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ROLE OF COAL IN ENERGY TRANSITION

Role on Coal in Energy Transition: A Blue Print for Coal Sector

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The Indian Coal Sector should be legitimately proud of having achieved a coal production level of one billion tonne during the just concluded financial year 2023 - 24. It includes about 165 million tonnes from captive and commercial mining. It is also expected that during the year 2025-26, Coal India

Limited itself will achieve the production level of one billion tonne, may be hopefully during the year 2024-25 itself. Obviously, the achievement of this level of production and supply also led to reduction in the import of coal. This process will continue with increasing domestic production and declining import. We need to recognize that while the performance of the coal India limited and Singareni Coal Company have improved significantly, the growth of coal sector as a whole is also attributable to opening of the sector for Captive coal block and also for commercial mining. In view of the cancellation of as many as 240 Coal Blocks in 2014-2015, in accordance with the judgment of Supreme Court, a large number of producing coal mines, and those almost ready to produce got stopped. This did create a major setback affecting significantly not only the coal production growth but also power generation capacity addition and generation of power, in fact, economy as whole. It continued to impact for several years, had adverse consequence on power generation and also requiring increasing import of coal to meet the power generation programmes. The ordinance on coal during early 2015, followed by the legislation, was to address the challenges resulting from the massive cancellation of coal blocks. However, implementation of the Act took

more time than expected. What has been achieved during the last financial year could have been the outcome a few years ago, from the commercial mining and captive coal sector. It is also relevant to mention that the full impact and benefits of the historic legislation namely Electricity Act 2003 could have been achieved if the Coal Bill, which was introduced during 2001-2002, would have been legislated. Unfortunately, this Bill lapsed and coal sector reforms based on the new legislation waited for almost 15 years hampering the several positive outcomes which could have been possible on account of far-reaching provisions of Electricity Act 2003. Gratifyingly, the new Government in 2014 could bring this coal reform legislation which is showing its positive impact.

The renewed thrust provided by the NDA Government, which came to power in 2014, on unprecedented expansion of renewable power, mainly solar power, was a welcome initiative with potential of not only providing less expensive power but also for addressing the climate change concerns by providing to the power consumers carbon free electricity. Even though the challenging target of solar power and other renewables do have the resultant impact on managing the problems of the power transmission grids, the achievements of installing over 80,000 MW of solar have been very positive and satisfying. The ambitious agenda of India on renewable in general and solar in particular did create a degree of uncertainty about the future of coal. Similar perception grew all over the world. However, when large scale developments on renewable front have happened in India and abroad, the accompanying challenges of having to manage grid because of variable loads in the system, a scenario of rethink on future of coal has also emerged. Solar Power not being available during nights, when it is scaled up, in terms of several thousands of Giga Watt, does pose a challenging situation. Various options to provide backup are being explored, many of them are work-in-progress. Under the circumstances, these have led to a near consensus in India and abroad that large scale expansion of power from

renewable sources would not necessarily mean substantial dilution in power profile supported by coal sector, at least during the initial ten to fifteen years of the transition. Different countries have identified different paths for energy transition. India has targeted net zero over a 50-year time frame till 2070.

It appears that in case of India, in the next few years, the growth of coal sector may be at par, or even better, compared to the growth in the immediate past. Subsequently, during the transition period, even though rate might decline, the absolute quantum of power generation based on coal might keep increasing during the period the proportion of profile of non-fossil fuel-based power—solar—wind—nuclear might witness a quantum jump. This is obviously a positive signal for coal sector professionals. In so far as absolute level of production is concerned. But, progressively declining rate of growth provides a good opportunity for the sector to focus attentions on areas which have remained not in their priority lists. A blue print for the next about 50 years, which may have to be reviewed from time to time, keeping in view the emerging scenario of transition management globally as also several forms of technological changes and disruptions, appears relevant to be presented. Some of the important issues that should receive top most attention during energy transition, to manage the coal sector, would include the following:

a) During last fifty years, coal sector growth witnessed a rapid rise in open cast mining and ever declining proportion of underground mining, to the incredibly low level of coal being produced through this route to almost zero. This resulted in corresponding decline in level of quality of coal. Obviously, poor quality has highly adverse impact on performance of the consuming sectors besides severely affecting the environment and devastation of forests. During the next fifty years of transition, this trend should be attempted to be reversed toward progressively rising proportion of coal production through underground mining.

Obviously, the technological advances achieved all over the world should facilitate more efficient coal mining processes to be adopted.

- b) India is endowed with huge coal reserves, estimated at 370 billion tonnes, and this is the most dominant and important source of energy for the country. However, it is known that the ash content in the Indian coal is very high, of the order of 40 to 45 percent. This has adverse implications on operations of power plants, besides increasing cost of transportation and serious adverse impact on environment. Several attempts were made in the past, through Administrative Notifications placing obligations on power generating companies to use washed coal with reduced ash content. These policy directions had little effect and use of washed coal was more by exception than by the rules. Subsequently, another serious attempt was made by the Ministry of Environment and Forest. On the basis of dialogue with the stakeholders and studies through an Expert Committee, a revised notification was issued with the obligations cast on both- coal producers and power generating companies - to use washed coal in power plants which were 500 KM or more away from the coal sources. This amended Notification also remained, by and large, unimplemented. Subsequently, the Notification itself has been withdrawn. It is important that coal washeries are brought back on the agenda, since it is one of the important Clean Coal Technologies, and, in fact, more relevant in the Indian context.
- c) National Coal Distribution Policy was amended a few years ago to respond to the huge shortages in the demand and supplies of coal, post cancellation of coal blocks. The coal linkages used to be provided by Ministry of coal unrelated to Power Purchase Agreement. This facilitated faster development of power projects and capacity additions. This was changed by way of providing required priority to those power

generating projects which had PPA since there was a huge gap in supply of coal. Now that coal production has substantially improved and Thermal Power capacity addition is also on a lower growth profile, the condition of Power Purchase Agreement may not be relevant. Linkages could be provided as in the past and fuel supply agreements could be left to the power generating companies and coal producing companies.

d) With the opening of the coal sector, facilitating, commercial coal mining, the advantage of the new legislation and policy are already visible. Captive coal blocks and commercial coal mining made substantial contribution to the coal production and supply during the last financial year, of the order of 165 million tonnes (about 17% of total coal production). The share of captive and commercial coal mining will progressively rise and a number of new coal producing companies would be participating in the expansion of coal industry. The need and relevance of Coal Regulator has been emphasised in the past. In the context of the emerging scenario of coal sector, the institution of Coal Regulator is essential. This would ensure growth of coal industry, enhancement in the quality of coal, appropriate pricing structure, and an equitable sharing of risks and gains among all the stakeholders.

e) Transportation logistics has been another important area since due to the challenge of coal stocks being transported to the consumption centres, power plants and others have been experiencing serious constraints. The need for the main transportation through rail is being attended to by the Railway Board, and that requires substantial augmentation, has an obvious gap between demand and supply in terms of not only rakes but also inadequacies of railway lines. Equally important are the local links from the coal mines to the main railway system. Serious mismatches, which have

remained unattended over the years, have led to massive road transportation of coal resulting in not only inefficient transportation requiring imported diesel consumption but also serious environmental implications. The issues have to be attended at the Railway Board level for the main railway systems and at the local level by organisations like Coal India and other coal producers who should be setting up local logistics which should include rapid loading systems and rail links up to the main railway lines.

f) Coal Gasification has been discussed over decades. Major technology interventions – Gasification, Coal Bed Methane, production of Ammonia, and Coal to Hydrogen, Carbon Capture and Utilisation (CCU) need to receive active attentions and interventions in the wake of emerging transition. Efforts have to be coordinated among a number of public and private sector companies. Several missions have already been set up, a number of large public and private sector companies have announced launching of their initiatives. It is hoped that the changing mix of energy, and the challenges the emerging scenario is creating, would compel all stakeholders for the required actions.

From the Desk of the Honorary Secretary General



Dear Colleague

I am happy to share with you the April Issue of our bi-monthly e-magazine TOTAL ENERGY.

During this month Coal Vertical organised its 8th Roundtable Conference on Coal on the theme “Role of Coal in Energy Transition” on 12th April

2024 at Hotel Le Meridien, New Delhi in association with the ISMAA DC and MGMI DC. The conference was inaugurated by **Shri Alok Kumar IAS**, Former Secretary, Ministry of Power.

There were four Technical Sessions including Panel Discussion which deliberated upon “Coal Production – Meeting the Demands”; “Applications of Modern Technology in Open Cast Mining”; and “New Trends in Coal Usages”.

Shri CK Mishra IAS, Former Secretary, Ministry of Environment, Forest and Climate Change delivered the Valedictory Session. The Summit was a grand success.

In the month of **May**, two webinars shall be organised. The one on “Regulatory Affairs” which will held tentatively on 18th May 2024 and second one will be on Renewable Energy which will be held in the last week of May.

The year-on-year growth rate in energy sector has been encouraging, with y-o-y growth rate of electricity at 8.0%, Coal at 8.7%, Crude oil at 2.0%, and Natural Gas at 6.3% in March 2024.

With best wishes

K S Popli

India installed 7.1 GW of renewable energy capacity in March

Rystad Energy’s latest data reveals monthly renewable energy installations in India surged to a record 7.1 GW in March 2024, more than doubling the previous record of 3.5 GW set in March 2022. Of the record 7.1 GW of renewable capacity added in March, more than 6.2 GW was new solar capacity—a significant addition considering the Jan-Dec. period of 2023 saw 7.5 GW of new solar installations.

The increase in RE installations in March helped India reach its highest-ever annual installed capacity of 18.5 GW for the fiscal year ending on March 31, 2024.

Rystad Energy stated that the [annual] growth in RE capacity was primarily driven by solar installations, which were up 23% on levels from the 2023 financial year, driven by the commissioning of numerous projects within India’s inter-state transmission system network and ultra-mega solar park schemes. In particular, states such as Gujarat, Rajasthan, Madhya Pradesh and Maharashtra have contributed to this expansion.

Notably, Adani Green, the renewable energy arm of Indian conglomerate Adani Group, made significant strides in the first quarter of 2024 by installing approximately 1.6 GW of solar capacity in the Kutch district of Gujarat. This initiative is part of a wider hybrid renewable energy park that will see up to 30 GW of combined solar and wind capacity installed in Khavda in the coming years.

While the recent increase in renewable capacity is encouraging, further boost in annual additions is imperative to meet the nation’s RE goal to achieve 500 GW of non-fossil fuel capacity by 2031-32. To achieve the 500 GW target, India must install around 30 GW of non-fossil fuel energy generation capacity annually, which includes solar PV, hydropower, onshore wind and nuclear energy.

