INDIA ENERGY FORUM

TOTAL ENERGY

Volume 17, Issue 5 December–January 2023

SUSTAINING COAL GASIFICATION ROUTE

INDIA ENERGY FORUM 408 PHD House, 4/2 Siri Institutional Area, New Delhi-110 0016

Coal and Renewables: Requires Fine Balancing during Energy Transition

R.V. SHAHI

During the month of January, 2023, I have gone through the highly involved debates, over three WhatsApp Groups of knowledgeable and experienced experts, making important observations on the issue of role of coal, criticism against the sector, future of coal, and priority this important source of energy should receive etc. They have also highlighted the significant contribution various organizations in the coal sector have made, and are continuing, in the energy management of the economy. Similarly the experts supporting renewables have been highlighting that emergence of renewables such as Wind, Solar, and others could effectively and successfully replace Coal altogether and should receive the topmost priority since carbon emission and climate change is a major threat. This debate has intensified following a recent amendment to the Green Open Access Rules 2022. These amendments, it is being projected by them, to be curtailing the existing benefits to renewable sector. They say "Seems Government of India is changing its stands from Pro Renewable Energy to Pro Coal now slowly and steadily. First they issued Notification to not retire old Thermal Plants without citation of what if they are inefficient and not cost effective, and now this anti re-amendment". Response to this observation suggests that it may not be perceived as a change of stance, since the Government has a responsibility to act in accordance with their assessment of the ground reality and one would like to see this development as a sign of changing perception about the maturing of the Renewable Energy industry. Adding to this, another observation is about the need for power as a survival need of the country – even if it comes from coal power plants.

There is another group of experts from the power sector who continue to support the coal based power generation but have serious observations against the management of coal sector. Non availability of coal, its poor quality, less than required customer friendly approach of coal producers, least importance accorded by them to clean coal technologies including coal washing, improper coal pricing, scant regard to the need for developing transportation logistics upto the main railway system, excessive pricing through e-auction disregarding their responsibility for fuel supply as per coal linkage etc. They feel that near monopoly situation in the coal sector, which has prevailed over decades, gives them an edge to carry on with business as usual approach. They hope that the commercial mining which has just now been started, though delayed by more than two decades may, over a period of time, bring about the required changes in approach of the coal producers on various issues which have been highlighted by.

Power experts also suggest that it is not only the monopoly of coal sector which is adversely affecting the power sector, but also the monopoly of railways which not only causes serious problems by way of shortages of coal at power plants due to inadequate arrangement for rakes and their movements, but also because of highly skewed nature of freight charges to substantially subsidise the passenger group, which leads to significant increase in the cost of power. Augmentation of railway network has lacked far behind the massive expansion of volume of coal supply. Coal and coal transportation account for more than 70% of cost of generation, particularly in plants which are located far away from the fuel sources. It has also been observed, and rightly so, by many that the suggestion of having Regulatory mechanism for coal sector as well as for ailways has remained unattended causing these two monopoly organisations suffering from the advantages they would have had for being more efficient if they had to face competition. The Regulatory processes could have also created the required impact, so that consumer interests are safeguarded to a great extent.

Advocates of Coal Group also have very important observations with regard to some of the misplaced perceptions in their opinion, of many of the experts.

They agree about the cost of coal but do assert that a significant portion of the cost of coal delivered to power plants is on account of rail transportation and also due to elements like Coal Cess and Royalty etc. They feel proud that Coal sector has contributed to mitigating the challenging demands of power and other industries, in most adverse situations. Industry and other consumers do carry the burden of many of the inefficient power plants which consume 30% to 40% more coal than a well-run efficient power plant. This group does favour that old and inefficient power plants need to be shut down, so that the efficient power plants are in a position to get adequate coal supply. In their perception, though commercial coal mining has been opened up recently, a number of coal mines were allotted earlier on the basis of Captive Coal Policy. They say the difficulties of developing coal mines and operating them efficiently have been experienced by a number of these organisations. There is no evidence to suggest that by and large all of them have done better than the public sector coal miners. On the issue of energy transition they do believe that coal will continue to play a major role in the overall energy scenario of the country for a long period. The disadvantages of import of coal at exorbitantly higher rates, in last two years particularly, have further established the need for not only substantial expansion of coal sector, but also the need for avoidance of large scale import of coal. Imported coal based power plants have experienced enormous difficulties and many of them had to be shut down because the generation cost with imported coal did not quality for dispatch of power from these plants. To be fair to this Group, many of them do admit that the sector has been oblivious of the need for research and technology development. They do believe that while the power generation will continue to need coal as the fuel for at least fifty years or so, a substantial percentage of overall power profile will shift from coal to Solar, wind, Hydroelectric, Nuclear, Bio-Mass, and Hydrogen, etc. Coal sector will have to undertake diversifications through research and development routes to supply energy in other forms to industries beyond power sector also.

Renewable Power – Solar, Wind, Hybrid of Solar and Wind, Bio-Mass, Hydroelectric, etc. will indeed play a much larger role. Even those who are advocates of conventional power, more particularly, Thermal Power, believe that renewables would have rapid expansion. However, the pace will have to be slower than what is being projected. In their view, the present programmes would lead to not only excessive burden on transmission cost, but also domestic manufacturing would not be able to support such expansions necessitating massive imports, a situation which could be avoided. A realistic analysis of cost of additional transmission, challenges of managing the Grid and commensurate capacity expansion on the manufacturing side of renewables would be necessary to determine the pace of expansion of different groups of power and energy sectors.

Perceptions and views of various groups of experts, which I have been able to capture from the comments on some of the WhatsApp Groups reflect adequately the essence of how the energy transition should be carried out during coming decades. This paper does not include some of the other important segments such as Petroleum and Gas sectors, Hydroelectric in general, and Nuclear power. In one of my other papers, energy transition, in general, relevant to India, was covered. In this paper, an attempt has been made to comment on the views and perceptions of experts, particularly, in relation to Coal, Renewable, and Thermal Power. Given below is an outline of what can be a fine balancing over next three decades in energy transition in relation to these issues.

- Thermal Power Plants.
  - ❖ Old plants which are highly inefficient should be progressively shut down thereby making available additional coal for efficient plants. The apprehension that power generation will reduce is misplaced since underutilized capacity of efficient plants may provide more power.
  - ❖ All Thermal Power plants should launch Schemes for further improvement on fuel efficiency.
  - ❖ In the context of growth of Solar Power, the subject of flexible power operations in thermal plants with the objective of establishing minimum loads should be

carried out as an exercise for each plant. Merit Order Dispatch should also be re-worked with an appropriate weightage for fuel efficient plant operation, and not only on variable cost which includes transportation cost.

- ❖ Further expansion of Thermal Power Plants should be carefully worked out based on medium and long term achievable projections for other sources of power supply

- ❖ Imported coal based power stations must have the ability to run on blended coal (imported and domestic). Existing plants, not having this ability, should consider appropriate retrofits.

- Coal Sector

  - ❖ Quality of Coal should receive top priority, should supply only crushed and conditioned coal.

  - ❖ Coal Washeries should be brought back on the agenda as the coal sector initiative, as a responsible supplier, even though the Coal Washery Policy has been taken away.

  - ❖ Coal Regulator, particularly in the context of coal sector having been opened up, needs to be put in place.

  - ❖ Coal transportation logistic from coal mines to the main railway system should be organised by the coal producers, Coal India by itself, other smaller producer jointly.

  - ❖ Coal India could also consider arrangements for Rakes, the issue which is often mentioned as a constraint. Coal Regulator could factor in this cost while determining the coal cost.

  - ❖ Coal cost is excessively burdened by railway freight. Regulator for Railways needs to be put in place not only for this, but also for ensuring general quality of service, since railway is a monopoly service provider.

  - ❖ E-Auction of Coal, in view of shortage situation, leads to excessive high in prices. Coal supplier could be asked to supply coal upto the linkage, and only after that if they have coal available, this could be sold through E-Auction.

- Renewable Energy

  - ❖ The power generation plan through renewables, particularly Solar, should be integrated with development of domestic manufacturing capability (if not 100 percent at least to the extent of 70 percent could be supported through domestic manufacturing capacity).

  - ❖ Renewable generation plan should also be integrated with reasonable and achievable projection of transmission network.

  - ❖ Transmission cost is leading to a higher burden on the Discoms and, hence, to consumers. Additional transmission needed for renewables and for variable load operations, could be financed from the Coal Cess (GST now) collected in the past, and to be collected in the future.

  - ❖ Since Battery Storage is taking time to be cost effective, Pump Storage Plant should be incentivised and aligned to programme development of Solar Power.

