with grey hydrogen, which relies on fossil fuels, would necessitate the Levelised Cost of Hydrogen (LCOH) for green hydrogen falling by more than half.

Analysts at Crisil estimate this requires a substantial 40-50 per cent reduction in the capital costs of both the renewable plant and the electrolyser – a decline considered unlikely within the next 2-3 fiscal years.

Slow pace
Despite some positive trends, such as declining battery prices (down 30-40 per cent in the past two years) and government exemptions for domestic modules in special economic zone for renewable projects, the impact on the overall cost of storage-backed renewable plants is limited, perhaps only around a 10 per cent reduction even with a significant 50 per cent drop in battery prices.

Electrolyser costs have also seen declines, falling 42 per cent between 2010 and 2020. However, the pace has slowed considerably, with only about a 20 per cent reduction from 2021-2024.

Costs still exceed $1,000 per kilowatt as of March 2024. Furthermore, electrolyser efficiency has stagnated at 60-65 per cent, hampered by technological challenges, limited manufacturing scale, and the high costs of critical rare earth materials.

Ankit Hakhu, Director at Crisil Ratings, expects a 30-35 per cent reduction in electrolyser cost and a 5-10 percentage point efficiency improvement by 2030. However, he noted, "Even if these expectations come true, the price differential between grey and green hydrogen will persist at $1.0-1.5 per kg over the next three fiscals.

He added that with over 90 per cent of global electrolyser projects still in early planning phases, actual cost declines will only become fully apparent as more capacity is built and becomes operational.

NTPC Renewable Energy floats tender for 2 MW green hydrogen electrolyser in Chhattisgarh

NTPC Renewable Energy (NTPC REL) has invited bids for the installation of a 2 MW green hydrogen generation system or electrolyser at Sipat, Chhattisgarh, as part of its green hydrogen mobility project. The final project capacity may vary between 1 MW and 2 MW depending on NTPC REL's requirements. According to the tender guidelines, the bidders are required to submit a security deposit of Rs 2 million. The selected bidders will be responsible for designing, engineering, erecting, testing, and commissioning the hydrogen mobility project. Furthermore, they must handle the delivery and receipt of project equipment and conduct all necessary safety assessments, including the hazard identification and risk assessment study. The last date for bid submission is May 7, 2025. Additionally, the bidders must also finalise the hydrogen generation layout for obtaining approvals from the Petroleum and Explosives Safety Organization and the local administration. The entire project is required to be completed within eight months. According to the eligibility criteria, the bidders must be electrolyser technology providers who were previously selected through an earlier expression of interest issued by NTPC REL and must have signed electrolyser technology provider agreements.

Adding 50 GW renewable energy yearly can end coal imports by 2029, save India Rs. 5,61,066 crore: Report

According to a think tank Climate Risks Horizon report, India could eliminate its reliance on thermal coal imports by 2029 by adding 50 gigawatts of renewable energy annually. This shift could result in approximately Rs. 5,61,066 crore (US$ 66 billion) in foreign exchange between 2025 and 2029, with total savings reaching at least Rs—14,70,673 crore (US$ 173 billion) from 2025 to 2034. The report highlights that India's electricity sector remains heavily dependent on coal imports, with around 20% of thermal coal (206 million tonnes) imported in FY24 at Rs. 1,78,521 crore (US$ 21 billion). Thermal coal imports have surged by 58% between 2013 and 2023, with the value of these imports increasing by 124% due to global price volatility and a weakening rupee.

India's energy sector faces physical and financial risks from its dependence on imported coal. Whether from political instability or natural disasters, disruptions in coal supply pose a threat. At the same time, volatile energy prices create financial challenges for power companies and consumers. The report also notes that India's electricity demand is set to rise due to urbanisation, industrial growth, and the increased adoption of electric technologies. Per capita electricity consumption has risen from 957 kilowatt-hours (kWh) in 2013 to 1,331 kWh in 2022, with climate-related heatwaves further driving demand. The government has set a target to achieve 500 gigawatts of non-fossil fuel energy capacity to address these challenges by 2030. It plans to add 50 gigawatts of renewable energy annually until 2027-28. With 151 gigawatts of solar and wind power already in place and additional hydro and biogas capacity, the country is on track to meet its renewable energy targets.

Earth Day 2025 Inspires Action for Green Energy Future

This year's focus emphasizes the significance of cooperation from all people to discover alternative sustainable energy. Earth Day is an international event celebrated every 22nd of April to remind people to be more conscious about saving our planet and to persuade them to act on it. "Our Power, Our Planet," the theme of this year, invites all to join hands to harness green energy in order to build a just, sustainable, and prosperous future. The climate crisis is so severe that we must act immediately, and the solutions for having clean, secure, and affordable energy are already at our doorstep.

Earth Day began in 1970 when U.S. Senator Gaylord Nelson from Wisconsin, inspired by the damage a huge oil spill in California had done to the environment, thought of a national teach-in on the subject. With the help of activist Denis Hayes, the first Earth Day was held on April 22, which was picked to get as many students as possible to take part. Earth Day has become a worldwide cause over the years, getting people in over 192 countries to do good things.

The message of Earth Day this year is stronger than ever: now is the time to switch to green energy. Leaders from different fields stress the need for a unified approach to a sustainable energy future as the world struggles with the worsening climate problem.

Even though the federal government has changed its policies, there are big steps forward in green energy technologies. In 2023, the U.S. produced more than 238,121 gigawatt hours (GWh) of electricity from solar energy, which was a record high. This is more than eight times the amount of electricity produced from solar energy in 2014. California and Texas are the top states for solar power production. In the same year, Texas also produced 28% of the country's energy from wind power.

The green energy market was worth $1.21 trillion around the world in 2023, and it's expected to keep growing at a rate of 17.2% per year until 2030. Countries like China and Brazil are putting a lot of money into renewable energy. China has the most solar and wind power of any country in the world. Solar and wind energy production in China rose by 45% and 18%, respectively, from the previous year to 357 gigawatts in 2024. In the first nine months of 2023, Brazil, on the other hand, got almost all of its energy from clean sources. Hydroelectric power made up 68% of its total electricity production.

Not only is switching to renewable energy good for the environment, it also opens up big business possibilities. The 2022 National Solar Jobs Census found that 263,883 people worked in the U.S. solar energy business, which is 3.5% more than the previous year. In 2020, 430,500 people worked in Canada's clean energy field. By 2030, that number is expected to have grown to 639,200, which is an increase of almost 50%.

Additionally, switching to clean energy has huge advantages for your health. Cutting back on fossil fuels can clean up the air a lot and lower the number of asthma, coughing, heart disease, and strokes. Clean energy also makes water cleaner, which lowers the risk of getting diseases from water and helps public health services.

As Earth Day 2025 goes on, it's clear what needs to be done. There are many groups that can help with the switch to renewable energy sources, from businesses and schools to local governments and towns. Giving young people the tools to understand how energy, water, and climate are connected will help them make smarter choices.

As we celebrate Earth Day, let us promise to keep protecting our world and using renewable energy to build a better future. As stated by EarthDay.org, The production and use of renewable energy transcends economic systems, political borders, and political parties, demonstrating a universal appeal. Together, we can build a cleaner, healthier, and more equitable world for generations to come.

Ministry targets 65 MT coal transport via rail-sea-rail route by FY26

The Ministry of Coal recently announced a target to transport 65 million tonnes (mt) of coal via the rail-sea-rail (RSR) route by FY26, with expectations to reach 120 mt by FY30. According to the ministry's statement, coordinated inter-ministerial efforts are expected to provide strong momentum to the RSR model and significantly improve the sustainability and efficiency of coal transportation across the country. Initiatives like Telescopic Freight Circular issued by the Ministry of Railways, optimization of shipping and port handling charges and development of dedicated coal berths by the Ministry of Ports, Shipping and Waterways will play a vital role in achieving the goal.

Vikram Dev Dutt, Secretary, Ministry of Coal, highlighted the benefits of the RSR model and said, "The RSR model is a forward-looking initiative that aligns with the nation's broader goals of enhancing logistical efficiency, ensuring energy security, and promoting environmental sustainability." He was speaking at the stakeholder consultation, held in New Delhi by the Ministry of Coal. He noted that RSR transportation, which integrates rail and coastal shipping, is not only an economical alternative but also significantly environment-friendly due to its lower carbon footprint.

India’s Underground Coal Mining Gets a Major Boost with New Incentives by Ministry of Coal

In a decisive step towards revitalizing India's coal sector, the Ministry of Coal has introduced a series of transformative policy measures aimed at promoting underground coal mining. These bold reforms address the traditional challenges of high capital investment and longer gestation periods, reaffirming the Government’s resolve to modernize the coal ecosystem while aligning with the broader vision of sustainable development.

To accelerate the growth/ Operationalization of underground coal mining, the Ministry of Coal has introduced a robust package of incentives:

Reduction in Floor Revenue Share: The floor percentage of revenue share for underground coal mines has been reduced from 4% to 2%. This targeted reduction offers substantial fiscal relief and enhances the financial viability of underground projects.

Waiver of Upfront Payment: The mandatory upfront payment requirement for underground mining ventures has been completely waived off. This measure removes a significant financial barrier, encouraging broader participation from the private sector and facilitating faster project implementation.