“With the commencement of India’s general elections earlier this month, the country’s emphasis on renewable energy comes as no surprise. Despite ambitious climate goals to reduce carbon dioxide

emissions, achieving them is only achievable if the country maintains the fervor witnessed in recent months. However, critical challenges persist: ensuring grid stability alongside the higher integration costs that come with introducing more renewable capacity. A strategic solution lies in balancing this clean energy embrace with targeted exports, enabling India's growth visions for the power sector, without compromising national climate goals," says Rohit Pradeep Patel, vice president of renewables and power research at Rystad Energy.

On the supply chain side, the ramp-up of solar installations in India has created substantial demand for solar equipment.

Historically, Indian developers heavily relied on Chinese imports due to their competitive pricing over domestic manufacturers. In response, the Indian government introduced initiatives like the Production Linked Incentive (PLI) scheme to empower domestic manufacturers to boost their production capabilities, thus enhancing their price competitiveness to meet local demand. Additionally, governmental support measures like the Approved List of Models and Manufacturers (ALMM) mandate and the basic customs duty on imported solar modules further assisted in bolstering the domestic solar industry.

Supported by these measures, India's solar panel production capacity hit 68 GW as of March 2024 and the nation started expanding its reach by exporting panels.

The US has emerged as a major export destination due to its high demand for solar energy and the potential for strong profit margins. The Uyghur Forced Labor Prevention Act (UFLPA) in the US also played a role in this shift towards Indian exports.

Despite millions of panels being shipped from India to the US, Indian manufacturers encounter stiff competition from their Southeast Asian counterparts who are able to lower their production costs by utilizing material inputs from China.

However, exports from India are expected to increase as the US imposes duties on panels from Southeast Asian counterparts, which are expected to be as high as 254% and set to be implemented from

June 2024, making these panels significantly costlier than ones from India.

SJVN Limited inaugurates India's first Multi-purpose Green Hydrogen Pilot Project

SJVN Limited achieved a significant milestone with inauguration of India's first Multi-purpose (Combined Heat & Power) Green Hydrogen Pilot Project at 1500 MW Nathpa Jhakri Hydro Power Station (NJHPS) in Jhakri, Himachal Pradesh recently.

Smt. Geeta Kapur, Chairman & Managing Director, SJVN inaugurated 20Nm³/hr Electrolyzer & 25kW Fuel Cell Capacity based state-of-the-art Green Hydrogen Pilot Project. This project is nation's first Multi-purpose (Combined Heat & Power) Green Hydrogen Generation Plant with capability to cater to the High Velocity Oxygen Fuel (HVOF) Coating Facility of NJHPS for meeting its combustion fuel requirements in addition to generating electricity through its 25kW capacity Fuel Cell.

The project will produce hydrogen gas by splitting hydrogen and oxygen from water with the help of alkaline electrolyzer of 20Nm³/hr capacity by utilizing renewable energy supplied from 1.31 MW Solar Power Plant of SJVN located in Wadhal, Himachal Pradesh.

The Pilot Project is set to produce 14Kgs. of Green Hydrogen daily during 8 hours of operation which will be stored in 6 nos. of storage Tanks with total storage capacity of 12 m³ at 30 bar pressure. The green hydrogen will be utilized for HVOF Coating of turbine underwater parts in addition to generating electricity through its 25kW capacity Fuel Cell.

"Aligned with National Green Hydrogen Mission of Government of India, SJVN's Green Hydrogen Pilot Project is poised to accelerate the development of green hydrogen production infrastructure in power sector, establishing green hydrogen as a clean energy source." said Smt. Kapur. During her visit, Smt. Geeta Kapur also inaugurated first of kind Centralized Operation of 1500 MW NJHPS and 412 MW Rampur Hydro Power Station (Rampur HPS) by remotely operating Unit-2 of RHPS from NJHPS Control Room at Jhakri, Himachal Pradesh. Rampur

HPS is being successfully operated on Tandem Operating System with NJHPS.

Smt. Kapur commended dedicated efforts of NJHPS, Rampur HPS and Electrical Design Team at Corporate Headquarters for this historical achievement and urged the employees to continue working diligently towards fully operating entire Power Station from NJHPS at the earliest.

During these significant events, Sh. Manoj Kumar, Head of Project (NJHPS), Sh. Vikas Marwah Head of Project (Rampur HPS), Sh. Harish Kumar Sharma, Head of Department (Electrical Design), along with senior officials of NJHPS, Rampur HPS and Corporate Headquarters were also present.

India expected to install more than 20 GW of solar this year: JMK Research

A new report by JMK Research projects that India's annual solar installations in 2024 will surpass 20 GW, with 15.9 GW of capacity likely to be added in the utility-scale segment and 4.2 GW in rooftop (onsite) PV.

The research, titled Annual India Solar Report Card – CY2023, states that India commissioned around 9.5 GW of solar capacity in 2023, including 6.5 GW from utility-scale projects and 3 GW rooftop. The capacity additions in 2023 were led by Rajasthan, where 2.4 GW of new projects were installed. Rajasthan was followed by Gujarat (1.3 GW) and Maharashtra (0.9 GW).

As of Dec. 31, 2023, the nation had installed a cumulative utility-scale solar capacity of 60.9 GW, while another 64 GW is under pipeline (auctions completed).

Leading players in 2023

China's Jinko, Longi and Trina were the top three module suppliers in India in CY2023. The sales of Chinese players increased in India due to the suspension of ALMM mandate until March 2024.

Waaree, Vikram Solar and Adani were the top 3 exporters among all domestic module manufacturers. These players exported about 60-64% of their total production in CY2023.

Sungrow, Sineng and FIMER led inverter supplies in India.

Adani, ReNew and UPC Renewables were the top three utility-scale project developers. Adani developed 11.5% of the overall 6.9 GW utility-scale capacity commissioned in CY2023. ReNew contributed 5.9% and UPC Renewables 4.6%.

Waaree, Sterling & Wilson and Vikram Solar were the leading third-party EPC contractors for utility-scale solar projects.

Solar power drives record renewable energy growth in India

India has recorded its highest annual installed renewable energy capacity of 18.5 gigawatts (GW) for the fiscal year ending March 31, 2024, with March installations peaking at 7.1 GW, surpassing the previous record of 3.5 GW set in March 2022, Rystad Energy reported.

The surge in installations, predominantly driven by solar energy, is a significant step towards India's target of achieving 500 GW of non-fossil fuel capacity by 2031-32, a goal set in alignment with Prime Minister Narendra Modi's vision for a net-zero emissions country by 2070.

Rohit Pradeep Patel, Vice President of Renewables and Power Research at Rystad Energy, emphasized the critical role of continued momentum in renewable energy development, stating, "With the commencement of India's general elections earlier this month, the country's emphasis on renewable energy comes as no surprise. Despite ambitious climate goals to reduce carbon dioxide emissions, achieving them is only achievable if the country maintains the fervor witnessed in recent months."

Significant contributions to the installation figures include projects like Adani Green's 1.6 GW of solar capacity in Gujarat's Kutch district, part of a larger plan for a hybrid renewable energy park aiming for 30 GW of combined solar and wind capacity. Patel also highlighted challenges such as grid stability and integration costs, "Critical challenges persist: ensuring grid stability alongside the higher integration costs that come with introducing more

renewable capacity. A strategic solution lies in balancing this clean energy embrace with targeted exports, enabling India's growth visions for the power sector, without compromising national climate goals."

The domestic solar equipment demand has surged due to the increase in installations, with more than 6.2 GW of new capacity from solar alone. India's solar panel production capacity stood at 68 GW as of March 2024, with the country looking to expand its export markets, particularly to the US.

Despite stiff competition from Southeast Asian manufacturers, Indian exports are expected to rise following the U.S. imposition of duties on panels from Southeast Asia, potentially as high as 254% starting June 2024.

India currently exports power primarily to Bangladesh, Nepal, and Bhutan, with minor amounts to Myanmar. Plans are underway to establish renewable power trading through interconnectors with countries like the UAE, Saudi Arabia, Sri Lanka, and potential expansions to Southeast Asia. However, these projects are capital intensive and not expected to impact the energy transition until the 2030s.

As India continues to navigate its path towards its renewable energy targets, the focus remains on harnessing domestic capabilities while exploring avenues for international trade in renewable power.

Tata Power hits 100 million green kilometers with EV charging network

Tata Power, an electric vehicle (EV) charging solutions provider, has reached a milestone of 100 million green kilometers through its expansive EV charging network across India. This achievement underscores the company's role in promoting sustainable mobility nationwide. Aligned with India's ambitious sustainable transportation goals, supported by government initiatives like the FAME scheme and the National Electric Mobility Mission, Tata Power has significantly expanded its charging network. The network includes over 86,000 home chargers and more than 5,300 public, semipublic, and fleet charging points, along with over 850 bus charging stations in 530 cities.

The placement of these chargers in strategic locations such as highways, hotels, malls, and hospitals supports the growing adoption of electric vehicles in the country. Industry estimates suggest that India is poised to reach annual sales of 10 million electric vehicles by 2030.

Tata Power continues to innovate within the sector, offering tech-enabled solutions that enhance user experience, such as an RFID card system enabling wireless payments at charging stations.

Additionally, Tata Power's commitment to zero-emission mobility was recognized with the 'Shoonya Infrastructure Champion' accolade at the recent 2nd Annual Shoonya Forum in New Delhi. The Shoonya campaign, initiated by NITI Aayog in 2021, includes collaborations with roughly 200 industry partners, aimed at advancing cleaner mobility within the EV ecosystem.

India has \$78 bn opportunity for green hydrogen electrolyzers by 2050: Report

India has \$78 billion green hydrogen electrolyser potential by 2050, up from \$4 billion in 2030, according to a latest report titled 'Green Hydrogen for Decarbonizing Asia's Industrial Giants' by the Asia Society Policy Institute. The report assesses the future potential and trajectory for electrolyzers needed to meet green H2 demand in China, India, Japan, and South Korea. It said that net zero targets in Asia's four largest economies could substantially expand the market for green hydrogen (H2) electrolyzers, with the combined potential in these countries projected to reach \$180 billion by 2050 for key industrial applications.

"The collective market potential for electrolyzers is expected to skyrocket to \$180 billion by 2050, with a compound annual growth rate as high as 12 per cent between 2030 and 2040. This is nearly five times as large as the market potential under a business-as-usual scenario," it said.

The study looks at the role of green H2 in three priority industries — steel, ammonia, and methanol — under various decarbonization scenarios. In these

sectors, green H2 has the capacity to significantly reduce emissions by replacing carbon-intensive processes with renewable energy-powered electrolysis.

“Should the four countries adhere to their declared net zero targets, the analysis projects massive growth in the market potential of green H₂ electrolyzers for the three industries by 2050,” it added.

China has \$85 billion potential by 2050, up from \$22 billion in 2030, Japan has \$9 billion by 2050, up from \$1 billion in 2030, and South Korea has \$8 billion potential by 2050, up from \$1 billion in 2030.

