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Managing Energy Transition: Challenges and Opportunities

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Managing Energy Transition, all over the world, has emerged as one of the most challenging tasks for every country. Nature of challenges differs from country to country. A number of developed countries, with very high per capita consumption of energy and power, have the challenge of drastically reducing the per capita carbon emissions. Besides this, many of them also have the major issue of energy security due to the changing dynamics of geo political situation. The developing countries like India have the challenges of enhancing energy access, increasing per capita energy and power consumptions, containing and reducing per capita carbon emission and, at the same time, also tackling the challenge of energy security due to dependence on others for importing energy. In Indian context, therefore, the challenges are more complex and, hence, it requires greater degree of preparations and planning not only on projecting the future but also on how to manage in a coordinated manner, so as to meet various objectives, which are sometimes complementary and sometimes contradictory to each other. India's vision and associated plans and programmes, aimed at Net Zero by 2070, are required to be structured in a manner that the various objectives are concurrently achieved.

Presently, at the population level of 1.43 billion, with an installed capacity of about 440 GW India has achieved a per capita electricity consumption level of the order of 1300 KWhr only, and has to cover considerable ground to get into the category of developed county, even if it is among the top three countries from the point of view of GDP. The average population growth rate in India, which has declined marginally over last few years, is of the order of 1%. It would be reasonable to assume a 6% growth rate in per capita power consumption, though for the GDP growth that is being projected for over several years, the per capita power consumption could be somewhat higher than 6%. Considering the population growth rate of 1%, the rate of growth in generation of power may have to be 7%. On the basis of these assumptions the per capita consumption of 1300 KWhr. will have to be about 2550 KWhr. by the year 2035, about 5000 KWhr. by the year 2045, and over 7000 KWhr. by the year 2050. This means that the level of 1300 KWhr. per capita consumption is estimated to cross 7000 KWhr. (that is 5.38 times as at present). The size of the power sector, in terms of installed capacity, will depend on the profile in terms of technology, fuels, the nature of mix of fossil fuels and renewables-based electricity. It would be desirable to make reasonable assumptions to approximately project the profile of the sector in next ten, twenty, and twenty-five years, to also project the various types of challenges which would be associated to manage the transition.

The estimates discussed in the previous paragraph are based on the present consumption pattern of electricity in India. The country also has to drastically reduce its dependence on Petroleum fuels, which in terms of overall energy profile of the country, constitutes almost 30%, and import dependence is of the order of more than 85% in respect of crude and more than 50% in respect of Gas. Several initiatives have been launched to drastically reduce these proportions. Shift from Diesel based Railway locomotives to electrical traction, electrical vehicles (EV) and transportation systems, large scale agricultural irrigation driven by Diesel Pumps to Solar Power Systems and many other areas of Petroleum fuel-based consumptions gradually shifting to

other forms of energy – primarily renewables. If these are factored in, the estimates presented in the previous paragraphs, the overall profile would change significantly.

Given the above future scenario and tasks ahead, it would be important to project the challenges in implementing all the programmes aimed at achieving the core objectives of enhancing energy access shifting progressively from fossil fuel centric profile to carbon free energy sources and also meeting the requirement of energy security (energy independence). During the last ten years, some of these shifts, mainly on the supply side of the industry, associated with a few shifts on the consumption patterns have definitely given a glimpse of challenges. The long terms scenario has to be visualised keeping in mind some of the projections which have been presented in the previous paragraphs. Briefly presented, the challenges to be addressed would be as follows:

(a) Solar Power has emerged, among renewables, as the largest contributor to provide energy and power. We have the experience of managing the entry of this technology in the range of 75 GW. We need to visualise when it is scaled up to 750 GW (almost ten times). The nature and size of the problems in terms of having to manage the Grid and also the impact on the fossil fuel-based power generation systems are now better understood. When scaled up, absence of Solar Power after sun set, flexible operations of Thermal Power Plants, and absence of sufficient back up, have definitely provided the nature of challenges ahead. It has been possible to cope with the expansion of Transmission Systems commensurate with the pace of growth of Solar capacity so far. Going forward, in the years ahead, when the rate of expansion becomes significantly higher, whether the grid expansion can cope with that pace, needs to be properly analysed and corresponding preparations need to be put in place.

(b) In order to provide backup power in evenings, exercises carried out on Thermal Power Stations have demonstrated that it would be possible to reduce their level of generation during day time to about 40 to 45 percent, and raise it during evenings when Solar Power is not available. As an approach this has been demonstrated that it can work. This is, however, not been without problems. It has been seen that in many cases stations had to resort to shutting down some of the units. When scaled up, whether the flexible operations can fully meet that requirement, will have to be properly examined and appropriate solutions may have to be evolved. It might entail some sort of retrofitting, so that the capability of the Thermal Power Plants is further enhanced to better match the requirement of the flexible operations. It would be desirable to put this approach in implementation so that its outcome is available matching with the pace of expansion of the Solar capacity.

(c) The Pump Storage Plants (PSP) has been known well to the power sector. Its application, however, remained marginal in the past in view of fossil fuel-based power as an input to run these pumps to deliver power at a time of choice, did not work out to be economical. Roughly, it required two units of Thermal Power to produce one unit of Hydro Power through PSP. Now, the pumps can be operated through Solar Power, which is comparatively much cheaper and also carbon free, during day time to raise the level of water in the reservoir and the PSP is operated to produce power in evenings as a backup for Solar Power which is then not available. This system has emerged as a practical solution to battery backup, whose economics at this time is in question.

Throughout the country several exercises have already started with preparations of Feasibility Reports and Detailed Project Reports for PSP. This is a welcome development with enormous potentials. It is heartening that the recent Budget 2024 specifically emphasizes about the PSP. Based on the initial experiences, Government support in terms of financing etc. and also in terms of statutory clearances, and Banking Sector looking at it as one of the strongest solutions for managing the transition, would go a long way in the overall exercise of shift from fossil fuel-based power systems to renewables.

(d) In several parts of the country, it has been found that Solar Power Plants and Wind Turbines can be located in same areas. The overall economics of the hybrid of Solar and Wind, both renewables not only work well, but Wind Power can also be a backup for Solar during nights and the system of supply through the Grid is better managed. This initiative also needs support from Government in terms of Regulatory and Environmental Clearances and a more positive dispensation by the Banking Sector. This arrangement might make a significant contribution toward the management of transition. The domestic manufacturing capability in the country has also improved with the success of Adani Group in developing 5.2 MW Wind Turbine. It would be necessary for the Government Agencies entrusted with the task of assessing Wind profile at appropriate heights in different areas to re-assess the overall Wind Power capacity potential of the country.

(e) Another exercise that may help is about retrofitting of the existing Wind Turbine Systems. The combined system of Solar and Wind (Hybrid) can have maximum advantage if the commercial arrangement of Power Purchase Agreement is structured appropriately enabling maximum potential to be tapped in an integrated manner. There appears to be some scope for re-visiting the present mechanism of commercial agreements.

(f) India's powerful entry into the renewable power capacity development space and overwhelming participation of both public and private sectors have not only emerged as strong foundation for renewable capacity expansion, but also it has led to domestic manufacturing gaining confidence and very effectively participating in this process. Manufacturing of Solar Modules and development of large Wind Turbines have raised the level of confidence for domestic manufacture to effectively and successfully support the renewable energy expansion plans of the country. Production Linked incentive in this regard has been very useful. This approach should not only continue, but should cover many more areas in which the industries of the country depend on large scale imports to substitute these imports with domestic production.

(g) Development of Transmission System to cope with renewable expansion is a real challenge as explained earlier. This is not only because of the complexity of managing the Grid when Solar Power is not available, but also because of relatively much shorter durations required for developing Solar Projects. It has been possible to address this at the present scale of Solar capacity addition. Scaling up the expansion which will be several times more than achieved so far would indeed pose a major challenge to develop commensurate Transmission capabilities. While development of the National Grid, associated Transmission and Sub Transmission Systems and Distribution Infrastructure to meet the requirement would necessarily entail commensurate planning and implementation, and will obviously pose

major challenges for the reasons mentioned above, some of the following steps could reduce the burden to some extent:

(i) Decentrailised Distributed Solar Systems on a large scale to cover rural electricity supply, more particularly rural agriculture would have a balancing effect on distributed load with consequential lesser burden on national level planning. Some of the States have already initiated the process of decentralized Solar Plants in rural areas. This approach with comprehensive planning needs to be adopted as a National level Policy, in consultation with the State Governments in order to bring it not only to a critical mass, but establish this approach as a strong option to tackle the problem of National and State level Transmission planning. In fact, this could also be considered as an initiative to be implemented extensively through private sector participation.

(ii) The Roof Top Solar in the entire country may have similar effect on partially reducing the Transmission planning burden if these are also linked in a manner of decentralised distributed generation and supply. In this context the existing Rural Electrification Policy of the Government of India, which was notified as a Statutory Policy under the Electricity Act 2003 provides for license free generation and distribution of power can be followed up with a comprehensive Guideline which could become a major rural electricity supply initiative and could go a long way in ensuring economically sustainable power supply in rural India and at the same time partially unburden the major task of Transmission planning in the context of what has been discussed in this paper.

These are some of the important issues which need long term planning and timely actions. This paper has covered the challenges relating to the supply side including Generation and Transmission. Managing transition would entail the issue of the distribution and supply of power to consumers. The financial burden of transition will ultimately fall on the distribution segment. In Indian context, even without the transition related financial burdens, distribution utilities, by and large are financially stressed. Therefore, the energy transition and its impact, at the final end of the chain, will need even more careful consideration. Distribution continues to be a regulated segment of power industry. Opening of this sector has been few and far between. This challenge will have to be dealt with more extensively. While this paper has analysed some of the important challenges and the required responses for addressing them.

Energy transition has thrown up major challenges, no doubt, but it has opened up possibilities and opportunities leading to the carbon free energy supply, enabling better preparedness for addressing the climate change concerns, and, above all, in the ultimate analysis a more economical energy access to people at large.

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From the Desk of the Honorary Secretary General

Dear Colleagues

Greetings!

I am pleased to share with you the JULY Issue of our monthly e-magazine TOTAL ENERGY. It covers the energy sectoral news and views and activities of the India Energy Forum.

During this month Hon'ble Finance Minister, Smt Nirmala Sitharaman presented the Union Budget for the year 2024-25 in the Parliament and Economic Survey was also tabled in the Parliament.

Economic Survey showed that Solar installed capacity increased by over 25 times between 2014 to 2023 though risks associated with such large-scale phase in of renewables in the overall energy mix remains.

It added that while phasing in renewables is imperative, in the short to medium term, the focus should also be on actively adopting clean coal technologies.

According to the Survey, the Government's initiatives for 'cleaner' coal, such as the Coal Gasification Mission, extraction of coal-bed methane gases, exploring coal-to-hydrogen, carbon capture and storage, and coal beneficiation through washeries, etc, to mitigate emissions and enhance environmental sustainability needs to be promoted.

A number of initiatives in related with Energy Securities were announced in Budget Speech in the Parliament. Some of them are given below:

- Initiatives with private sector in Nuclear Energy
  - Setting up Bharat Small Reactors
  - R&D of Bharat Small Modular Reactor and newer technologies for nuclear energy
- Energy Audit
  - Financial support for shifting of micro and small industries to cleaner forms of energy
  - Facilitate investment grade energy audit in 60 clusters, next phase expands to 100 clusters
- Pump Storage Policy
  - For electricity storage and facilitation of smooth integration of the growing share of renewable energy
- AUSC Thermal Power Plants
  - A joint venture between NTPC and BHEL will set up a full scale 800 MW commercial plant.
- PM Surya Ghar Muft Bijli Yojana
  - 1 crore Households obtain free electricity
  - Up to 300 Units every month
  - 1.28 crore Registrations and 14 lakh applications so far

In this month, India Energy Forum organized three programmes. First one was organized by Gas Vertical i.e. Webinar on "Future Outlook for LNG in India" on 13th July. The second webinar was organized by Coal Vertical on "Role of Coal Gasification in Energy Transition" on 26th July. A virtual Panel Discussion was also organized on World Bank Report on Empowering Utilities for Energy Transition". All the programmes were very informative and appreciated by the participants.

With best wishes

K S Popli

India to be 'engine of green energy growth': MNRE Minister Pralhad Joshi

India will be the engine of green energy growth for the world as the the country is expected to have an installed electrolyser manufacturing capacity of up to 100 GW by 2030, Union Minister Pralhad Joshi said recently. The Minister for New and Renewable Energy made the remarks while inaugurating an electrolyser manufacturing facility of a private company at Doddaballapur, in Karnataka.

"India has the potential to be the driver of growth for green energy in the world. The demand for green hydrogen shall fuel demand for electrolysers in India. By 2030, it is likely India shall have installed electrolyser capacity of 60 GW-100 GW," he added.

His comments assume significance as the government has set up a target to have 5 million metric tonne (MMT) of installed green hydrogen mission capacity.

Electrolysers are a key component used in the manufacturing of green hydrogen.

The green hydrogen holds the key to decarbonising sectors like transportation, steel manufacturing, and even heavy industry, Joshi said adding the clean energy can power vehicles, fuel factories, and illuminate homes, all without leaving a harmful carbon footprint.

Speaking on the overall renewable energy sector, he said "India has achieved many milestones in this area. Under the Prime Minister's leadership. The renewable energy capacity has increased over 2.5 times from 76 GW in 2014 to more than 195 GW till June 2024."

The solar power capacity witnessed a steep jump from just 3 GW in 2014 to more than 85 GW now while wind power capacity increased from 21 GW to more than 46 GW in this decade, the Minister added

Renewable energy push: 151 GW projects underway, 76.42 GW to be operational in 3-4 years, says Joshi

Nearly 151 GW of renewable power projects are currently being implemented, with 76.42 GW set to be operationalized in the next 3-4 years, Union minister of new and renewable energy Pralhad Joshi said.

Speaking at the Mercom India Renewables Summit 2024, Joshi emphasized the government's focus on boosting renewable energy, reflected in various initiatives and Budget 2024 announcements.

Joshi highlighted key initiatives, including prioritizing energy storage, providing free electricity to 10 million households under the PM Surya Ghar: Muft Bijli Yojana, and developing a policy for pumped hydro storage to enhance renewable energy integration.

The renewable energy capacity in the country has increased over 2.5 times from 76 GW in 2014 to more than 195 GW by June 2024. Solar power capacity jumped from 3 GW in 2014 to over 85 GW, while wind power capacity increased from 21 GW to over 46 GW this decade.

"The recent Union Budget demonstrates our unwavering support for the renewable energy sector, with allocations nearly doubling from last year," Joshi said at the workshop on "Unlocking Value from Carbon Markets: Accelerating Green Hydrogen and Clean Energy" in New Delhi. He stressed the government's commitment to renewable energy and the significant increase in budget allocations.