These incentives are further complemented by an existing 50% rebate on performance security for underground coal blocks, collectively lowering the entry threshold and facilitating smoother project implementation.

The Ministry’s reform-oriented approach underscores its commitment to fostering a future-ready, investment-friendly, and innovation-driven coal sector. By incentivizing underground mining, the Government is not only catalyzing economic growth but also driving the industry toward greater efficiency, safety, and employment generation.

Underground coal mining is inherently more environment-friendly, as it causes significantly less surface disruption compared to opencast operations. These policy measures are expected to encourage the adoption of advanced technologies—such as continuous miners, longwall systems, remote sensing tools, and AI-based safety mechanisms—which will boost productivity while ensuring ecological balance.

These forward-leaning reforms mark a strategic shift toward cleaner and more sustainable coal extraction practices. They are poised to unlock the vast untapped potential of underground mining in India, fostering innovation, reducing carbon emissions, and contributing meaningfully to the nation’s energy security and Atmanirbhar Bharat objectives.

With this visionary roadmap, the Ministry of Coal is not only reshaping the future of coal mining but also reaffirming its role as a catalyst in India's journey toward self-reliant and environmentally responsible industrial growth.

Ministry of Coal Reviews "Operational/ Likely to Operational" Captive/ Commercial Coal Mines

The Ministry of Coal convened a comprehensive review meeting in New Delhi to assess the status of 79 captive and commercial coal mines classified as "Operational / Likely to be Operational." The meeting was held on April 9, 2025 and chaired by Smt. Rupinder Brar, Additional Secretary, Nominated Authority, Ministry of Coal. Director/ Nominated Authority Shri Marapally and Director Shri Ajitesh Kumar from the Ministry of Coal also attended the meeting.

During the meeting, Smt. Brar lauded the proactive efforts of mine allottees in contributing to India's growing coal production and reaffirmed the Ministry's commitment to engaging with stakeholders to further enhance reforms in the sector. She underlined the transformative developments in coal mining over the past decade, attributing this progress to strong collaboration between project proponents and the government. Notably, captive and commercial coal mines now account for approximately 20% of the country's total coal output.

She further emphasized the importance of putting in their best efforts to obtain the required clearances within the desired timelines. She assured the allottees that the Ministry is committed to providing all necessary support and encouraged them to approach the Nominated Authority for any assistance or to address any issues they may face. She encouraged the importance of mine allottees meeting their committed production targets for the financial year 2025–26.

Looking ahead, she expressed confidence in the ongoing partnership between the Ministry and mine developers and appreciated the consistent performance of the Nominated Authority's office, calling it a symbol of national pride. She also announced an upcoming interactive workshop to accelerate implementation and deepen sectoral collaboration.

The Ministry's efforts have yielded significant results, with remarkable year-over-year (Y-o-Y) growth in both coal production and dispatch from captive and commercial mines. Coal production increased by 29.79% rising from 147.12 million tonnes (MT) during FY 2023-24, to 190.95 MT during FY 2024-25. Similarly, coal dispatch from these mines also showed significant growth of 33.36%, increasing from 142.79 MT during FY 2023-24 to 190.42 MT during FY 2024-25.

Approximately 70 allottees, including major companies such as NTPC Ltd., Adani Power, Hindalco Industries Ltd., Jindal Steel and Power Ltd., and WBPDCL, attended the meeting. A total of 79 coal mines were reviewed during the session. Of these, 61 mines are currently producing coal, 8 are operational but not yet producing, and 10 remain non-operational. Out of the 61 operational captive and commercial coal mines, 38 have been allocated to the power sector, 11 to the non-regulated sector, and 12 are designated for the sale of coal.

The allottees were encouraged to share detailed insights on the measures they are undertaking to enhance coal production and expedite the operationalization of their mines. The Ministry sought constructive suggestions on how production levels could be further increased, with a focus on identifying best practices, addressing bottlenecks, and leveraging available resources efficiently. Emphasis was placed on proactive planning, adoption of advanced technologies, and timely completion of statutory clearances to ensure early commencement of mining operations and sustained growth in output.

These achievements underscore the Ministry's commitment to reinforcing India's energy security, reducing dependency on imports, and contributing to the nation's economic growth. The meeting culminated in a dynamic interactive session, where mine allottees actively contributed constructive

suggestions aimed at expediting coal production and accelerating project execution.

Ministry of Coal Reports Record-Breaking Production and Dispatch in Captive and Commercial Mines for FY 2024-25

Ministry of Coal has achieved a historic breakthrough, setting new records in captive and commercial coal production and dispatch for the financial year 2024-25. Total coal production surged to 190.95 million tonnes (MT) as of March 31, 2025, marking a remarkable 29.79% growth over the previous year's 147.11 MT.

Coal dispatches also witnessed an extraordinary rise, reaching 190.42 MT, a 33.36% increase from the 142.79 MT recorded in FY 2023-24. These outstanding numbers reflect the sector's resilience, efficiency, and crucial role in securing India's energy needs, driving industries such as power, steel, and cement.

Both captive and commercial mines have contributed significantly to this success:

Captive mines achieved 24.72% growth in production and 27.76% in dispatch from the previous year, ensuring a steady supply to core industries.

Commercial mines led the momentum with a phenomenal 67.32% surge in production and a staggering 76.71% rise in dispatch from the previous year—a testament to India's coal sector expansion and efficiency.

These record-breaking achievements directly reflect India's strategic push for energy self-reliance, strengthening the country's position as a global economic powerhouse. The Ministry of Coal remains steadfast in its commitment to fostering a sustainable, efficient, and future-ready coal ecosystem that not only meets the nation's growing energy demands but also aligns with India's green development goals.

This milestone marks a crucial step toward realizing the Government's vision of Viksit Bharat 2047, ensuring a resilient, energy-secure, and economically thriving India. With a strong focus on innovation, efficiency, and sustainability, the coal sector continues to power industrial growth, enhance economic progress, and shape a greener future for generations to come.

Government waives upfront payment, offers rebates instead to expedite underground coal mining
In a bid to speed up the operationalisation of underground coal blocks, the government recently (April 24, 2025) announced new incentives like waiving off of the upfront payment.

The push for underground coal mining aligns with the country's drive for sustainable coal production.

"In a decisive step towards revitalising India's coal sector, the Ministry of Coal has introduced a series of transformative policy measures aimed at promoting underground coal mining," an official statement said.

These reforms address the challenges of high capital investment and longer gestation period.

"The floor percentage of revenue share for underground coal mines has been reduced from 4% to 2%. This targeted reduction offers substantial fiscal relief and enhances the financial viability of underground projects," the statement said.

The mandatory upfront payment requirement for underground mining ventures has been completely waived. This measure removes a financial barrier, encouraging broader participation from the private sector and facilitating faster project implementation.

Govt extends deadline to May 7 for feedback on Coal Trade Exchange rules

The government has extended the deadline to early next month for public comments on the proposed rules on Coal Trade Exchange that will facilitate the dry-fuel's trading as a commodity.

"Ministry of Coal had published the proposed draft legislations on Coal Trade Exchange for public consultation... Ministry of Coal has decided to extend the last date for submission of

comments/suggestions from April 6, 2025 till May 7, 2025," the coal ministry said on its website.
The coal ministry has proposed to empower the Coal Controller Organisation (CCO) as the regulator for the proposed trade exchange.

At present the coal sales channels in the country are specific to the government-owned coal companies, including Coal India Ltd. A need is therefore felt to provide a platform i.e. Coal Trading Exchange (CTE), to also allow commercial, captive miners a ready access to market their produce, the ministry said, adding that the public sector coal companies may also use this platform. The exchange will facilitate trading of coal as a commodity.

The CTE is envisaged to lead to a many-to-many' platform where both buyers and sellers can bid simultaneously, thereby, making price discovery of coal more efficient and competitive. Thus, the Coal Trading Exchange would lead to a paradigm shift by transforming the coal sales model in the country from a One-to-Many' model to Many-to-Many' model. Besides, it is envisaged that the CTE will provide for clearing and settlement systems where the Exchange shall act as a counterparty.

The different commodity exchanges operating within India or internationally, are being regulated by a regulator. Ministry of Coal has also proposed to empower the CCO as the regulator for the CTE to be set up in the country.

The ministry further explained that India's coal output is likely to grow beyond 1.5 billion tonnes (BT) by 2030.

With the increased availability of domestic coal in the country, it is envisaged that there would be a paradigm shift towards a surplus coal scenario and as a result the coal sales scenario is expected to undergo a major change from the existing mechanisms of coal sales channels, necessitating a major market reform backed by a regulatory mechanism.

Therefore, in the scenario of increased availability of domestic coal in the country, there is a necessity to introduce further reforms in the coal sector with focus on promoting competitive markets for sale of coal.

The government had earlier said that it is optimistic about coal exchange in 2025 and the details are being worked out.