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From the Hon. Editor

India towards Green Energy Leadership

Let me welcome and congratulate the new Board and leadership. Mr Shahi and his team steered the Forum towards greater heights despite a host of obstacles imposed by the Covid and its aftermath. The physical restrictions could not restrain FORUM's growth and during the last two years the Forum has had excellent webinars and even two physical events. Congratulations to the Team Shahi.

IEA in the last report has said India to see highest jump in energy demand this decade climbing 3%.

India becomes the world's most populous country by 2025 and combined with urbanisation and industrialisation, this underpins rapid growth of energy demand in the country. India meets a third of growth with demand growth in coal.

India is well aware of the predicament and is working overtime to make the source of energy green. Solar, wind and Hydrogen programmes are in full swing and we will reduce carbon generation in a big way. These programmes are well known throughout the world and well appreciated.

The Green Hydrogen push is at the Centre with Union Cabinet Clearing Rs 20,000 crores National Green Hydrogen Mission to make India green hydrogen hub. The main aim is

The Government has formally approved the National Green Hydrogen Mission with a stated aim of making India a global hub for the production of green hydrogen.

An outlay of Rs 19,9744 crores was cleared by the Union Cabinet recently aimed at the creation of export opportunities for green hydrogen and its derivatives; decarbonisation of the energy sector and use in mobility applications in a bid to lower the dependence on imported fossil fuels; and development of indigenous manufacturing capacities.

The ultimate aim is to fuel key sectors of the economy using hydrogen that is made by splitting water by an electrical process called electrolysis using a device called electrolyser that is powered entirely by renewable energy.

Green hydrogen has specific advantages. One, it is a clean burning molecule that can decarbonise a range of sectors including iron and steel, chemicals, and transportation. Two, renewable energy that cannot be stored or used by the grid can be channelled to produce hydrogen.

Green hydrogen is not commercially viable at present. The current cost in India is around Rs 350-400 per kg; it is likely to become viable only at a production cost of under Rs 100/- kg. This is what the Hydrogen Energy Mission aims for.

India's Mission was first announced by the Prime Minister in his Independence Day speech in 2021. The Ministry of New and Renewable Energy is in the process of formulating guidelines for the scheme that seeks to promote the development of green hydrogen production capacity of at least 5 million metric tonnes (MMT) per annum with an associated renewable energy capacity addition of about 125 GW by 2030.

A major part of this is proposed Strategic Interventions for Green Hydrogen Transition Programme (SIGHT0, under which two financial incentive mechanisms – targeting domestic manufacturing of electrolysers and the production of green hydrogen - will be promoted to achieve a reduction in fossil fuel imports and abatement of annual greenhouse gas emissions by 2030.

India's electricity grid is predominantly coal-based, thus negating collateral benefits from a major EV push - as coal will have to be burnt to generate the electricity that will power these vehicles.

Hydrogen vehicles can be especially effective in long-haul trucking and other hard to electrify sectors such as shipping and long haul air travel. Using heavy batteries in these applications would be counterproductive, especially for countries such as

India, where the electricity grid is predominantly coal-fired.

Besides auto, there is a concerted attempt to leverage green hydrogen in sectors such as petroleum refining and steel. In April 2022, Oil India Ltd commissioned India's first 99.99 per cent pure green hydrogen plant in Jorhat.

In the proposed Mission, the steel sector has been made a stakeholder, and it is proposed to set up pilot plants with part funding from the Government to explore the feasibility of using green hydrogen in Direct Reduced Iron (DRI) production by partly replacing natural gas with hydrogen in DRI plants.

Kerala has set up a high-level working group for its own Hydrogen Economy Mission to make the state 'a green hydrogen hub".

Indian Oil Corpn Ltd's R&D Centre in collaboration with Tata Motors Ltd had earlier carried out trials of hydrogen fuel cell buses. Reliance Industries Ltd, Adani Enterprises, JSW Energy, and Acme Solar have plans to tap the green hydrogen opportunity. Adani announced in June that it will collaborate with France's Total Energies to create the "world's largest green hydrogen ecosystem". US-based Ohmium Inter-national has commissioned India's first green-hydrogen factory in Karnataka.

India has and India will continue to lead the world in green energy. India has also started in big way manufacturing equipment for wind energy which will obviate dependence on imported parts especially for wind energy generation.

Amarjit Singh MBE

From the Desk of the Secretary General

I am pleased to release this fifth issue of our Flagship publication Total Energy in digital for this FY 2022-23. This issue includes articles contributed by our members and also Proceedings of the conference and webinars organised in last two months.

I have great pleasure in inform you that in the last month, India Energy Forum had its 20th Annual General Meeting. The new Board of Management was elected in this meeting. In the first meeting of the Elected Members of the Board, the Office Bearers were elected, Mr R V Shahi (President), Mr Rakesh Nath and Mr G C Mrig as Vice Presidents, Dr V K Garg (Treasurer) and myself as Secretary General.

The last year was full of activities, during this period we organised 15 Webinars and 2 physical conferences. Recently we had organised a highly successful 8th Coal Summit which was held on 18th January 2023. The Summit was inaugurated by Shri Amrit Lal Meena IAS, Secretary, Ministry of Coal. Eminent expert from public and private sector participate at the Summit and shared their views. A brief report will be published in the next issue.

Next month on 7th February 2023, our Regulations Vertical is organising a Panel Discussion **Deviation Settlement Mechanism (DSM) Regulations 2022 of CERC on Zoom. Members are invited to join this meeting.** Eminent experts on the subject, **Dr. S K Chatterjee**, Chief (Regulatory Affairs), CERC, **Shri S C Saxena**, ED, NRLDC and **Shri B B Mehta**, Director, Orissa SLDC/ Ex-CE, Gujarat SLDC will participate and share their views as Distinguished Panelists. A background note on the subject is also published in this issue the Section IEF Activities.

Apart from these, we also regularly organise our month Executive Committee meeting in which day-to day issues are discussed.

B Bhambhani

India has achieved 172 GW of power capacity from non-fossil fuel sources: MNRE

The Ministry of New and Renewable Energy is working towards achieving 500 GW of installed electricity capacity from non-fossil sources by 2030 and 172.72 GW of capacity from non-fossil fuel sources has been installed in the country as on 31 October 2022, according to an official statement.

"This includes 119.09 GW RE, 46.85 GW Large Hydro and 6.78 GW Nuclear Power capacity. This has a share of 42.26 per cent of total installed generation capacity in the country i.e. 408.71 GW as on 31.10.2022," the ministry said in a statement. A total of 14.21 GW of Renewable Energy capacity was added during the period from January to October 2022 as compared to a capacity of 11.9 GW added during the period.

January to October 2021. The statement, a Year End Review of 2022, also said a Production Linked Incentive Scheme (Tranche II) on 'National Programme on High Efficiency Solar PV Modules', with an outlay of Rs 19,500 crore was approved and launched. Also, in order to facilitate large scale grid-connected solar power projects, a scheme for "Development of Solar Parks and Ultra Mega Solar Power Projects" is under implementation with a target capacity of 40 GW capacity by March 2024.

"As on 31-10-2022, 56 Solar Parks have been sanctioned with a cumulative capacity of 39.28 GW in 14 states. Solar power projects of an aggregate capacity of over 10 GW have already been commissioned in 17 parks," the ministry said. A total capacity addition of 1761.28 MW has been achieved during the period of January to October 2022. Also, a strategy paper including business models for offshore wind energy has been issued. This provides roadmap for achieving 30 GW of offshore wind energy target by 2030.

"A concept note for VGF scheme of Rs 14,283 crore for the initial 3 GW of offshore wind energy projects has been sent to Department of Expenditure, Ministry of Finance, for 'in-principle' approval. A trajectory to bid out offshore wind energy blocks for 37 GW capacity till 2029-30 has been issued," according to the statement. The ministry also said the Draft Offshore Wind Energy Lease Rules, 2022 have been finalized and sent for legal vetting and the Draft contractual documents for offshore wind energy projects have been finalized and being circulated for stakeholders consultation.

India's renewable energy subsidies more than doubled in FY22: Report

Subsidies for renewable energy and electric vehicles in India more than doubled in the financial year 2022, but it will be critical for the government to build this momentum over the coming years to reach the country's climate targets, according to a study by the International Institute for Sustainable Development (IISD) released recently.

The study, titled 'Mapping India's Energy Policy 2022: Tracking Government Support for Energy', found that subsidies for renewable energy rose from Rs 5,774 crore in 2021 to Rs 11,529 crore in 2022, while support for electric vehicles jumped 160 per cent from Rs 906 crore to a record-high of Rs 2,358 crore.

This rise is the result of greater policy stability, a 155 per cent jump in the installation of solar photovoltaic, and the post-COVID-19 economic resurgence, the study found.

Yet, to establish this trend, the government needs to further enhance the support measures – including subsidies, public finance, and investments by publicly-owned companies – over the next few years to reach 500 GW of non-fossil capacity by 2030 and become net-zero by 2070, experts said.