India has a renewable energy potential of 2,109 GW from solar, wind, hydro, and biomass sources. "We are committed to achieving a significant shift towards cleaner alternatives," Joshi added.

The government aims to reach a renewable energy capacity of 500 GW by 2030, indicating a strong commitment to transitioning towards sustainable energy sources and reducing carbon emissions.

India's renewable energy capacity surges to 195 GW, focus on green hydrogen

India’s renewable energy capacity has surged to 195 GW, up from 76 GW in 2014, Union Minister of Consumer Affairs, Food and Public Distribution & New and Renewable Energy Pralhad Joshi said. Speaking at the inauguration of Ohmium’s electrolyser manufacturing facility in Doddaballapur, Karnataka, Joshi emphasized the potential for India to drive global green energy growth.

"The MNRE is relentlessly working towards the vision of achieving Green Energy goals," Joshi said. He highlighted that solar power capacity has increased from 3 GW in 2014 to over 85 GW, while wind power capacity has grown from 21 GW to over 46 GW in the last decade. The new electrolyser facility is set to deliver 2GW of fully assembled and tested systems, contributing to these efforts.

Joshi noted that modern facilities like Ohmium’s would enhance India’s energy security by producing green hydrogen, reducing reliance on fossil fuels, and integrating solar and wind energy. "Domestic electrolyzer manufacturing will ensure a steady supply, reducing import dependence and enhancing energy independence," he said.

He linked these developments to the National Green Hydrogen Mission, which aims to position India as a global hub for hydrogen production, export, and usage. "The potential of green hydrogen is limitless. It can decarbonize sectors like transportation, steel manufacturing, and heavy industry," Joshi added.

Joshi also highlighted government incentives, including waivers on ISTS charges for green hydrogen production plants until 2030. He projected that India could have an installed electrolyser capacity of 60GW-100GW by 2030. "The government is committed to encouraging this sector to meet domestic demand and become a reliable global supplier," he said.

The minister pointed out that under the SIGHT (Strategic Interventions for Green Hydrogen Transition) programme, tenders for 4.12 lakh tonne per annum have been awarded to 10 companies. He stressed the importance of speed and scale in achieving India’s renewable energy goals.

The event was attended by Karnataka’s Minister of Large & Medium Industries & Infrastructure Development M.B. Patil, KREDL Chairman & MLA Sringeri, T.D. Rajegowda, and MLA Doddaballapur, Dheeraj Muniraj.

Power surge: Renewable capacity hits 195,013 MW, transmission network grows by 195,181 Ckm

India’s renewable energy sector has seen a significant jump with its capacity escalating from 75,519 MW in March 2014 to 195,013 MW by June 2024, said minister of state for power Shripad Naik in a written reply in the Rajya Sabha. In parallel, the total installed power capacity has surged from 248,554 MW to 446,190 MW in the same period. The coal power sector also marked a substantial rise in capacity from 139,663 MW to 210,969 MW.

The nation has strengthened its power infrastructure by adding 195,181 circuit kilometers (ckm) of transmission lines, 730,794 MVA of transformation capacity, and 82,790 MW of inter-regional capacity. This expansion connects the entire country into a single grid operating at one frequency, capable of transferring 118,740 MW from one corner of the nation to another. This unification has transformed India into one of the world's largest unified grids and a single integrated power market, enabling distribution companies to buy power at the most competitive rates, thereby facilitating lower electricity tariffs for consumers.

Looking ahead, India is committed to significantly increasing its non-fossil fuel-based power generation capacity to over 500,000 MW by 2031-32. The implementation of this ambitious goal involves a phased transmission plan that aligns with renewable energy capacity additions.

In a move to boost sector viability, the government has managed to reduce aggregate technical and commercial (AT&C) losses from 22.62% in 2013-14 to 15.40% in 2022-23. Measures have also been implemented to ensure timely payments to generation companies, reducing legacy dues from Rs. 1,39,947 crore to Rs. 35,119 crore, and keeping subsidy payments to distribution companies up to date.

Significant progress has been made in rural electrification under the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), Integrated Power Development Scheme (IPDS), and the Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA). These schemes have collectively electrified 18,374 villages and connected 2.86 crore households to electricity. Additionally, 2,927 new substations and 3,965 existing substations have been upgraded, with a substantial addition of 8.5 lakh circuit kilometers of high tension and low tension lines. As a result, power availability in rural areas has improved from 12.5 hours in 2015 to 21.9 hours in 2024, while urban areas now enjoy 23.4 hours of power supply.

Solar installed capacity increased by over 25 times between 2014 to 2023

India's solar power installed capacity has increased 'drastically' by over 25 times between 2014 to 2023, though risks associated with such large-scale phase in of renewables in the overall energy mix remains, noted the Economic Survey 2023-24, tabled in Parliament by Finance Minister Nirmala Sitharaman recently.

It added that while phasing in renewables is imperative, in the short to medium term, the focus should also be on actively adopting clean coal technologies.

According to the Survey, the Government's initiatives for 'cleaner' coal, such as the Coal Gasification Mission, extraction of coal-bed methane gases, exploring coal-to-hydrogen, carbon capture and storage, and coal beneficiation through washeries, etc, to mitigate emissions and enhance environmental sustainability needs to be promoted.

It said that with the advent of ultra super-critical technologies for coal power plants, it would be possible to lower emissions and achieve higher efficiency. "Several risks are associated with the large-scale phasing-in of renewables, such as intermittency, grid integration, backup power generation, storage, etc. It is important to supplement with other non-fossil fuel sources such as nuclear, biofuels, and hydrogen," it said. India needs to target diversified energy sources, including renewables, green hydrogen, nuclear, and biofuels. Such diversification will help minimise risks associated with energy systems while pursuing low-emission pathways in line with national commitments, added the Survey.

"India's high dependency on imports mainly for petroleum for its energy needs, shifts to high import dependency for Solar PV panels and critical minerals, whose supply chain and geopolitics may be even trickier," it said.

The diversification also includes a significant role for thermal power in providing the base load to support large-scale deployment of renewables.

MNRE issues guidelines for incentivising DISCOMs under PM Surya Ghar Muft Bijli Yojana

नवीन एवं नवीकरणीय ऊर्जा मंत्रालय
MINISTRY OF NEW AND RENEWABLE ENERGY
सत्यमेव जयते

The Ministry of New and Renewable Energy (MNRE) has issued guidelines for incentivising power distribution companies (DISCOMs) for the installation of rooftop solar projects under PM-Surya Ghar: Muft Bijli Yojana in the areas serviced by them. "Under the scheme, the DISCOMs shall be required to put in place several facilitative measures for promotion of rooftop solar in their respective areas such as availability of net meters, timely inspection and commissioning of installations, vendor registration and management, interdepartmental

convergence for solarizing government building etc. It is also expected that rooftop solar installations shall be undertaken by the commercial and industrial segments under the DISCOM areas," said the MNRE in its guidelines.

"In order to enable DISCOMs to undertake these tasks more effectively and to create a greater motivation within DISCOMs as SIAs for the scheme, the PM Surya Ghar: Muft Bijli Yojana has a provision to incentivize DISCOMs," said the MNRE.

PM Surya Ghar: DISCOMs incentives component will have outlay of Rs 4,950 crore

DISCOMs or power departments will serve as the State Implementation Agency (SIA) at the state/UT-level. The total financial outlay for the 'Incentives to DISCOMs' component is Rs 4,950 crore, said the MNRE. The ministry was implementing the Grid-Connected Rooftop Solar (GCRT) Phase II Programme under which incentives to DISCOMs were provided under Component B. After the approval of PM Surya Ghar: Muft Bijli Yojana, the Phase II programme has been subsumed under the new scheme. This scheme component will operate in continuation of the Component B of GCRT Phase II programme.

"The Incentives to DISCOMs shall provide resources to the DISCOMs to participate in IEC and branding activities, create conducive regulatory and administrative mechanisms to ensure adherence to timelines for approvals (feasibility, commissioning, inspection, grievance redressal etc.), achieve targets for implementation, ensuring timely availability of net meters, saturation of RTS on government buildings, utilisation of incentive for RTS-dedicated activities, incentivising field-level staff through recognition and rewards and other measures that are to be undertaken by the State DISCOMs or other agencies for RTS deployment," said the MNRE.

Budget 2024-25: India introduces duty on solar glass imports, exempts equipment for solar cell and module manufacturing

Finance minister Nirmala Sitharaman presented the Union Budget 2024-25 in the Lok Sabha today. For the renewable energy sector, especially solar, the budget gives a fillip to manufacturing by announcing exemption on basic customs duty (BCD) for specified machinery/equipment used in the manufacture of solar cells and modules. These machines earlier attracted a 7.5% customs duty. Duty exemption on this equipment will lower the costs for solar cell and module manufacturers.

Import duty (BCD) exemption has been extended for specified goods used in the manufacture of silicon wafers, specified material for manufacture of EVA (ethylene vinyl acetate) sheets, and flat copper wire for use in the manufacture of photovoltaic ribbon. These are now exempted from BCD up to March 31, 2026. Further, the scope of materials which can be imported is being expanded.

On the other hand, solar glass for manufacture of solar cells or solar modules will attract 10% customs duty from Oct. 1 this year. Tinned copper interconnect for manufacture of solar cells or solar modules will also attract 5% customs duty from Oct. 1.
"In view of sufficient domestic manufacturing capacity of solar glass and tinned copper interconnect, I propose not to extend the exemption of customs duties provided to them," said the finance minister in her budget speech.

Customs duty exemption on active energy controller (AEC) for use in manufacture of renewable power system inverters will also lapse from September 30.

To boost battery manufacturing, BCD exemption for parts and raw material for use in the manufacture of lithium-ion cells is being extended up to March 31, 2026. Specified parts and components for use in Lithium-ion battery and battery pack production are also exempted from BCD up to March 31, 2026. Lithium, copper, and cobalt have been exempted from customs duty.

On the solar installation front, the finance minister announced an INR 6,250 crore allocation for residential rooftop solar scheme PM Suryaghar Muft Bijli Yojana in 2024-25. “In line with the announcement in the interim budget, PM Surya Ghar Muft Bijli Yojana has been launched to install rooftop solar plants to enable 1 crore households obtain free electricity up to 300 units every month. The scheme has generated remarkable response with more than 1.28 crore registrations and 14 lakh applications, and we will further encourage it,” said the minister.

The minister stated that a policy for promoting pumped storage projects will be brought out for electricity storage and facilitating smooth integration of the growing share of renewable energy with its variable and intermittent nature in the overall energy mix.

Further, a roadmap for moving the ‘hard to abate’ industries from ‘energy efficiency’ targets to ‘emission targets’ will be formulated. Appropriate regulations for transition of these industries from the current ‘perform, achieve and trade’ mode to ‘Indian carbon market’ mode will be put in place.

The minister said, the government will partner with the private sector for setting up Bharat Small Reactors, research & development of Bharat Small Modular Reactor, and research and development of newer technologies for nuclear energy. The R&D funding announced in the interim budget will be made available for this sector.

She said, “we will develop a taxonomy for climate finance for enhancing the availability of capital for climate adaptation and mitigation. This will support achievement of the country’s climate commitments and green transition.”

‘Boost for green energy’: Govt enhances financial aid for biomass pellet manufacturing

In a significant move to promote cleaner energy alternatives and tackle air quality issues, the ministry of new and renewable energy has revised the funding for biomass pellet manufacturing plants. The enhanced financial incentives, effective from July 16, 2024, aim to boost the utilization of the country's substantial biomass resources, which amount to an annual production of 750 million metric tonne (MMT), with 228 MMT available as surplus

Under the revised terms of the Central Financial Assistance (CFA) scheme, part of the National Bioenergy Programme (NBP) running from FY 2021-22 to 2025-26, the support for non-torrefied pellet manufacturing plants have been set at ₹21.0 lakhs per metric tonne per hour (MTPH) with a cap of ₹105 lakhs per project. For torrefied pellet manufacturing plants, the financial aid is even more substantial, at ₹42.0 lakhs/MTPH, with a maximum of ₹210 lakhs per project or 30% of the capital cost for plant and machinery of a 1 MTPH plant, whichever is lower.

This strategic funding revision is designed to accelerate the adoption of biomass pellets, particularly in states like Punjab, Haryana, and Uttar Pradesh, where the burning of paddy straw and other agricultural residues has been a persistent environmental challenge. By converting these residues into biomass pellets, the initiative aims to significantly reduce the incidents of stubble burning, thereby improving air quality in these regions.

"The revision of CFA will enhance the utilization of Biomass in the country and contribute to Air Quality Management by avoiding stubble burning," stated the ministry, highlighting the dual benefits of this initiative in terms of energy generation and environmental conservation.

Green power surge': Budget allocates ₹1.39 lakh crore to renewable and power sector

In a significant move to bolster India’s green transition, the fiscal 2025 budget has ramped up allocations for renewable energy and power sectors, injecting over ₹1.39 lakh crore into these critical areas. The ministry of new and renewable energy (MNRE) and the ministry of power (MoP) received ₹0.52 lakh crore and ₹0.87 lakh crore respectively, signaling the government's intent to strengthen the energy infrastructure amid rising environmental and economic demands.

According to the latest CRISIL M&A report, the budget has notably increased funding for key schemes under the MNRE by 25 per cent from the interim budget. This increase is largely attributed to a 16 per cent rise in allocation to the Indian Renewable Energy Development Agency (IREDA) and the allocation of ₹6,250 crore to the Pradhan Mantri Surya Ghar Muft Bijli Yojana for FY 2025.

Further boosting the renewable sector, the government announced the removal of basic customs duty on critical minerals like lithium and cobalt, which previously stood at 5 per cent.
\This funding is expected to aid the addition of 1 GW to India's battery storage capacity, aiming for a substantial increase to 27-29 GW by 2030.

The exemption of basic customs duty for capital goods used in the manufacture of photovoltaic cells and panels continues, alongside the removal of the duty exemption for solar glass to push forward domestic production. These measures are expected to catalyze the setting up of 48 GW of cell and module capacity, significantly reducing solar module import dependency from 50 per cent in fiscal 2024 to 7-10 per cent by fiscal 2027.

On the conventional energy front, the government has earmarked ₹21,400 crore for setting up several power projects including a new 2,400 MW power plant at Pirpainti. Additionally, financial support will be provided for an 800 MW commercial coal power plant that employs Advanced Ultra Super Critical (AUSC) technology, anticipated to enhance the efficiency of the coal fleet.

Despite the emphasis on clean energy, the allocation for coal projects underscores the necessity to balance immediate power supply needs with long-term sustainability goals. "The focus on coal additions, despite being at odds with India's clean commitments, is necessary to manage power system requirements where coal is expected to form 50 per cent of electricity generation by fiscal 2030," the CRISIL report highlights.