India's Coal Boom

Production Surpasses One Billion Tonnes

Key takeaways

- India has achieved a historic milestone by surpassing one billion tonnes of coal production in FY 2024-25, with a 4.99% growth in output compared to the previous year.
- The country's coal imports decreased by 8.4%, leading to substantial foreign exchange savings and a reduction in import dependency.
- The coal sector remains a crucial contributor to India's energy mix, powering over 74% of the country's electricity and sustaining key industries like steel and cement.
- A focus on coal gasification is positioning India to leverage syngas for producing methanol, fertilizers, and synthetic natural gas, promoting environmental sustainability.

Introduction

India achieved a historic milestone by surpassing **one billion tonnes (BT)** of coal production on **20 March 2025**, in **FY 2024-25—11 days ahead of last year's 997.83 million tonnes (MT).** With the **fifth-largest** coal reserves and as the **second-largest** consumer, coal remains crucial, contributing 55% to the national energy mix and fuelling over **74%** of total power generation. The coal sector's success is attributed to the tireless efforts of Coal Public Sector Undertakings (PSUs), private players, and the dedicated workforce of around **5 lakh** mine workers across more than **350 coal mines**. These coal miners, who have defied numerous challenges with unmatched dedication, have played a pivotal role in achieving this historic milestone.

Growth in Coal Production and Dispatch

India's coal production has reached 1047.57 MT (Provisional) in FY 2024-25, compared to 997.83 MT in FY 2023-24, marking a 4.99% growth. Production from Commercial & Captive, and other entities also saw a remarkable surge, reaching 197.50 MT (Provisional)—a 28.11% increase from 154.16 MT recorded in the previous year.

Coal production refers to the extraction of coal from mines.

Coal dispatch has also crossed the One BT milestone, with total dispatch reaching 1024.99 MT (Provisional) in FY 2024-25, up 5.34% from 973.01 MT in FY 2023-24. Dispatch from Commercial, Captive, and other entities witnessed an even more significant rise, reaching 196.83 MT (Provisional)—a 31.39% increase compared to 149.81 MT in the previous year.

Coal dispatch refers to the process of transporting and distributing that coal to various consumers, including power plants and industrial facilities.

Indian coal sector achieves notable reduction in imports

Coal imports fell **8.4%** to **183.42 MT** in April-December 2024 from **200.19 MT** in the same period of FY 2023-24, saving **$5.43 billion (₹42,315.7 crore)** in foreign exchange. The **Non-Regulated Sector** saw a sharper decline of **12.01%**, while imports for blending by thermal power plants dropped **29.8%**, despite a **3.53%** rise in coal-based power generation.

Government initiatives like **Commercial Coal Mining** and **Mission Coking Coal** boosted **domestic coal output by 6.11%** during this period, reducing import dependence.

Coal remains crucial for power, steel, and cement industries, but shortages in **coking and high-grade thermal coal** make imports necessary. The Ministry of Coal is strengthening domestic production to enhance energy security and advance **Viksit Bharat**, ensuring a **self-reliant, sustainable energy framework** for long-term growth.

Economic significance of the coal sector

Coal is vital to India's energy needs, supplying over half of the country's power. Despite renewable energy growth, coal-based thermal power will remain essential, with its share projected at 55% by 2030 and 27% by 2047.

Key contributions:

Railways & revenue: Coal stands as the single largest contributor to railway freight, with an average share of nearly 49% of total freight income amounting to Rs. 82,275 Crore in the fiscal year 2022-23 alone. This revenue contribution has surpassed 33% of total railway earnings, showcasing the sector's substantial influence on India's transportation network.

Government earnings: The coal sector contributes over Rs. 70,000 Crore annually to the central and state governments through royalties, GST, and other levies. These funds play a crucial role in fostering socio-economic development and infrastructure enhancement in coal-producing regions. Coal production generates substantial revenue for both Central and State Governments, with royalty collections reaching Rs. 23,184.86 Crore in the fiscal year 2022-23.

Employment: The sector provides jobs to over 239,000 workers in Coal India Ltd and thousands more in contractual and transport roles.

Economic growth Substantial investments in capital expenditure, averaging Rs. 18,255 Crore annually over the past five years, have facilitated infrastructure development and resource optimization within coal sector PSUs.

Coal gasification initiative
The Government has undertaken the following coal gasification initiatives:

Financial incentive: On 24th January 2024, the Government approved ₹8,500 crore for promoting coal/lignite gasification projects for PSUs and the private sector.

Investment by CIL: Coal India Limited (CIL) has been approved to invest in joint ventures with BHEL and GAIL for coal gasification projects.

New sub-sector: In 2022, "Production of Syngas leading to coal gasification" was added under the NRS linkage auctions policy. Auctions under this sector have a floor price at the regulated sector's notified price for projects commissioning within next seven years.

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

Coal gasification converts coal into syngas, which can be used for producing methanol, ammonium nitrate, Synthetic Natural Gas (SNG), and fertilisers. This technology promotes environmental sustainability in line with the vision of a developed India by 2047.

Safety audit of coal mines:
As per the Ministry of Coal's "Safety Health Management System Audit" guidelines (December 2023), safety audits are conducted annually. On 17th December 2024, the "National Coal Mine Safety Report Portal" was launched, incorporating a safety audit module for audit report submissions.

Key safety measures:
Regulatory updates: Directorate General of Mines Safety revamped the Coal Mines Regulations 1957 into The Coal Mines Regulations 2017, addressing modernisation, mechanisation, emergency response, and evacuation planning.

Advanced mining technologies:
Blast-free mining: Introduction of Blast-free mining technologies, such as Continuous Miner, Powered Support Longwall (PSLW) in UG mines, Surface Miner, Eccentric/Vertical Ripper in Opencast (OC) mines and Hybrid High Wall mining to extract coal seams that are not techno-economically viable through traditional opencast mining method.

Real-time monitoring: Real-time monitoring of UG mine environment by Environmental Telemonitoring System (ETMS) and Gas Chromatographs are used for quick and accurate mine air sampling.

Strata control: Mechanised roof bolting arrangement i.e. Universal Drilling Machine (UDM), QUAD and Twin Bolter systems, along with resin capsules and advanced instrumentation for strata monitoring.

Dust control: Dust suppression systems like truck-mounted Fog Canons and Sprinkler cum-mist sprays to reduce dust.

Training: Simulator-based training for Heavy Earth Moving Machinery (HEMM) operators and Virtual Reality (VR) training programs.

Monitoring: Modern technologies like Total Stations, 3D Terrestrial Laser Scanning (TLS), and Slope Stability Radars for monitoring slope and overburden (OB) dump stability. GPS-based Operator Independent Truck Dispatch System (OITDS), Geo-fencing in large OC to track HEMM movements.

Environmental & worker welfare initiatives:
Environmental protection: Environmental Impact Assessment studies are conducted before project approval, and ongoing environmental monitoring is ensured.

Worker welfare: Mines Rules, 1955 (under Mines Act, 1952) ensures health checks, first aid, shelters, canteens, and welfare officers. Additional initiatives include housing, clean drinking water, scholarships, financial assistance, healthcare, and compassionate employment.

Skill development: Structured vocational training, simulator-based training, specialised job training in drilling, blasting, fire safety, and safety workshops for Workmen Inspectors and Safety Committees.

Conclusion

The coal sector's continued growth and resilience are vital to India's energy strategy, economic development, and long-term sustainability. The remarkable achievements in production, dispatch, and coal gasification initiatives highlight the sector's evolving role in meeting the nation's energy demands. Through constant advancements in safety, environmental protection, and workforce welfare, the coal industry is setting a strong foundation for future progress. The government's initiatives, alongside the dedication of the workforce, ensure that the coal sector will remain a cornerstone of India's path toward becoming a self-reliant and developed nation by 2047.

Coal India Commissions India's First Electric rope shovel

Coal India announced the commissioning of India's first indigenously developed electric rope shovel at Nigahi Project of its subsidiary, Northern Coalfields Limited (NCL), in Singrauli, Madhya Pradesh.

The handing-over and commissioning ceremony of this state-of-the-art shovel - manufactured by Bharat Earth Movers Limited (BEML) - witnessed the presence of Chairman, Shri P.M. Prasad; Director (HR), Dr. Vinay Ranjan; Director (Technical), Shri Achyut Ghatak; CMD, BEML, Shri Shantanu Roy; CMD, NCL, Shri B. Sairam; and senior management from Coal India, NCL, and BEML, both physically and virtually.

In his virtual address from Corporate Office in Kolkata, Chairman, Shri Prasad, described the induction of this shovel into Coal India's HEMM fleet as a significant step towards Aatmanirbhar Bharat. He also lauded the strong work culture at NCL and expressed confidence that the new machine would be utilized to its optimum capacity.

This 20-cubic-meter electric rope shovel features a robust high-tensile bucket and boom design, a fully air-conditioned ergonomic operator cabin, and an impressive annual production capacity of 4.45 million cubic meters. It is also equipped with real-time monitoring and diagnostics with integrated safety and fault protection systems.

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Indian government unveils major plan to reduce energy consumption by 89 Mtoe by 2030

The Indian government, through the Ministry of Power, announced in Vijayawada, Andhra Pradesh, that it plans to cut energy consumption by 89 million tonnes of oil equivalent (Mtoe) by 2030.