That is because in the financial year 2022, India still allocated four times more support to fossil fuels than clean energy, although the gap narrowed significantly since 2021 when it was nine times greater.

"Continued support for fossil fuels is out of step with India's long-term objectives of energy access, energy security, and addressing climate change," co-author of the study and policy advisor at IISD Swasti Raizada said.

"Aligning government's support with its climate targets will require shifting support from fossil fuels to clean energy, including developing a clear investment plan and interim targets to reach its long-term goal of net-zero by 2070." Subsidies for coal, fossil gas, and oil totalled Rs 60,316 crore in FY 2022, having fallen by 76 per cent since FY 2014 in real terms. Most notably, oil and gas subsidies fell by 28 per cent to Rs 44,383 crore in FY 2022, but this does not include foregone revenue from cuts in excise and VAT on diesel and petrol.

Overall, India provided at least Rs 5 lakh crore to support the energy sector in FY 2022, including over Rs 2.2 lakh crore in the form of subsidies.

While fossil fuels yielded important financial returns for the government, with energy accounting for nearly a fifth (19 per cent) of all government revenue in FY 2022 at Rs 9 lakh crore, IISD experts found that the social costs of energy were at least four times higher than government revenue.

Fossil fuel use costs Indians between Rs 14 lakh crore and Rs 35 lakh crore in social costs, such as from air pollution and climate change, the report found.

Great opportunity to look at sectors like green hydrogen: G20 Sherpa Amitabh Kant

G20 Sherpa Amitabh Kant on Friday said it is a great opportunity to look at sunrise sectors like green hydrogen development and mobile phone manufacturing with India holding the presidency of the G20 grouping.

“The stars are aligned in favour of India,” he said while referring to India’s G20 presidency while delivering the third annual lecture of Public Affairs Forum of India.

Kant further said that there will be a renewed push for green development and climate finance, with the concept of Lifestyle for Environment (LiFE) woven in.

Referring to the climate crisis, Kant said: “The promise of climate finance is not being lived up to by the developed world. It is important to have the flow of resources from multilateral institutions, besides the $100 billion funding from the developed countries. Nudging them is a key part of the government’s agenda.”

India's G20 Presidency to Play Key Role In Renewable Energy Push: IEA Chief Fatih Birol

India is among the countries that will drive the acceleration of the extraordinary increase in the deployment of renewables over the next five years. "We are entering a new and extraordinary growth phase of renewables," said International Energy Agency chief Fatih Birol. Driving this acceleration are concerns about energy security, economy, as well as climate change. The increased pace of renewable energy deployment will require investment to flow, particularly to emerging markets and developing economies. Birol said that India's G20 presidency will play an important role, especially as it takes over from another developing country Indonesia and will hand over in late 2023 to Brazil.

"It is a good opportunity for India to show case its recent successes," said Birol. The IEA chief said that India can demonstrate that a developing country can manage its clean energy transition but will require financial and technological support of advanced countries to move faster. Total renewable

energy capacity, according to the International Energy Agency, is set to almost double in the next five years, overtaking natural gas and coal as the largest source of electricity generation. "Solar energy becomes the king of all electricity sources," stressed Birol. Over the next five years (2022-27), global renewable power capacity is expected to grow by 2400 GW. "The world is expected to add as much renewable capacity in the next five years as it did in the last 20 years. Or to put it another way the world will add renewable energy capacity equal to the entire power generation capacity of China today," said Birol. The IEA chief said that this "extraordinary expansion" would be led by United States, China, European Union and India. Over the last few years, particularly due to the Covid pandemic, there has been a great deal of discussion on manufacturing, on whether solar manufacturing is focused on one single country, that is China. Birol pointed out that India will, thanks to government policies like production linked incentives, have an important role on reducing this concentration of manufacturing capacity in one country. "Today China's manufacturing capacity accounts for about 90% of global capacity. But as a result of big push from two countries, the United States and India, this 90% will be down to 75%. This mainly as a result of the Inflation Reduction Act in the United States and the Production Linked Incentives in India," said Birol.

Birol said that the data shows that the production linked incentives (PLI) scheme in India "attracts a lot of domestic and foreign investment" for PV manufacturing in India. "When I look at the India numbers, we expect that the manufacturing numbers will increase more than 10 times. Government policy will make India the second largest destination for PV manufacturing," said Birol.

The IEA chief says that the current energy crisis can be a historic turning point towards a cleaner and more secure future world energy system. The continued acceleration of renewables is critical to help keep the door open to limiting global warming to 1.5 °C. This multiple drivers of this "extraordinary growth" of renewable energy gives Birol the confidence to say that despite the difficulties it is too early to write the obituary of the 1.5 °C".

However, Birol points out that investment in clean energy has to increase exponentially. Current policies and efforts will result in investment of $2 trillion by 2030. "This needs to double to $4 trillion," said Birol. More importantly the bulk of the money must move to emerging markets and developing economies.

Renewable Energy

NTPC crosses 1-GW annual capacity mark in FY23

NTPC has crossed the milestone of 1GW annual capacity in renewable energy (RE) segment by adding 1074.59 MW RE capacity in FY23. With this, standalone installed and commercial capacity of NTPC has reached 57,801.27 MW, while group installed and commercial capacity stands at 70,416.27 MW, the company stated

In a BSE filing, the company said, “Consequent upon successful commissioning, entire capacities of 150 MW & 90 MW Devikot Solar PV Projects at Jaisalmer, Rajasthan, are declared on Commercial Operation w.e.f. 00:00 Hrs. of 13.12.2022.“

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As per the NTPC website, the 150 MW and 90MW Devikot Solar PV project is being developed in under the CPSU Scheme Phase-II Tranche-I of Ministry of New & Renewable Energy, Govt. of India (MNRE).

In view of NTPC’s plan to have 60 GW capacity through RE (Renewable Energy) sources, constituting nearly 45% of its overall power generation capacity by 2032, the company would require over Rs 2.5 lakh crore to achieve this ambitious target in the next one decade.

NTPC, under the ministry of power, is the country’s largest power-producing company. The company

supplies one-fourth of the total electricity in the country.

At present, the NTPC has a commissioned renewable energy capacity of 2,332 MW. Overall, the installed power generation capacity, including fossil-fuel based, of the NTPC Group (including joint ventures and subsidiaries) stands at 70,254 MW.

NTPC to allot 5 GW for green hydrogen, ammonia by 2032

NTPC, plans to use about 5 GW capacity in green hydrogen and ammonia business out of its 60 GW green portfolio target by 2032, said Mohit Bhargava, chief executive director, NTPC REL. “Out of the 60-GW renewable energy target, roughly about 5 GW of our capacity will be used for hydrogen production and ammonia… It will all be green, we are not looking at any other form,” he said in a panel discussion at the ETEnergyWorld Annual Gas Conclave held on 5-6 December, 2022.
Hydrogen in its current context is more useful for industrial uses, rather than for power generation,” said Bhargava.

NTPC has already started three pilots on the hydrogen business. One is in Leh in which they are setting up a green hydrogen filling station along with the solar plants and running hydrogen based fuel cell buses. This project is expected to start rolling by July or August next year.

The other pilot is blending green hydrogen and natural gas at its Kawas plant in Gujarat and is expected to be commissioned this month itself. The third pilot at its Vindhyachal plant in Madhya Pradesh is a combination of hydrogen and carbon capture.

“A broad idea is that in the next 10 years, we should try to create renewable capacity which is almost as large as the coal base capacity which we have done over the last 40 years,” added Bhargava.

IEX becomes India’s first carbon-neutral power exchange

Energy trading platform Indian Energy Exchange (IEX) became the country’s first carbon-neutral power exchange, using market based tradable instruments to offset its carbon emissions, the company said in a statement yesterday. “To reduce its carbon footprint, IEX voluntarily cancelled CERs (certified emissions reductions) from clean projects registered under the Clean Development Mechanism of United Nations Framework Convention on Climate Change," it said.

“We are honoured to achieve another milestone as a carbon-neutral exchange, as we further our commitment towards India’s net zero ambitions. This achievement is yet another milestone in our 15-year journey towards enabling India’s energy transition in a sustainable manner," said SN Goel, chairman and managing director at IEX.

IEX’s commitment towards climate mitigation will support corporates and industries who want to be associated with an environmentally responsible organisation and will enable them to contribute towards the critical challenge of climate change.

According to the UNEP 2022 report, global greenhouse gas (GHG) emissions must be cut 45% by 2030 to get on track to limit global warming to 1.5 degrees. Total global GHG emissions were estimated at around 53 GTCO2eq in 2021.

The recently concluded COP 27 reiterated the need to ramp-down GHG emissions. India has set a target to net zero emissions by 2070.

IEX said it is committed to fulfilling India’s net zero emissions target by creating an ecosystem for reducing emissions.