Furthermore, a provision of ₹1.5 lakh crore for long-term interest-free loans has been announced to support states in their resource allocation efforts, enhancing their capability to finance and sustain power infrastructure projects.

Rs 6,250 cr allocated to PM Suryaghar Muft Bijli Yojana

The 2024-25 Budget provided for a budgetary allocation of Rs 6,250 crore to PM Suryaghar Muft Bijli Yojana in FY2025 BE, according to the Expenditure Budget document for 2024-25

"The scheme PM Suryaghar Muft Bijli Yojana has been launched by the government. The existing solar power grid scheme is proposed to be subsumed under this scheme along with the remaining financial outlay and liabilities. An amount of Rs 6,250 crore is allotted in this scheme for BE 2024-2025," the document noted.

It added that this Provision includes a sum of Rs 2,000 crore, sanctioned as advance from Contingency Fund of India, which will stand recouped to Contingency Fund of India after Demands for Grants for 2024-2025 is passed by Parliament and the connected Appropriation Act is assented to by the President of India.

The Budget 2024 this year focussed on boosting India's green growth, announcing a bouquet of schemes and incentives to facilitate faster energy transition, Finance Minister Nirmala Sitharaman in her speech did focus on rooftop solarisation to ensure free electricity to households.

"In line with the announcement in the Interim Budget, PM Suryaghar Muft Bijli Yojana has been launched to install rooftop solar plants to enable one crore households to obtain free electricity up to 300 units every month," she said in her speech in Parliament recently.

She added that the scheme has generated remarkable response with more than 1.28 crore registrations and 14 lakh applications, and we will further encourage it.

Analysis of Budget 2024 on Renewable Energy

As India stands at the crucible of development and stakes a claim for global leadership, it is imperative for it to focus on infrastructure development in this era. Finance Minister Ms. Nirmala Sitharaman, cognizant of this fact, presented the Union Budget 2024-25 ("Budget") evidently showing that India is poised to expand its infrastructure and green energy sector and harness the resulting capital expenditure for the growth and prosperity of the nation.

The Budget focused on specific infrastructure centric areas such as manufacturing and services, energy security, infrastructure, innovation, research and development as well as the promisingly titled next generation reforms. The Union Government taking into account the multiplier effect of investments in these sectors stated that it would provide concentrated attention and incentives for these areas in the current as well as for the forthcoming financial years.

This article provides an in-depth analysis of the announcements made in the Budget for these priority areas and analyses their potential impact on the Indian green model of development for the coming years.

Infrastructure: Lever of growth and development

The Budget has continued the momentum of the Interim Budget presented in February this year and allocated a corpus of INR 11,11,111 crore equivalent to 3.4% of GDP for infrastructure development. It has provided for long term interest free loans for an additional sum of Rupees One Lakh Crore for state governments to develop local infrastructure projects. The Economic Survey for 2024-25 ("Economic Survey") had underscored the need for higher resource allocation for infrastructure sector investment stating that a higher level of private sector financing and resource mobilisation from new sources is urgently required by the sector. The Budget thus was conscious of the need for viability gap funding for private investments, along with a promise for bringing enabling policies and regulations in the infrastructure sector.

As India grows in population its urban areas will sprawl further, it is expected that 40% of the Indian population would be living in urban cities by 2036, thus the urban infrastructure has a critical need to be made future ready. The Budget has identified cities as growth hubs for development. It aims for development in 14 large cities across the country along with provision of appropriate financing facilities. Water supply, sewage treatment and solid waste management shall also be developed in 100 large cities across India. To provide for industrial development of the nation, the Budget has made a provision for development of 12 industrial parks under the National Industrial Corridor along with plug and play development of industrial parks in 100 cities across the country.

The Union Government has realised the importance of infrastructure development particularly as a lever of progress and growth of economy. It has aimed to resolve the longstanding issue of land identification by providing for an array of policies and programmes. The Budget provides for assignment of Unique Land Parcel Identification Number (ULPIN) or Bhu-Aadhar for all rural lands. It aims for digitisation of cadastral maps, survey of map divisions as per current ownership, establishment of land registry and linking it with farmers registry. Along with it the Union Government is aiming for digitisation of urban lands by GIS mapping with an IT based system for record administration. This will help in augmenting credit flow for growth of agriculture and improve local governance, record keeping and facilitate ease of doing business.

With the increasing urban migration the gulf between villages and cities is widening. The Union Government plans to narrow this gap and bring villages closer to cities by boosting rural road connectivity. It has thus identified 25000 rural areas where road connectivity would be improved under the fourth phase of Pradhan Mantri Gram Sadak Yojana.

Renewable Energy and India's Goal of Energy Independence

A country grows on the back of infrastructure, but it is powered by energy. In the modern age where nations strive to become net-zero economies,

reliance on green energy for the growth of a nation is particularly important. India has pledged to add 500 GW of renewable energy capacity by 2030 as per the Nationally Determined Contribution under the Paris Agreement of the UNFCCC. The Union Government is thus steadily progressing on its path of expansion of renewable energy. With flagship schemes like PM Surya Ghar Muft Bijli Yojana currently being implemented on a wide scale, solar installed capacity particularly through rooftop solar power plants is set to witness an unprecedented growth. The Budget also aims to shift micro and small industries to cleaner forms of energy thus increasing the demand base of renewables in the country.

However, despite concentrated policies by Union and state governments, India's current installed capacity of renewable energy stands at 170 GW with plenty of room to grow. The Economic Survey also warned that India's focus on renewable energy sources on a large scale is beset with its own set of unique challenges, the principal of which being reliance on imported goods and the intermittent nature of renewable energy. The Budget therefore aims to reduce dependency on China for rare earth minerals which are essential for manufacturing of renewable energy components. Under the Critical Mineral Mission, the Union Government plans to allocate funds for the production, recycling and overseas acquisition of rare earth assets. The Central Government also plans to augment technology, training and provide for a financing mechanism to private entities involved in extracting and utilizing these rare earth minerals. The Budget has also exempted twenty-five critical minerals from basic custom duty and reduced rates on elements like Graphite, Silicon Quartz and Silicon Dioxide to aid local manufacture of key raw materials in the electronic vehicles and renewable industries.

To overcome the intermittent nature of renewable energy and help in the transition of the nation to netzero, augmentation of renewable energy with other clean sources of round the clock sources of energy will need to be explored. The Union government is therefore exploring pumped energy storage systems as well as exploring research programmes for the small modular nuclear reactors with Bharat Small Reactors.

Hits and Misses- A vision for 2030

As India plans to have fifty percent of its installed capacity from renewable energy by 2030, the sector was envisaging a more concentrated package of incentives. The Budget was ominously silent on extension of the ISTS waiver which expires in June 2025 and there was no relief in tariff charges to boost the growth of the sector. The Budget also did not ruminate on the plight of DISCOMS under the new shift to decentralized renewable energy generation. A long-term solution to cleaning up finances of ailing DISCOMS is urgently needed to secure the backbone of power distribution.

Additionally, industry experts in the biogas sector were also disappointed as the Budget failed to live up to the momentum built for the sector in the Interim Budget. The industry was expecting a dedicated financing and research package for the expansion of the biogas sector, similar to the current SIGHT scheme for green hydrogen, however their demands seemed to have fallen on deaf ears.

However, keeping the criticisms aside, the flurry of reforms in the infrastructure sector ranging from the construction of large-scale road networks to exploring small nuclear energy reactors, has given proof that the Union Government is keen to use infrastructure as a catalyst of development. With novel ideas and policies all across the spectrum, India is surely set to witness a historic rise in economic activity over the coming years. Let us hope that the nation succeeds in building on the momentum and beckons the next five years with the intent and promise of a global superpower.

Govt extends electric mobility scheme by 2 months with additional ₹278 cr outlay

The Union ministry of heavy industries (MHI) recently announced the extension of the electric mobility promotion scheme 2024 (EMPS 2024) by two months till 30 September 30.

Initially set to conclude on 31 July, the scheme's extension is accompanied by an increased financial outlay from ₹500 crore to ₹778 crore.

Launched on March 13 as a stop-gap arrangement ahead of the end of FAME-II, which drew to a close

on 31 March, EMPS provides incentives for electric two-wheelers and electric three-wheelers, including registered e-rickshaws, e-carts, and L5 category vehicles. These incentives are designed to promote affordable and eco-friendly public transportation options, primarily targeting commercially registered e-2Ws and e-3Ws, the MHI said recently. Additionally, privately or company-owned registered e-2Ws are also eligible for the benefits.

On 23 July, the ministry had stated that the EMPS, a demand-incentive scheme meant to act as a bridge between the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) II and the upcoming FAME III scheme, had limited funds. The government clarified that subsidy claims would only be entertained until the scheme's ₹500-crore outlay was exhausted or until the scheme's end on 31 July.

With the original outlay of ₹500 crore, EMPS 2024 offered incentives for up to 333,387 e-2Ws and 40,828 e-3Ws. Recently, companies had raised claims totaling ₹54.42 crore for 41,557 vehicles, according to the government's EMPS dashboard. This indicated a significant runway was left for claims to be made over the next two to four weeks, by which time the new iteration of the FAME III scheme was expected to be introduced.

However, the MHI has now decided to extend the scheme by two months, indicating that the new FAME III will not come into effect before 30 September. The extension and enhanced outlay ensure continued support for EV adoption in the interim period.

The component-wise allocation of the enhanced outlay includes ₹769.65 crore for subsidies and demand incentives for e-2Ws and e-3Ws, and ₹8.35 crore for the administration of the scheme, including information, education and communication (IEC) activities and project management agency fees. The revised target under the scheme now supports 560,789 EVs, comprising 500,080 e-2Ws and 60,709 e-3Ws, including 13,590 e-rickshaws and e-carts, and 47,119 L5 category e-3Ws. To qualify for incentives, EVs must be equipped with advanced batteries, ensuring the promotion of cutting-edge technologies within the sector.

Climate Change: Need to move away from 'excessive preoccupation' with meeting global temperature target, says Economic Survey

Mamking a strong departure from the global narrative on climate change, India recently said risking economic welfare of the people in developing countries for keeping global temperatures within some threshold was a "flawed" way of dealing with the problem.

Articulating a radically new argument on climate change in the Economic Survey presented in Parliament recently, the government suggested that nearer-term policies to improve the lives of the people were the best insurance against climate change, and the world needed to move away from its "excessive preoccupation" with meeting a single global temperature target, like the 1.5 or 2 degree Celsius thresholds.

The Economic Survey, which contained two chapters on climate change for the first time, lamented the fact that development goals had been "downgraded" and reduction of global emissions had been elevated "to the pinnacle of all economic policies".

The 2015 Paris Agreement asks countries to make efforts to ensure that the rise in global average annual temperature is contained within 2 degree Celsius from the pre-industrial times (average of 1850-1900 period), preferably within 1.5 degree Celsius itself. Every country has to prepare, and implement, an action plan that contributes towards meeting this target.

The Economic Survey twice quoted Mike Hulme, a professor of Geography at the University of Cambridge, to make the argument that this was not the best course.
"…global temperature is a seriously flawed index for capturing the full range of complex relationships between climate and human welfare and ecological integrity," Hulme wrote in his 2023 book Climate Change isn't Everything: Liberating Climate Politics from Alarmism.

In the same book he also wrote: "It is quite easy to imagine future worlds in which global temperature exceeds 2 degrees Celsius, which is 'better' for

human well-being, political stability and ecological integrity, for example, than other worlds in which – by all means and at all costs – global temperature was stabilised at 1.5 degrees Celsius."

The Economic Survey used these remarks to make the point that the current approach of tackling climate change, wherein all the efforts are directed to meeting a global temperature goal, might be counterproductive.

Hulme is a contrarian, but not a denialist, and has experience of researching on climate change. He has contributed to the assessment reports of the Intergovernmental Panel on Climate Change (IPCC) and was the founding director of Tyndall Centre for Climate Change Research, a reputed institution in the UK. He has also taught at King's College London. He has been critical of the "obsession" with net-zero targets, calling it "unfair" to the world's poor, and has argued that the world's climate "cannot simply be put back to some pre-disturbance condition".

The Economic Survey said that the kind of demands being put on the developing countries, particularly with regard to transitioning away from fossil fuels, had a cost that was "too much for most nations".

"It is morally wrong to tell developing countries to abandon their aspirations for better living standards so that developed countries can maintain their ways of living in cleaner environments and cooler climates," it said.

The Economic Survey argued that a more sustainable solution to the climate problem lay not in replacing one form of energy fuel with another, but in avoiding overconsumption and wastage and making lifestyle changes. Pointing out that the solutions being offered had their own set of problems, India gave the example of critical minerals required for batteries. These minerals were being mined in the most underdeveloped parts of the world, utilising the labour of poor people in very dangerous conditions.

"The current climate change strategy seems to say that given that our energy needs will continue to rise, we must try replacing conventional fuel with renewables and clean energy — thus making it a substitution issue rather than a global lifestyle issue. This replacement must be done only in the way we know — through swapping of one preferred industry to another, through the creation of new transportation and supply lines in place of existing ones, penalising the low-emitters with disproportionately higher payments. What this strategy doesn't do is attack the root of the problem – overconsumption, which is starker amongst developed countries," the survey said.

"Moreover, do each of us really need multiple screens, even if they are charged by renewable energy sources, or must everyone fly off to fancy destinations in fancy planes for a great conversation on reducing climate impact, or that we must eat for taste what we shouldn't eat for health or environment… instead of imbibing sustainable practices in the way we live, we worry more about carrying PETA labels on our bags," it said.

India also called out the uniform and prescriptive nature of climate change strategies without taking into account the geographical, economic and climatic differences of countries.

"Without cross-learning, many natural ideas relevant to sustainable development, such as consumption patterns, lifestyles, plant vs meat-based diet, etc., are not factored in… Beef production has the highest emissions per kilogram of food product… Despite this, there is not even a call for change, let alone a mandate (for reduction)," it said.

India argued that the scale of energy transitions that the countries were being asked to make for meeting the temperature target had never happened in history in the short period that was envisioned.

India said the world needed a more "balanced" approach to the problem of climate change. "It should also focus on nearer-term policy goals of improving human welfare rather than excessively preoccupied with one large, longer-term goal of global climate management… When we assess the best course of action going forward, we must compare alternative systems and weigh the benefits of avoiding climate change against the costs of transitioning to alternative energy and agricultural systems over time," it said.