It said that the total electrolyzer market opportunity will be even greater since it includes applications for other industries. The study also breaks down the electrolyzer market potential for each of the three industries and four countries analyzed.

India offers \$125-bn investment opportunity across green hydrogen value chain: Report

India offers a \$125-billion investment opportunity across the green hydrogen value chain by 2030, according to a recent report by Avendus Capital, a Mumbai-based investment bank. The report said that the growth will be driven by rising sustainability focus, demonstrated commercial viability, ever-expanding use cases and a strong regulatory push. “We see an emergence of the first set of serious standalone and integrated participants forging partnerships to aggregate capabilities and infrastructure to tap into green hydrogen derivatives,” said Prateek Jhavar, managing director and head, infrastructure and real assets investment banking, Avendus Capital

He added that while the C&I business model for domestic consumption of green hydrogen will drive the first set of investments in the sector, the steel industry will form the largest share of off-take contracts in the near-term with the imposition of the Carbon Border Adjustment Mechanism in the EU. According to the report, early-stage investment risks are likely to be short-lived as the sector is already at an inflection point. In terms of project bankability,

green hydrogen is already viable for a subset of target off takers and its derivatives are also gaining visibility in global markets, said Akhil Dokania, director, infrastructure and real assets investment banking, Avendus Capital.

“Hence, long-term contracts are already available. In the absence of long-term contracts, we expect the gray molecule price benchmarks to act as de-facto for debt sizing and a corporate financing model to emerge and co-exist with the project financing model,” he added. He further added that ammonia is the largest end-user segment for green hydrogen in the near-term and it plays a pivotal role in producing green hydrogen at scale. “We expect that a nuanced understanding of global trade dynamics and risks to existing business will drive oil & gas companies to invest in green ammonia. There is also a potential for partnerships and joint ventures between developers and fertilizer companies, owing to their lack of expertise in the sale of Ammonia,” said Dokania.

Given the push for hydrogen mobility, an offtake market for green hydrogen refueling is also likely to emerge, especially for long haul and large road applications, he said.

India to Have 122GW Installed Wind Capacity by 2032: GWEC Report

India is expected to more than double its onshore wind and solar PV capacity by 2028 and achieve its milestone of 50% non-fossil fuel generation before 2030, according to the Global Wind Report by the Global Wind Energy Council. As far as wind energy is concerned, the GWEC report shed light on the country’s wind capacity stating that as per the National Electricity Plan of the central government for the period ending 2032, India’s installed wind capacity is estimated to amount to around 73 GW in 2026-2027 and 122 GW in 2031-2032.

Globally, India ranks fourth in total wind installations, with 45 GW of installed onshore wind as of January 2024. It is the second-largest wind market in the Asia Pacific region after China. In 2023, due to a range of policy and institutional interventions by central and state governments, over 2.8 GW onshore wind

capacity was commissioned – the highest annual installation level since 2017, stated the GWR report.

GWEC expects continued recovery and has revised its onshore wind outlook for 2024-2028 to 22.8 GW. Concluded wind and hybrid tenders affirm that there is a pipeline of more than 13 GW of wind projects in India, as of September 2023.

However, despite positive policy and regulatory momentum, the current onshore wind forecast through the end of the decade still leaves a sizeable gap between wind market growth and the government's 140 GW target of installed capacity by 2030. A few challenges continue to deter progress on onshore wind, including state-level issues for right of way, PPA sanctity, and delayed payments, as well as land allocation. The industry is also experiencing increased turbine prices due to commodity price inflation and higher cost of financing.

Delving into offshore wind energy, the report further stated that there is intense interest among PSUs to forge partnerships and JVs, for example between ONGC and NGEL, L&T and Navantia, NGEL and Gujarat Pipavav Port as well as Stiesdal and L&T for floating wind and an energy island. The Asian Development Bank (ADB) and World Bank are reportedly exploring low-cost financing for offshore wind in India too. To achieve offshore wind installation progress, India needs to address key market barriers such as readiness of ports and grid infrastructure, availability of vessels, supply chain or import strategy, assurance for offtake, streamlined permitting and clearances, community partnership, and the availability of a local skilled workforce.

New study finds potential for 3,200 GW of agrivoltaics in India

While traditional land-based solar PV plants have proven to be effective in generating electricity, there is a growing need to explore new and innovative solar applications that offer distinct advantages.

While traditional land-based solar PV plants have proven to be effective in generating electricity, there is a growing need to explore new and innovative solar applications that offer distinct advantages. In

particular, the concept of land-neutral or dual-use applications has gained significant traction. Agrivoltaics not only reduces land-use impact and potential risks of land conflicts but also offers improved conditions for crop growth by providing protection against strong solar irradiation and winds, hot temperatures, and improved water availability.

A new study has estimated a potential for 3,200 GWp of agrivoltaics in India. The state of Punjab tops with a potential for around 871 GWp. It is followed by Haryana (700 GWp) and Rajasthan (592 GWp).

The researchers considered 17 crops and suitability of three agrivoltaics technology configurations (overhead south facing, overhead east-west facing and interspaced vertical) for each of these crops while calculating the overall agrivoltaics potential in India.

India's total potential for agrivoltaics was estimated across minimum and maximum scenarios for respective crops with various agrivoltaics technologies in each district and it varied from 3,156 GW to 13,803 GW.

To calculate the agrivoltaics potential, the researchers considered the potential farming area for agrivoltaics and power density for three APV technology types. The potential agrivoltaic area is one that fulfils the criteria of slope < 8 degrees, global horizontal irradiance (GHI) >4.5 kW/m²/day, distance from road/rail < 25 km). The power density for the agrivoltaics technology types was referenced from international best practices and on-ground projects. The potential for each crop in all the districts was calculated for each of the three technologies based on the crop suitability matrix.

The report projects a cumulative agrivoltaics capacity addition of 20 GW and 60 GW under the moderate and optimistic scenario, respectively. The total investment required to realise the 20 GW capacity (moderate case) will be around INR 81,424 crore. Further, it estimates that to meet an agrivoltaics demand of 20 GW by 2040, 1.1 lakh full-time equivalent jobs will be required.

The study was conducted by Fraunhofer-Institut für Solare Energiesysteme ISE, Center for Study of Science, Technology and Policy, and EY. It was launched by the Center of Excellence on AgriPV established jointly by the National Institute of Solar Energy and Indian Agricultural Research Institute.

The report covers agrivoltaics in detail including the potential assessment, business models, modes of implementation, key technical, policy and market enablers, finance portfolio and skills required to facilitate the acceleration of agrivoltaics in India.

India's 10 GWh tender draws seven bids to set up mega-scale battery cell manufacturing facilities under PLI scheme

India's Ministry of Heavy Industries (MHI) has received seven bids under its global tender for the re-bidding of production-linked incentives (PLI) for 10 GWh advanced chemistry cell (ACC) manufacturing announced in January this year.

ACME Cleantech Solutions, Amara Raja Advanced Cell Technologies, Anvi Power Industries, JSW Neo Energy, Reliance Industries Ltd, Lucas TVS, and Waaree Energies submitted bids for a cumulative capacity of 70 GWh against the tendered 10 GWh capacity.

In May 2021, the Cabinet had approved the INR 18,100-crore PLI Scheme to achieve ACC manufacturing capacity of 50 GWh.

The first round of the ACC PLI bidding was concluded in March 2022, and three beneficiary firms were allocated a total capacity of 30 GWh. Among the winning firms, Ola Electric Mobility secured incentives support for 20 GWh, Reliance New Energy Solar Ltd 5 GWh, and Rajesh Exports 5 GWh. The program agreement with selected beneficiary firms was signed in July 2022.

Further, in January, MHI issued the tender for setting up 10 GWh of ACC manufacturing capacity with maximum PLI outlay of INR 3,620 crore.

NTPC targets 5GW power generation capacity addition in FY25



NTPC on Recently said it is eyeing 5 GW power generation capacity addition in financial year 2024-25. NTPC aims to add 3 gigawatt (GW) of renewable energy (RE) capacity, exemplifying its steadfast dedication to environmental stewardship, a company statement said.

Simultaneously, the power major aims to add 2 GW to its thermal energy capacity.

According to the statement, NTPC has set a target to add 5GW of installed capacity reflecting its commitment to providing clean, reliable, and affordable energy solutions.

In FY24, NTPC successfully added 3,924 MW of new capacity to its portfolio, bringing its cumulative installed capacity to nearly 76 GW.

Presently, the group has an operational RE capacity of 3.5 GW, with an extensive pipeline exceeding 20 GW. By 2032, NTPC is looking to expand its non-fossil-based capacity to 45-50 per cent of the company's portfolio that will include 60 GW RE capacity with a total portfolio of 130 GW. NTPC Ltd is India's largest integrated power utility, contributing 1/4th of the power requirement of the country. With a diverse portfolio of thermal, hydro, solar, and wind power plants, NTPC is dedicated to delivering reliable, affordable, and sustainable electricity to the nation. The company is committed to adopting best practices, fostering innovation, and embracing clean energy technologies for a greener future.

Why electric mobility trumps hydrogen and hybrids in India



Alok Kumar IAS (Retd),
Former Secretary (Power)

The government's push for electric mobility has generated intense debate over the past few years. One argument is that hybrid vehicles should be promoted as they may be more acceptable to buyers for now, and less likely to cause much disruption in the labour-intensive auto manufacturing industry. It has also been argued that promoting EVs is increasing greenhouse gas emissions in the short term as India presently generates over three-fourths of its electricity from coal.

Let us look at this closely. India's medium-term strategic goals require substituting fossil fuels with renewable energy as much as possible as we are constrained when it comes to local availability of oil and gas. No doubt our electricity grid is heavily dependent on coal, but it is projected to go green quickly, with the share of generation from RE expected to grow from 24% in 2022 to 45% in 2032, according to the National Electricity Plan. Generating nuclear energy from thorium is still under development, so solar is currently the king of renewables for India.

India launched its National Electric Mobility Mission Plan 2020 in 2013 to address three key concerns: energy security in view of the huge dependence on oil and gas imports, the imperative to combating global warming, and the health hazard from air pollution in our major cities.

EV technology has just started picking up (only about 1% of transport energy demand worldwide is met by electricity), and we are already seeing near price parity between EVs and petrol cars. Operating costs of EVs are extremely competitive, which makes a strong case for their use in fleets and public transport. They also address the challenge of air pollution in cities, with attendant public-health benefits.

Full-scale adoption of any new technology takes time and requires sustained incentives to promote both demand and supply, along with local manufacturing

and support systems. China is a big player in the EV industry today because of 20 years of hard work. The country prioritised electric mobility as an area of research as early as 2001. We already have a robust electrical grid and EV technology could be rolled out faster than a transportation, storage, and distribution ecosystem built from scratch for another, more expensive green fuel – hydrogen.