In becoming India’s first carbon-neutral power exchange, IEX had EKI Energy as the sustainability partner, which provided it with advisory and consultancy services in this climate action exercise, said a press release.

Govt may expand approved list of solar module makers to beat shortage

Solar PLI scheme: Module manufacturing capacity of 8.7 GW to be commissioned by end 2024

The government has issued letters of awards to three successful bidders in Nov – Dec 2021 for setting up 8.737 Gigawatt of fully integrated solar PV module manufacturing units under tranche I of the PLI scheme for High efficiency Solar PV modules, the Parliament was informed.
The move is aimed at addressing a shortage of solar modules, both due to global supply chain issues and the norms imposed by the government to boost domestic sourcing of equipment.

“The government has been in talks with the companies and brands which get equipment produced by domestic OEMs, on bringing them under the ambit of ALMM," said one of the two people mentioned above.

Being on the list is essential to do business in the country for solar equipment manufacturers. Equipment of firms on the ALMM list can be sourced for government-supported schemes and projects from where electricity discoms procure electricity. Manufacturers and solar modules are to be approved by the Bureau of Indian Standards (BIS) and the ministry of new and renewable energy (MNRE).

The MNRE issued an order in March 2021 enforcing the list, which initially featured around 23 manufacturers. It has been updated a few times and currently has around 75 solar module manufacturers.

The Centre aims to reduce import dependence and boost the domestic manufacturing of solar project equipment and has also come out with a production linked incentive (PLI) scheme for modules. But the restrictions have led to a severe shortage of modules as domestic production has been inadequate. The manufacturing plants proposed under the PLI initiative will take around one to two years to produce at full capacity and cater to the demand.

The solar power industry is already reeling from a sharp rise in module prices in the last two years. This has been further aggravated by the imposition of the duty on import of modules and the lack of supplies. The Centre imposed a 25% customs duty on import of cells effective from 1 April, 2022.

According to a report by the Institute of Energy Economics and Financial Analysis, module costs form 65% of the initial capital expenditure of a typical solar project, hinging project viability on their trajectory. Any increase in the cost of solar modules can significantly take up overall cost of the project. In an interview to Mint in September 2022, union minister for new and renewable energy R.K. Singh had said that the capacities impacted due to the high prices of modules and the pandemic then stood at 26 GW.

India’s Wind Installations Increased 8% YoY to 229 MW in Q4 2022

Total wind capacity installations in India increased year-over-year (YoY) by 8%, with 229 MW added in the fourth quarter (Q4) of 2022 against 212 MW installed during Q4 2021. However, installations fell by 74% quarter-over-quarter (QoQ) from 878 MW in Q3 2022. The QoQ decline is largely attributable to the commissioning of unusually high capacity in Q3 when several pending projects from Q2 rolled over to the subsequent quarter. QoQ fluctuations, both up and down, are relatively common depending on project deadlines and delays. The country’s cumulative wind installations by the end of Q4 stood at 42 GW compared to 40 GW during the same period last year.

Wind installations in Tamil Nadu and Gujarat followed the growth trajectory from the previous quarter by adding 23.7% and 23.5% of the country’s new capacity additions. These states were ranked the top two adding 99.3 MW and 98.6 MW of capacity in Q4, respectively.

Karnataka, Maharashtra, and Rajasthan occupied the next three spots on the list, with cumulative capacity addition of 149.5 MW in the last quarter of 2022. In absolute terms, Karnataka, Maharashtra, and Rajasthan added 52.6 MW, 50.1 MW, and 46.8 MW of new wind capacity, respectively.

Andhra Pradesh ranked sixth, accounting for 9.8% of India's total wind capacity additions during the quarter by adding 40.9 MW of new capacity. Madhya Pradesh accounted for almost 37% of total installations in the previous quarter. The State topped the list of states for highest capacity additions, but it ranked seventh during Q4 by adding 28.4 MW of new capacity. The Ministry of New and Renewable Energy (MNRE) recently decided to scrap the e-reverse bidding mechanism introduced in 2017. Reverse bidding has been held as the main reason for dwindling installations by making projects unviable for developers who engage in aggressive bidding. MNRE also said it has decided to issue 8 GW of wind capacity tenders annually beginning this year and will continue through 2030. Last October, Power Minister R K Singh proposed the option of pooling under which 8 GW of bids would be announced every year. The government also identified seven wind-rich states where it said that wind installation bids would be pooled together to derive an average cost of power.

Luminous green solar panel factory in Uttarakhand to be fully functional by end of 2023

Luminous Power Technologies on Friday revealed that it plans to build the country's first green energy-based solar panel manufacturing plant in Uttarakhand which will be operational by the end of this year.

The location of the new manufacturing plant is Rudrapur which will be equipped with the latest technology to design and produce high-quality solar panels that will be used for both residential and commercial applications.

Once operational, the facility, spread across 4.5 lakh square feet/10 acres will help enable a solar production capacity of 500 MW per annum, expandable up to 1 GW, producing a range of solar panels with a power output of 40W to 600W.

Luminous would establish its first facility in solar panel with the commencement of this factory.

Expressing excitement for the company's first solar panel facility in Rudrapur, Uttarakhand, Preeti Bajaj, CEO and MD, Luminous Power Technologies, said "This is a major step forward in Luminous Power Technologies' journey towards enabling a cleaner and more sustainable future and aligns with hon'ble prime minister's goal of being net zero by 2070."

This solar panel facility is fully robotic and will use 100 per cent energy from solar power. Annual production capacity of the facility will be equivalent to carbon sequestration of planting one crore trees, making a major contribution to the reduction of CO_2 emissions.

Green Energy Investment Tops $1 Trillion, Matches Fossil Fuels

Investment in cleaner energy is on the verge of overtaking spending on fossil fuels for the first time ever after exceeding $1 trillion last year, a report recently said.

Despite the milestone, spending on energy transition technology must immediately triple to meet the target of net-zero emissions by 2050 to combat climate change, according to research group BloombergNEF.

Investment in sectors such as renewables, nuclear, zero-emission vehicles or recycling projects totalled $1.1 trillion last year, matching spending on fossil fuels, the report found. This is up 31 percent on the previous year, and marks the first time the investment total has been measured in trillions.

The increase was driven by the energy crisis that followed Russia's invasion of Ukraine, the report said.

"Investment in clean energy technologies is on the brink of overtaking fossil fuel investments, and won't look back," said Albert Cheung, head of global analysis at BloombergNEF.

India increasing domestic oil and gas exploration: Hardeep Singh Puri

India, the world's third largest energy consumer, is increasing domestic oil and gas exploration, diversifying import basket, switching to alternate sources and using gas and green hydrogen as a pathway to energy transition and security, Oil Minister Hardeep Singh Puri said yesterday

Puri, who was here for an event showcasing age-old boats on the 'ghats' of the holy city switching to CNG instead of polluting diesel, said India is projected to contribute fourth of the world's energy demand growth in next couple of decades.

While the nation is dependent on imports to meet 85 per cent of its oil needs and 50 per cent of its natural gas requirements, India is mixing ethanol extracted from sugarcane and other agri produce in petrol to cut overseas reliance.

It will achieve 20 per cent ethanol blending in petrol by 2025, Puri said.

"Our energy security strategy is based on four pillars of diversification of energy supplies, increasing exploration and production footprint, using alternate energy sources, and meeting energy transition through the gas-based economy, green hydrogen and EVs," he said.

India increased the number of its crude oil suppliers from 27 countries in 2006-07 to 39 in 2021-22, adding new suppliers like Columbia, Russia, Libya, Gabon and Equatorial Guinea etc.

Crude oil extracted from below the earth's surface is refined to produce fuels like petrol and diesel. Natural gas too is found below the surface and is used to generate electricity, make fertilizer and convert into CNG to run automobiles and piped to homes for cooking purposes.

Energy prices globally shot up following Russia's invasion of Ukraine but consumers in India were largely insulated as state-owned retailers did not raise prices commensurate with the spurt.

Prices of diesel -- the most used fuel in the country -- rose by only 3 per cent between December 2021 and December 2022 while they went up by 34 per cent in the US, 36 per cent in Canada, 25 per cent in Spain and 10 per cent in the UK, Puri said.

Diesel price increased from Rs 86.67 per litre in December 2021 to Rs 89.62 a year later. Rate of petrol rose from Rs 95.41 per litre to Rs 96.72.

The increase was tempered by a cut in excise duty. The government had raised the excise duty on petrol by Rs 13 a litre and that on diesel by Rs 15 per litre in 2020 when the pandemic had battered global energy prices. This hike was rolled back in two instalments in November 2021 and May 2022.

Also, some states cut VAT or local sales tax on fuel to help consumers. Puri said the government is targeting to increase India's exploration acreage to 0.5 million square kilometre by 2025 and 1 million sq km by 2030.