Coal likely to remain backbone of country's energy system for next two decades: Eco Survey

Coal is expected to continue to be the backbone of the Indian energy system for the next two decades and the phase-down of the dry fuel will be heavily dependent on the import of critical minerals required for clean energy and battery storage, the Economic Survey said. The carbon dioxide removal technologies and carbon capture utilisation and storage need to be explored to bring down the emissions from the use of coal, as per the Economic Survey 2023-24 which was tabled in Parliament. "Coal phase-down will be heavily dependent on the import of critical minerals required for renewable energy and battery storage unless the country invests in the development of technologies based on domestically available mineral resources and those that enable the reuse, recovery, and recycling of critical minerals," it explained.

It further said the adoption of gasification technology in India can transform the coal sector and bring down the dependence on import of natural gas, methanol, and ammonia, and will help lower emissions.

Coal, which accounts for 70 per cent of the total electricity generation, is also a critical input in various industries, such as steel, sponge iron, cement, and paper.

"Adopting gasification technology in India can revolutionise the coal sector, reducing reliance on imports of natural gas, methanol, ammonia, and other essential products while reducing emissions," the Economic Survey 2023-24 said.

The Centre has launched several clean coal initiatives, including the coal gasification mission. The country is aiming to gasify 100 million tonnes of coal by 2030 through surface coal, lignite gasification projects.

Initiatives such as extracting coal bed methane gases, exploring coal to hydrogen, carbon capture and storage, and coal beneficiation through washeries can reduce emissions and enhance environmental sustainability.

"Encouragement to adopt super-critical and ultra-super-critical technologies for coal power plants has also led to lower emissions and higher efficiency," it said. Coal accounts for more than 55 per cent of India's primary commercial energy.

Coal-fired power generation accounts for about 70 per cent of the total power generation.

India targets 100 million tonnes of coal gasification by 2030

In an ambitious move toward cleaner energy solutions, India has set a target to gasify 100 million tonnes of coal by 2030. This initiative is part of the country's broader strategy to enhance energy independence and maximize the utility of its abundant coal reserves, estimated at 378 billion tonnes, with about 199 billion tonnes classified as 'proven'. As outlined by the ministry of coal, this effort aligns with Prime Minister Narendra Modi's vision for an energy-independent India by 2027.

Currently, coal is a cornerstone of India's energy sector, with approximately 80% of it being utilized in thermal power plants. However, the introduction of the Coal Gasification Mission in 2020 marked a significant pivot towards employing cleaner technology to harness this resource. Coal gasification converts coal into synthesis gas or 'syngas', a mixture primarily consisting of carbon monoxide and hydrogen, through a thermo-chemical process. This shift not only promises a cleaner way to use coal but also reduces India's heavy reliance on imported commodities such as oil, methanol, and ammonia.

The push for coal gasification is expected to decrease the import of oil, which currently stands at 83%, and significantly cut down on the 90% methanol and 13-15% ammonia that the country imports. These changes are anticipated to conserve foreign exchange and foster partial import substitution in the oil, gas, fertilizer, and petrochemical sectors.

In a significant development on January 24, 2024, the Cabinet Committee on Economic Affairs

approved equity investments by Coal India Limited (CIL) to form joint venture companies with heavyweights like BHEL and GAIL, allowing them to exceed the 30% equity limit. This move is designed to demonstrate the financial and technical viability of gasification projects, stimulate markets for downstream products, and establish new economic value chains.

To further bolster the coal gasification initiative, the ministry of coal has introduced incentives including a 50% rebate in revenue share in commercial auction policies for gasification coal, created a new sub-sector for syngas production, and provided long-term coal allotments to gasification plants. Financially, the scheme is backed by an outlay of ₹8,500 crores, distributed across three categories, aiming to support both public and private ventures into this innovative area.

Significant ongoing projects include the CIL-BHEL JV in Lakhanpur, Odisha, focused on producing ammonium nitrate, and the CIL-GAIL JV in Sonepur Bazari, West Bengal, which targets the production of synthetic natural gas. These projects, along with others like the NLCIL's Lignite to Methanol Project and the WCL's Coal-to-Ammonium Nitrate Project, illustrate the diverse applications of coal beyond traditional uses.

Furthermore, the Ministry has launched India's first pilot project for Underground Coal Gasification (UCG) at Kasta coal block in Jharkhand, setting the stage for innovative extraction techniques that could redefine coal usage in India.

The ministry of coal has opened applications for more Coal/Lignite gasification projects, inviting participation from Government PSUs and private sector entities. The deadline for bid submission is set for November 11, 2024, promising a competitive and dynamic exploration of coal gasification's potential.

This initiative is not just a step towards modernizing India's coal industry but is also a significant leap toward sustainable and self-reliant energy solutions. With enthusiastic responses from various sectors and substantial government support, coal gasification is poised to transform India's energy landscape, create numerous job opportunities, and stimulate robust economic growth. The commitment to this clean coal technology underscores the government's dedication to embracing environmentally sustainable practices while capitalizing on the country's extensive coal reserves.

Coal Production Target set Over One Thousand Million Tonnes in FY25

The government has set a coal production target of over one thousand million tonnes in 2024-25. Union Coal Ministry said, that as of 19th July, the coal production has reached over 294 million tonnes, reflecting a robust growth rate of around 11 percent compared to the same period last year.

The target underscores the Ministry's commitment to meet the energy demands of various sectors while maintaining a focus on sustainable economic development. The Ministry said, government is committed to ensure an adequate supply of coal at notified prices for the Power and Fertilizer sectors.

Additionally, the Ministry of Coal, in coordination with the Ministry of Railways, Ministry of Power, and other relevant departments, is committed to ensuring an adequate supply of coal at notified prices for the Power and fertilizer sectors. This initiative also extends to non-regulated sectors, including Steel, Cement, Paper, and Sponge Iron, which are vital for the country's economic growth.

For the fiscal year 2024-25, the Ministry has set an ambitious coal production target of 1,080 MT. As of 19.07.24, coal production has reached 294.20 MT, reflecting a robust growth rate of 10.70% compared to the same period last year, which was 265.77 MT. This positive trend underscores the Ministry's commitment to meeting the energy demands of various sectors while maintaining a focus on sustainable economic development.

In terms of coal dispatch, as of 19.07.24, the Ministry has successfully dispatched 311.48 MT of coal, achieving a growth of 8.49% over the previous year, which was 287.12 MT.

This increase in dispatch not only supports the operational needs of key industries but also contributes to the overall stability of the energy market, according to the official sources.

Advancing 119 projects with sanctioned capital of Rs 1.33 lakh cr to boost output: Coal India

CIL is advancing 119 projects with a capacity of 896 million tonne per year and a sanctioned capital of Rs 1,33,576 crore, the world's largest miner said. These projects, which are at various stages of implementation, are part of CIL's "proactive strategy" to increase production capacity and meet future coal demands, the company said in its latest annual report

Though the mining major did not specify a timeline for the capex, it said the development of these projects involves substantial investments in advanced mining technologies and infrastructure, aimed at enhancing productivity and ensuring sustainable mining practices.

The Kolkata-headquartered company has set an ambitious target of achieving 1 billion tonne of production by 2025-26 to fulfill the nation's coal demand and support the goal of 'Atmanirbhar Bharat'.

In the 2023-24 fiscal, its production stood at 773.6 million tonne.

CIL said in 2023-24, one coal mining project with a sanctioned capacity of 20 million tonne and a sanctioned capital of Rs 1,783.09 crore was completed, which demonstrates "our ability to execute largescale projects within the stipulated time frames".

During the financial year ended March 31, 16 coal mining projects with a total capacity of 170.46 million tonne per annum (incremental capacity of 85.66 MT) and a total sanctioned capital of Rs 27,087.69 crore were approved, it said.

As part of its comprehensive modernisation strategy, CIL is embracing latest equipment, advanced exploration and assessment techniques, efficient mine planning and development, and optimised extraction processes, the report said.

The company plans to procure high-capacity equipment worth more than Rs 3,700 crore in the next financial year, aiming to bolster coal production capabilities for increased efficiency.

The mining major has set a capital expenditure target of Rs 15,500 crore for the 2024-25 fiscal. In line with its investment plans, CIL intends to allocate a significant portion of funds to diversification projects, including solar power, thermal power plants, revival of fertilizer plants, surface coal gasification (SCG) and coal bed methane (CBM) during the year.

Global coal demand to remain flat this year and next-IEA

Global coal deman d is set to remain largely flat this year and next as higher electricity demand in some major economies offsets the rapid expansion of solar and wind, the International Energy Agency said in an update on the coal market.

Global use of coal rose by 2.6 per cent in 2023 to an all-time high, driven by strong growth in the two largest coal consumers, China and India.

While coal demand grew in the electricity and industrial sectors, the main driver was the use of coal to fill the gap created by low hydropower output and rapidly rising electricity demand, the report showed.

"Our analysis shows that global coal demand is likely to remain broadly flat through 2025, based on today's policy settings and market trends," said Keisuke Sadamori, IEA's director of energy markets and security.

"The continued rapid deployment of solar and wind, combined with the recovery of hydropower in China, is putting significant pressure on coal use. But the electricity sector is the main driver of global coal demand, and electricity consumption is growing very strongly in several major economies," he added.

Without such strong growth in consumption, there would be a decline in global coal use this year, he said.

Although the continued deployment of solar and wind power is slowing the growth in coal use in China, it's

electricity demand is forecast to rise by 6.5 per cent this year, making a decline in coal consumption unlikely.

In India, coal demand growth is set to slow in the second half of 2024 as weather conditions return to seasonal averages and hydropower output improves.

After falling by more than 25 per cent in 2023, coal power generation in the European Union is forecast to drop by almost as much again this year. Coal use has also been contracting significantly in the United States in recent years, but stronger electricity demand and less switching from coal to natural gas threaten to slow this trend in 2024, the report said.

DGMS focuses on mine safety amid increase in commercial coal mine auctions

With more commercial mines being auctioned, the DGMS has started discussions with captive and commercial coal block operators on mine safety, an official said recently. The Directorate General of Mines Safety (DGMS) emphasises ensuring adherence to safety norms among new players.

"We see more captive and commercial mines coming into production every year. So, we are actively engaging in consultation with the mine operators so that they understand the rules and regulations that have to be followed for mine safety," DGMS Director General Prabhat Kumar said at the Mines Safety Award 2024 event.

In the last nine rounds, the Ministry of Coal has auctioned 107 blocks with a peak-rated capacity of 256 MT. So far, 11 commercial coal blocks have been operationalised.

Meanwhile, Coal India, which is diversifying into the non-coal sector, will actively participate in more auctions of critical mineral blocks, including lithium, to capitalise on the battery value chain.

"We have taken one mine in graphite. For lithium, we participated in the auction but did not succeed in bagging the mine. We are interested in this sector," Coal India Chairman PM Prasad said recently on the sidelines of the event.

Coal India has recently won a graphite block in Madhya Pradesh, marking its first venture into the noncoal mineral mining.

In its annual report for FY'24, Coal India stated that it is diversifying into the emerging battery materials sectors-lithium, nickel, cobalt, and graphite with the challenges of a rapidly evolving global energy landscape.

Leveraging its mining expertise, operational footprint, and financial resources, the company aims at capitalising on these opportunities, enhancing long-term resilience and competitiveness. "A deep understanding of the Indian energy and industrial landscape aids in expanding into markets for lithium-ion batteries,electric vehicles, and renewable energy technologies," Coal India said in the report.

India eyes export of 15 MT coal to neighboring countries amidst production boost

In a significant shift towards bolstering its energy sector, India is eyeing a potential to export 15 million tonne (MT) of coal to neighboring countries, including 8 MT to Bangladesh, 3 MT to Myanmar, 2 MT to Nepal, and 2 MT to other neighboring regions, according to a study by IIM Ahmedabad.

The ministry of coal is spearheading initiatives to reduce coal imports and promote exports, aiming to strengthen India's energy security and enhance domestic coal production. As part of these efforts, the coal production in India has seen an 11.65% increase in the year 2023-24. For the fiscal year 2024-25, the government has set an ambitious target of achieving a production of 1,080 million tonne.

India's power generation capacity rose to 4.46 GW in last decade: Govt

India's total installed power generation capacity has grown around 80 per cent over the last 10 years to 446,190 MW (4.46 GW) in June 2024, Parliament was informed recently. The installed capacity, which was 248,554 MW in March 2014, reached 446,190 MW in June, the Union Minister of State for Power Shripad Naik said.

In a reply to the Rajya Sabha, he said the installed capacity of coal-based power has increased from 139,663 MW in March 2014 to 210,969 MW in June 2024.

While the installed capacity of renewable sector has increased from 75,519 MW in March 2014 to 195,013 MW in June 2024, the minister added.

The Government of India proposes to set up an additional minimum 80 GW coal-based capacity by 2031-32, Naik said.

He further said 195,181 circuit kilometer (ckm) of transmission lines, 730,794 MVA of transformation capacity and 82,790 MW of inter-regional capacity have been added, connecting the whole country into one grid running on one frequency with the capability of transferring 118,740 MW from one corner of the country to another.

"India's grid has emerged as one of the largest unified grids in the world. Connecting the whole country into one grid has transformed the country into one unified power market," he added.

Now, the distribution companies (discoms) can buy power at cheapest available rates from any generator in any corner of the country, thereby enabling cheaper electricity tariffs for consumers.

Besides, 2,927 new substations have been added, upgrade of 3,965 existing sub stations has been carried out and 8.5 lakh ckms of high tension and low tension lines have been added/upgraded, the MoS said.

As a result of these measures, the availability of power in rural areas has increased from 12.5 hours in 2015 to 21.9 hours in 2024, Naik said, adding that the availability of power in urban areas is 23.4 hours.

India's electricity grid is among world's largest: Economic Survey

India's power transmission system is emerging as one of the largest unified electricity grids in the world with the inter-regional capability of transferring 1,18,740 megawatts (MW) on one frequency, according to the Economic Survey 2023-24 tabled in the Parliament recently. Until March 31, 2024, transmission systems expanded to 4,85,544 circuit km of transmission lines and 12,51,080 mega volt amp (MVA) of transformation capacity, the Survey noted.

The government has accelerated its efforts to enhance the sector and meet the continuously rising demand for electricity in the country. The peak electricity demand increased by 13 per cent to 243 GW in FY24. Between FY23 and FY24, the maximum rise in electricity generation was recorded in renewable energy resources for utilities, the Survey added. As per the Survey, a total of 2.86 crore households have been electrified since the launch of the Saubhagya scheme in October 2017.

It also said that the implementation of Electricity (late payment surcharge and related matters) Rules, 2022, has given relief to the DISCOMs, as well as electricity consumers and generating companies.

India commits to 50% Non-Fossil fuels Power Capacity by 2030: Minister of Power

Minister of Power, Manohar Lal today said India stands committed to achieve about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. In a written reply in Rajya Sabha, Mr. Lal said that at present, India has already achieved 45.5 per cent installed capacity from non-fossil fuel-based resources. He further stated that a plan has been prepared according to which, India will not only meet its commitment of 50 percent non-fossil fuel-based energy resources by 2030.