Incentivising hybrids, which is a stop-gap solution at best, will only delay the transition to an emissions-free future and extend India's dependence on imported oil. The country will soon face scrutiny from the world as the second-biggest carbon emitter after China. EV technology is a much more feasible and affordable option for India's transport sector in the near to medium term. Even in trucking, electric vehicles are emerging as a feasible option for several applications. We now have an unwavering national policy in favour of electric mobility to attract investors in EV and battery manufacturing, and to set up public charging infrastructure. This is the singular course we must diligently follow.

India has several other advantages on EV adoption, such as a large potential market and expertise in auto manufacturing. China has about five million jobs in its auto industry compared to about 1.4 million in India.

We need to prioritise a quick roll-out of an electric mobility ecosystem, including enhanced public funding for charging infrastructure, interoperable chargers, standards for battery swapping, a national program for reskilling of our workforce in this new technology, aggressive efforts to acquire critical minerals such as lithium, and 'smart charging' of EVs. Transitioning all government vehicles to EVs in the next two years would send out a loud and clear message.

Former union power secretary Alok Kumar also chaired the G20 Energy Transitions Working group during India's presidency.

Achieving the tripling target is far from assured as an additional 7.2 terawatts (TW) of renewable power would need to be deployed to reach the required 11 TW by 2030. However, current projections indicate the target will remain out of reach without urgent policy intervention.

For the first time, India crosses coal and lignite production of 1 billion tonnes in FY24: Pralhad Joshi



The coal and lignite production in India has for the first time crossed the milestone of 1 billion tonnes in the financial year 2023-24, Union Coal and Mines Minister Pralhad Joshi said recently.

According to official figures, India's total coal and lignite output was at 937 million tonnes (MT) in the preceding 2022-23 fiscal year.

"Proud to share that under the leadership of PM Narendra Modi, we have registered a stellar achievement by crossing 1 billion tonne (BT) coal and lignite production," Joshi said.

It is a historic moment for India as the country has achieved the highest-ever production, and it will go a long way in ensuring energy security to the nation. The continuous efforts to increase domestic coal production has ensured that going forward the country will never have to face coal shortage, the minister said.

Joshi further said, "I thank the officials of the sector, all the coal warriors and private miners for their grit and hard work in helping achieve mission-1BT. Owing to your support we have registered 70 per cent growth in production over the last 10 years."

The share of imported coal for blending purposes has gone down this fiscal compared to last financial year, Joshi told PTI last month.

In FY24, coal import for blending was around 22.20 million tonnes, while it was at 30.80 million tonnes in the financial year 2022-23. Savings to the tune of Rs 82,264 crore had been made through the reduction of coal imports in just one year, Joshi said.

According to the official data, the combined coal and lignite production was at 1,039.57 MT, while the despatch was at 1,016.71 MT during FY24.

Of the 1,039.57 MT, the coal production was at 997.39 MT, up 11.67 per cent over the previous fiscal year's production of 893.19 MT.

The 42.18 MT lignite production was 5 per cent lower from 44 MT lignite produced in 2022-23 fiscal.

The coal production has registered a compound annual growth rate (CAGR) of 5.83 per cent till 2023-24 from 2013-14 when the output was at 565.77 MT. Furthermore, the nation exceeded previous dispatch records by sending out 973.31 MT of coal during FY24 over 877.36 MT in the preceding fiscal year.

The despatch has grown at a CAGR of 5.46 per cent from 572.06 MT during FY14.

Of the total coal dispatched during FY24, 805.35 MT was allocated to the power sector, indicating an 8.16 per cent growth compared to FY23, while 167.96 MT was directed towards non-regulated sectors such as steel, cement, and sponge iron, showcasing a remarkable growth of 26.51 per cent.

This achievement was facilitated by the railways, which supplied an average of 393.1 daily rakes during FY24, compared to 371.55 in FY23, demonstrating a notable growth of 5.8 per cent.

The implementation of First Mile Connectivity Projects has notably enhanced overall logistics efficiency by optimizing coal transportation in an eco-friendly manner.

Coal-based power generation experienced a significant surge, recording a 9.98 per cent increase to 1244.81 billion units (BU) during FY 2023-24, compared to 1131.84 BU during FY 2022-23.

Additionally, coal and lignite-based power generation witnessed a CAGR of 5.46 per cent, generating 1269.81 BU in FY 2023-24 compared to 746.09 BU during FY 2013-14.

The coal stock is around 161 MT in the country, with 47.38 MT allocated to domestic coal-based thermal

power plants as of March 31, 2024, ensuring uninterrupted power supply nationwide.

Private captive, commercial coal mines cross 140 MT production in FY24

Coal production from mines awarded to private miners for captive (self use) and commercial purposes touched 147 million tonnes (MT) in financial year 2023-24 (FY24), a government statement said recently. This is a 27 per cent jump over 2022-23 when their production stood at 116 MT.

Dispatch during FY24 was 143 MT against 110 MT in FY23, a growth of 30 per cent, the ministry of coal said.

As on March 31, 2024, 58 coal mines were under production in FY24 whereas 49 mines were producing as on March 31, 2023.

Nine new coal mines commenced production during FY24, which includes four captive mines and five commercial coal mines.

Of the total production of 147.2 MT, power sector captive mines produced around 121.3 MT. Captive mines of the non-power sector produced 8.4 MT and production from commercial mines stood at 17.5 MT.

These captive mines were awarded to private companies and state-owned utilities over the last eight years. This came after a 2014 Supreme Court decision cancelled all coal block allocations made over the past two decades.

Three years ago, the coal ministry opened up the coal mining sector for private players to sell coal. The coal ministry has auctioned around 64 mines under commercial auction.

The coal ministry believes that when private mining picks up, it will help build surplus coal stock.

It will also reduce pressure on national miner Coal India, which is the largest producer and supplier of coal.

This paper had reported recently that India plans to scale up its coal production capacity to 2 billion

tonnes by 2030. This, it expects, would be more than the demand then, thereby helping build a buffer stock.

Govt confident of 1.1-billion-tonne coal production

The government is confident of producing 1.08 billion tonne of coal during 2024-25, an official source told recently. The coal ministry is planning to inaugurate 20 first-mile connectivity projects with coal handling plants and silos this fiscal to boost evacuation.

“This year, we will produce 1,080 million tonne of coal,” the source said. “Rake deployment has increased and effective utilisation of rakes is going to happen. We have CHP (coal handling plants) silos. In FY24, we inaugurated eight CHP silos. This year, we are going to inaugurate almost 20.”

Of the envisioned FY25 target, Coal India is set to produce 838 MT. The company earlier had a target of producing 850 MT, which was revised owing to huge stocks at thermal power plants.

In FY24, the government had envisaged the coal output crossing 1 billion tonne, but fell short of the target at 997.4 MT, official data showed. Production, however, touched a new high, up by 11.67% from FY23. The cumulative production of coal and lignite stood at 1.04 billion tonne.

The government is planning to open three coking coal mines in Jharkhand this fiscal with capacity ranging from 5 MT to 6.5 MT.

“This year, we are going to open three coking coal mines – all in Jharkhand. One of them will be the largest coking coal mine in the country,” said the source.

The move comes amid the government’s efforts to reduce imports of coking coal, primarily used in the steel sector. The country imports around 70% of its coking coal requirements.

“We wish to set up more washeries, auction high grade coal to the steel sector exclusively and change the technology in steel making and use the blast furnace route,” said the official. “We should be able

to reduce coking coal imports in the next two-three years.”

Currently, there are two companies – Bharat Coking Coal and Central Coalfields, both subsidiaries of Coal India – that produce coking coal in the country.

Over the years, owing to shortage of coal, the good quality stuff produced by BCCL primarily to be used in steel making, has been supplied to the power sector.

During FY24, Coal India and other captive mines cumulatively produced 66.63 MT of coking coal, up from 60.76 MT in FY23, as per government data. The country imported 48.29 MT of coking coal till January in FY24.

Coal mine auction likely in May, 30 new blocks to be put on offer

The coal ministry is likely to hold the next round of auction of coal mines for commercial mining by May 10 with 30 new blocks on offer. The ministry has received permission from the Election Commission of India for the auction, a senior government official told referring to the 2024 general elections starting recently. The auction will also see 50 mines that did not elicit a response in previous rounds being put on offer, the official said. "It will take two months to receive bids for the mines," the official said. The government's target is to augment domestic coal production and reduce imports with commercial mines playing a major role.

Captive and commercial mines produced 147 million tonnes of coal in FY24, an increase of nearly 48%, the official said. Production is likely to breach 170 MT this fiscal, the official added. Coal production target for FY30 has been set at around 1.5 billion tonnes, as per the ministry.

In the last forward auction held in March, JK Cement bid the highest for Mahan coal mine in Madhya Pradesh. Rungta Sons Pvt. Ltd pipped JSW Steel Ltd to clinch South of Damuda in Jharkhand. Bull Mining bid highest for Jharkhand's Duni Central, where Tata Steel was also a contender.

The coal ministry launched auctions of mines for commercial mining under the ninth round on December 20 and eighth round on November 15. The coal ministry earlier said it is taking strategic initiatives for sustainable development and self-reliance in the energy domain. Coal minister Pralhad Joshi said earlier his ministry will ask imported coal-based power plants to consider switching to domestic fuel-based design and technology as electricity production in India is set to rise. The ministry is aiming for zero thermal coal imports by FY26.

NTPC sets target of 40 MMT coal production from captive mines in FY'25



NTPC Limited has set a target of 40 Million Metric Tons (MMT) of coal production from its captive mines for the fiscal FY'25.

The ambitious target will help NTPC achieve significant growth of 17% of captive coal production compared to the previous fiscal.

This will fulfill over 15 percent of coal requirement through captive mines in FY25, thereby strengthening fuel security for the power major.

The company achieved an impressive coal despatch of 34.15 MMT and coal production stood at 34.38 MMT by the end of March 31.

This outstanding performance reflects NTPC's relentless commitment to enhancing coal production from its captive mines and ensuring efficient supply to meet the nation's energy needs.

To achieve sustained growth in coal production, NTPC has implemented a range of strategies and technologies. These include the adoption of rigorous safety measures, improved mine planning, equipment automation, workforce training, and the implementation of continuous monitoring and analysis systems. These initiatives have played a vital role in optimizing operations, enhancing productivity, and ensuring the safety of the workforce.

NTPC remains committed to delivering reliable and sustainable power to the nation. This remarkable growth in coal production and despatch is a testament to NTPC's dedication to operational excellence and its contribution to meeting India's energy demands. The company will continue to explore innovative technologies and sustainable practices to further enhance its performance and support the nation's energy goals.

India's coal import rises 13% in February

India's coal import rose by 13% to 21.64 million tonnes (MT) in February as some buyers took fresh positions to replenish stocks ahead of summer, according to online marketplace mjunction. The country's coal import was 19.15 MT in the corresponding month of FY23. "Coal imports in February 2024 were up by 13%.