Exploration over a wider area will yield more discoveries, raising domestic oil and gas output and cutting reliance on imports.

Also, India increased the ethanol blending in petrol from 1.53 per cent in 2013-14 to 10.17 per cent in 2022 and advanced its target to achieve 20 per cent ethanol blending in petrol from 2030 to 2025-26. The phased rollout of E20 will commence from this month or February, he said.

Simultaneously, the government is supplementing supplies by setting up compressed biogas (CBG) plants that use animal and agri waste to produce gas.

India will contribute 25% of global demand by 2040: Hardeep Singh Puri

India has been able to navigate through the most formidable energy crisis the world has seen since

the 1973 oil crisis thanks to its four-pronged energy security strategy: Diversification of energy supplies

India may split planned mega refinery to various sites: Sources

India is considering building several refineries instead of a single mega plant planned with Saudi Aramco and Abu Dhabi National Oil Company (ADNOC), due to challenges in acquiring land, three sources familiar with the matter said.

Hurdles in land purchases are one of the key reasons for sluggish infrastructure development in Asia's third-largest economy.

Aramco and ADNOC joined a consortium of Indian state-run firms in 2018 to set up a 1.2 million barrels-per-day coastal refinery and petrochemical plant in western Maharashtra, seeking a reliable outlet for their oil.

Delays in acquiring a 15,000-acre land parcel have almost stalled the project, initially planned for 2025, and boosted costs by 36% to $60 billion, as per estimates made in 2019.

"There is a proposal that instead of one we can actually have three, which is a matter of discussion between the companies involved," said one of the sources.

Aramco and ADNOC own 25% each in the joint venture Ratnagiri Refinery & Petrochemicals Ltd (RRPCL), a company named after the region where the refinery was initially planned.

State-run refiners Indian Oil Corp, Bharat Petroleum Corp and Hindustan Petroleum hold the remaining stake in RRPCL.

Another source said ADNOC and Aramco were aware of the plan for several refineries.

"It is good to build the refinery at different sites if a huge chunk of land is not available as that will reduces investment risk," said a second source.

"Also with multiple refineries you have the flexibility to modulate product slate in line with changing product demand pattern," this source said.

ONGC to rely more on advanced tech, says Sushma Rawat

Oil and Natural Gas Corporation (ONGC) will drill more, drill deeper and increase reliance on advanced technologies and tech-savvy younger minds to boost chances of making major discoveries, said Sushma Rawat, the first woman to be appointed as the state-run company's exploration chief.

"We have to image better, drill deeper, and monetise faster," Rawat told ET.

Indo-Bangla Friendship Pipeline likely to be commissioned in February

The ambitious 130-km long Indo-Bangla Friendship Pipeline (IBFPL), constructed at a cost of Rs 377.08 crore, is likely to be commissioned by next month, official sources said on Sunday.

The international oil pipeline, IBFPL, will carry fuel from Assam-based Numaligarh Refinery Ltd's (NRL) marketing terminal at Siliguri in West Bengal to the Parbatipur depot of Bangladesh Petroleum Corporation (BPC).

The mechanical works of the bilateral project, being funded by India, was completed on December 12 last year, a senior official of NRL told PTI on condition of anonymity.

"We have set the commissioning target completion in February 2023," he added.

The ground breaking ceremony for the 130-km IBFPL was held in September 2018 in the presence of Prime Ministers of India and Bangladesh through video conferencing.

"The project is in a true sense an engineering marvel. We faced lots of hurdles but with mutual cooperation and technological understanding between the two countries, this international project will see the light of the day," another senior executive of the Northeast's largest refiner said.

The IBFPL has been successfully implemented because of the true friendship between India and Bangladesh, and it will remain as a testimony of best relationship between the two South East Asian nations, she added.

Global oil inventories expected to grow, prices to drop in next 2 yrs: EIA

Global oil inventories will increase over the next two years with more global oil production than consumption, the US Energy Information Administration (EIA) has forecast.

Partly as the result, crude oil prices will further go down, the EIA said in its January Short-Term Energy Outlook (STEO) report.

The report forecast that global production of liquid fuels will reach an average of 102.8 million barrels per day (b/d) in 2024, up from 100 million b/d in 2022, driven by large growth in non-OPEC production, reports Xinhua news agency.

However, uncertainty over Russia's oil supply will persist, particularly in early 2023, the report noted, expecting global consumption of liquid fuels will rise from an average of 99.4 million b/d in 2022 to 102.2 million b/d in 2024.

The EIA said that ongoing concerns about global economic conditions as well as the easing Covid-19 restrictions in China raised the uncertainty of the outcomes of its demand forecasts.

As for crude oil prices, the Brent crude oil price is forecast to average $83 per barrel in 2023, down 18 per cent from 2022, and continue to fall to $78 dollars in 2024 as global oil inventories build, putting downward pressure on crude oil prices.

Gasoline prices will also decline as both wholesale refining margins and crude oil prices fall, said the report, forecasting US gasoline refining margins to fall by 29 per cent in 2023 and by 14 per cent in 2024, leading to retail gasoline prices averaging around $3.30 per gallon in 2023 and $3.10 per gallon in 2024.

US refining margins for diesel are expected to fall by 20 per cent in 2023 and by 38 pe rcent in 2024. The EIA forecast retail diesel prices to average about $4.20 per gallon in 2023, down 16 per cent from 2022, and continue to fall in 2024, averaging near $3.70 per gallon.

In the EIA forecast,the Henry Hub natural gas spot price averages slightly less than $5 per million British thermal units (MMBtu) in 2023, down close to 25 per cent from last year, as domestic consumption declines and liquefied natural gas (LNG) exports remain relatively flat.

In 2024, natural gas prices will again average slightly below $5 per MMBtu, as dry natural gas production outpaces an increase in LNG exports that results from rising LNG export capacity.

The report expected natural gas production in both the Permian and Haynesville regions to grow with the completion of pipeline infrastructure expansions in 2023 and 2024.

The EIA also forecast that the share of US electricity generation from coal will fall from 20 per cent in 2022 to 18 per cent in 2023 and 17 per cent in 2024.

As an offset, the share of combined utility-scale solar and wind generation will surge from 16 per cent in 2023 to 18 per cent in 2024.

Safety top priority in coal sector: Joshi

Coal minister Pralhad Joshi on Tuesday said that safety is the top priority in the coal sector and all companies should ensure that there is no shortage of funds for taking safety measures. The minister said that mine safety has always been accorded the top-most priority in the coal sector and stressed that it should be strictly followed. "All our achievements would be futile if our workers are not safe and healthy...'Safety First, Production Must' in all mines," Joshi said in a statement. The minister said that there has been significant improvement in the safety records as number of fatal and serious accidents in coal mines in the last eight months have declined remarkably despite high increase in coal production.

India's coal production target at more than one billion tonnes for FY24: Govt

The government on Wednesday said that it has set a coal production target of more than one billion tonnes (BT) for the next financial year. Of the said target, state-owned CIL has been given the task to produce 780 MT of coal, followed by 75 MT for SCCL and 162 MT for captive and commercial mines. "The ministry of coal targets to produce more than one billion tonne coal during the year 2023-24," the coal ministry said in a statement.

In a bid to achieve this aim, in-depth review has been carried out by coal secretary Amrit Lal Meena with all coal companies.

A total of 290 mines are operational in Coal India Ltd (CIL) out of which 97 mines produce more than one MT per year. For all 97 such coal mines, issues of land acquisition, forest clearance, environment clearance, rail connectivity and road connectivity have been discussed and timelines fixed. With continued effort of coal companies, out of 97 coal mines, there are no pending issues in 56 mines.

Only 41 mines have 61 issues, for which continued co-ordination and monitoring is being carried out by top management of coal companies with concerned state government authorities and the central ministries. CIL produced 622 MT of coal during FY22 and 513 MT have been produced so far in the current financial year.

It is expected that CIL will surpass the target of 700 MT fixed for current fiscal and accordingly will achieve 780 MT for the year 2023-24. CIL accounts for over 80 per cent of domestic coal production.

India’s coal production to touch 1 billion tonnes next fiscal

India's coal production will touch one billion tonnes in FY24 from 900 million tonnes this fiscal, as the country gears up to stop the import of thermal coal by 2024-25, Union Coal Minister Pralhad Joshi informed Parliament yesterday.

Replying to queries in the Rajya Sabha during the Question Hour, the Coal Minister said India's domestic coal requirement will reach 1,500 million tonnes by 2030, for which the nation needs to scale up its production.

"As far as production is concerned, in FY14, it was 566 million tonnes. This year, our total production will be 900 million tonnes, this means all our PSUs are producing at the optimum level," Joshi said in the Rajya Sabha.