In a written reply in Rajya Sabha, Mr. Lal said that at present, India has already achieved 45.5 per cent installed capacity from non-fossil fuel-based resources. He further stated that a plan has been prepared according to which, India will not only meet its commitment of 50 percent non-fossil fuel-based generation capacity but will surpass the target.

The Power Minister, however, added that the peak and electrical energy requirement of the country is increasing over the years. He added that in order to mitigate the seasonal behaviour of hydro, wind, and non-availability of domestic gas for gas-based power plants, the coal-based generation capacity is required to meet the demand during non-solar hours. The Minister stated that expansion of fossil fuel-based generation capacity has been planned based on domestic coal.

India's power demand surges 8.3% in 1st half of 2024, coal dominates supply

Power demand in India has witnessed an 8.3% increase during the first half of 2024, primarily driven by robust economic expansion, according to Andre Lambine, Senior Analyst at S&P Global Commodity Insights Asia Power. Coal continues to dominate the power generation mix, accounting for 78% of the year-on-year increase in supply.

Lambine highlighted the role of coal in meeting India's surging power requirements, projecting that "higher power demand in India should continue to be met by mostly coal." In contrast, China is experiencing a shift towards non-thermal fuels, with renewables and hydro power showing faster growth rates than thermal fuels, which only contributed to 25% of the year-on-year increase in power demand.

The overall power demand in the Asia-Pacific region is aligning with the economic growth rates, with S&P Global projecting a 4.2% GDP growth for the region in 2024. This figure starkly contrasts with the much lower growth rates expected in North America at 2.3% and in the Eurozone at 0.8%.

This surge in electricity demand across major Asian economies, including India and China, is further fueled by factors such as intense heatwaves and the ongoing global trend towards electrification. The International Energy Agency also noted that the world's electricity demand is set to grow at the fastest pace since the post-COVID rebound over 2024-2025.

REC eyeing 50% funding opportunity from 85 GW thermal power capacity coming up by FY32

With India’s plans to add about 85-90 GW of thermal power capacity by 2031-32, REC Limited, a major state-run non-banking financial company in the power sector, has declared its intention to fund 50 percent of the capital requirements of the thermal power capacities coming within the said timeline. At a press interaction held recently, REC’ Chairman and Managing Director Vivek Kumar Dewangan said that financing the traditional coal-based generation capacities and renewable energy capacities are priority areas for the state-run NBFC going forward.

It was earlier reported that India’s thermal power capacity addition plans for 2031-32 will entail an investment of Rs 6.67 lakh crore. Ajoy Choudhury, Director (Finance) at REC, said that out of the total investment of Rs 6.67 lakh crore, funding will be restricted to about Rs 4-4.5 lakh crore. “We are targeting roughly 50 percent of this funding opportunity that will happen over a period of time by 2031-32,” he said. He added that according to the government’s plan, 85-90 GW of thermal power capacity addition has been envisaged by 2031-32. This will include coal, lignite and gas-based capacities.

Power Grid planning Rs 40,000 cr undersea interconnection with Middle East

State-run Power Grid is planning an undersea interconnection worth up to Rs 40,000 cr with countries in the Middle East, a top official said recently. After the soft June quarter, which witnessed revenues being almost flat, the company sees the topline inching by only 4-5 per cent in FY25, its chairman and managing director R K Tyagi told reporters here after the earnings announcement recently.

The company plans to invest Rs 18,000 cr this fiscal year, which will help accelerate the growth rate going forward, Tyagi said, explaining that as projects become older, the earnings from transmission projects go down and the company has to keep commissioning new projects to have higher revenue growths.

On the interconnected projects front, it is looking at companies beyond the immediate neighbourhood and will be looking at countries in the Middle East, Tyagi said.

He specified that discussions are ongoing with Oman, Saudi Arabia and the UAE for the interconnection.

The company has a 'pulling station' near the Arabian Sea in Gujarat's Bhuj, which will be connected with a similar station on the shores of the Middle East country as well, he explained.

A high voltage direct current cable will go from the seabed with a capacity of up to 2,500 MW, he said, adding that it will cost Rs 35,000-40,000 cr and will take up to six years to complete.

Speaking about revenues, he said the topline growth suffered as it had a 'capitalization' of commissioning of projects worth only Rs 2,300 cr during the quarter, and added that it plans to take the number to up to Rs 18,000 cr in the current fiscal.

It has won six of the ten transmission projects till July, he said, adding that the bids for three projects were won in the June quarter alone had levelised tariff of Rs 4,172 cr.

Tyagi acknowledged that the company is facing challenges on the transformers front, but explained that it is pre-ordering the critical equipment before bagging a project which ensures that work does not suffer for want of components.

The revenue growth will accelerate from here on, Tyagi said, pointing to the target of investing over Rs 18,000 cr during the fiscal.

A bulk 80-85 per cent of the money will be spent on core transmission lines business, he said, adding that over 80 per cent of the new work is around renewable energy.

The company is diversifying into other areas as well, including smart meters, data centers, putting up solar power capacities and also green hydrogen, he said. It has won smart meter projects in Gujarat. It already has a datacenter in Manesar and is mulling more capacity to come up at Chennai, Bengaluru and Hyderabad, he said.

86% of NTPC's upcoming coal-based power generation capacity will be AUSC power plants

Days after the Union Budget announced financial support for the setting up of an Advanced Ultra Super Critical (AUSC) thermal power plant by NTPC Limited and BHEL, NTPC has said that AUSC power plants constitute the lion's share of its under-construction coal-based power generation capacity. In an investors' presentation, NTPC said that a total of 9.5 GW of coal-based power generation capacities are under construction, out of which 86 percent, or 8.2 GW, will be AUSC power plants. The remaining 1.3 GW will be super-critical power plants.

With India continuing to rely on coal for meeting baseload power requirements, the government is pushing the AUSC technology as it is more efficient than the super-citical and critical power plants. Currently, India's thermal power plants operate at an average efficiency of 32 percent. Employing the AUSC technology can ramp this figure up to 46 percent. Such higher efficiency is achieved by higher steam temperatures of 710-720 degree Celsius instead of 540-600 degree Celsius used in present power plant technology. Greater efficiency means that the power plant requires less coal per megawatt-hour, leading to lower emissions.

NTPC planning 7 GW of conventional power generation capacity addition in 3 yrs

NTPC's capacity addition plans for the next three years reveal that its renewable energy capacity addition will be more than double the capacity addition of conventional sources. NTPC said that it is planning to add 7 GW of conventional power generation capacity and 16 GW of Renewable

Energy (RE) capacity in the next three years. In addition, it is also planning to commission Flue Gas Desulphurisation (FGD) systems in 54 GW of thermal power plants which will entail an investment of Rs 27,000 crore.

Nepal, India, Bangladesh to sign tripartite power trading deal on July 28

Nepal will sign a tripartite power trading deal next week to export 40 MW of electricity to Bangladesh via India, a senior official said recently. This will be the first time in history that the Himalayan nation will sell electricity to a third country other than India.

Ground has been cleared for the three countries to sign the agreement on exporting electricity to Bangladesh, said Chandan Kumar Ghosh, spokesperson at Nepal Electricity Authority (NEA) -- the government-owned electricity body.

The Power Sales Agreement will be signed by officials from the NEA, the Bangladesh Power Development Board (BPDB) and the NTPC Vidyut Vyapar Nigam Ltd (NVVN) of India at a function here on July 28, Ghosh said.

Nepal's Minister for Energy, Water Resources and Irrigation, Dipak Khadka, India's Power Minister, Manohar Lal Khattar and Bangladesh's Power, Energy and Mineral Resources Minister, Nasrul Hamid, will witness the signing ceremony, he said.

Under the agreement, the NEA will export 40 MW of hydroelectricity to Bangladesh via India from June 15 to November 15 every year.

As per the agreement, Nepal will get a tariff of USD 0.064 per unit for selling electricity to Bangladesh.

Nepal will transmit the energy to India through the 400KV Dhalkebar-Muzaffarpur crossborder transmission line. India will then transmit the equivalent to Bangladesh.

The delivery point will be a 400kV substation at Muzaffarpur in India, and Bangladesh will pay the transmission charge for using the Indian transmission infrastructure.

According to an estimate by the NEA, Nepal will receive around Rs 330 million through the sale of electricity.

Last month, a meeting of the 'Cabinet Committee on Government Purchase' of Bangladesh approved a proposal to import 40 MW of electricity from Nepal.

In January, Nepal signed a long-term agreement for the export of 10,000 MW of power to India, and jointly inaugurated three cross-border transmission lines during the two-day visit of External Affairs Minister S Jaishankar to the Himalayan nation.

Nepal has prepared an energy development strategy intending to produce 28,000 MWs of electricity in the next 12 years; of that, a target has been set to export 15,000 MWs to different countries including India, Nepal media had said then.

THDC India To Invest ?6600 Crore As UP Government Grants In-principle Approval To 1200 Megawatt Pumped Storage Power Plant In Sonbhadra

The Uttar Pradesh government has granted in-principal approval for 1200 megawatt pumped storage power plant project of THDC India in the Robertsganj tehsil of Sonbhadra district. The estimated cost of the project is ₹6600 crore. The project is expected to generate electricity for 6 hours and 36 minutes each day.

As per details provided by THDC India, it is an off-stream closed-loop pump storage project. The project requires 300.55 hectares of land. For the operation of the project, an initial filling of the reservoir will require 15.031 million cubic meters (MCM) of water annually and 1.7112 MCM due to loss caused by evaporation. The source of water supply will be the Son River.

Chief Secretary and Infrastructure & Industrial Development Commissioner, Shri Manoj Kumar Singh said, "This project marks a significant step towards enhancing the power infrastructure in Uttar Pradesh and reinforces the state's commitment to sustainable energy solutions. The involvement of THDC India, a prominent player in the energy sector, ensures the successful execution and operation of this ambitious project."

Invest UP has been designated as the nodal agency for granting in-principal approval to pumped storage power (PSP) projects in Uttar Pradesh. Under the chairmanship of IIDC, a committee has been formed with the CEO of Invest UP as the member secretary. This committee includes representatives from the Energy Department, Uttar Pradesh New & Renewable Energy Development Agency, Irrigation Department, forest dept, Revenue departments, and the Central Water Commission. The District Magistrate and Divisional Commissioner of the project's proposed location attend the committee meetings as special invitees. Project proponents submit their proposals to Invest UP, which are then presented to the committee for review. Project proponent also gives a detailed presentation of their projects in front of the committee, on the basis of which in principal approval accorded to a project by the committee.

More power to the energy sector

Alok Kumar, Former Secretary, Ministry of Power

The Budget presented by the finance minister has two big messages for the energy sector. First, India has started to calibrate the pace of its energy transition to subserve the overarching objectives of energy security and growth of green jobs. Second, India is going to open nuclear energy for its private sector. Beyond this, it stayed away from difficult but critical reforms and mostly preferred the route of taking forward the programmes already initiated.

Before we examine the Budget announcements for power sector growth and the missed opportunities, let us quickly take a birds' eye view. India successfully met a record demand of 250 GW in May and can boast of one of the largest and well-functioning integrated electricity grid in the world. Our electricity markets have evolved significantly. RE capacity has expanded at record speed. Discoms have shown a rapid improvement in operational efficiency. However, sluggish than targeted growth in RE capacity expansion, controlling the increase in costs of power and ever increasing financial losses of utilities still remain as key challenges. There are pressures to set up many more new coal-based capacities for meeting the anticipated demand in growth. In this context, the Budget announcement to prioritise the development of small and modular nuclear reactor technology might turn out to be a gamechanger for phasing out coal after few decades. Initiatives like a policy to promote pumped storage projects, supporting development of a coal-based 800 MW unit with cleaner Advanced Ultra Supercritical Technology, investment grade energy audits in MSME clusters and rolling out of the Indian Carbon Market are also welcome steps building upon the progress made in the past. However, absence of a announcement of FAME-3 to support electric mobility would create a policy uncertainty.

Vocal for Local

With the objective of promoting local manufacturing of clean technologies and processing/recycling of critical minerals, a 'critical minerals mission' has been announced and import duties on critical minerals and the capital goods for manufacturing of solar modules/cells have been slashed. Though it may be on bit slower route, these steps will not only boost growth of manufacturing jobs but also ensure energy security in the long term. For attaining the goals of reliability, affordability and sustainability, power sector requires more policy interventions than direct budgetary support. Our experience in development of transmission lines and large solar parks through private sector participation has shown that appropriate policy framework can bring in private capital at much lower costs to consumers. Real challenge lies in further opening of markets to achieve lower power system costs through optimisation of both the capacity expansion and despatch of plants in day-to-day operations.

Our electricity markets are still very shallow and utilities are still being forced to enter into rigid long-term PPAs which hinders optimisation of power plant despatches. The solution lies in transition to capacity markets and instruments like contract for difference. Policies like waiver of transmission charges for RE, good for initial scaling up, needs to be quickly phased out as it is now leading to ballooning of transmission costs on utilities and lopsided growth of RE potential only in few areas of the country. Budgetary support needs to be provided in a manner that it incentivises financial discipline in utilities and mitigates the additional burden on power purchase costs as India adopts new clean technologies for decarbonisation of the power sector. .

India's natural gas production rises 2.9% in June, power sector demand up 40.8%

India’s natural gas sector witnessed significant growth in June 2024, with LNG imports soaring by 13.6 per cent to 2704 MMSCM compared to the same month last year, according to the Petroleum Planning & Analysis Cell (PPAC). The gross production of natural gas for June reached 2993 MMSCM, a 2.9 per cent increase from June 2023.

The total natural gas available for sale also saw a notable rise, hitting 5195 MMSCM, an 8.7 per cent increase from the previous year. The month recorded a total consumption of 6249 MMSCM, with the fertilizer sector consuming 27 per cent, city gas distribution (CGD) 20 per cent, and the power sector 18 per cent. Refineries and petrochemicals accounted for 7 per cent and 5 per cent of the consumption, respectively.

After accounting for internal consumption and flaring by gas producers, the net production for sale was approximately 83.26 per cent of the gross production.

In terms of sectoral consumption, the power sector showed the most significant increase, jumping 40.8 per cent year-on-year to 3307 MMSCM. The CGD sector reported a 16.6 per cent increase, with consumption rising to 3722 MMSCM. The refinery sector's consumption grew by 27.7 per cent to 1585 MMSCM, while the petrochemical sector saw an 8.2 per cent increase, totaling 727 MMSCM. The 'others' category, which includes various sectors, experienced a 31.4 per cent growth, reaching 4464 MMSCM.