Coal Ministry targets nearly 20% higher stock at power projects by June 30



The coal ministry is expecting a closing stock of around 38-40 million tonnes at domestic coal-based power plants by June 30, when the summer demand starts cooling off from highs and monsoon logistical disturbances pick up.

The target is 13-19% higher than the stock on the same date last year. T

he stock is expected to be sufficient to start the monsoon season, when coal production and evacuation typically slows down, a senior government official said. "There is massive improvement in rail transportation in Mahanadi Coalfields. The average rake supply [in Mahanadi Coalfields] is currently at 99-100 per day compared with 94 per day in FY24," the official said.

Start of coal transportation from Dhamra and Gangavaram ports a few months back and restart of production from Rajmahal mines last year have also

helped in increasing the supply to power plants, the official said.

During monsoon, depletion of stock can be higher as coal production and transport take a hit. The current stock at domestic coal-based power plants is around 46.5 million tonnes.

Moreover, the financial year started with 47.3 million tonnes, much higher than last year's 34.5 million tonnes. Higher fuel stocks leave a cushion to raise power generation as demand rises, reducing the urgency of quick railway transportation.

Sampling and grading of coal at 427 mines completed; new grades to be applicable for FY24

The coal ministry recently said it has completed the annual exercise of sampling and grading of coal at 427 mines and the new fuel grade will be applicable from April 1 this year. Of the total 427 mines, 331 are central public sector units, 69 under state governments and 27 private sector mines, the coal ministry said in a statement.

"To ensure the correctness of the grade, the samples drawn were analyzed in two different labs," it added.

The ministry further said, the process of "declaration of annual grading of seams of mines as per laid down procedure has been completed" and the declared grade will be applicable with effect from April 1, 2024.

The Coal Controller's Organisation (CCO), having its field offices at Dhanbad, Ranchi, Bilaspur, Nagpur, Sambalpur, and Kothagudem, carried out the exercise of drawing the coal samples and its analysis from coal and lignite mines for the ongoing financial year.

CCO, a subordinate office of the coal ministry, lays down the procedure and standard for sampling of dry fuel and inspects collieries to ensure the correctness of the class and grade of coal.

Power Minister R K Singh Says, India Is One of the Lowest Carbon Emitters In World & Emerged As Global Leader In Energy Transition



India is one of the lowest carbon emitters in the world and it has emerged as a world leader in energy transition. This was stated by Power Minister R K Singh while inaugurating the first international conference on Green Hydrogen in New Delhi recently.

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Mr. Singh said that the country had aimed at reducing the emissions intensity of its GDP by 30 percent by 2030, which has been achieved nine years in advance. He said, the government is running programmes including the Ujala scheme related to LED bulbs which are the world's leading initiatives in carbon emission reduction. Mr. Singh said, India has also achieved its COP21 pledge related to the Nationally Determined Contribution nine years in advance.

Stressing upon India's achievements in the renewable energy sector, the Minister urged industry from across the world to be part of India's National Green Hydrogen Mission. He added that India is the biggest market outside China in the renewable energy space. Talking about creating a global market for green hydrogen, the Minister said, the world should practice free trade and not indulge in protectionist measures. He added that barriers are not good if one wants to achieve a global Net Zero in time. The three-day conference is aimed at brainstorming and working out a mechanism to

establish a Green Hydrogen ecosystem and foster a systemic approach for meeting the global goals for decarbonization through Green Hydrogen.

Power Ministry sets up panel for monitoring thermal power projects



The Union Power Ministry has constituted an independent Thermal Project Monitoring Group (TPMG) for the monitoring and execution of thermal power projects that are under implementation. Headed by the Central Electricity Authority's (CEA) Member (Thermal), the group comprises the CEA chief engineer or above level official and six retired senior officials of CEA/NTPC/DVC. Two deputy director-level officials of the CEA will assist the group.

The Ministry's move comes against the backdrop of its ambitious plan of installation of 93,380 MW of new coal-based thermal power generation capacity by 2031-32, as announced recently.

Of the 93,380 MW, 26,380 MW is already under construction, 11,960 MW has been bid out and 19,050 MW is under clearance.

According to the Power Ministry, 31,000 MW is at an advanced implementation stage and the construction of 17,000 MW is expected to commence soon.

At present, the country's total installed capacity is 428299.27 MW.

The group will undertake site visits of all the thermal power projects of the Central and state sectors as well as independent power producers, which are under implementation.

The members would conduct the site inspection of the project areas to oversee the first-hand progress made by the project proponents and based on their assessment, they would submit a progress report to the TPMG.

The group would compare the progress report with the progress being reported by the project proponents directly to the CEA. Based on these reports, the CEA will submit a realistic position about the progress of the projects under implementation.

The TPMG would identify any challenges or obstacles encountered during the implementation phase and evaluate the effectiveness of the mitigation strategies employed by the project proponents.

The members are also expected to submit a progress review report within seven working days after a site visit, and thereafter the TPMG after every visit would apprise the progress and timelines of the site of the thermal power projects under implementation to the Power Ministry.

Peak power demand in India projected at 260 GW, states need to up clean energy capabilities: Reports

Karnataka and Gujarat continue to lead India's shift towards clean energy, maintaining strong performance in integrating renewable resources into their power sectors, according to a new report released by the Institute for Energy Economics and Financial Analysis (IEEFA) and Ember. "Despite the significant strides in clean energy adoption by some states, our findings this year reveal that the pace of transition is far from uniform," said Vibhuti Garg, Director – South Asia, IEEFA. "A purely national overview can often overshadow subtle intricacies at the state level, which may stymie the country's electricity transition."

The report comes at a crucial time when India is bracing for a peak power demand of 260 gigawatts due to rising temperatures, highlighting the urgent need for states to ramp up their clean energy capabilities. Aditya Lolla, Asia Programme Director at Ember, added, "Some states have developed progressive steps such as promoting solar pumps for agriculture and enhancing storage solutions. However, the transition to clean electricity is still in its infancy in many states." The study also points out disparities in state capabilities, with some like Delhi being well-prepared for decarbonisation, whereas

others like Odisha have robust market enablers but lag in actual decarbonisation efforts.

"States must address deficiencies in readiness and market enablers to sustain their momentum in decarbonising the power sector," stated Saloni Sachdeva Michael, Energy Specialist at IEEFA. "We recommend the strengthening of state-level regulatory ecosystems to ensure compliance, promote growth, and create a conducive environment for business." The report underscores the need for a more focused state-level approach to fully understand the nuances of India's electricity transition and to tailor policy interventions accordingly.

India's power consumption rises nearly 10% to 70.66 bn units in first half of April

India's power consumption grew nearly 10 percent year-on-year to 70.66 billion units (BU) in the first half of April this year, showing improvement in economic activities and consumption patterns, according to the power ministry data.

According to the data, power consumption in the country rose to 70.66 BU during April 1-15 this year from 64.24 MU in the year-ago period.

The peak power demand met or the highest supply in a day rose to about 218 GW in the first half of April compared to 206 GW in the same period a year ago.

However, the rating agency believes much of this demand will be met through larger operating capacities, adequate coal inventory, and higher utilization of gas-based plants. India's monthly power demand typically peaks in the pre-and post-monsoon months of May or August, as cooling demand picks up with the temperature rise. IMD has predicted higher-than-normal maximum temperatures over most parts of the country till June 2024, further increasing demand.

At the same time, the rating agency expects distribution utilities to work towards minimizing supply disruptions due to India's general elections in April and May, given that power supply is a politically

sensitive issue. On the supply side, the Indian Ministry of Power has directed both gas-based and imported-coal-based power stations to maintain availability to meet the anticipated demand. "Utilisation of gas-based plants has been low in the past due to higher fuel prices or lack of availability of fuel," the rating agency said. India has experienced strong growth in power demand, averaging 8.5 per cent a year over the last three years after the Covid-19 pandemic. It has met a large part of the increase through thermal power plants' higher plant load factors (PLFs), which have jumped by around 10 per cent to around 69.5 per cent over the last two years. "Strong power demand bodes well for additions of renewable capacities and associated storage demand as India aims to meet ambitious long-term energy-transition goals," said the rating agency. At COP26 held in 2021, India committed to an ambitious five-part "Panchamrit" pledge. They included reaching 500 GW of non-fossil electricity capacity, generating half of all energy requirements from renewables, to reducing emissions by 1 billion tonnes by 2030. India as a whole also aims to reduce the emissions intensity of GDP by 45 per cent. Finally, India commits to net-zero emissions by 2070. About 44 per cent of India's energy requirements at present come from non-fossil sources and are likely to touch as high as 65 per cent by 2030, much higher than what the country pledged at the COP summit in 2021, Union Minister RK Singh, who handles power and renewable portfolio, said recently.

The highest supply in a day during the entire month of April last year was about 216 GW.

The ministry has projected a peak power demand of 260 GW during the summer season (April to June) in view of longer heat wave duration. The peak power demand had touched an all-time high of 243 GW in September 2023.

The India Meteorological Department (IMD) has predicted above-normal maximum temperatures in most parts of the country during summer this year.

The experts said that the power demand will increase in the coming days as rains in different parts of the country have reduced the need for cooling appliances like air conditioners, desert coolers etc used during this time of the year.

However, they said that power consumption growth in double digits shows improvement in economic activities and change in consumption patterns.

They are of the view that the consumers in India are also increasing their energy consumption on various appliances and gadgets as is being done in the developed world.

Besides, they pointed out that the increase in electricity in the transport sector like electric buses, cars, rickshaws and railways has also changed the consumption pattern and increased per capita use.

Higher generation capacity, gas-based plants to help meet India's high summer power demand: Fitch

Fitch Ratings expects India's power demand to rise by 7-8 per cent year-on-year in second quarter of 2024 due to robust industrial activity, strong GDP growth and the Indian Meteorological Department's (IMD) forecast of above-normal temperatures during the summer months.

India may need \$500 billion capex in power transmission by FY50

Goldman said Power Grid Corporation of India (PGCIL) stands to be the largest beneficiary of its over \$500 billion grid total addressable market (TAM) estimate between FY24-50 — one-third of India's overall energy transition TAM, based on its estimates.

"Power transmission is key to India's energy transition and global new energy cost leadership ambitions. India's large, highly integrated grid enables the utilisation of least-cost renewable generation sites, and by keeping the central grid access free, the government is assisting the viability of renewable projects via indirect financial support worth \$270 billion," Goldman Sachs said in a report.

Creating surplus transmission infrastructure and keeping it free for renewables makes economic sense as the gains from transition should more than offset the incremental network cost, it said.

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"It's large balance sheet, low cost of debt and strong annual free cash generation position it favourably to capture the bulk of our TAM estimate," it said. PGCIL also benefits from being eligible for direct nomination to execute large, complicated, multi-region projects — which, it said, can see material ramp up as India focuses on cross-border grid interconnections.