The Bureau of Energy Efficiency (BEE), under Minister of State for Power Shripad Naik, unveiled the roadmap recently, aiming to boost energy efficiency across industries, buildings, transport, and appliances.

The plan, introduced to meet growing demand sustainably, outlines how states can implement energy-saving measures through new building codes and appliance standards.

At the event, the BEE launched the Energy Conservation and Sustainable Building Code (ECSBC) for commercial buildings and the Eco Niwas Samhita (ENS) for residential construction, encouraging states such as Andhra Pradesh to adopt these frameworks.

Appliance efficiency will be promoted under the expanded Standards and Labelling Programme, mandating 1-to-5-star ratings for products like air-conditioners, fans, and refrigerators.

Industries participating in the Perform, Achieve and Trade (PAT) Scheme will receive tradable Energy Saving Certificates for exceeding energy-saving goals.

Speaking separately in Delhi, Minister Naik emphasised the importance of collaboration and praised Andhra Pradesh's State Designated Agency (SDA) for its leadership in implementing energy initiatives.

BEE Secretary Milind Deore highlighted India's commitment to reducing its carbon intensity by 45 per cent by 2030. The BEE-German Energy Summit held in Vijayawada also produced a concept note focused on doubling India's energy efficiency, with significant contributions from Andhra Pradesh's experience in the residential sector.

NITI Aayog reviews role of central, state electricity regulators

India is targeting an overhaul of power sector regulations, with necessary changes in the role and accountability of entities. Towards this, government think-tank NITI Aayog has initiated a study on the autonomy, role clarity, capacity and accountability of the Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs), a senior government official told recently.

"The study is aimed at strengthening these institutions to address the rapidly changing nature of electricity, including entry of new market players, new types of systems, and new products in the sector which demands greater responsibility and accountability on the part of the regulators," the official said.

The plan is to enable energy regulators to undertake systemic changes in their approach and functioning to better address the challenges faced by regulatory commissions including maintaining viability of the power system, attracting private investments and protection of public interest.

The study is expected to conclude by this year-end with proposed changes to the regulatory commissions getting implemented from next year, the official said.

The Aayog is of the view that while some electricity regulatory commissions (ERCs) have developed a reputation for high-quality regulation, enforcement, and adjudication, few ERCs continue to draw criticism on issues such as regulatory capture, delay in tariff orders, and lack of autonomy. This has necessitated the need for a study to revamp the structure, function and power to make them more robust.

India expects peak power demand to surge to 370 GW by 2030 from 243 GW currently. This will require massive expansion and strengthening of the electricity generation, transmission and distribution system in the country.

The CERC was set up in 1998, under the provisions of the Electricity Regulatory Commission Act, 1998. It is the central commission for purposes of the Electricity Act, 2003, and is primarily responsible for regulating tariffs of generating companies owned or controlled by the Centre and tariffs for interstate transmission of electricity. It is also responsible for promoting competition, efficiency and economy in activities of the sector besides supporting investments in the power sector.

CEA has ambitious plan to concur minimum 13 PSP of 22 GW for 2025-26

The Central Electricity Authority (CEA), under the Ministry of Power, Government of India, has concurred Detailed Project Reports (DPRs) of following 6 Hydro Pumped Storage Projects (PSPs) of about 7.5 GW in record time during 2024-25, marking a key milestone in India's ongoing commitment to developing advanced long term energy storage solutions:

- Upper Indravati (600 MW) in Odisha
- Sharavathy (2,000 MW) in Karnataka
- Bhivpuri (1,000 MW) in Maharashtra
- Bhavali (1,500 MW) in Maharashtra
- MP-30 (1,920 MW) in Madhya Pradesh
- Chitravathi (500 MW) in Andhra Pradesh

This is the outcome of the collaborative efforts of the PSP developers, appraising organisations (CWC, GSI and CSMRS).

A number of steps were taken to resolve the issues and fast track the appraisal process. This is a big achievement since inception of new concept of Off-Stream, close loop PSPs. CEA has made the appraisal process transparent through the Portal “Jalvi Store”. The DPR for appraisal has been made shorter, check list has been provided for ease of submission of chapters to appraising agency and many more such initiatives.

Further, CEA has made ambitious plan to concur minimum 13 PSPs of about 22 GW during 2025-26. Most of these PSPs are targeted to be commissioned in 4 years and latest by 2030. Development of these projects shall boost energy storage capacity drastically in the country, making a major contribution to grid reliability and supporting India’s ambitious renewable energy goals. This further underscores the CEA’s ongoing commitment for facilitating the transition towards a more sustainable and resilient power system.

The participation of private sector in this segment is quite encouraging and with the help of self-identified PSP, the PSP potential in the country has crossed 200 GW and it is further increasing almost every month. Thus, from a meagre 3.5 GW of operational hydro PSP capacity in the country, the development needs to be taken up in an accelerated mission mode to harness this potential. This year two PSPs around 3000 MW will get commissioned and by 2032 we expect around 50 GW. At present 8 projects of 10 GW is under construction and DPR has been concurred for 3 projects of around 3 GW. In addition to this, 49 projects of 66 GW are under Survey and investigation. All these DPRs are expected to be finalised by the developers in 2 years.

Hydro PSPs are vital for the energy transition, as they allow excess electricity generated during off-peak hours to be stored in the form of water in elevated reservoirs. This stored energy can then be used back during non-solar hours peak demand periods, ensuring a reliable, consistent, and flexible power supply.

For developers and investors, it is a great investment opportunity to develop and invest in a long term asset of more than 70- 80 years.

Union Power Minister emphasises prioritising prepaid smart metering at govt establishments

Union Power Minister Manohar Lal recently asked states to prioritise prepaid smart metering at government establishments including government colonies. Addressing the regional conference of the power sector in Gangtok, he said that the installation of prepaid smart meters at government

establishments, including government colonies, will streamline optimisation of revenue from consumption of power.

"The installation of prepaid smart meters at government establishments, including residential colonies, will not only optimise revenue generation from power consumption but help reduce operational losses of the entities involved in power generation, transmission and distribution network," he said.

The regional conference was attended among others by Tripura's Power minister Ratan Lal Nath, Meghalaya Power Minister A T Mondal, Mizoram Power minister F Rodingliana and Sikkim Chief Minister Prem Singh Tamang.

The Union Power minister also underlined the importance of a future-ready, modern, and financially viable power sector to fuel the country's growth on its journey towards becoming a developed nation.

"The growth of power sector is important for achieving the goal of 'viksit Bharat'," Lal said, adding that the regional conference would help in identifying specific challenges and solutions with respect of the power sector of the North Eastern states.

He said that despite the minor gap of 0.1 percent in meeting current power requirements, efforts must continue to meet future demands.

Since 2014, power generation has increased significantly through various modes of generation, including thermal, hydro, atomic, and renewable energy, he said and urged the power utilities to further augment generation.

Addressing environmental concerns and moving towards non-fossil power is essential for achieving the target of net zero emissions, Lal said.He mentioned that through government schemes like RDSS and PM-JANMAN, difficulties in the distribution sector are being addressed, and left-out households are being electrified.

The Power minister highlighted that the distribution sector faces challenges due to poor tariff structures, suboptimal billing and collection, and delayed payments of government department dues and subsidies.

"It is essential to reduce the AT&C losses and the gap between the average cost of supply and average revenue realised, to ensure that the distribution sector becomes viable," he said, adding to achieve that, it is essential that the tariffs are cost-reflective.

Lal said states should work towards ensuring energy security and given the hydro-power potential, including pumped-storage, in the North Eastern region, the states should make efforts to effectively utilise that potential.

In his welcome address, Sikkim Chief Minister Prem Singh Tamang highlighted the various steps taken by his state towards improving the quality and reliability of power supply. He said that the state government proposed to take measures to further improve the power sector for which the interventions from central government will be required to resolve various issues.

Coal India to set up power plant in joint venture

Coal India, the country's top coal producer, will build a 1,600 megawatt coal-powered plant through a joint venture in the eastern state of Jharkhand at an investment of 165 billion rupees ($1.94 billion) to meet increasing power demand.

CIL recently signed a non-binding memorandum of understanding with Damodar Valley Corporation for setting up the plant, which will have two 800 MW units and will be an expansion of an existing 500 MW plant. The state-run company is also building two thermal power plants at its coal pit-heads in the central Indian state of Madhya Pradesh with 660 MW capacity, and a 1,600 MW plant in the eastern state of Odisha, both due for completion by 2030.

India aims to ramp up its thermal power capacity to meet growing domestic electricity demand even as it aims to increase non-fossil power capacity amid weak demand for tenders and project cancellations.

India attracted $36 billion investment, 177 discoveries in pre-2014 oil, gas block: Oil Ministry Report

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
MINISTRY OF PETROLEUM AND NATURAL GAS
सत्यमेव जयते

India attracted over $36 billion investment from nine NELP bid rounds held before 2014, and has so far yielded 177 oil and gas discoveries, according to a report commissioned by the Petroleum Ministry. Under the New Exploration Licensing Policy (NELP), blocks were awarded to bidders promising maximum exploration, allowing them to recover investments from oil and gas they discover and produce before sharing profits with the government.

In 2016, this was replaced by a revenue-sharing model, where blocks go to firms offering the highest share of output to the government.