Without naming any political party, the Minister said the previous regime was riddled with scams whereas, the current dispensation led by Prime Minister Narendra Modi is ensuring energy security for India.

"Our requirement by 2030 will be 1,500 million tonnes, and for that, we have to scale up our production, the previous regime, they did not produce, there were only scams, and today, we are producing and we are ensuring energy security for India, for that coal is needed," Joshi said.

As per demand projections, coal mines are planned and their operations are run to ensure the energy security of the country. Development of new mines is also required towards Atmanirbhar Bharat to reduce import dependence. Coal demand of 1500 million tonnes per annum is projected by various agencies by 2030.

"This year our production will be 900 million tonnes, next year it will be 1 billion tonnes. During their time, coal was under the regime of scams. Our regime under Prime Minister Narendra Modi, I would like to assure this House, from 2024-25, we will stop the import of thermal coal," said the minister.

Operations of coal mines are monitored by the Government on regular basis.

India's Coal Production Rises 16 Pc To 608 Million Tonnes In April-Dec Period

The country's coal output went up by 16.39 per cent to 607.97 million tonnes (MT) during the April-December period of the ongoing fiscal. India's coal production was 522.34 MT in the corresponding period of previous fiscal.

The coal production by state-owned Coal India which accounts for over 80 per cent of domestic output of the fossil fuel -- was at 479.05 MT in the April-December period, registering a rise of 15.82 per cent, the coal ministry said in a statement.

The ministry has paved the way for releasing additional coal in the market by greater utilisation of mining capacities of captive coal blocks which has led to increase in production of coal by captive and other companies by 31.38 per cent to 81.70 MT during the period under review as compared to 62.19 MT in 2021.

The ministry has also amended the Mineral Concession (Amendment) Rules, 1960 under MMDR (Amendment) Act, 2021 to allow lessee of captive mines to sell coal/lignite up to 50 per cent of the total excess production after meeting the requirement of the end-use plants.

The ministry is taking steps to build up rail connectivity infrastructure for all major mines under PM Gati Shakti to ensure faster evacuation. As a result, the total coal despatch have been to the tune of 637.51 MT during April-December period as against 594.22 MT during the same period of FY22, registering a growth of 7.28 per cent. The Centre has put 141 new coal blocks for commercial sale and has been engaging regularly with various coal companies and keeping a track of its production. The all-round efforts made to increase the domestic production and despatch have shown extremely good results.

Allocation orders for 6 coal blocks issued

The government said it has issued allocation orders to the successful bidders for six coal mines which were put on sale for commercial coal mining.

The successful bidders got the vesting orders from coal secretary Amrit Lal Meena.

"The Nominated Authority, Ministry of Coal issued vesting order for six coal mines i.e. Barra, Maiki North, Alaknanda, Basantpur, Bandha North and Kasta East for which the Coal Mine Development and Production Agreements (CMDPAs) were signed on October 17, 2022," the coal ministry said in statement.

Coal is here to stay despite India's ambitious renewable energy goals

Coal is dirty—it makes up for 40 per cent of carbon dioxide emissions from fossil fuels, its mining wreaks havoc on the environment and burning it produces pollutants like mercury which are linked to acid rain and particulate matter that causes respiratory illnesses. But the war in Ukraine has caused a mini-energy crisis globally, pushing its use to record levels this year.

And India, the world's third largest energy consumer, was at the forefront of the global rise in coal usage as it fell back on the easiest available fossil fuel in the face of a surge in oil and gas prices that threatened to derail the economic recovery from the pandemic.

The trends of coal consumption and production this year indicate that the dirty fuel is here to stay despite the nation's ambitious target of meeting 50 per cent of energy requirements from renewable energy and non-fossil fuel capacity of 500 GW by 2030.

India's coal consumption has doubled since 2007 at an annual growth rate of 6 per cent and the International Energy Agency (IEA) estimates that the largest increase in the fuel's demand globally this year was from India (7 per cent or an addition of 70 million tonnes). This on top of a 14 per cent rebound in 2021, and 1,033 million tonnes consumption in 2022.

And this demand is led by its electricity generation which is overly reliant on coal. Coal-fired electricity generation accounts for about 73 per cent of India's overall power needs and is likely to remain the most important source of electricity in the foreseeable future. Coal-fired power plants make up 50 per cent of the overall installed capacity of 404 GW connected to grids, with another 25 GW currently under construction.

The IEA expects India's coal demand to rise steadily to 1,220 million tonnes in 2025, with 92 per cent of this going into electricity generation. Electricity demand too is seen growing at 7 per cent.

The government, which has been propagating self-reliance and cutting down imports, has been pushing for raising domestic coal production not just to meet the surge in demand but also to avoid summer blackouts.

Coal production in 2021 reached 800 million tonnes for the first time and is forecast to surpass 1 billion tonnes by 2025.

Nevertheless, by targeting a share of 50 per cent renewables in its power mix by 2030, the government is in the medium term seeking to alleviate the electricity sector's dependency on coal and reduce the cost of energy generation. It mandated 81 coal fired power plants to reduce power generation by a total of about 58 terawatt-hour (TWh) over the next four years, however, without shutting down any of the country's 172 power plants connected to the grid.

The ministry also desires to make some significant achievements in the area of coal gasification in the new year.

Speaking to PTI, Coal and Mines Minister Pralhad Joshi unveiled the plans for the next year and said the coal output of one billion tonnes will come from different sources which consist of state-owned CIL, commercial mines and captive coal blocks.

"We want to see that there is highest production and dispatch as far as coal is concerned. The entire coal production in the country will be one billion tonnes," Joshi said. Coal India (CIL) accounts for over 80 per cent of domestic coal output.

In the mineral sector, Joshi said, the Centre is eyeing some more amendments in the mining act which can happen in the second half of the Budget session of Parliament. Besides, the ministry plans to put on sale 500 mineral blocks in the financial year 2024-25.

India has come a long way. Joshi said earlier the country's production was 582 million tonnes and today it is 870 MT. This output will reach 900 million tonnes by the end of the current financial year.

The launch of the sixth tranche of commercial coal mines auction under which the government offered 141 blocks across 11 states—the biggest auction so far for the key commodity—is one of the achievements of his ministry in the current year, the coal minister explained.

Moreover, the minister stated the Centre's approval for granting a one-time window to government companies to surrender non-operational coal mines without penalty was another achievement of his ministry in the ongoing year.

However, Joshi expressed concerns over the delays in operationalisation of both coal and mineral blocks due to issues like land acquisition, and said there was a need to bring states on board for the same.

"I am not talking about any particular state. I don't want to do that because I have to ultimately take state governments into confidence and have to work. But there are some state governments which we are not able to bring on board," the minister noted.

Severe power cuts due to coal shortage in a number of states snowballed into a major political crisis as it came in an election year when two BJP-ruled states Himachal Pradesh and Gujarat—the home state of Prime Minister Narendra Modi and Home Minister Amit Shah—went to polls.

Power Minister R K Singh asserted that electricity shortage was primarily happening because states have not paid their dues to Coal India and are unable to lift the allocated dry fuel on time.

The states suffered prolonged blackouts as scorching heat waves boosted energy demand at a time when coal stockpiles were low.

That sent the officials to the drawing board to rework a coal supply plan to avert future crises. Coal-fired power plants were ordered to use imported fuel to operate at full capacity.

Stock norms were also revised. The revised norms mandated coal stock of 17 days at pit head stations and 26 days at non-pit head stations to be maintained by power plants from February to June every year.

India is the world's second-largest producer and consumer of coal. Three-quarters of the electricity produced in the country is through coal. India sits atop the world's third-highest reserves of the dry fuel and boasts of the world's largest coal mining company but per person consumption is still modest.

India imports a little under a quarter of its consumption—much of it coking coal which is used in blast furnaces for producing steel and is not available domestically. Yet there are perpetual shortages.

Coal part of India's base load energy: Adani Group

India's power demand will double by 2040 and coal is here to stay for the next few decades. The role of coal was reiterated by Adani Enterprises, CFO, Jugeshinder Singh, when he was quizzed if use of coal for its power business could be a deterrent for international investors to invest in Adani Enterprises' follow-on public offer.

"India does not have a foreseeable pathway out from base load energy in which coal is not there. Thus it requires orderly transition," said Singh at Adani Enterprises' mega follow-onpublic offer (FPO) announcement on Thursday. In its draft red herring prospectus, the company says its integrated resource management business primarily depends on an increasing demand for imported coal in India and its ability to maintain a diverse supplier base.