"Our analysis of PGCIL's cash flows implies PGCIL alone will be able to fund 30% of India's planned grid capex by FY32, while maintaining its current dividend payout," the report said.

PGCIL's cost of debt advantage is similar to that of NTPC in renewables, which has allowed PGCIL to capture over 40% of the auction market share. "We also expect PGCIL to benefit from an easing of competitive intensity in new project auctions as most private developers run out of balance sheet capacity due to the sheer quantum of capex we expect grid expansion will require," it said.

Goldman views Hitachi Energy India as a pure upstream manufacturing play on India's energy transition. "Hitachi is a global leader in high voltage equipment manufacturing and has achieved meaningful levels of indigenisation in India. In fact, Hitachi Energy India manufactures 80% of Hitachi Energy's global equipment portfolio with capability to manufacture 75-80% of HVDC systems (by value) domestically," it said.

Goldman expects Hitachi to be a significant beneficiary of its \$105 billion grid capex estimate for FY24-32, where it could have a TAM size of as much as \$50 billion. Incrementally, it can also participate in various non-grid opportunities- where it estimates the relevant TAM to be over \$20billion.

It expects the revamped distribution system scheme to drive \$37billion capex in distribution system expansion and strengthening over the next five years. So far, projects worth \$14billion have been

sanctioned under the scheme, of which it estimates Schneider Electric Infra to have a play in over 50% of the total capex outlay.

Govt asks all gas-based plants to be operational from May 1 to June 30 as electricity demand surges

The government has directed all gas-based power generating stations to operationalise their plants from May 1 to June 30 in view of rise in electricity demand due to a likely prolonged heat wave this summer. A significant portion of Gas-Based Generating Stations (GBSs) is currently unutilized, primarily due to commercial considerations. The ministry has projected 260 GW peak power demand this summer (April to June 2024). Peak power demand had touched an all-time high of 243 GW in September last year. The decision to operationalise GBSs is part of a series of measures taken by the Centre to ensure that electricity demand in the summer is met.

According to a power ministry statement, the order shall remain valid for generation and supply of electricity from May 1, 2024 to June 30, 2024. "To ensure maximum power generation from Gas-Based Generating Stations, the government has issued directions to all Gas-Based Generating Stations under Section 11 of the Electricity Act, 2003, under which the appropriate government may specify that a generating company shall, in extraordinary circumstances operate and maintain any generating station in accordance with the directions of that government," the statement said. The order under Section 11, which is on similar lines as done for imported coalbased power plants, aims to optimise the availability of power from GBSs during the ensuing high demand period.

As per the arrangement, GRID-INDIA will inform GBSs in advance, of the number of days for which gas-based power is required. GBSs holding Power Purchase Agreements (PPAs) with distribution licensees shall first offer their power to PPA holders. If the power offered is not utilised by any PPA holder, then it shall be offered in the power market. GBSs not tied to PPAs must offer their generation in the power market. A highlevel committee headed by Chairperson, Central Electricity Authority has been

constituted to facilitate the implementation of this direction. Other measures taken by the government to meet the summer demand include planned maintenance of power plants to be shifted to monsoon season; new capacity additions to be fast-tracked and partial outages of thermal power plants being brought down. India's electricity demand has been rising rapidly, driven by economic growth, particularly during hot-weather and high-demand periods. The India Meteorological Department (IMD) has predicted above-normal maximum temperatures over most parts of the country during the 2024 summer.

India's power consumption rises 1.4 pc to 129.89 billion units in March

India's power consumption growth remained subdued at 1.4 per cent to 129.89 billion units (BU) in March as compared to the year-ago period mainly due to pleasant weather, according to government data. In March 2023, power consumption stood at 128.12 BU, lower than 128.47 BU recorded in the same month a year earlier, the data showed. The highest supply in a day (peak power demand) rose to 221.70 GW in March 2024 as opposed to 208.92 GW in March 2023 and 199.43 GW in March 2022. Experts said power consumption as well as demand growth remained subdued in March as the weather remained pleasant across the country and people did not feel the need for heating or cooling appliances, especially in north India.

The power ministry has estimated around 260 GW of peak demand during summer. The experts said power demand as well as consumption will see robust growth April onwards with the onset of summer. The power ministry had estimated the country's electricity demand to touch 229 GW during summer in 2023, but it did not reach the projected level in April-July due to unseasonal rainfall. Peak supply, however, touched a new high of 224.1 GW in June before dropping to 209.03 GW in July. Peak demand touched 238.82 GW in August 2023, while it was 243.27 GW in September, 222.16 GW in October, 204.77 GW in November, 213.79 GW in December 2023, 223.51 GW in January 2024 and 222.72 GW in February 2024.

Industry experts said power consumption was affected in March, April, May, and June in 2023 due

to widespread rainfall. They said power consumption grew in August, September, and October, mainly due to humid weather conditions, and also a pick-up in industrial activities ahead of the festive season. Experts are expecting steady power consumption growth due to improvement in economic activities and onset of summer in March.

India hydropower output records steepest fall in nearly four decades

India's hydroelectricity output fell at the steepest pace in at least 38 years during the year ended March 31, a Reuters analysis of government data showed, as erratic rainfall forced further dependence on coal-fired power amid higher demand. The 16.3% drop in generation from the country's biggest clean energy source coincided with the share of renewables in power generation sliding for the first time since Prime Minister Narendra Modi made commitments to boost solar and wind capacity at the United Nations climate talks at Paris in 2015. Renewables accounted for 11.7% of India's power output in the year that ended in March, down from 11.8% a year earlier, a Reuters analysis of daily load despatch data from the federal grid regulator GridIndia showed

India is the world's third-largest greenhouse gas emitter, and the government often points to lower percapita emissions compared to developed nations to defend rising coal use. A five-year low in reservoir levels means hydro output will likely remain low during the hottest months of April-June, experts say, potentially boosting dependence on coal during a period of high demand before the monsoon starts in June. K. J. Ramesh, former chief of the Indian Meteorological Department, said there is increased chance of high rainfall during the annual monsoon this year, but any impact on hydropower output would not be visible before July/

"When hydro increases due to good rainfall, it should be used to reduce dependence on thermal," he said, adding that erratic rainfall means India should not count on hydro as a reliable power source in the future. DECLINING SHARE Hydro's share in India's total power output fell to a record low of 8.3% during the fiscal year ended March 31, Grid-India data showed, compared with an average of 12.3% in the 10 years through 2020. The share of hydropower has

steadily declined in recent years amid a slowdown in addition of new capacity, with other sources including coal, solar and wind gaining share.

The lightest rainfall since 2018 meant reduced water levels in reservoirs, pushing annual hydro generation to a five-year low of 146 billion kilowatt-hours (kWh). Meanwhile, power generation from coal and lignite in 2023/24 rose 13.9%, outpacing the 9.7% increase in renewable sources' output, data from the grid regulator showed.

Total power generation rose 10.3% in 2023/24, Grid-India data showed. India missed a 2022 target to install 175 gigawatts (GW) of renewable energy, and remains 38.4 GW short of that goal, with Grid-India data showing India's dependence on fossil fuel for power hit a five-year high of 77.2% in 2023/24. India's addition of renewables slowed to a five-year low in 2023.

Globally, hydropower output fell for only the fourth time since 2000 due to lower rainfall and warmer temperature brought about by the El Nino weather pattern, according to energy think tank Ember. Hydro output in India, the sixth-biggest hydropower producer, fell nearly seven times faster than the global average, Ember data showed.

Nepal hosts an investment summit in hopes of attracting foreign money for hydropower projects

Nepal hosted an investment summit recently in hopes of attracting much-needed foreign investment, especially in developing hydropower projects to produce more electricity that it can sell to neighboring countries.

Several foreign investors were attending the two-day meetings in the capital, Kathmandu, where Nepali officials urged investment in developing hydropower projects and in other areas like tourism and industry.

Nepal is home to eight of the tallest mountain peaks in the world and has several rivers flowing down from them, bringing huge hydropower potential. But only a few projects have been built in the poor south Asian nation.

"Our hydropower potential holds the promise of abundant renewable and clean energy supply," Nepal's prime minister, Pushpa Kamal Dahal, told the delegates. However, he said, "only 3,200 megawatts have been harnessed so far and only about 5,568 megawatt large-scale projects are under construction or in the pipeline."

"This explicitly shows the enormous opportunities to invest in the hydropower sector in Nepal," Dahal said, adding that the existing and planned cross-border transmission line with India and China aids energy exchange within the region.

He said Nepal has signed agreements or memoranda of understanding with China, India and Bangladesh for power trade or cooperation.

G7 nations reach deal to shut down their coal-fired power plants by 2035

Energy ministers from the Group of Seven (G7) wealthy countries reached a deal to shut down their coal-fired power plants by 2035 at the latest, in a significant step towards the transition away from fossil fuels.

"We have an agreement to stop using coal in the first half of 2030's... it is an historical agreement," Britain's minister for Energy Security and Net Zero Andrew Bowie told Class CNBC according to a video posted on X.

Italian diplomatic sources said a technical deal had been reached. The accord will be included in the G7 energy ministers' final communique to be released on Tuesday at the end of a two-day meeting in Turin.

One source told Reuters earlier that diplomats from the G7 nations - Italy, the United States, Britain, France, Germany, Canada and Japan - discussed the issue until late on Sunday, before the start of the ministerial gathering. The agreement marks a significant step in the direction indicated last year by the COP28 United Nations climate summit for a transition away from fossil fuels, of which coal is the most polluting.

March crude oil imports decline 1.1% to 20.69 million tonnes: Govt



India's crude oil imports in March fell by 1.1 per cent from a year earlier to 20.69 million metric tonnes, government data released recently showed.

Data from the Petroleum Planning and Analysis Cell's (PPAC) website also showed imports of crude oil products dipped nearly 12 per cent to 3.83 million tonnes on a yearly basis, while product exports decreased 6.4 per cent to 5.66 million tonnes over the same period.

Product imports in March fell 6.1 per cent from the previous month to 3.83 million tonnes, its lowest since July 2023, while exports gained 6.4 per cent.

Exports of fuel oil jumped nearly 79 per cent from the previous month to 0.25 million tonnes, while those of gasoline, or petrol, gained 6.3 per cent to 1.34 million tonnes, the PPAC data showed.

Russia became the top oil supplier to India during fiscal year 2023/24 for a second straight year, squeezing the market share of Middle Eastern and OPEC producers to historic lows, ship tracking data from industry sources showed earlier in the month.

A ship controlled by U.S.-sanctioned Russian shipping giant Sovcomflot (SCF) discharged fuel oil at a western Indian port recently, two sources familiar with the matter said, indicating a resumption in the use of SCF vessels to supply Moscow's key market after a brief halt.