The 254 blocks awarded in nine bid rounds of NELP between 1999 and 2010 attracted $17.6 billion investment in exploration that led to 67 oil discoveries and 110 gas finds, and another $18.64 billion in development of some of those discoveries.

The 144 blocks awarded in eight big rounds of Open Acreage Licensing Policy (OALP) from 2018 to 2022 saw $1.37 billion investment in exploration, leading to 6 oil discoveries and 4 gas finds, the report said.

Reliance Industries and its partner BP Plc's eastern offshore KG-D6 block, which produces a third of all natural gas produced in the country, as well as the showpiece KG-DWN-98/2 (KG-D5) block of state-owned Oil and Natural Gas Corporation (ONGC) were awarded in NELP rounds.

The interim report of the Joint Working Group constituted by the ministry on issues related to Ease of Doing Business in the Indian Upstream Sector said NELP helped increase area under exploration and attract private and foreign investment into India's exploration and production (E&P) sector.

"Major international companies such as British Gas, Cairn Energy, Eni, BHP Billiton, and BP participated in the NELP bidding rounds, bringing advanced exploration technologies and capital into India's upstream industry."

Despite its successes, NELP rounds had its challenges, it said. "One of the major issues was the delays in obtaining clearances, including environmental and regulatory approvals, which often resulted in significant project delays.

"Additionally, disputes over cost recovery under the PSC regime led to disagreements between contractors and the government, with both parties interpreting the contracts differently."

Recognizing the need to improve the Ease of Doing Business in the sector, the government introduced a series of policy reforms and incentives aimed at addressing these inefficiencies.

In 2016, the Hydrocarbon Exploration and Licensing Policy (HELP) was introduced to address the challenges faced under NELP and create a more investor-oriented regime. HELP replaced the production sharing contract (PSC) model with a Revenue Sharing Contract (RSC) model, simplified the licensing framework, and introduced greater flexibility in exploration and production activities.

"This marked a transformational shift in India's E&P regime, with a stronger focus on reducing operational complexities, increasing transparency, and providing greater autonomy to operators," the report said, adding RSCs reflected the government's vision to create a more transparent, efficient, and competitive environment in India's oil and gas sector, aligning with global best practices.

"RSCs represent a critical evolution in the contractual framework and are designed to address some of the limitations of the previous PSC model such as intricate cost recovery process, leading to delays, bureaucratic bottlenecks, and disputes over recoverable expenses."

Under RSCs, the contractor and government share revenue from the sale of hydrocarbons at pre-agreed percentages, regardless of the costs incurred during exploration and production.

The RSC regime was implemented in a series of eight bidding rounds, starting with OALP-I round in 2018 and concluding with OALP-VIII in 2022, the report said.

Last week, the government signed contracts for the 28 blocks offered in OALP-IX round and a 10th round is under offer currently.

Alongside OALP, the government also introduced the Discovered Small Field (DSF) policy in 2015 which aimed at monetizing small and marginal fields that had been discovered by the national oil companies but were not developed due to their perceived lack of economic viability under previous regimes.

The report said 85 contract areas, holding multiple discoveries, were awarded in three bid rounds since 2016, drawing $69 million investment in exploration and another $192 million in development of the finds. Of the 85 areas, 51 are active presently.

Last week, contracts for two areas offered in a Special DSF Bid Round were signed and a fourth round was offered.

The report said only 29 blocks out of the 254 blocks bid round in NELP rounds, are active presently. The remaining being relinquished for want of a discovery or the finds being too small to develop. Similarly, of the 144 blocks awarded in eight bid rounds of OALP, 128 are active presently.

The JWG, headed by Praveen M. Khanooja, Additional Secretary, Ministry of Petroleum and Natural Gas, made recommendations for resolutions of issues ranging from delivery points of hydrocarbon discovered, grant of extra days for delays in government related approvals, reduction in contract area and work programme due to denial or delay in statutory clearances for exploratory activities, field development plan approvals, grant of extension of exploration/development period and transfer of participating interest in blocks.

Crude oil output drops 3.1% in March; FY25 petroleum product consumption up 2.1%

India's indigenous crude oil and condensate production declined by 3.1 per cent to 2.4 million metric tonnes (MMT) in March 2025 compared to the same period last year, according to data released by the Petroleum Planning and Analysis Cell (PPAC) under the Ministry of Petroleum and Natural Gas.

Of the total domestic production, Oil India Ltd (OIL) contributed 0.3 MMT, Oil and Natural Gas Corporation (ONGC) fields accounted for 1.6 MMT, and production under production sharing and revenue sharing contracts (PSC/RSC) by private and joint venture players stood at 0.5 MMT.

Crude oil processed during the month stood at 22.9 MMT, 1.9 per cent lower than March 2024. PSU and JV refiners processed 16.3 MMT, while private refiners handled 6.6 MMT. Of this, 2.1 MMT was indigenous crude and 20.8 MMT was imported.

For FY25 (April–March), total crude oil processed rose by 2.3 per cent compared to the previous fiscal.

Crude oil imports increased by 6.3 per cent in March 2025 and 3.0 per cent for the full financial year. The net oil and gas import bill for March 2025 was USD 11.6 billion, up from USD 10.9 billion in March 2024. Of this, crude oil imports amounted to USD 12.1 billion, LNG USD 1.3 billion, while product exports were USD 3.9 billion.

Brent crude averaged USD 72.60 per barrel in March 2025, compared to USD 75.16 in February 2025 and USD 85.48 in March 2024. The Indian basket crude averaged USD 72.47 per barrel in March 2025.

Petroleum product output in March 2025 was 24.9 MMT, a 0.1 per cent increase over March 2024. Refinery production contributed 24.6 MMT, while 0.3 MMT was from fractionators. Total product output during FY25 rose 2.9 per cent over FY24.

High speed diesel (HSD) accounted for 42.4 per cent of total production, motor spirit (MS) for 17.8 per cent, aviation turbine fuel (ATF) and naphtha each for 6.0 per cent, petcoke 5.3 per cent, and LPG 4.3 per cent. The rest was shared by bitumen, furnace oil/low sulfur heavy stock (FO/LSHS), light diesel oil (LDO), lubricants and others.

POL product imports increased by 0.4 per cent in March and by 5 per cent in FY25, largely due to higher imports of LPG and petcoke. Exports of petroleum products rose 1.0 per cent in March and 3.3 per cent for the full year, driven by motor spirit, petcoke/CBFS, and fuel oil.

Consumption of petroleum products for FY25 stood at 239.2 MMT, marking a 2.1 per cent increase over 234.3 MMT in FY24. This was led by a 2.0 per cent growth in HSD, 7.5 per cent in MS, 8.9 per cent in ATF, 5.6 per cent in LPG, and 12.3 per cent in lubricants, along with growth in petcoke and LDO.

However, for March 2025, consumption declined 3.1 per cent to 20.9 MMT compared to March 2024. Ethanol blending in petrol was recorded at 19.8 per cent for March 2025, with cumulative blending during November 2024 to March 2025 at 18.4 per cent.

Natural gas consumption, including internal consumption, stood at 5,992 million standard cubic metres (MMSCM) in March 2025, down 2.2 per cent year-on-year. Cumulative consumption in FY25 was 72,293 MMSCM, a 7.1 per cent increase over the previous fiscal.

Gross natural gas production in March 2025 was 2,988 MMSCM, down 4.8 per cent. For the full year, production was 36,113 MMSCM, a 0.9 per cent decline.

LNG imports in March 2025 stood at 3,044 MMSCM, 0.3 per cent lower than March 2024. Cumulative LNG imports for FY25 rose 15.4 per cent to 36,699 MMSCM, according to PPAC data.

ONGC plans Rs 3500 Crore Green Energy Capacity Push

Oil and Natural Gas Corporation (ONGC) plans to spend up to ₹3,500 crore in this financial year on adding green energy generation capacity as it pursues its goal of 10 GW by 2030, said its finance chief.

A large share of the green budget this year will go into setting up 1 GW of renewable projects, with the capacity split equally between solar and wind, Vivek Chandrakant Tongaonkar, director (finance), ONGC, told ET. The company is also looking for acquisitions, he said.

"We have a target of 10 GW by 2030, which we think we should be in a position to comfortably reach," Tongaonkar said. ONGC NTPC Green Pvt Ltd (ONGPL), an equal joint venture between ONGC Green and NTPC Green, acquired full ownership of renewable energy platform Ayana Renewable Power for ₹6,248 crore last month. Ayana Renewable Power has a portfolio of 2.1 GW of operational and 2 GW of under-construction assets.

Last month, ONGC Green also completed the acquisition of PTC Energy for ₹925 crore. PTC Energy has a wind generation capacity of 288 MW. ONGC aims to spend another ₹35,000 crore on its core exploration and production (E&P) business in this fiscal, Tongaonkar said. The annual capital expenditure on E&P is likely to rise over the next few years if large discoveries are made and developed, he said, adding that the annual capex could rise to as much as ₹45,000 crore in 2028-29. With an aim to boost oil and gas production, ONGC has won several exploration blocks in the bidding rounds in recent years.