The total consumption for the first quarter of FY 2023-24 stood at 18773 MMSCM, reflecting an 18.4 per cent increase compared to the same period last year, underscoring the growing demand and consumption patterns in India's natural gas sector.

India’s fuel consumption grows 2.6% in June, driven by surge in ATF and Petrol use

India's consumption of petroleum products in June 2024 recorded a 2.6% increase, reaching 19.93 million metric tonnes (MMT), up from 19.48 MMT in June 2023, according to the latest PPAC Industry POL & NG Consumption Report. The report highlighted notable trends in various fuel types, including a 4.6% rise in motor spirit (MS) or petrol consumption, which stood at 3.30 MMT for the month, compared to 3.15 MMT the previous year.

Diesel (HSD) usage modestly grew by 1.0% to 7.98 MMT, while aviation turbine fuel (ATF) consumption surged by 10%, reflecting increased air traffic across the country.

Additionally, the domestic sale of passenger vehicles in June 2024 saw a 4.9% increase, with sales reaching 294,000 units up from 280,000 in June 2023. In contrast, kerosene (SKO) consumption saw a significant decline of 28.8%, primarily used within the Public Distribution System (PDS).

Liquefied petroleum gas (LPG) usage, largely driven by domestic consumption, which accounts for 90% of the LPG market, rose by 3.2% to 2.31 MMT. This increase is attributed to the growth in the Pradhan Mantri Ujjwala Yojana (PMUY) segment and various state schemes.

Ethanol blending reached 15.9% in June 2024, with 14,476 retail outlets now offering E20 fuel, which blends gasoline with 20% ethanol. Meanwhile, total natural gas consumption during the month was reported at 5,594 million standard cubic meters (MMSCM), marking a 7.1% increase from the previous year.

As of June 30, 2024, India had 32.68 crore active LPG domestic connections, with 10.33 crore under the PMUY initiative.

Older petroleum product pipeline tariff to rise 17% after PNGRB's new regulation

Tariffs for older petroleum product pipelines will increase 17% next month and rise 3.4% annually from next year to account for inflation and to ensure

a reasonable return to operators, the Petroleum and Natural Gas Regulator Board (PNGRB) has said

Budget 2024: Govt allocates ₹1.19 lakh crore for petroleum and natural gas, focus on strategic reserves and infrastructure

The ministry of petroleum and natural gas has been allocated a total budget of ₹1,19,402.52 crore for the fiscal year 2024-2025, reflecting a significant financial commitment to bolster India's energy infrastructure and capabilities. This allocation, comprising both budget support and Internal and Extra Budgetary Resources (IEBR), underscores the government's focus on securing energy resources and supporting the sector's growth.

The Oil and Natural Gas Corporation (ONGC) has been a major beneficiary, with an allocation of ₹30,800 crore for 2024-2025. This represents a steady increase from ₹30,500 crore in the revised budget for 2023- 2024 and ₹30,125 crore in the initial 2023-2024 budget. This continuous increase highlights ONGC's critical role in India's energy sector and the government's intention to support its exploration and production activities.

In contrast, the Gas Authority of India Limited (GAIL) has seen a significant reduction in its budget allocation. For 2024-2025, GAIL has been allocated ₹4,886 crores, a sharp decrease from ₹6,888 crore in the revised 2023-2024 budget and ₹6,002.49 crore in the initial budget for 2023-2024. This reduction might indicate a shift in strategic priorities or a realignment of GAIL's project pipeline.

Bharat Petroleum Corporation Limited (BPCL) is set to receive ₹2,000 crores for the fiscal year 2024-2025, down from ₹2,150 crore in the revised budget for 2023-2024 and ₹2,360 crore in the initial 2023-2024 budget. This decrease could reflect the completion of key projects or a strategic pivot in BPCL's operational focus.

IOCL has been allocated ₹27,374.04 crores for 2024-2025, a slight increase from ₹27,064.45 crore in the revised 2023-2024 budget and significantly higher than the ₹25,741.31 crore allocated in the initial 2023-2024 budget. This increase suggests continued investment in refining and marketing operations, crucial for maintaining India's energy supply chain.

Oil India Limited has received an increased allocation of ₹6,880 crore for 2024-2025, up from ₹5,648 crore in the revised 2023-2024 budget and ₹4,896 crore in the initial budget for 2023-2024. This significant boost underscores the company's growing role in exploration and production.

OVL has also seen a notable increase in its budget, with ₹5,580.01 crore allocated for 2024-2025, up from ₹3,311.23 crore allocated for 2024-2025, up from ₹3,311.23 crore in the revised 2023-2024 budget. This increase highlights strategic importance of OVL's international ventures and the need to secure overseas energy assets.

The Refinery and Marketing Sector as a whole has been allocated ₹57,176.04 crore for 2024-2025, compared to ₹54,757.95 crore in the revised 2023-2024 budget. Within this sector, Hindustan Petroleum Corporation Limited (HPCL) has been allocated ₹10,770 crore, up from ₹10,210 crore in the previous year, reflecting ongoing and new refining projects. Numaligarh Refinery Limited's budget has increased to ₹8,986 crore from ₹8,765.50 crore, highlighting the expansion and modernization efforts.

The Petrochemical Sector has seen a budget increase to ₹10,850.94 crore for 2024-2025 from ₹9,180.59 crore in the revised 2023-2024 budget. This increase indicates a push towards boosting petrochemical production capabilities to meet rising domestic demand.

Strategic oil reserves continue to be a priority, with significant allocations for the Indian Strategic Petroleum Reserve Limited (ISPRL). The construction of caverns under Phase II has been allocated ₹408 crore, a substantial increase from ₹40 crore in the previous year. Additionally, payments for crude oil reserves stand at ₹628.04 crore, underscoring the importance of maintaining strategic reserves to mitigate supply disruptions.

Capital support to oil marketing companies has seen a remarkable allocation of ₹30,000 crore, indicating the government's intent to stabilize the energy sector

and ensure the uninterrupted supply of essential fuels.

PNGRB launches 11th CGD bidding round for City Gas distribution networks

The Petroleum and Natural Gas Regulatory Board (PNGRB) launched the 11th City Gas Distribution (CGD) Bidding Round on September 17, 2021, for the development of CGD networks in 65 Geographical Areas (GAs) across 19 states and 1 Union Territory. This round covers 215 districts (212 complete and 3 part) following subsequent amendments

Bid Submission: The last date for bid submission was December 15, 2021, receiving 439 bids from 26 bidders for 61 out of 65 GAs.

Technical Acceptance: 438 out of 439 bids were technically accepted, and their financial bids were opened on January 14, 2022.

Approval: On January 27, 2022, in its 108th Board meeting, PNGRB approved the issuance of Letters of Intent (LoI) to 13 successful entities for 52 GAs.
Consortium of THINK Gas Distribution Private Limited: 44 bids
Adani Total Gas Limited: 50 bids
Hindustan Petroleum Corporation Limited: 37 bids
Bharat Petroleum Corporation Limited: 44 bids
Gujarat Gas Limited: 15 bids
GAIL Gas Limited: 30 bids
SHOLAGASCO Private Limited: 14 bids
Indraprastha Gas Limited: 15 bids
Megha Engineering and Infrastructures Ltd.: 43 bids
Indian Oil Corporation Limited: 51 bids
Torrent Gas Private Limited: 28 bids
Assam Gas Company Limited: 6 bids
Tripura Natural Gas Company Limited: 3 bids
Consortium Of Enertech Fuel Solutions Pvt Ltd: 3 bids
IRM Energy Private Limited: 7 bids
Mahanagar Gas Limited: 3 bids
Consortium Montecarlo Limited & Corrtech International Pvt. Ltd.: 10 bids
Consortium of HCG (KCE) Private Limited: 4 bids
Aavantika Gas Limited: 3 bids
Consortium Of Dinesh Engineering Limited: 9 bids
Sabarmati Gas Limited: 4 bids
Central U.P. Gas Limited: 4 bids
Maharashtra Natural Gas Limited: 5 bids

RIL gets US nod to resume crude imports from Venezuela despite sanctions

Reliance Industries Ltd. has secured US approval to resume importing oil from Venezuela despite White House sanctions on the country, according to people familiar with the development. India's largest privately owned refiner plans to start purc hasing Venezuelan crude soon, said the people, who asked not to be named as the information is not public. Reliance accounted for around 90 per cent of India's crude imports from Venezuela after the sanctions were lifted last year, according to data intelligence firm Kpler.
Washington temporarily removed restrictions on the South American nation's gold and oil sectors last year, when President Nicolas Maduro and the opposition signed a deal to guarantee free and fair elections. The sanctions were then reinstated in April after Venezuela failed to honor the agreement, and oil companies have been applying for permits from the US Treasury Department to keep doing business there.

Venezuela's crude exports climbed to 654,000 barrels a day in June, the highest since April 2020, according to shipping reports and data from Kpler, after the US granted a specific license for companies to continue to drill in the country despite the sanctions being in place.

Apart from Reliance, India's state-owned Oil and Natural Gas Corp.'s overseas investment arm ONGC Videsh Ltd. has also applied for waivers to import crude from Venezuela.
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Govt to open up nuclear power sector for private investments

Union Finance Minister Nirmala Sitharaman recently opened up the nuclear power for private investments to boost the share of atomic energy production, as the government aims to achieve net-zero carbon emissions by 2070. Presenting the Union Budget, Sitharaman announced that the government will partner with the private sector to set up Bharat Small Reactors and in the research and development of small modular reactors.

She said the government will also partner with the private sector for research and development of newer technologies for nuclear energy.

Sitharaman said the Rs 1 trillion research and development funding, announced in the interim budget in February, will be made available for the nuclear sector.

"Nuclear energy is expected to form a very significant part of the energy mix for a Viksit Bharat (developed India)," the finance minister said.

However, the government will have to amend the Atomic Energy Act to allow the entry of private companies in the nuclear power sector as the law allows only government entities to handle nuclear material and technologies.

In the interim budget presented on February 1, Sitharaman had announced a Rs 1 trillion corpus, with the provision of a 50-year interest-free loan, to help finance research in technology.

"The corpus will provide long-term financing or refinancing with long tenors and low or nil interest rates. This will encourage the private sector to scale up research and innovation significantly in sunrise domains," Sitharaman had said in February.

Last month, Science and Technology Minister Jitendra Singh had said that the Department of Atomic Energy (DAE) was "suitably designing" the 220 megawatts (MW) Pressurised Heavy Water Reactor (PHWR) as a Bharat Small Reactor (BSR) for captive nuclear power generation.

Singh said that the DAE was also working on a Bharat Small Modular Reactor (BSMR) of 220 MW to use light water-based reactors by replacing Calandria with pressure vessel.

Small Modular Reactors (SMRs) can be factory-built, unlike conventional nuclear reactors that are built on-site. They have a power capacity of up to 300 MW per unit. Being a mobile and agile technology, SMRs can be set up at locations unsuitable for larger plants.

SMRs are seen to be making a significant and meaningful contribution to the energy transition phase as part of efforts to deal with the effects of climate change.

The push for nuclear power, which is considered to be a cleaner fuel or non-fossil fuel, comes in the backdrop of India's ambitious net-zero goals.

Nuclear power surge: 21 new reactors to boost capacity by 15,300 MW

India's installed nuclear power capacity is set to increase from 8,180 MW to 22,480 MW by 2031-32, said Union minister of state (Independent Charge) for science and technology Jitendra Singh, in a written reply to an unstarred question in Rajya Sabha. The minister highlighted that 21 new nuclear reactors with a combined capacity of 15,300 MW are currently under various stages of implementation by Nuclear Power Corporation India Limited (NPCIL).

Singh noted a significant increase in India's nuclear power capacity, which has surged by more than 70% over the last decade, rising from 4,780 MW in 2013-

14 to 8,180 MW at present. The annual electricity generation from nuclear power plants has also increased, from 34,228 million units in 2013-14 to 47,971 million units in 2023-24.

The current installed nuclear power capacity is spread across 24 nuclear power reactors. Among the 21 reactors under implementation, nine reactors with a total capacity of 7,300 MW, including the Prototype Fast Breeder Reactor (PFBR) by Bharatiya Nabhikiya Vidhyut Nigam Limited (BHAVINI), are under construction. Additionally, twelve reactors with a capacity of 8,000 MW, including two 500 MW twin units of Fast Breeder Reactors (FBR) by BHAVINI, are under pre-project activities.

Highlighting India's energy transition to Net Zero by 2070, Singh said, "Various studies have projected the need to have a national nuclear capacity of the order of 1 lakh MW by 2047, recommendations of those studies are being viewed for possible future adoption."

The minister emphasized the ongoing efforts to augment nuclear energy capacity, with a focus on meeting the growing energy demands and supporting India's long-term energy goals.

India's Most Advanced Nuclear Reactor Approaches Finish Line

India's atomic energy program has crossed a big hurdle, the country's most advanced and most complex nuclear reactor the Prototype Fast Breeder Reactor (PFBR) located at Kalpakkam in Tamil Nadu has finally got approval from India's atomic regulator to start loading the nuclear fuel and then to go ahead and initiate the controlled chain reaction. "It is a huge milestone for India's self-reliant atomic energy program," confirmed Dinesh Kumar Shukla, Chairman of the Atomic Energy Regulatory Board who added that the "PFBR is an inherently safe reactor".

This development now marks the use of plutonium as a nuclear fuel and more importantly the first steps at using thorium as an atomic energy source. India has limited reserves of uranium and all plutonium is anyways generated in atomic plants as natural plutonium does not exist, on the other hand, India has huge reserves of thorium and hence the country is mastering and developing complex technology to use thorium as fuel. Experts say if India can tap thorium as a fuel, the country can be assured of energy independence and find the potential 'akshay patra' for energy that will last for more than three centuries.

A fast breeder reactor is very unique and to a layperson these defy basic logic since breeder reactors produce more fuel than they consume and that is why some describe these reactors as an endless source of energy. The word 'fast' in these reactors comes from the use of high-energy fast neutrons. India has a functional Fast Breeder Test Reactor (FBTR) at Kalpakkam that has been functioning for the last 39 years.

Atomic Energy Regulatory Board or AERB said, "This permission marks a significant step towards operationalization of PFBR. The 500MWe sodium-cooled Prototype Fast Breeder Reactor (PFBR) being commissioned by BHAVINI at Kalpakkam is a significant milestone in country's nuclear power programme".

"The AERB had been carrying out extensive safety review and assessment through multi-tier safety review mechanism. The safety reviews are complemented with periodic inspections and observation by resident site observer team," it added. If all goes well, it could become operational in a few months.

In 2003, the government approved the creation of Bhartiya Nabhikiya Vidyut Nigam Ltd (BHAVINI) to construct and operate India's most advanced nuclear reactor-Prototype Fast Breeder Reactor (PFBR), which is a 500 MW liquid sodium cooled reactor. As per BHAVINI it "got clearance for fuel loading, first criticality, and also low power physics experiments at one go".