India's thermal coal imports up nearly 15 per cent in 2022: Coalmint

India’s imports of thermal coal - used mainly for power generation - grew 14.7 per cent to 161.18 million tonnes in 2022, data from Indian consultancy Coalmint showed on Monday, driven by higher domestic production and shipments by utilities

Data showed that shipments of coal, which is typically used to manufacture steel, also edged higher. Imports of coking coal rose 0.8 per cent to 56.1 million tonnes, anthracite grew 12.2 per cent to 1.79 million tonnes, and PCI coal shipments increased 8 per cent to 13.43 million tonnes. Indian imports of petcoke, mostly used by cement plants, doubled to 9.77 million tonnes in 2022 as they were cheaper compared with coal, whose prices hit record highs following Russia's invasion of Ukraine.

Thermal coal imports were driven higher by an uptick in demand from utilities, as power demand surged due to a resurgence in industrial activity following the easing of coronavirusrelated restrictions and an intense heatwave in the first half of the year. Thermal coal imports by power plants increased 58.1 per cent to 47.6 million tonnes during the first 11 months, compared with the same period in 2021, government data showed.
Data on coal imports by utilities in December was not available. Indonesia cemented its place as India's largest overseas supplier of thermal coal, with its share rising to two-thirds in 2022, from over half the market in 2021. Indonesia's share rose at the expense of Australia and South Africa, while Russia overtook the United States to become India's fourth-largest supplier. However, the United States increased its share in India's coking coal imports, more than doubling supplies to Indian steelmakers to 7.03 million tonnes.

Higher US supplies resulted in Australia's share falling to 68 per cent of the Indian overseas coking coal market in 2022, from 80 per cent in the prior year. Russia surpassed Australia to become India's largest supplier of PCI coal, with exports nearly trebling to 7.33 million tonnes, the Coalmint data showed.
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New coal transport mechanism may raise power cost up to 10 per cent

The overall electricity cost is likely to rise by up to 10% when a fifth of a power plant's coal requirement is transported through the 'rail-ship-rail' system, a senior government official told ET. The power ministry had on Monday asked Gujarat, Rajasthan, Maharashtra, Punjab as well as NTPC to transport 10-15% of their coal requirement through a combination of land and sea route, also called rail-ship-rail mode. The new coal transport mechanism was worked out because of logistical constraints of direct rail movement and an anticipated increase in coal requirement in the coming peak demand season of April-May. The power cost will still be cheaper than that produced using imported coal.

"Let's say today power is being sold at 4 per unit then it will be 4.4 per unit (after rail-shiprail). But if we generate power through imported coal, then it will be 5 per unit," the official said. "So, the impact on power generation from imported coal will be much higher than the additional cost because of this longer route of transportation," he said.

The new mode of transport will take coal from Coal India's mines to Paradip Port, from where the fuel will move to the west coast for various power plants, travelling a longer distance than the traditional direct rail route.

"Due to the recent surge in demand and consumption of electricity, the share of coal-based generation has increased. Although the supply of coal from all sources has increased, it is not commensurate with the requirements of thermal power plants," the power ministry had said on Monday.

Last year, a coal supply crisis emerged in April because of a sudden rise in power demand, stretching the Railways and coal production. The coal ministry also plans to have 118 million metric tonnes of domestic coal by the end of the ongoing financial year to avoid a fuel crisis during the peak power demand season in April-May. Other measures like an increased gas supply to power plants, blending of imported coal, and staggered power plant maintenance have also been planned by the power, coal, and renewable energy ministries to meet the upcoming peak demand.

India will try to meet 230 GW peak demand in April '23: Power Secretary

The government will take all possible measures to meet the 230 gigawatt (GW) single-day peak demand expected in April 2023, according to Power Secretary Alok Kumar. Power Minister R.K. Singh presided over a meeting recently to review the preparation to meet the high electricity demand expected in April next year.

The top power ministry official, Chairperson of the Central Electricity Authority (CEA) Ghanshyam Prasad besides other government officers were part of the meeting.

On the outcome of the meeting, the secretary told PTI there are two parameters on which the government will work.

Firstly, it will ensure there should be enough power generation capacity, and for that companies have been directed to carry out maintenance work of their plants so there is no issue at that time, he said.

According to Mr. Kumar, the demand in April next year could be as high as 230 GW.

As per official figures, the maximum all-India power demand met at 2:51 p.m. on April 26, 2022 was 201.066 GW.

The second aspect discussed at the meeting was to increase the production and dispatch of coal as much as possible. In this regard, review meetings are being held with ministries of coal and railways on a regular basis, he said.

When asked if the government will also keep the option of coal imports open to maintain supply of the dry fuel, the official said, "We (government) will do whatever we will have to do to ensure continuous power supply (in April)."

Earlier this year, the power minister had asked state power generation companies (GENCOS) to import 10% of coal requirement for blending purposes and lift the entire quantity of coal offered under rail-cum-road (RCR) mode expeditiously to build coal stock to avoid shortage during monsoon.

All-India electricity demand may grow 7% to 1,480 BU in FY23: ICRA

The all-India electricity demand is expected to grow 7 per cent to 1,480 billion units (BU) in the ongoing financial year, according to ICRA.

In the preceding 2021-22 fiscal, the all-India power demand was at 1,380 BU, the ratings agency said on Monday.

"All-India electricity demand to remain healthy at over 7 per cent in FY23 despite growth slowdown post Q1 of this fiscal, and grow at 5-5.5 per cent in FY24," Icra said in a report.

The estimates are based on the fact that all-India electricity demand increased 10.6 per cent year-on-year in first eight months of FY2023, amid a severe heat wave in north and central India, it said.

Girishkumar Kadam, Senior Vice President & Co-Group Head - Corporate ratings, Icra, said, growing energy demand along with subdued capacity addition in the thermal segment is leading to an improvement in average thermal PLF (plant load factor) level for gencos/IPPs (power generation companies/independent power producers) at all-India level.

Thermal power plant load factor or capacity utilisation will improve to 63% in FY24, fuelled by strong demand growth along with subdued capacity addition in the sector, rating agency Icra said.

“All-India electricity demand to remain healthy at over 7% in FY2023 despite growth slowdown post Q1 of this fiscal; and grow at 5-5.5% in FY2024. The estimates are based on the fact that all-India

electricity demand increased by 10.6% on a year-on-year (YoY) basis in 8M FY2023, because of the severe heat wave in North & Central India and a favourable base," Icra said in a statement.

Thermal power PLF estimated to improve 63% in FY24: ICRA

“Growing energy demand along with subdued capacity addition in the thermal segment is leading to an improvement in average thermal PLF level for the Gencos/IPPs at all India level, which is expected to improve from 58% in FY2022 to about 62% in the current fiscal and thereafter to about 63% in FY2024,“ Girishkumar Kadam, Senior Vice President & Co-Group Head - Corporate ratings, ICRA, said.

“Sustained energy demand growth is also expected to improve the visibility on signing of new PPAs for the private thermal IPPs, as also evident from the recent medium-term (5-year) PPA tender for 4.5 GW issued by PFC Consulting Ltd. On the contrary, lack of long/medium term PPAs remained one of the major concerns for private thermal IPPs in the power sector," he added.

From the perspective of the fuel mix in energy generation on all India basis, coal as a fuel contributed a dominant share (73%) in FY2022. The same is estimated to come down gradually to about 58% in FY2030, considering cumulative renewable energy (RE) capacity of 350 GW under ICRA’s base case scenario, according to rating agency Icra.

As a result, dependency on coal as fuel is expected to continue with a sizeable share to meet the energy demand, despite the strong policy focus and growing capacity addition in the RE segment, it added.

The average spot power tariffs in the day ahead market (DAM) of the Indian Energy Exchange remained high at Rs. 5.9 per unit in YTD FY2023 against the long-term average of Rs. 3.0 - 3.5 per unit, owing to the sharp revival in electricity demand and high coal prices. While the prices have moderated post-July ’22, the full-year average spot tariff in FY2023 is estimated to remain elevated at over Rs. 5.0 per unit against Rs. 4.4 per unit in FY2022.

“The discoms in several states including Andhra Pradesh, Telangana, Karnataka, Jharkhand, Chhattisgarh, J&K and Rajasthan among others have received sanctions from PFC and REC aggregating to Rs. 1 trillion to clear the outstanding dues (as of June 2022) to the power generating companies through installments of 12-48 months under late payment surcharge (LPS) scheme. This is a near-term positive for Gencos/IPPs due to the liquidation of overdues,“ said Vikram V, vice president & sector head – corporate ratings, Icra.

“As per our channel check, the payments from the discoms for the bills raised post-June 2022 in participating states under LPS are reported to be timely aided by the penalty provisions of LPS. However, sustainability of the same would be critically dependent on discoms’ ability to improve their financial profile through a focus on improvement in operating inefficiencies, timely revision of tariffs and timely realization of dues from state government and government departments," he added.

The rating agency expects that the outlook for the distribution segment remains negative amid the weak operating efficiencies, lack of timely and adequate tariff revisions, and delays in receiving payments from respective state government and government bodies.