"We are conscious of the fact that we need to make more capex in future," he said, adding that the company continues to manage its cash flows in a way that it is able to meet its current and future spending requirements while rewarding its shareholders.

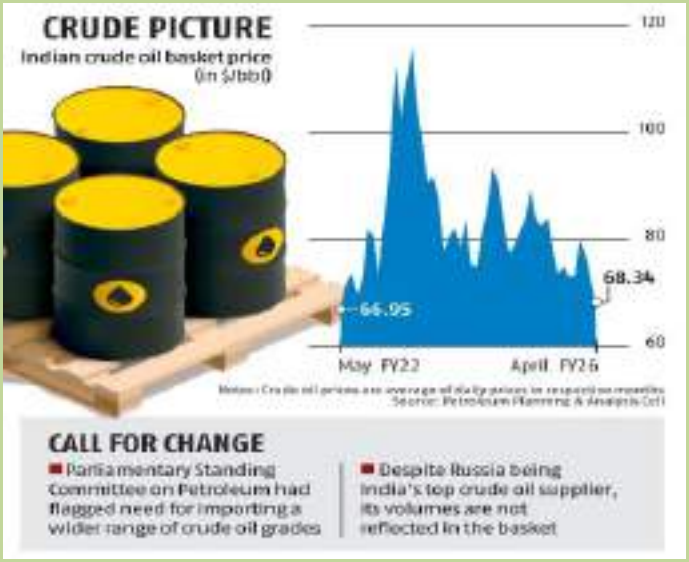
India's oil basket price at 47-month low of $68.34 a barrel in April

The average price of the Indian basket of crude oil has fallen to a 47-month low of $68.34 per barrel so far in April. This marks a 5.6 per cent drop from March's $72.47 per barrel, and is the lowest level since May 2021, when global prices plummeted amid the economic turmoil triggered by the Covid-19 pandemic, according to data from the Petroleum Planning and Analysis Cell (PPAC).

In 2023-24, the ratio of sour grades, such as Oman and Dubai, reached their highest levels in relation to sweet Brent grades in the basket, government data shows. The Indian crude basket is a derived blend comprising sour grade (Oman and Dubai average) and sweet grade (Brent Dated) crude oil, processed in domestic refineries, with the current ratio standing at 78.50:21.50.

Last year, the Parliamentary Standing Committee on Petroleum underscored the need to diversify India's crude oil imports by sourcing a wider range of grades, with the aim of bringing down the cost of the Indian basket. The price remains elevated in part because Middle East crude typically commands a higher rate due to the so-called Asian premium -- an additional charge imposed by the Organization of the Petroleum Exporting Countries (Opec) on sales to Asian nations over and above the actual selling price, the standing committee noted.

However, the petroleum ministry maintained that the selection of crude oil grades for import is driven by the technical and economic competitiveness of each option.



The Indian crude basket serves as a key indicator of import prices and is closely monitored by the government when assessing domestic pricing issues. As a result, some industry insiders have called for a revision in the way the basket price is calculated, particularly since it has yet to reflect the significant volumes of Russian crude that India has been importing since the outbreak of the war in Ukraine. In May 2023, Russia became India's largest crude oil supplier, delivering 1.96 million barrels per day (mbpd). As of March 2025, it continues to lead inbound shipments, with 1.66 mbpd, according to energy cargo tracker Vortexa.

Even so, global market conditions are expected to keep the basket price in check over the near term, PPAC officials said. Oil prices took a sharp hit after April 2, when the United States announced retaliatory tariffs against almost all major trading partners. Both the global benchmark Brent crude and the US benchmark WTI fell to four-year lows amid weak industrial demand and fears of oversupply.

Later, US President Donald Trump announced a 90-day pause for most nations, excluding China, during which a lower, baseline rate of 10 per cent would apply on a vast number of import items.

Brent crude futures stood at $67.96 per barrel, having edged higher over the past week.

The latest figures also show that India's crude oil import volumes rose by 4.2 per cent to 242.4 million tonnes (mt) in FY25, up from 232.3 mt in FY24. In value terms, the crude import bill increased by 2.7 per cent in FY25 to $137 billion, compared with $133.4 billion the previous year. The combined import bill for crude and petroleum products climbed to $161 billion in FY25, up from $156.3 billion in FY24.

The data revealed that India's crude oil import dependency hit an all-time high of 89.1 per cent in March 2025, up from 88.6 per cent in March 2024. For the full financial year, import dependence stood at 88.2 per cent, rising from 87.8 per cent in FY24.

Amid rising energy demand and sluggish domestic production, India's reliance on oil, gas imports grow further in 2024-25

India's dependence on imported crude oil and natural gas grew further in 2024-25 (FY25) as the gap between consumption growth and subdued domestic hydrocarbon production continued to widen. The country's oil import dependency for the full financial year touched yet another record high, while reliance on imported natural gas was at a four-year high, per latest data from the petroleum ministry.

India's oil import dependency for the financial year ended March was 88.2 per cent, up from 87.8 per cent in the previous fiscal (FY24), per provisional data from the oil ministry's Petroleum Planning & Analysis Cell (PPAC). Import dependency in the

case of natural gas was at 50.8 per cent in FY25, up from 47.1 per cent in FY24.

India's energy demand has been growing swiftly, resulting in rising crude oil and natural gas imports. This is fuelled by factors like growing energy-intensive industries, increased vehicle sales, a rapidly expanding aviation sector, growing consumption of petrochemicals, and a rising population.

Reliance on imported oil has been growing continuously over the past few years, except in FY21, when demand was suppressed due to the Covid-19 pandemic. The country's oil import dependency stood at 87.8 per cent in FY24, 87.4 per cent in FY23, 85.5 per cent in FY22, 84.4 per cent in FY21, 85 per cent in FY20, and 83.8 per cent in FY19. India is the world's third-largest consumer of crude oil and high import dependency makes the Indian economy vulnerable to global oil price fluctuations. It also has a bearing on the country's trade deficit, foreign exchange reserves, the rupee's exchange rate, and inflation rate, among others.

Growing reliance on imported oil and natural gas

	2024-25	2023-24
Domestic petroleum product consumption (mn tn)	239.2	254.5
Petroleum product output from domestic crude oil (mn tn)	28.2	28.5
Crude oil import dependency (per cent)	**88.2**	**87.8**
Domestic natural gas consumption (bcm)	72.3	67.5
Natural gas imports (bcm)	36.7	31.8
Natural gas import dependency (per cent)	**50.8**	**47.1**

Source: PPAC, Ministry of Petroleum and Natural Gas

The government wants to reduce India's reliance on imported crude oil but sluggish domestic oil output in the face of incessantly growing demand for petroleum products has been the biggest impediment.

As for natural gas, the government wants to increase its consumption and share in the country's primary energy mix to 15 per cent by 2030 from over 6 per cent at present. The rationale behind the push for natural gas, even though it would lead to higher imports of the fuel, is rather simple.

Natural gas is far less polluting than conventional hydrocarbons like crude oil and coal, and is usually cheaper than oil. It is also seen as a key transition fuel. To be sure though, the government has also been pushing India's oil and gas companies to increase domestic production of natural gas in a bid to keep import dependency levels under check.

India's crude oil imports rose to 242.4 million tonnes in FY25 from 234.3 million in FY24, while domestic production declined slightly to 28.7 million tonnes from 29.4 million tonnes, per PPAC data. The country's gross oil import bill for the financial year rose nearly 3 per cent year-on-year to $137 billion.

Natural gas imports rose 15.4 per cent year-on-year to 36.7 billion cubic metres (bcm) in FY25, and cost $15.2 billion against $13.4 billion a year ago. Domestic natural gas output in FY25 was 35.6 bcm, slightly lower than 35.7 bcm in FY24.

Total domestic consumption of petroleum products in FY25 was 239.2 million tonnes, of which just 28.2 million tonnes came from domestically produced crude oil, resulting in a self-sufficiency level of 11.8 per cent, per PPAC data. As for natural gas, the total domestic consumption in FY25 was 72.3 bcm, while imports stood at 36.7 bcm.

In early 2015, the government had set a target to reduce reliance on oil imports to 67 per cent by 2022 from 77 per cent in 2013-14, but the dependency has only grown since. Cutting costly oil imports continues to be a key focus area for the government, which has taken a number of policy measures to incentivise investments in India's oil and gas exploration and production sector.

Reducing oil imports is also one of the fundamental objectives of the government's push for electric mobility, biofuels, and other alternative fuels for transportation as well as industries. While there has been a pick-up in electric mobility adoption and blending of biofuels with conventional fuels, it is not enough to offset petroleum demand growth.

Dr. Jitendra Singh informed Parliament on Indigenous Nuclear Reactors

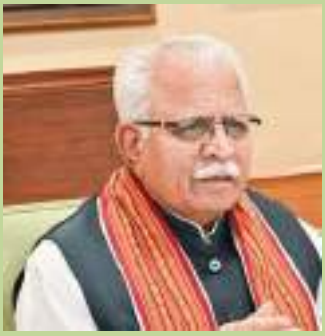
Units-3&4 of Kakrapar Atomic Power Station (KAPS-3&4), the first pair of indigenous 700 MW Pressurized Heavy Water Reactors (PHWR) setup at Kakrapar in Gujarat are already operational, having commenced commercial operation on 30.06.2023 and 31.03.2024 respectively.