The initiation of fuel loading at PFBR marks the entry of India into its second stage of the atomic energy program. Here spent fuel from India's existing reactors is used. Incidentally, the moniker 'fast' is not about quick construction but because it uses 'fast neutrons' as part of the fission reaction. It uses the man-made element plutonium as fuel.

The PFBR has been in the making for the last 20 years and being a first-of-kind reactor, delays were expected and since no country shares such complex technology, it had to be mastered indigenously. BHAVINI estimated it has cost ₹ 6,840 crore and over years cost overrun did happen from its earlier approved cost of ₹ 5,677 Crore.

In line with the true spirit of Aatmanirbhar Bharat, the PFBR has been fully designed and constructed indigenously by BHAVINI with significant contributions from more than 200 Indian industries including MSMEs. Once commissioned, India will only be the second country after Russia to have commercially operating Fast Breeder Reactor.

The Fast Breeder Reactor (FBR) will initially use the Uranium-Plutonium Mixed Oxide (MOX) fuel. The Uranium-238 "blanket" surrounding the fuel core will undergo nuclear transmutation to produce more fuel, thus earning the name 'Breeder'. The use of Throium-232, which in itself is not a fissile material, as a blanket is also envisaged in this stage. By transmutation, Thorium will create fissile Uranium-233 which will be used as fuel in the third stage. FBR is thus a stepping stone for the third stage of the program paving the way for the eventual full utilization of India's abundant thorium reserves.

On March 4, 2024, Prime Minister Narendra Modi himself inspected the PFBR and witnessed the 'core loading' since then activities have accelerated. The Department of Atomic Energy (DAE) says in terms of safety, the PFBR is an advanced third-generation reactor with inherent passive safety features ensuring a prompt and safe shut down of the plant in the event of an emergency. Since it uses the spent fuel from the first stage, FBR also offers a great advantage in terms of a significant reduction in nuclear waste generated, thereby avoiding the need for large geological disposal facilities.

According to the DAE, notably, despite the advanced technology involved, both the capital cost and the per unit electricity cost is comparable to other nuclear and conventional power plants.

The growth of the Indian nuclear power program is imperative to meet the twin goals of energy security and sustainable development. As a responsible nuclear power with advanced technology, India remains committed to expanding peaceful applications of nuclear technology, both in the power and non-power sectors, while ensuring the security of nuclear and radiological materials.

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Bio-Gas: Success Stories and Challenges
28th June 2024

Welcome Address and Setting the Context: Shri K. S. Popli, Hon. Secretary General, India Energy Forum, extended warm welcome to all speakers and participants. He gave brief introduction about India Energy Forum and said that webinars on all verticals of energy sector are being organized to bring out the critical issues by inviting the experts to deliberate on those issues. It works as a bridge between the industry and the government to formulate the policies suitable for their growth. He said we require all type of non-fossil-fuel resources to reach net zero. The major schemes of Government of India were highlighted. Different Ministries have launched policies and schemes for 'waste to energy' such as SATAT, Govardhan scheme, Swatch Bharat Mission, National Bioenergy Mission etc to provide support. Despite financing allocations, the progress in them is not commensurate with the goals and this webinar is expected to discuss the issues and constraints. As Chairman, IEF Renewable & Environment Group he welcomed the panellists for the webinar, namely; Lt Col Monish Ahuja, CMD, PRESPL; Shri Guru Inder Mohan, MD, Carbon Circle; Shri M P Singh, Director, PEDA and Shri Gaurav Kedia, Chairman, Indian Bio-gas Association. With these introductory remarks, he invited the President, India Energy Forum for his Presidential Address.

Presidential Address: Shri R.V. Shahi, President, India Energy Forum extended welcome to all the participants on behalf of the India Energy Forum, particularly the eminent speakers and panellists who have agreed to participate. He said, each piece of renewable energy is to be seen in totality, because each resource has a different type of challenge. All over the world renewables have received the right type of thrust in the context of climate change. India has taken a very massive task of renewable energy expansion to meet the goal of net zero by 2070. In the overall energy mix of the country, we are still dependent to the extent of almost 30% on petroleum and natural gas. The potential of biogas in the country as assessed or as achieved so far, both of them are very much in the margin. We have to make recommendations so that instead of importing gas, 50% share is met through domestic production of biogas, which can be fed into the grid through gas pipeline, and reduce the burden on Natural gas imports.

Supply Chain and Logistics Success Story and Challenges: Lt Col Monish Ahuja, CMD, PRESPL, talking about the challenges in supply chain segment, said that resource mapping of biomass is debatable in terms of how it has been done and who has done it. Describing the challenges in the Upstream Sector arising from biomass supply chain management, he said there is no regulatory framework to facilitate investment and recognition of this feedstock supply chain management of farm agri-residue, or municipal solid waste of biodegradable fractions to be an independent business activity. Open market tender process to understand the pricing of biomass is lacking. The upstream sector suffers from the risk of aggregation, capital investment made for supply chain management, storage, insurance, warehousing and of delivery to the client as the biomass aggregator supplier. We need to have a transparent regulatory environment. He said, Global Biofuels Alliance has been announced under India's G-20 Presidency, aimed at facilitating cooperation among Brazil, India, and the United States, and intensifying the use of sustainable biofuels, including in the transportation sector. India has to have the transparency and know-how to teach the entire global south and the world about how it can be done.

Success Story and Challenges/Risks in Developing Bio-gas Plant: Shri Guru Inder Mohan, MD, Carbon Circle said we have just commissioned our first plant in Bareli using different feed stocks including Napier grass and Paddy straw. He described the characteristics of each feed-stock and the availability crisis. He cited the example of biofuel ethanol, which has feed-stock

based pricing. For making ethanol from molasses, one gets a different pricing; from maize, it's a different pricing. Why can't the same formula be followed here? While for large thermal power project and a 10 ton biomass based thermal power project, the investments are similar from an investor perspective, but the land that is required for growing the feedstock is very different. If we were to grow Napier grass for 10 ton CBG plant, it would need 350 to 400 acres of land. As compared to solar projects, biomass projects have different challenges. In one case it is business model innovation, and in the other is technology innovation. There are challenges in using feedstock and corresponding pricing. If the carbon credits as revenue is not available to supplier and they go to the oil companies, then even the revenue stream goes away. To attract 'startups' in this sector we need to have a stronger policy certainty and a stronger long-term visibility.

Success Stories and Challenges faced by Bio-gas Industry in Punjab: Shri M. P. Singh, Director, PEDA said to mitigate the problem of stubble burning through ex-situ industries, PEDA is facilitating the setting up of Compressed Biogas (CBG) Plants and Biomass Power Projects based on Agro-residue, on Build Operate and Own (BOO) basis under state NRSE Policy-2012. About 20 Million Ton of paddy straw is produced per annum and 11 Million ton paddy straw is managed with various in-situ applications, Remaining about 9 Million ton is to be disposed of by way of ex-situ activities, At present 101.5 MW capacity 11 Biomass power projects are in operation and are consuming about 1 Million ton paddy straw annually, 4 CBG projects of total capacity 85.23 TPD CBG are in operation and are utilizing 0.18 Million ton paddy straw annually. He said about 1.56 million ton per annum paddy straw is planned to be utilized in the implementation 38 CBG projects in the pipeline for production of 469.50 TPD. He informed that PEDA has signed MOU with GAIL India Limited and M/s. Hindustan Petroleum Corporation Limited for setting up 10 CBG projects of total capacity 150 ton per day CBG. He referred to the notification announced very recently on 25th of this month by Ministry of Petroleum & Natural Gas. The viability gap fund will be provided to off-take the CBG. Govt. of Punjab is providing several incentives under the NRSE policy-2012. He highlighted the challenges in the CBG sector; draft Punjab State Policy for biofuels, proposed incentives for biofuels production.

IBA's Perspective on Development of Bio-gas in India: **Shri Gaurav Kedia**, Chairman, Indian Bio-gas Association made a presentation on 'Biogas in India'. He said biogas is an all-rounder and the biogas plants fall in three categories (i) House hold based (1-25 m3); (ii) Community based Biogas Plant (25-1000 m3); and (iii) Large Scale Biogas Plant (>2500 m3). For each, technology and feedstock priorities are different. He explained characteristics of CBG vs CNG (Table 1) and said '*CBG is a premium CNG and can be used as automotive fuel for CNG vehicles*'.

Table 1 CBG vs CNG

S. No.	Characteristic	CBG IS 16087 : 2016	CNG IS 15958 : 2012
1	Methane, minimum	90%	90%
2	Ethane, maximum	-	6%
3	C3 and higher HC, maximum	-	3%
4	C6 and higher HC, maximum	-	0.5%
5	Total unsaturated HC, max.	-	0.5%
6	Carbon Dioxide, maximum	4%	3.5% (CO_2 and N_2)
7	Total sulphur, maximum	20 mg/m^3	20 mg/m^3
8	Moisture, maximum	5 mg/m^3	5 mg/m^3
9	O_2, maximum	0.5%	0.5%

He described CBG potential of various feed stocks, developments in CBG industry in India and the government incentive schemes. Bio-manure processing technologies in use and

recommendations which have led to 'Sustainable Biogas-Organic – Fertilizer' (SBiCulp) based cultivation programme. Enablers for potential revenue streams i.e., upstream, midstream and downstream are; organic manure, carbon offset and market demand of other by-products. He concluded by saying that a CBG plant economics is very important in the sustenance of biogas industry.

Concluding Remarks

(i) Industry should embrace various applications of biogas on a large scale. We need to examine what different government interventions are required for different types of applications.
(ii) More research is needed on the barriers to biogas generation and its adoption with stakeholders' perspectives, so as to improves performance of biogas development efforts.
(iii) Biogas has to have a market. It is desirable that Petroleum ministry takes a lead to see how best gas is injected into our gas grid and a market structure of gas is created.
(iv) The CBG cuts down greenhouse gas emissions and is low-cost technology that encourages circular economy. We should design whole formulations of schemes/ policies and regulations to promote biogas so as to reduce our import dependence on CNG.

Vote of Thanks

Dr (Mrs) Malti Goel, Convener, Environment and Renewable Group, IEF presented Vote of thanks on behalf of the India Energy Forum. She said, India is endowed with vast agricultural resources. The first biogas plant was successfully developed way back in 1946, yet the challenges and barriers remain to achieve the desired goals. Key government initiatives such as NBMMP, NNBOMP, and SATAT are underscoring their pivotal role in driving forward green energy generation. This discussion today has evidenced that biogas success in our country is under transition. She thanked Mr. Popli for taking the discussion forward and Shri R.V. Shahi ji for his perspective on enriching the role of industry, government and stakeholders. We thank all the guest speakers for their insightful deliberations, Mr. Gaurav Kedia for sharing the vision for biogas development in India, Col Manish Ahuja, pointing out upstream sector challenges and signifying India to be role model for the entire global south and world. Mr. Guru Inder shared his experience on putting a plant in Barelli and said that to attract 'startups' in this sector we need to have a stronger long-term visibility. Mr. M.P. Singh described PEDA vision on biogas plants development using agricultural resources, the proposed incentives for biofuels production and a draft Punjab State Policy, in offing.

Dr. Malti Goel profusely thanked all the distinguished participants in the webinar. Thank you very much!

Webinar on
Future Outlook for LNG in India
13th July 2024

A Webinar on "Future Outlook for LNG in India" was organized on July 13, 2024 by the Gas Vertical of India Energy Forum. Shri KS Popli had been travelling so Shri Subhash Kumar, Chairman of Oil vertical welcomed the guests.

Unfortunately, Dr. CR Prasad, former Chairman of GAIL had passed away the same morning so the delegates observed one minute's silence in his respect before beginning the program.

Welcoming the guests, **Shri Subhash Kumar, Chairman, Oil Group, IEF and Former CMD, ONGC** said, India is one of the fastest growing economies in the world and having anticipated that a growing economy requires a lot of energy, Government of India has been working in right earnest to secure different sources of energy. On 27th March. 2015, honourable Prime Minister set a target for gas to have 15% share in the total energy mix in the country. The occasion was the 50th year of having established ONGC Videsh. Now at that point in time the Gas had a share of around 11.2% in the national energy mix. Today, from 2015 to 2024 in a matter of around 9 years, instead of going up, actually we have reached a stage where we are just above 6% as far as the gas share in energy mix of the country is concerned. This

is despite the fact that a lot of investments and pro-investment policies have come during this period. Large number of LNG re-gasification terminals have been setup. Of course, Petronet LNG had taken initiative, its plant at Dahej has been performing spectacularly since its inception in 2004. But as far as other projects are concerned, they have not yet delivered at scale during this period.

Government of India has simultaneously taken Pro gas initiative by encouraging CGD networks covering around 98% of population, which means almost entire country is covered through the CGD network. Despite all these initiatives gas unfortunately continues to lose its share in the overall mix and the country is losing an opportunity to have this cleaner fuel constitute a significant proportion to the clean energy development efforts.

One needs to find out why the results have not been as per the aspirations which were laid out. This webinar intends to have deliberation on the issues and understand what has happened and where the miss has been.

Probably one of the reasons for gas not taken to scale has been non-inclusion of gas in the GST regime. Different states have different layers of taxes for gas value chain. There are certain practical problems relating to the approvals etcetera also.

The time is now ripe for a revolution relating to the gas, so that it acquires at least 15% share in the energy mix. Even at 15:00 percent, it will be significantly lower than the global average.

In his opening remarks, **Shri R V Shahi, President, IEF and Former Secretary, Ministry of Power,** said, gas deserves to have better share in the energy basket. In fact, it has been going down, probably because for the last 15 years, there has been negative net increase or a zero net increase in gas production. That means while the existing gas fields deplete, commensurate new fields do not get discovered. A former chairman ONGC, Mr RS Sharma headed a committee which went into detail about how the gas proportion can be increased.

Gas is of course a fossil fuel but better than coal due to lesser emissions. If the growth in production of gas is negative and we need more gas to fuel our economy, with a target of achieving 15% share in the energy basket, we need to import gas.

Power and fertilizer sectors are the largest consumers of gas. Many of our gas based power generation facilities are of 25,000 megawatts. We don't use more than 1/3 of the capacity. Last summer it was seen that even at higher price of gas based power generation, we had to use these capacities.

The country decided to import LNG several decades ago. We have about 6 or 7 LNG regasification terminals. But except the terminal that Petronet-LNG operates, I think most of the other terminals have a utilization factor of 15 or 20%. So this is a paradox. Is it because we do not have downstream distribution pipelines or because the prices are very high and volatile? If the pipeline or gas grid is an issue, why are we not handling it? Globally the erratic behavior of supply and erratic behavior of the prices have kept people away from making any major investments. If they make major investments, whether in power stations or fertilizer or gas pipeline or LNG terminal and the prices become so prohibitive that you cannot use these terminals, then investment becomes a big problem. Investment will be there only when some degree of predictability about availability of gas and reasonable predictability about the behavior of the price is there.