Last week, India, the world's third biggest oil importer and consumer, discussed recent trends and volatility in the global oil market and their impact on global energy stability with OPEC secretary general recently, a government statement said.

India's petrol consumption doubles in a decade

India now consumes more than double the petrol it used a decade ago as new and larger vehicles are

selling at a scorching pace. Diesel consumption is up by about a third while the overall oil demand is up by half.

Regulator plans new tariff policy for petroleum product pipelines

After coming out with unified tariff for natural gas pipelines, the Petroleum and Natural Gas Regulatory Board is now seeking to revise the tariff policy for the product pipelines laid out by the state-owned oil marketing companies and private refiners, a member of the regulatory board, who did not wish to be identified told FE.

The new tariff structure will depend upon the capacity utilisation, capex, and the internal rate of return (IRR) of the pipeline. This will be a significant shift as the product pipeline tariffs are currently calculated as the 75% of rail tariffs on equivalent rail distance, along the pipeline route, except for LPG (liquefied petroleum gas) where it is 100%.

The new rules are expected to make pipeline investments more remunerative, although the exact impact will be known only after revised tariffs are notified.

"Currently the product pipeline tariff is linked to the railway freight charges. We want to offer them new formula, like for gas pipeline tariffs," the source said. "We realise that whoever is putting a pipeline should get some money and get some reasonable returns."

The Board member noted that railway freight charges don't change much often and stagnant railway tariff has resulted in maintaining pipeline tariff constant although the operational expenses of running the pipelines have increased.

Moreover, the Board wants to bring all product pipelines under one regulation in order to ensure proper capacity utilisation of all the pipelines. "Today, whoever is there in this industry is putting their own pipeline and charging the consumer. We are suggesting that all product pipelines should come under regulation for effective utilisation," the member said.

PNGRB is also working to bring some amendments under the Petroleum and Natural Gas Regulatory

Board (PNGRB) Act, 2006 post elections which is expected to have regulations on charges taken by regas terminals, transportation of green hydrogen and compressed biogas, and creation of a Transport Service Operator.

“Now we are seeing there are a number of terminals which are not being used for which we may create a pipeline for them to offtake gas. But there should be some regulation in place, so that if you have invested in the pipeline it should be secured.”

A Transport Service Operator will ensure equitable distribution of gas capacity to consumers in order to meet their requirements.

“Currently, you have to approach the entity, they will bargain and you get the capacity. We want a TSO, so that they can see capacity is being equally distributed to all, meeting the demand of consumers,” the source said. “If you want capacity you will get it.”

India lets oil firms procure extra ethanol from sugar mills, source says

India has agreed to allow oil marketing companies to procure ethanol by diverting an extra 800,000 metric tons of sugar for biofuel production, a government source said recently. Concerns over sugar production due to below normal monsoon rains between June and September had led the world's second-largest to cap the amount that could be diverted for ethanol in the current season to end-September at 1.7 million metric tons. But as the supply situation has improved as a result of unseasonal rainfall in Maharashtra and Karnataka, the government has agreed to the diversion of an additional 800,000 tons of sugar for ethanol production, said the senior industry official.

"Many sugar mills produced B-heavy molasses in anticipation of ethanol production. However, these stocks remain unused after the government capped the diversion of sugar for ethanol. Mills can now use stored B-heavy molasses for ethanol production," said the official, who spoke on condition of anonymity.

Russia emerges as India's top oil supplier amid decreasing OPEC market share

According to ship tracking data from industry sources, Russia has maintained its position as the largest oil supplier to India for the fiscal year 2023-2024, marking the second consecutive year of this achievement. During this period, the market share of producing countries in the Middle East and the Organization of the Petroleum Exporting Countries (OPEC) has declined to unprecedented lows. India's dependence on Russian oil has grown significantly, with the country emerging as the top supplier to the world's third-largest oil importer.

The reliance on Russian oil stems from its availability at discounted rates, particularly after Western countries refrained from purchasing it and imposed sanctions on Moscow amid the Ukraine crisis. Despite the challenges posed by sanctions aimed at curbing Moscow's oil revenues, India has continued to import Russian oil, highlighting the strategic importance of this energy partnership.

While Russia maintains its alliance with OPEC, it has managed to capture a substantial portion of India's crude oil imports, surpassing even the largest producing countries within the OPEC alliance. Ship tracking data indicates that Russian oil accounted for approximately 35 percent of India's total crude imports, which amounted to 4.7 million barrels per day for the fiscal year ending March 31. This represents a notable increase from the previous year, where Russian oil comprised only about 22 percent of India's imports.

The data further reveals a significant uptick in the volume of Russian oil imported by India, reaching 1.64 million barrels per day for the fiscal year 2023-2024. This reflects a remarkable increase of approximately 57 percent compared to the previous year, underscoring the strengthening partnership between the two nations in the energy sector.

As India seeks to diversify its energy sources and ensure a stable supply of oil, its reliance on Russian oil has become increasingly pronounced, despite geopolitical tensions and economic sanctions. The strategic alignment between India and Russia in the energy domain underscores the resilience and

adaptability of their partnership amidst evolving global dynamics and geopolitical challenges.

India to build first commercial crude oil strategic storage

India, the world's third biggest oil consumer and importer, plans to build its first commercial crude oil strategic storage as part of efforts to shore up stockpiles as insurance against any supply disruption.

Indian Strategic Petroleum Reserves Ltd (ISPRL), a special purpose vehicle created by the government for building and operating strategic petroleum reserves in the country, has invited bids for constructing 2.5 million tonnes of underground storage at Padur in Karnataka, according to the tender document.

ISPRL had in the first phase built a strategic petroleum reserve in underground unlined rock caverns for storage of 5.33 million tonnes of crude oil at three locations Visakhapatnam (1.33 million tonnes) in Andhra Pradesh and Mangalore (1.5 million tonnes) and Padur (2.5 million tonnes) in Karnataka.

Under Phase-II, it intends to build a commercial cum strategic petroleum reserve in underground unlined rock caverns along with associated above ground facilities, including dedicated SPM and associated pipelines (offshore and onshore) for storage of 2.5 million tonnes of crude oil at Padur-II at a cost of ₹5,514 crore.

The Phase-I storages were built at government expense.

In the tender, ISPRL said the Padur-II will be constructed in a PPP (public-private partnership) model where private parties will design, build, finance, and operate the storage.

Bidders have been asked to quote the financial grant they require for the building of the reserves or the premium/fee they want to offer to the authority.

The project will be awarded to entities that offer the highest premium. Where no bidder is offering a premium, it would go to the one seeking the lowest grant, the tender document said.

"Maximum quantum of grant to be quoted for the project shall be capped to ₹3,308 crore," ISPRL said. "A bidder who seeks a grant cannot offer any premium." The operator of Padur-II will lease out the storage to any oil company wishing to store oil and charge a fee. The companies storing oil can sell it to domestic refiners. But in case of an emergency, India will hold the first right on oil usage.

ISPRL is acquiring about 215 acres of land for Padur-II.

India, which meets over 85% of its oil needs through imports, will use the strategic reserves in any emergency situation like supply disruption or war.

Of the Phase-I reserves, UAE's Abu Dhabi National Oil Company (Adnoc) has hired half of the 2.5 million tonnes storage capacity at Padur and 1.5 million tonnes facility at Mangalore. While the remaining 1.25 million tonnes at Padur has been filed by ISPRL, the 0.75 million tonnes of vacant storage at Mangalore is to be leased out.

Out of the 1.33 million tonnes of storage built at Visakhapatnam, 0.33 million tonnes was a space that was built at the expense and for Hindustan Petroleum Corporation Ltd (HPCL). Of the remaining, HPCL has hired 0.3 million tonnes more and the rest of the storage is to be leased out.

The government had in the 2023-24 budget provided for ₹5,000 crore for filling the vacant slots in the caverns but mid-year that plan was deferred. In the interim budget for 2024-25, presented in February, no allocation has been made for the purpose.

Companies like Adnoc use the strategic storages to hold oil for further sale to users.

Last month, the government allowed Adnoc to export crude oil it has stored in Mangalore reserves to give operational flexibility to the foreign firm.

At present, crude oil, which is the raw material for producing fuels like petrol and diesel, is not allowed to be exported except through state-owned Indian Oil Corporation (IOC).

In an order, the Ministry of Commerce and Industry on March 23 said the condition of export being allowed only through IOC will continue but "AMI (Adnoc Marketing International (India) RSC Limited India) is exempted from STE conditions and is allowed to re-export crude oil from their commercial stockpile at Mangalore strategic petroleum reserve, at their own cost." Adnoc had sought permission for the export of its oil from the cavern in cases where it could not find buyers in Indian refiners.

LNG import volume up 17.5% in FY24 as consumption rises

India's import of liquefied natural gas (LNG) rose in volume term by 17.5% on year to 30,917 mmscm (million standard cubic meter) in the financial year 2023-24 due to increased consumption, data from the Petroleum Planning and Analysis Cell showed. The rise in consumption by 11.1% on year in FY24 to 66,634 mmscm was driven by use of gas by the fertilizer, power, and city gas distribution sectors.

Even as the import volume reported such increase, the country's gas import bill fell significantly by 22% to \$13.3 billion in FY24 from \$17.1 billion in FY23, as prices fell.

While the fertilizer sector contributed to 32% of the total consumption, CGD entities accounted for 19% of the total natural gas consumption, followed by the power sector at 12%.

In the fertilizer and other industries, natural gas is used as a feedstock and is also used as a fuel for electricity generation and heating purposes in industrial and commercial units.

Higher gas generation in the power sector was driven by higher peak thermal demand amid reduced hydro power generation. India generated 133,966.18 GWh of hydro power during April to March, a decline of 17% from 162,098.77 GWh in the same period a year ago, as per data from the Central Electricity Authority.

Moreover, the production of natural gas also grew by 5.7% on year to 36,438 mmscm in the financial year 2023-24. In March alone, the production stood at 3,138 mmscm, up 6.2% from the corresponding period a year ago.

India's consumption of LNG is expected to rise further in the coming months on the back of growing demand from the fertiliser and power industries, analysts say. Anticipated lower spot LNG prices will further add to this growth.

"In Summer 2024, imports are expected to increase by a further 3 mmscm per day compared with 2023, driven by sustained demand in the power sector and continued growth in the industrial and fertilizer sectors," S&P Global had earlier said.

The total capacity of the country's existing LNG terminals at the end of FY24 was at 47.7 million tonne per annum.

The LNG terminal at Dhamra operated at 23% capacity. Petronet LNG terminal at Dahej operated at 95.1% capacity while Shell's LNG terminal at Hazira operated at just 31.5% capacity during April-February period, according to PPAC.