Two units of 700 MW indigenous PHWRs were sanctioned to be setup at Rawatbhata in Rajasthan (RAPP-7&8, 2X700 MW)

One of the units, RAPP-7 has been connected to the grid on 17.03.2025, while RAPP- 8 is under advanced stage of commissioning and is expected to be completed in 2025-26.

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

House panel discusses roadmap for developing 100GW nuclear power by 2047



The Parliamentary consultative committee on power met rto discuss the roadmap for nuclear power generation against the backdrop of India's target of achieving 100GW of nuclear power capacity by 2047.

During the meeting chaired by the Union minister for power and housing & urban affairs Manohar Lal, members of parliament stressed the need for faster project execution, creating a favourable public narrative, ensuring technology diversification, and building robust vendor and manpower ecosystems for nuclear power.

A statement from the power ministry said Lal reiterated the government's commitment to achieving net zero carbon emissions by 2070 and emphasized that increasing the share of non-fossil fuel-based power generation is central to this vision.

As the power sector contributes over 40% of global energy-related emissions, nuclear energy, being a non-fossil and stable power source, will play an increasingly important role in India’s sustainable development journey, he said.

The minister said that apart from electricity generation, nuclear energy can also serve non-electric applications such as hydrogen production, desalination, process steam, and space heating, thus supporting India's broader energy transition goals.

Members of the committee were informed that India currently operates 25 nuclear reactors across seven locations, with a total installed capacity of 8,880MW, contributing about 3% of the country's electricity generation. Eight reactors with 6,600MW capacity are under construction, and another ten with 7,000MW capacity are in pre-project stages.

"In line with India's vision of 'Viksit Bharat @2047', the Government has set a target of achieving 100 GW of nuclear power capacity by 2047. This will significantly strengthen India’s long-term energy security and contribute towards achieving clean energy goals," said the official statement.

Lal outlined the key challenges and strategic steps required for scaling up nuclear energy including the need to amend the Atomic Energy Act, 1962 and Civil Liability for Nuclear Damage Act, 2010 to enable broader participation by private and state sectors and strengthening public perception and enhancing awareness about nuclear energy's safety and benefits.

He also stressed on the need to facilitate faster land acquisition through brownfield expansions and repurpose retired thermal sites and streamline regulatory approval processes to reduce project timelines.

India Eyes 100 GW Nuclear Power by 2047: AEC Chairman

India aims to produce 1 lakh MW of nuclear power by 2047, a massive increase from the current production of over 8,000 MW, Atomic Energy Commission Chairman A K Mohanty said recently. Mohanty was speaking at the release of a report, 'Synchronising Energy Transitions Towards Possible Net Zero for India: Affordable and Clean Energy for All', largely funded by the Office of the Principal Scientific Adviser to the government of India.

Ravi B Grover, Chairman Emeritus of the Homi Bhabha National Institute, said the report was necessary as studies for energy transition for India have come up with a very insignificant role for nuclear citing high input cost and lower public acceptance.

Mohanty said a vision document for 'Amrit Kaal' was being prepared by the Department of Atomic Energy which envisages reaching a nuclear capacity of about 100 GW by 2047.

He said the breeder reactors would contribute 3 GW of nuclear power, while 17.6 GW would come from light water reactors built with international cooperation and another 40-45 GW would come from the pressurised heavy water reactors.

The report released recently stated that if India planned to phase down coal usage in the next three decades, it would need to build adequate infrastructure for alternative sources such as nuclear power, in addition to flexible grid infrastructure and storage to support the integration of renewable energy.

"If India intends to follow coal-dependent pathways, it will need to explore carbon dioxide technologies (CDRs) as well, such as bioenergy with carbon capture and storage (BECCS) and CCUS, to fully understand their long-term potential," it said.

India considers allowing 49% foreign stakes in nuclear power plants

India could allow foreign companies to take a stake of up to 49 in its nuclear power plants, three government sources said, as New Delhi draws up plans to open up its most guarded sector to help achieve goals to cut carbon emissions.

The government has considered changing its nuclear foreign investment framework since 2023. The need to increase nuclear capacity, however, has become pressing as India seeks to replace carbon-intensive coal with cleaner sources of energy.

Investment in the sector has the potential to spur tariff negotiations with the Unites States, although the officials could not say whether the issue would be linked to any trade deal.

In 2008, a civil nuclear agreement with the United States provided for deals worth many billions of dollars with U.S. companies. The companies, however, have been deterred by the risk of unlimited exposure in the event of any accident and no foreign investment has been allowed in India's nuclear plants.

If the latest proposals go through, together with plans to ease nuclear liability laws and allow domestic private players into the sector, they could remove the impediments to government aims to expand nuclear power capacity by 12 times to 100 gigawatts by 2047.

The sources said any foreign nuclear investments would still require prior government approval rather than be allowed automatically.

They said the necessary legal changes were likely to be placed before the federal cabinet soon and that the government aims to get the amendments to the Civil Liability for Nuclear Damage Act of 2010 and the Atomic Energy Act of 1960 passed in the monsoon session of Parliament in July. Amendments to the Atomic Energy Act would allow the government to issue licences to private companies to build, own and operate a plant and mine and manufacture atomic fuel, the three sources said.

The atomic energy department has said foreign companies including Westinghouse Electric, GE-Hitachi, Electricite de France and Rosatom were interested in participating in the country's nuclear power projects as technology partners, suppliers, contractors and service providers. Indian conglomerates, including Reliance Industries, Tata Power, Adani Power, and Vedanta Ltd, have also held discussions with the government to invest about $26 billion in the nuclear power sector.

India needs to fast-track nuclear power projects, government committee urges

India must accelerate execution of nuclear projects, create awareness on their safety and build a strong list of vendors, according to an advisory committee meeting of the country's power ministry held on Monday.

WHY IT'S IMPORTANT
In early February, India announced plans to amend its nuclear liability law to boost foreign and private investments, aiming to increase nuclear capacity to at least 100 GW by 2047 from about 9 GW currently.

The country is seeking to replace carbon-intensive coal with cleaner sources of energy.

CONTEXT
India is betting heavily on nuclear power to meet its rising energy demand without compromising on its net-zero commitments, and it proposes to allow private Indian companies to build nuclear plants.

The country could allow foreign companies to take stakes of up to 49% in its nuclear power projects and plans to ease its nuclear liability laws to cap accident-related penalties on equipment suppliers, Reuters reported earlier this month.

India must introduce tax concessions, ensure long-term financing to offer competitive nuclear tariffs, and develop diversified sources of uranium fuel to expedite project execution, Power Minister Manohar Lal told the advisory body on Monday, according to a government statement.

BY THE NUMBERS
India gets about three-fourths of its electricity from fossil fuel-based generation. The country currently operates 25 nuclear reactors, with a total installed capacity of 8,880 megawatts (MW), contributing about 3% to the country's electricity generation.

Eight reactors with a combined capacity of 6,600 MW are under construction, and another ten reactors with a total capacity of 7,000 MW are in pre-project stages, according to government data.

India helps world's largest nuclear fusion project cross key milestone

In a major boost for clean energy, the world’s biggest nuclear fusion project has completed its central magnet system, with India playing a critical role in building several key components, a PTI report said recently.

The ITER project, underway in southern France, aims to replicate the energy of the sun by fusing hydrogen atoms to generate carbon-free power. Unlike traditional nuclear power which uses fission, nuclear fusion creates no long-term radioactive waste.

The final module of ITER’s Central Solenoid, the powerful magnet that drives the fusion reaction, was recently built in the US and will soon be installed. Once operational, it will be strong enough to lift an aircraft carrier and will form the heart of the Tokamak, ITER’s doughnut-shaped reactor.

A global project
ITER (International Thermonuclear Experimental Reactor) is a collaboration between more than 30 countries including India, the US, China, Russia, Japan, South Korea, and EU nations.

It is designed to produce 500 megawatts of power from just 50 megawatts of input, creating a self-sustaining state known as 'burning plasma' that is the ultimate goal of fusion research.

“What makes ITER unique is not only its technical complexity but the framework of international cooperation that has sustained it through changing political landscapes,” ITER Director-General Pietro Barabaschi was quoted as saying.

"The ITER Project is the embodiment of hope. With ITER, we show that a sustainable energy future and a peaceful path forward are possible," he added.

Next steps for nuclear fusion
Earlier this year, ITER successfully installed the first part of its vacuum vessel. The rest of the machine is being assembled piece by piece. Though ITER won't produce electricity, it will prove that fusion works at scale and lay the groundwork for commercial fusion plants.

Private companies are also now investing in fusion, and ITER has launched programmes to share research and accelerate progress.

Funding and fair access
As a host, Europe is covering 45 per cent of the project's costs. The other six partners, including India, each contribute around 9 per cent. All members will share full access to data, technology and patents developed from the project.