10 years back, we were hoping that solar energy will have a lot of impact. It does have good impact and we might get rid of a higher growth of coal based power generation, but there is a need for generation and load balancing requirement so we continue to have more coal based generation and the government has decided to again give a new momentum to the coal based power stations. This phenomenon is not unique to India. The present geopolitical situation has made it even more imperative because energy security has become paramount. Some of the old coal based power stations have been made operational again in other countries. And in that context, we talk of petroleum. Here also, we import 85-86% of our requirement of oil and more than 50% of gas. So gas continues to be relevant, but supply is an issue. While the importance of exploration of both oil and gas to

reduce our exposure to the price fluctuations and improve our foreign exchange position cannot be undermined, sourcing gas to meet our growing energy demand and at the same time addressing environmental concerns continues to gain higher priority.

Therefore, today's session is on LNG. We shall be discussing about the management of gas sector, the behavior, the import dependence and the global scenario of gas sector. We should coordinate with various agencies to ensure there is no mismatch between capacities of LNG terminal, pipeline, supply and offtake. For the next 50 years, if not more, gas will continue to be relevant. So I look forward to listening to the experts on these issues in greater detail.

Shri B S Negi, Chairman, Gas Vertical, IEF and **Former Member, PNGRB** gave a pretext of the webinar saying, Natural gas will continue to play a role right up to 2050 and may be 2070 for India. We are importing hydrocarbons to the extent of 85% of the demand. Import of natural gas is more favorable for two reasons – first, it is cleaner than any other fossil fuel and second, price of gas is always lesser than oil in the international market. In today's presentation I will be mostly confined to the role of energy, availability, capacity and utilization of the terminals and how to take this to far flung areas in India even though they are not connected by pipeline.

My estimate is that by 2030 the requirement primary energy in India will be about 1216.45 MBOE. 15% of this translates to about 520 MMSCMD of gas every day, as compared to today's consumption of 180 MMSCMD. The Gas Based Economy Working Group projected that the demand by 2030 will be around 600 MMSCMD, so India will need to procure 340 - 420 MMSCMD additional gas. Domestic gas production has been declining since 2010 but last year we saw an increase of about 18%. Honorable Petroleum Minister announced ear marking almost 100 billion dollars for exploration & production in the next few years, which should be a shot in the arm for domestic production. Presently almost 50% of the gas demand is met by import of LNG (25 MTPA). By 2030, for the same 50% requirement the quantum may become 78 MTPA. The existing capacity for regasification is 49MTPA which may rise to 64 MTPA when the plants under various stages of construction are commissioned. The current plans for further expansion of capacity by 28.5 MTPA would make available a capacity of 92.5 MTPA. Thus importing LNG would not have a constraint of infrastructure.

The government has been encouraging establishing Energy Terminals in India. Anybody can import LNG on OGL system and use existing terminals on tolling basis. LNG dispensing for transport sector is also open. Any entity can establish energy dispensing station anywhere in India. 1000 such stations are planned to be established in India in a phased manner. State owned entities like IOC, GAIL, HPCL, BPCL, PLL and private entities like Ultra gas and Baidyanath LNGand have already started establishing LNG dispensing stations. Green Line in association with Blue Energy motors are operating 450 LNG fuelled trucks,

To provide far flung and isolated areas access to LNG, road tankers transport LNG from the terminal to areas even 1000 - 1400 kilometers away economically. Transporting LNG by railway wagons gives a further economy of scale if the offtake volume at receiving terminal is high.

Small scale liquefaction plants at remote areas which may also utilize locally available biogas, are also techno-economically viable options at just 40,000 SCMD gas and US $ 2-3 per MMBTU liquefaction cost.

Tanker filling facilities have also been established at Dahej, Kochi, Ennore, Hazira, Dabhol and Dhamra LNG terminals. PLL Dahej loads 29 tankers everyday with about 18 tons LNG per tanker. Carries almost 18 ton per per tanker single day. Transporting LNG by tanker has led to creation of energy storage from Regas terminals to feed the city gas distribution. Companies have started considering setting up LNG supply infrastructure starting from 40,000 SCMD to 100,000 as it has become quite economical. This is this is one which I want to cover and again I would like to just brief.It and summarize.

Dr. B Mohanty former Member PNGRB gave an overview of the gas sector. He said, International Energy Agency in 2011 announced arrival of the Golden Age of gas. USA was the primary factor creating huge supply of gas. The price came down to US $ 2 per MMBTU or even less. That golden age ended giving way to acute volatility due to various reasons like Covid, wars, green energy and reducing investment in fossil fuel exploration and development. Nobody knows which way the market will go now. The risks are still there, particularly on the geopolitical side.

Looking at the projection of region wise supply of natural gas, it seems Asia Pacific, particularly Australia and Qatar would lead the growth. North America is likely to continue as the major supplier till probably 2050. On the demand side, in the last decade, demand increased at a CAGR of 2% but now it is increasing by only about 0.4%. The IEA projection for demand over the next couple of decades indicates a continued decline.

The price projections also show a decline. While the US price seem to remain at about US$ 2, JKM and TK also likely to stay below US $ 10. If the oil price remains US $ 60-70 per barrel, then gas price at US $ 10 is good for the Indian industry. The share of LNG was 14% in 2013-14, now it has crossed 50 and may further rise to 60% in the next 5-10 years.

International Energy Administration have projected that LNG import will be much larger than the domestic supply in the coming years despite considerable increase in domestic production. With these projections, total gas demand works out to about 630 MMSCMD in 2050. India Energy Forum in Road Map for Gas Based Economy had also projected a demand of about 600 MMSCMD. Based on these numbers the dependence on LNG works out to about 400 MMSCMD in 2050, if the domestic production is increased as projected.

India Energy Forum, in their report in 2019 had projected sector wise gas consumption up to 2017-18. I have added projections till 2024. Major part of LNG caters to fertilizer and of domestic gas to city gas and other industries. IEA have projected that industry sector will dominate gas consumption in the coming years followed by transport, power and residential sectors because there will be lot of substitution of fossil fuels by renewables in transportation, power, residential and commercial sectors.

Under the Stated Policy Scenario (STEPS), IEA projects decline in world gas demand, primarily because of Europe. Chinese demand rises from 369 BCM today to 410 BCM in 2030 before it declines precipitously to 185 BCM by 2050. But in India it is projected to increase from 60 BCM today to 112 BCM in 2050 probably because India has targeted 2070 for its net zero emissions.

Price of domestic gas which is fixed by the Ministry of Petroleum and Natural gas, came down below $2 in 2020-2021 because of COVID but now have gone up near to $ 9. $ 9-10 per MMBTU has become affordable now. I hope prices will remain almost stable around this figure internationally.

Pipeline is the key to growth in consumption of gas. In a recently held conclave of gas industry directors, they said, we need another 30,000 kilometers of pipelines. We have about 25,000 kilometer pipelines but we need a good network to cover the whole country. City Gas requires access to the network less than 30 kilometers away. In some areas, it is more than 100 kilometers. So we need additional 30,000 kilometers. Gas storage is very critical but also very capital intensive and needs government support. So there are quite a few issues and the industry is looking forward to lot of reforms and policy decisions including uniform taxation under GST.

Shri Gyanendra Sharma, President (Marketing), PLL gave the status of global energy liquefaction and regas capacity and sourcing options for India. He said, considering net zero targets natural gas has become natural source of energy for India. India's energy consumption per capita is one third of the world average and one tenth of the affluent nations. India imports about 50% of its gas requirement and this dependency is likely to go further up to may be 70 percent. Global players

across the world have been planning enhancement of their liquefaction capacity. More than 1000 MTPA capacity creation is under planning stage. The capital-intensive nature of these projects may ultimately limit materialization to about 25%. Considering that the present capacity is around 480 MTPA, it may cross 700 MTPA by 2030.

Coming to the regasification, roughly 1030 MTPA capacity is available across the globe and around 270 MTPA regasification capacity is under construction of which China alone has about 150 MTPA capacity. Around 51 countries are importing. Of late, there has been unprecedented growth in FLNG. Around 200 MTPA FLNG is now operating.

Thus LNG availability is likely to be good and so market may not be subject to too much volatility.

This offers tremendous opportunity to both, LNG consumers and suppliers. As China is slowing down, the world is turning towards India. India has been developing its infrastructure and hopes to cover almost 99.9% population in next 3-4 years through terminals connected to the grid giving last mile connectivity to every nook and corner of the country. The terminals' utilization factor would go up and India would need additional regasification capacity.

Shri JP Mishra, ED, IOCL sharing his experience of IOCL 's involvement in serving country with LNG. He said, Currently Indian oil is the second largest supplier of natural gas in India. We supplied around 6.5 million tons last year and expect to cross around 8 million tons of gas this year. Over the next 2- 3 years, our own captive requirement will be approximately 7 million tons - currently it is around 2.2 million tons.

Pipeline connectivity is a constraint in India. More and more pipelines are being laid and 98% of the population is proposed to be connected by the city gas distribution network. But presently around 20% CGD areas don't have a pipeline connectivity. It is also not economical to lay a pipeline to supply some 1000 or 2000 MMBTU of gas. Indian oil supplies approximately 50% of the petroleum products in the country. A large number of products are supplied by road tankers. Indian oil introduced a new concept to supply LNG also by road tankers in 2006. In 2004 Dahej terminal was commissioned but at that time lot of pipelines were not there. Indian oil, with the help of Petronet LNG started supplying LNG by road tankers. Currently approximately 0.4 million ton of LNG is being supplied by road tankers in India from various terminals like Dahej, Conoor, Kochi, Hajira, Dhamra, Dhabol and more terminals are getting connected like Chara and Mundra. LNG is being transported up to 1850 kilometers from the terminal and to a vast variety of customers like HR Johnson making tiles, National Glass at Nasik Hindustan Saint Gobain Glass, Kajaria Ceramics, Somany Ceramics etc. LNG is used for heating requirement, captive power generation as well as a feedstock for hydrogen production. LNG is also being used as automotive fuel in mining dumpers and in railways. In our country approximately 50 million metric ton diesel is being consumed in the transportation sector. CNG, having limited range is not like a preferred fuel for the trucking operations. But LNG can be used for long haul trucking. In China approximately 13.5 million ton of LNG is used in the transportation sector alone. They have over 7 lakh LNG powered trucks. If India also starts using LNG as a transport fuel, we may increase LNG consumption by approximately one million tons in the near future. IOC has been working with Tata Motors since 2014 and first LNG powered truck was flagged off in 2015. IOC is also working with Ashok Leyland, Volvo, Eicher and other blue energy motors. All of these manufacturers are ready with 4-5 models. Approximately 600 LNG trucks are operating and it is expected that in next one or 2 years' time approximately 10,000 trucks LNG fueled trucks will be on Indian roads. About 10 LNG fueling stations are operational and in next 7 to 8 months 40 more LNG retail outlets will be operational.

Number of small and marginal stranded gas fields are available in the country from which 1.5 million ton of production may be possible. Recently Indian oil signed an MOU with ONGC and they are developing one such field. This will be the first of its kind project in India for well head gas liquefaction plant. In China, Oman, Nigeria and some other places, small scale liquefaction has become a prominent business model. These are very small plants with a footprint of about one or 1.5 acres of land and can liquefy one to two lakh cubic meters of gas which can be trucked without any investment in pipelines.

Indian oil has introduced LNG in mining sector also in 2019. Indian oil joined hands with Reliance at Sasan coal mines and converted large dumpers to LNG powered. Now coal India and Tata Steel are also planning to convert large number of dumpers, as these dumpers consume large volumes of HSD, to the order of 3000 liters per day. Current HSD consumption in the mining sector is about 1.5 million tons which may go further up to 3.5 to 3.7.Million metric tons since mining activities are increasing. Lot of ships are also getting converted to LNG because of the IMO regulations. About 400 ships are operating on LNG and about 600 are on order. India has good potential for becoming a bunkering node. About 1,00,000 ships sail through the southern tip of the India and about 1,00,000 more sail through the Great Nicobar Island. Indian oil is the largest bunker provider in India. These places can provide the ships an alternative to Singapore.

Following the presentations, detailed deliberations took place. **Shri Rajesh Mediratta** said, Lot of liquefaction capacity addition is expected to come and by 2026 we will have at least 150 to 200 million ton more capacity. We don't see much demand growth in Europe and Japan. China may continue to grow and other parts of the world may also see the growth, but that growth will not be as much as we expect in India. If the price comes down to a sweet spot of say $ 6 to $ 8, power sector will see a spurt in demand for gas fired power. Power demand is going up in India at say 7 to 8% and the differential between peak and solar may get wider - during evening peak we may be short of capacity. Power tariff will go up very high in the evening and night. So we should be ready to meet such intermittent requirement with spare capacity. One policy change I expect from power sector that today we have capped our power price @10 per unit because of which gas based power is not feasible because one is that in peak we are capping it at 10:00. Rupees in off peak times it goes down to say, ₹4- ₹5 average price comes out to be ₹6 -7 and at that price no gas based power plant can work. If this cap is removed or increased to say ₹12 or ₹15 then our average price will be something like ₹10. In that case, gas based power plants will become viable. Another problem - our regulations allow transport capacity booking on 3 days' notice and we get a dispatch only one day before or on the same day. Gas based power plant cannot buy gas and book capacity because the 3 days requirement is there for booking the capacity. If this time is reduced or capacity booking is allowed few hours intraday we will be able to see more gas based power being used by the power sector.

Dr. Suresh Sharma asked why can't our companies go for a long term contract? To which it was informed that about 60 % of gas being brought to India is through Long term contracts. Initially for 5 year long Term Lounge is cheaper than the spot and the spot is cheaper subsequently for 5 years except in December January. For this winter season, this spot is always cheaper, so it is very, very difficult to sell these long term contract.

Shri RV Shahi summed up the take aways from the webinar saying that it was a very rich set of presentations by all the speakers. Some of the new things many of us did not know like decentralized production and supply initiative of IOC. Also underutilization of Regas terminals, constraint of pipeline capacities, storage issues etc. He also touched upon the point that net production of gas had been declining in India for last 10 to 15 years, and Indian Oil Corporation's initiative in that respect opens good opportunity for monetizing smaller and stranded gas fields.

He said that IEF would pursue some of the points brought out in the webinar with Petroleum Ministry and the Petroleum and Natural Gas Regulatory Board.

The program ended with a vote of thanks to the Chair, all speakers, and delegates who graced the occasion by **Shri Ashok Varma, Convenor of Oil and Gas Verticals.**

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