Reliance wins govt nod for additional investment to raise KG-D6 gas output



Reliance Industries Ltd Ltd has got government approval for making additional investments in developing gas reserves in its KG-D6 block in the Bay of Bengal that can add 4 to 5 million standard cubic meters per day to the production, a company official said. Reliance and its partner bp Plc currently produce around 30 mmscmd or about 30 per cent of India's gas production, from the KG-D6 block. At an investors' call announcing the fourth quarter earnings, Sanjay Roy, senior vice-president for exploration and production at Reliance Industries Ltd, said the development plan for incremental production has been approved by the government.

"One good aspect of this quarter gone by was that we had an incremental development plan approved

by the government, which has the potential to deliver incremental production of 4 to 5 million standard cubic meters (per day) in the coming few years, which would augment the production that we have," he said. He, however, did not give details of the investment approved. Reliance-bp produces some 30 mmscmd of gas from three sets of discoveries in the deep-sea KG-DWN98/3 or KG-D6 block, the last - MJ oil and gas field - being put into production in May 2023. All three sets of discoveries, with MJ being the deepest, were made more than a decade back and have been progressively put into production.

Prior to that, they had brought the R-Cluster field to production in December 2020 and the Satellite Cluster in April 2021. KG-D6 has helped domestic production of natural gas, which is used to generate electricity, make fertilizer or turned into CNG for running automobiles or piped to kitchens for cooking, touching a multiyear high of 99 mmscmd. Total gas demand in the country is around 188 mmscmd, with the difference being met through imports. "When we look at the (domestic) production, we can see clearly there's been a sharp increase in production since FY21. And although the overall domestic production, besides KG-D6, has been flat, KGD6 production is almost 90 per cent of the incremental domestic gas production," Roy said.

Reliance is the operator of the KG-D6 block with a 66.67 per cent stake and bp holds the remaining 33.33 per cent. Reliance has so far made 19 gas discoveries in the KG-D6 block. Of these, D-1 and D-3 -- the largest among the lot -- were brought into production in April 2009, and MA, the only oilfield in the block, was put into production in September 2008. While the MA field stopped producing in September 2018, output from D-1 and D-3 ceased in February 2020. Since then, Reliance-bp invested USD 5 billion in bringing to production three deepwater gas projects in block KG-D6 -- R-Cluster, Satellites Cluster, and MJ. The MJ field is located about 2,000 metres directly below the Dhirubhai-1 and 3 (D1 and D3) fields. It is a high-pressure and high-temperature (HPHT), gas and condensate field. Besides gas, it is to produce 25,000 barrels of condensate per day at peak.

GAIL to commission its first green hydrogen project in April

GAIL (India) Ltd plans to commission its first green hydrogen project in central India in April, three company sources said. The 10-megawatt proton exchange membrane electrolyser for the green-hydrogen producing unit at the Vijapur complex in Madhya Pradesh state has been imported from Canada, they added.



"Once the initial hiccups are sorted at the commissioning stage, we expect to start producing in a month's time," one of the sources said. The sources declined to be named as they are not authorised to speak to the media.

The unit is expected to produce about 4.3 metric tons of hydrogen per day, with a purity of about 99.999% by volume, and would use renewable power. India aims to reach 5 million tons of annual green hydrogen production capacity by 2030. The company's communication office did not respond to a Reuters request for comment.

Hindustan Petroleum to set up a global oil trading desk

Hindustan Petroleum Corp. Ltd (HPCL) plans to set up an international oil trading desk, a company official said recently. The company is currently in the process of finalizing the location. HPCL is executing the Visakh Refinery Modernisation Project (VRMP) to modernize and enhance capacity ... Post modernization, the refinery will produce petrol and diesel with BS-VI specifications; increase in refining capacity from 8.33 million metric tons per annum (mmtpa) to 15 mmtpa by setting up various process and utility units and improve refinery distillate yields from 76% to 86%.

A trading desk helps companies procure crude oil from the international market on a real-time basis, helping cut import prices by locking in the best price and quality. India is the world's third-largest consumer of crude oil and depends on imports to meet over 85% of its requirements. HPCL is the second oil marketing company planning to set up an international trading unit.

India eyes 100 GW nuclear power by 2047: AEC Chairman



India aims to produce 1 lakh MW of nuclear power by 2047, a massive increase from the current production of over 8,000 MW, Atomic Energy Commission Chairman A K Mohanty said here recently. Mohanty was speaking at the release of a report, 'Synchronising

Energy Transitions Towards Possible Net Zero for India: Affordable and Clean Energy for All', largely funded by the Office of the Principal Scientific Adviser to the government of India. Ravi B Grover, Chairman Emeritus of the Homi Bhabha National Institute, said the report was necessary as studies for energy transition for India have come up with a very insignificant role for nuclear citing high input cost and lower public acceptance.

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

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

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

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

Licensing and testing progress for innovative thorium-based fuel

ANEEL has been developed for use in pressurised heavy water reactors and Candu reactors (its name is taken from Advanced Nuclear Energy for Enriched Life). The company says it can offer significantly improved performance with existing proven heavy water reactor systems by leveraging thorium's "inherently superior" nuclear, thermal and physical properties while retaining the same external dimensions and configuration design as in currently used natural uranium fuel bundles. It can be used to replace current fuel bundles, without any significant modifications to the reactor, to reduce life-cycle operating costs and waste volumes, increase safety and accident tolerance, and result in additional proliferation resistance, the company claims.

ANEEL is the first thorium-based fuel for Candu reactors to successfully complete the first phase of the Canadian Nuclear Safety Commission (CNSC) pre-licensing process for new fuel designs, Clean Core said.

The Vendor Design Review (VDR) process has included submissions across nine focus areas, building a licensing basis and safety case for the fuel. The pre-licensing process has provided an opportunity for Clean Core to demonstrate understanding and compliance with Canadian licensing requirements and seek detailed feedback ahead of a formal licence application, the company said.

The regulator concluded that the company "generally understands and has correctly interpreted the high-level intent of the CNSC's regulatory requirements as applicable to fuel design and qualification", Clean Core said. The executive summary of the assessment report will be made publicly available by the CNSC in the near future.

"The work performed through the VDR and our engagements with the CNSC highlights Clean Core's regulatory and commercial readiness. This is a critical step forward for our ANEEL fuel technology and in advancing nuclear power generation across Canada and globally," Clean Core CEO and founder Mehul Shah said.

Testing begins

The completion of Phase 1 of the Canadian VDR comes as irradiation testing and qualification of the fuel is about to begin in the Advanced Test Reactor at Idaho National Laboratory (INL) in the USA. This follows Clean Core's signature in 2022 of a strategic partnership project agreement with INL.

As part of that agreement, INL has received more than 300 ANEEL fuel pellets fabricated by Texas A&M University's Department of Nuclear Engineering under INL's quality assurance requirements. INL has developed the irradiation test plan, performed pre-irradiation characterisation of the fuel pellets, designed and fabricated the experiment hardware and test trains, assembled the test trains, and finally inserted the experiment into the ATR.

The CCTE-ANEEL-1A irradiation experiment is to begin this month and achieve burnup targets of up to 60 GWd per tonne. As each planned burn-up target is achieved, the test capsules containing irradiated ANEEL pellets will be sent to INL's Materials and Fuels Complex for destructive and non-destructive post-irradiation examination.

"Irradiating homogeneously blended thorium and uranium oxide in ATR is a first-of-a kind experiment for INL and the US DOE," said Michael Worrall, a nuclear engineer at INL and Principal Investigator for the CCTE-ANEEL-1A experiment. "We are excited to see the potential of the ANEEL fuel technology and what the future of this technology holds."

The ATR is a pressurised water test reactor which operates at very low pressures and temperatures compared to a large commercial nuclear power plant to produce large-volume, high-flux thermal neutron irradiation in a prototype environment. The one-of-a-kind reactor can be used to study the effects of intense neutron and gamma radiation on reactor materials and fuels.

8th Roundtable Conference on Coal 12th April 2024

India Energy Forum jointly with Indian School of Mines Alumni Association (ISMAA) - Delhi Chapter and Mining Geological & Metallurgical Institute of India (MGMI) Delhi Chapter, organised 8th Roundtable Conference on Coal on the theme "**Role of Coal in Energy Transition**" on 12th April 2024 at Hotel Le Meridien, New Delhi

Glimpses of the Conference are given below:



Lighting of the Lamp



Release of the Souvenir at the Inaugural Session. Distinguished speakers on the Dias (L to R) **Shri N N Gautam**, Former Advisor (Coal), **Shri U Kumar**, Former CMD, SECL/NCL; **Shri R V Shahi**, President, India Energy Forum; **Shri Alok Kumar**, Former Secretary (Power); **Shri Alok Perti**, Former Secretary (Coal); **Shri S K Srivastava**, Former Secretary (Coal) and **Shri P S Upadhyaya**, Former Director, NMDC.



Technical Session I: **Shri Alok Perti** Former Secretary (Coal) and **Shri Alok Kumar**, Former Secretary (Power), jointly chairing the Session. Others on the Dias (L to R) **Shri Ashok Mehta**, Former CMD, WCL; **Shri Birendra K Thakur**, Advisor (P), Ministry of Coal; **Shri Pramod Kumar**, GM (Mining), CMPDI; **Shri Himanshu Singh**, Director (Strategy), Vedanta; **Shri Kapil Dhagat**, Executive Vice President – Head BU Coal & Mining, JSPL and **Shri Randip Singh**, GM(OC), CMPDI.



The Panel Discussion was chaired by **Shri Partha Bhattacharyya**, Former Chairman, Coal India Ltd. The distinguished Panelists were (R to L) **Shri Manoranjan Hota**, Former Director, MoEFCC; **Shri Deep Krishna**, Founder DKG Labs Pvt Ltd; and **Shri Manish Singla**, Associate Director, CRISIL.



Technical Session II: Chaired by **Shri C Balakrishnan**, Former Secretary (Coal) and co-chaired by **Shri R P Ritolia**, Former CMD, CCL. The other prominent speakers (L to R) are **Shri Sitansu Nandi**, Head (Mining), Gainwell; **Shri Suresh Behera**, Chief Manager (Systems), CMPDI; **Shri Avinash Kumar Mishra**, ED (Coal), Railway Board and **Dr Chandra Shekar Singh**, GM (M)/TS to D(T), CIL.



Shri CK Mishra IAS (Retd), Former Secretary, Ministry of Environment, Forest and Climate Change delivered the Valedictory Session (R) and **Shri Alok Perti** (L)



Technical Session III chaired by **Shri Anil Razdan**, Former Secretary (Power). Others on the dias (L to R) are **Dr. R K Malhotra**, Former DG, FIPI; **Dr Peeyush Kumar**, General Manager (BD), CIL; **Shri S K Grover**, Former GM (Fuels), NTPC; **Shri Anil Razdan**, **Shri V K Sehgal**, Former CMD, SECL; **Shri Debasis Maity**, Executive Vice President, Coal Gasification, JSPL and **Dr. Rasesh Kotdawala**, Sr Manager (Clean Energy System), BHEL.