Crucial infra that India has delivered
* The cryostat, a massive chamber that encloses the reactor
* Cryolines that cool magnets to -269°C using liquid helium
* Components of the heating systems to raise plasma temperatures above 150 million degrees Celsius
* In-wall shielding and cooling water systems

NTPC seeks interest from global companies for nuclear power plant tech

NTPC has floated an Expression of Interest (EoI), inviting global companies for co-operation in indigenising Pressurised Water Reactor (PWR) technology and establishing large-capacity (1000 MW and above) PWR-based Nuclear Power Plants (NPPs) in the country on concept to commissioning basis. NTPC is targeting developing capacity of around 15 GW (plus-minus 10 percent).

"This EOI is to assess prospects of vendor base for indigenising Pressurised Water Reactor (PWR) technology for establishing large-capacity (1000 MW & above) Nuclear Power Plants (NPPs) in India," said NTPC in the tender document. Based on the interest received, a global tender shall be floated subject to approval by the government, it added.

Make in India: PWR technology
Recognising the critical need for technological advancement and domestic capability development in the nuclear sector, NTPC aims to indigenise Pressurised Water Reactor (PWR) technology, said the Maharatna PSU. "This move is aligned with the national objective of self-reliance in nuclear technology and localisation of the nuclear power plant supply chain. By fostering collaboration with global nuclear vendors, NTPC seeks to establish a robust domestic ecosystem for PWR-based nuclear power generation in India," said the tender document.

The framework for co-operation includes transfer of technology, minimum 60 percent indigenisation of components for the first reactor unit and progressively increase to more than 95 percent for the last reactor unit, ensuring a steady transition to self-sufficiency in nuclear technology, establishment of domestic manufacturing capabilities, lifetime fuel supply commitment, etc.

What Needs to be Done for Achieving 100 GW Nuclear Capacity by 2047

Alok Kumar, Former Secretary, Ministry of Power

Nuclear energy establishment in India, and the private sector within India and abroad is excited about the new target of 100 GW of nuclear based electricity generation capacity by 2047. In fact, this is very timely if India has to achieve Net Zero by 2070 because neither gas-based generation nor hydro-electric generation can significantly replace or substitute coal as baseload generation source for India. CCUS technology is still at development stage and has far larger challenges than those involved in ramping up nuclear based generation.

NPCIL has already announced its goal of achieving a cumulative capacity of more than 50 GW by 2047 and is busy locating new sites for its plants, in

addition to planned brownfield expansion at its existing power plants. Fleet mode execution of 700 MW units is proposed to be extended beyond the already under development ten units and can be a game changer in cost reduction as well as more certain and shorter execution period from the 'first pour of concrete'. NTPC has also announced its plans for JV with NPCIL as well as a wholly owned subsidiary. However, the real challenge lies in overcoming the uncertainties, particularly local opposition in pre-execution survey and investigation at the identified sites. This initial project development phase (before the first pour of concrete) is leading to uncertain and longish execution period. On the other hand, India's continuously growing electricity demand cannot wait for any delay in setting up new capacities. To address this challenge, there is urgent need for closely working with the states (may be making them joint owner of the projects) and for more intense awareness creation about our excellent safety record in operating nuclear reactors.

Another major task involved in this targeted expansion of our nuclear capacity is ensuring reorientation of our highly talented nuclear scientists and technologists to the reality that as the share of nuclear based capacity grows, they have to pay larger attention to the fact that nuclear based electricity not only needs to be generated but also despatched in the grid and sold according to the needs of power system and the electricity consumers. As we reach around 80% share of variable renewable based capacity by 2047, nuclear plant operations will require to be flexible if it has to replace coal as source for baseload generation. Flexibility may come from ramping up and down to the extent of best practices available internationally, or through using the surplus electricity/heat for other uses like industry or hydrogen production. All such modifications in design and operations of the reactors should not add to significant costs. This brings us to the other major challenge of ensuring that nuclear based electricity stays cost competitive to other sources like solar plus storage, or coal with CCUS. Presently the average sale price (as published by CEA) of nuclear based electricity is about 20% less than the thermal power plants. But it is set to rise rapidly as we add larger number of new units. We have seen this in case of transmission expansion as well as in case of state like Bihar which has contracted PPAs with several newly established coal plants. Therefore, thrust has to be on compressing the construction period so that the share of interest during construction in the capital cost is minimised. Streamlining of regulatory processes is also important to achieve this objective.

Our local industrial units have contributed immensely to our capabilities to achieve nearly hundred percent indigenisation of 700 MW nuclear unit. They have achieved high quality standards and many of these are also exporting. These industries are ready to expand their capacities quickly if we can provide them clear visibility of order pipeline through sustained expansion of fleet mode execution and placing bulk orders. Industry also wants streamlining of inspection processes by NPCIL during manufacturing which has potential of reducing the delivery time without compromising on quality.

Achieving 100 GW by 2047 will require substantial contribution from the private sector. This has been fully recognised by the Government. The recent Budget has announced legislative amendments to facilitate this. NPCIL has also floated a RfP for offering to set up two units of 220 MW in large industrial units in captive mode. Several developers have requested clarity on three aspects to ensure bankability of the investments. Of foremost importance is an assurance of reasonable completion cost so that the electricity generated remains cost effective for captive consumption or sale to bulk consumers/discoms. Second concern is fuel supply risk with the whole supply chain being controlled by public sector. Who will take the fuel availability risk in PPAs? Thirdly, industry would like to have a choice in size of units to be installed. May be 540 MW unit will lead to better economics.

Last but not the least, setting up large capacities to be operated based on imported uranium raises a serious concern from national energy security perspective. As we have seen in last few years, changing geopolitics may drastically impact the supply of fuel. Therefore, a well thought out strategy must be put in place in terms of acquisition of foreign mines or building up a strategic fuel reserve.

9th Coal Summit

9th April 2025, New Delhi

India Energy Forum jointly with The Mining, Geological & Metallurgical Institute of India (MGMI) Delhi Chapter, and ISM Alumni Association (ISMAA) – Delhi Chapter organized "9th Coal Summit" on the theme **"Optimising Coal Production and Productivity – Coal Pricing and Financing"**. The Summit was inaugurated by Dr Kirit Parikh, Chairman, IRADE and Former Member (Energy), Planning Commission; and the Guest of Honour of Summit was Shri S K Srivastawa, Former Secretary, MoC. Apart from the Inaugural and Valedictory Sessions, there were three technical Sessions which dwelled upon the issues of (i) Coal Production; (ii) Coal Productivity; and (iii) Coal Pricing and Financing.

Inaugural Session: Shri Alok Perti, Patron, National Advisory Board, 9th Coal Summit, welcomed the Dignatories on the dias and off the dais. Shri N N Gautam, Chairman, Coal Group, IEF & Former Advisor, Ministry of Coal introduced the theme with the participants. Shri J P Dwivedi, President, MGMI and CMD, WCL shared his views. Shri R V Shahi, President, IEF and Former Secretary, Ministry of Power also shared his views at the Inaugural Session. Key-note address was given by the Guest of Honour, Shri S K Srivastawa, Former Secretary, MoC. While Dr Kirit Parikh, Chairman, IRADE and Former Member (Energy), Planning Commission delivered the inaugural address, Shri M N Jha, President, MGMI DC & Former CMD, SECL/CMPDI gave the Vote of Thanks.

A Souvenir of the Summit carrying articles from the distinguished speakers and coal & mining experts was released by the dignitaries on the dais.

Session I: Coal Production: The Session was chaired by Shri Satish Jha, CMD, ECL. The other distinguished Speakers were: Shri Kapil Dhagat, Executive Vice President – Head BU Coal & Mining, JSPL; Dr V K Garg, Former CMD, PFC; Shri Afroz Ali, Senior VP, Adani Enterprise Ltd.; and Shri Amit Vyas, DGM (BS), Hindustan Power Projects Ltd. Session coordinator was Shri Tarun Mishra, CEO, EvotAi Technologies.

Session II: Coal Productivity: The Session was chaired by Shri Anil K Jha, Former Chairman, CIL. The other distinguished speakers who shared their views were: Shri Ajay Kumar, Director (Tech./P&D/RD&T), CMPDI; Shri Rajat Mukherjee, AVP - Coal Segment, Deepak Mining Solutions Limited (DMSL); and Shri Niladri Bhattacharjee, Partner, Grant Thornton. Session coordinator was Shri P S Upadhyaya, Former Director, NMDC.

Session III: Coal Pricing and Financing. The Session was Shri Anil Razdan, Former Secretary (Power). The other distinguished speakers who shared their views were Shri P S Bhattacharyya, Former CMD, CIL; Shri Alok Perti, Former Secretary, Ministry of Coal; and Shri Ashok Kumar Sharma, Dy. Managing Director & Chief Credit Officer and Chief Sustainability Officer, SBI. Session was coordinated by Shri N N Gautam.

Valedictory Session: Valedictory address was given by **Shri R R Rashmi**, Former Special Secretary, Ministry of Environment, Forests and Climate Change

Shri N N Gautam presented the Vote of Thanks and gave the concluding remarks.

The full proceedings and recommendations of the 9th Coal Summit will be published in the next issue of TOTAL ENERGY.

A Heartfelt Tribute to

1960– 2025

Shri K S Popli

Hon Secretary General, IEF - Former CMD, IREDA

A Pioneer of India’s Renewable Energy Revolution