“The outlook for the thermal generation segment also remains negative and, in this context, the progress on signing of new PPAs, as well as sustained improvement in the thermal PLF levels, remain key moniterables," it said.

Loans of Rs 7.62 lakh cr provided to thermal power plants in India: Report

Loans amounting to Rs 7.62 lakh crore have been provided by 84 lenders, both national and international, to thermal power projects in India, with a capacity of 1,000 MW and above between 2005-2022, a new report said yesterday. The report, The Coal Tail: Tracking Investments in Coal fired

Thermal Power Plants in India, by the Centre for Financial Accountability comes at the heels of COP27, which concluded on November 20 in Sharm-El-Sheikh, Egypt, where India announced its Long-Term Low Emissions and Development Strategies.

Moreover, India has recently assumed the presidency of the G20 Summit this month, which will have some focus on energy transition.

The report analysed data for 140 thermal power plants (TPPs) between 2005-2022 of which 122 were commissioned and 18 were in the construction phase and spread across 16 states/UTs.

The 122 plants account for almost 196 GW of the 204 GW total commissioned capacity during this timeframe, with 122 GW publicly held whereas 73 GW is privately-owned.

“Information about financing is indispensable to any scrutiny of project feasibility not only in terms of efficiency and requirement, but also the environmental and social impacts that accompany such projects. Yet, such information is rarely accessible to the public. This inaccessibility exists mainly due to lack of transparency and astute use of fiduciary relationships between bank and client,” said Kenneth Gomes, author of the report and Data Analyst at Centre for Financial Accountability.

“This report intends to remove this asymmetry and make such information available publicly to encourage demands for accountability from financial institutions.”

The report recorded a total of 22 international financial institutions, who have lent Rs 0.503 lakh crore in India. Japan Bank for International Cooperation has lent Rs 0.0734 lakh crore, China Development Bank Rs 0.0641 lakh crore.

Japan and China dominate the share of loans coming to the coal sector in India, which include financial institutions such as JBIC, JICA, China Exim Bank, Mizuho Corporate Bank, Ltd, Industrial & Commercial Bank of China and others.

Discoms' outstanding dues reduced by Rs 29,857 crore to Rs 1,08,092 crore, says Power Minister R K Singh

Power distribution utilities or discoms' total outstanding dues reduced by Rs 29,857 crore to Rs 1,08,092 crore, which were Rs 1,37,949 crore on June 3, 2022, Parliament was informed on Tuesday. One of the key indicators of financial distress of discoms is mounting power purchase dues towards the generation companies (gencos).

With the implementation of Electricity (LPS and Related Matters) Rules, 2022, a remarkable improvement has been seen in recovery of outstanding dues, power minister R K Singh said in a written reply to Rajya Sabha on Tuesday.

The minister informed the House that the total outstanding dues of the states, which were at Rs 1,37,949 crore as on June 3, 2022, have been reduced by Rs 29,857 crore to Rs 1,08,092 crore, with timely payment of just five monthly instalments.

Demand for power in India to decelerate in 2nd Half of FY23: Fitch Ratings

There will be deceleration in India's demand for power in the second half of FY23 and the growth rate for the year will be about eight per cent, said Fitch Ratings. According to the credit rating agency Fitch, the demand for power in India grew at 11.3 per cent year-on-year (YoY) during the first half of FY23 due to post pandemic rebound and a low base during 1HFY22.

Fitch Ratings expects India's power demand to grow by around eight in FY23 (FY22: 8.2 per cent). The rating agency expects thermal power plants' average plant load factor to remain above 60 per cent in FY23 (1HFY23: 64.5 per cent), benefiting from continuing power demand growth.

Fitch Ratings expects improved domestic coal supply will support coal inventory at power plants and should moderate coal import growth from current high levels, although imports are expected to remain robust.

As per Fitch Ratings' estimates, generation companies' (gencos) receivable position to improve as distribution companies have started clearing their dues to gencos following imposition of the late payment surcharge rule by the central government. "Renewable capacity addition is likely to soften in 2HFY23 (8.2MW: 1HFY23, 15.5MW: FY22) and we may see deferment in capacity additions due to high commodity prices, supply chain issues and higher import duties on solar modules and cells from April 2022," Fitch Ratings said.

Mahanadi Coalfields to set up 1,600 MW power plant in Odisha

Mahanadi Coalfields Limited (MCL), a subsidiary of Coal India Limited, is looking to diversify into power generation, and plans to set up a Rs 12,000 crore power plant in Odisha. It also aims to enter into aluminium business and may soon set up a greenfield aluminium project.

Sources informed that the 1,600 megawatt capacity coal-fired power project would come up in Odisha's Sundargarh district as a wholly owned subsidiary of MCL. MCL also plans to enter into the aluminium business, they further said. The mini ratna company is currently looking to secure a bauxite mine for the purpose. Coal India's board in October 2021 had approved a pre-feasibility report for setting up an integrated aluminium project in Odisha.

Earlier, the coal behemoth in December 2020 had got in-principle approval for venturing into aluminium and solar sectors and creation of special purpose vehicles.

Coal India in a regulatory filing in October 2021 had said that the proposed aluminium project would include bauxite mining, alumina refinery, aluminium smelter and an associated captive power plant by its wholly owned subsidiary MCL.

India, UAE to connect power grid

India and the United Arab Emirates plan to launch a feasibility study within the next couple of weeks to lay undersea cables between the two countries to connect their power grids as part of Prime Minister Narendra Modi's the One Sun, One World, One Grid initiative, India's ambassador to the UAE Sunjay Sudhir said.

He pointed out that with the interconnection of electricity supplies, all the six member states of the Gulf Cooperation Council grouping will get connected to India, promoting interdependence. Sudhir also said that post the India-UAE free trade agreement, bilateral trade has grown by nearly 30% in the April-November period, and that buyer-seller meets were being organized for sectors including engineering, food, gold jewellery, electronics, etc to encourage growth of non-oil trade.

As far as bilateral trade is concerned, we were always doing well. So, even before CEPA, the UAE was our third largest trading partner and second largest export destination. We were their second largest trade partner and also, we are already there on the top.

What has happened after CEPA is that this trade has got a further push. CEPA entered into force on the first of May. After the benefits start, then also it takes a month or two for business communities on both sides to start taking advantage of that. It takes a little time. So, in the last six to eight months, there's been a real push for several sectors. Our bilateral trade has shot up by nearly 30% already. And as the awareness grows and people become more used to Certificates of Origin and other little paperwork associated with using benefits under CEPA, trade will further increase. Exports to the UAE have grown by nearly 19%in the last eight months. These are very impressive figures.

20 new nuclear power plants to be commissioned in country by 2031: minister

India plans to commission 20 nuclear power plants by 2031, adding nearly 15,000 MW in power generating capacity, the government told the Lok Sabha. The first of these 20 nuclear power plants, a 700 MW unit, is expected to be commissioned in 2023 at Kakrapar in Gujarat, which already has three atomic power generating units operational.

According to a written reply by Minister of State in the PMO Jitendra Singh, the 500 MW Prototype Fast Breeder Reactor at Kalpakkam is likely to be operational in 2024, followed by two 1,000 MW units at Kudankulam in 2025.

PSUs to be roped in to build nuclear power plants: Jitendra Singh

India is all set to rope in its public sector behemoths for building nuclear power plants as it aims to achieve its goal of net zero emissions by 2070, Union Science and Technology Minister Jitendra Singh said recently. Addressing the media on the sidelines of the 108th Indian Science Congress here, Singh said the nuclear sector has been opened up for joint ventures with public sector undertakings to generate financial resources for building atomic power plants. Singh is the Union Minister of State in the Prime Minister's Office and in-charge of the Department of Atomic Energy. The government had amended the Atomic Energy Act in 2015 to enable joint ventures between the Nuclear Power Corporation of India Limited (NPCIL) and public sector companies to build nuclear power projects.

"We are now building nuclear power plants in northern parts of the country as well," Singh said citing the construction of a nuclear power plant in Gorakhpur in Haryana. In 2017, the government has approved the building of 10 nuclear power plants of 700 MW each under the fleet mode to expand the contribution of atomic power in the country's energy mix. The NPCIL, which operates almost all nuclear power plants in the country, has formed joint ventures with National Thermal Power Corporation, Indian Oil Nuclear Energy and Nalco Power Company Limited for expansion of the nuclear power sector.

Centre to include private sector in boosting nuclear power capacity: Report

To supplement India's green energy programme, the Centre will soon incentivise the private sector to set up small modular nuclear power plants under the public-private partnership (PPP) model. The NITI Aayog will soon start consultations with stakeholders for the same, a report in the Economic Times (ET) said.

Small modular nuclear reactors (SMRs) require less capital and space than traditional nuclear power plants. They have a power generation capacity of 300 MW per unit, one-third of regular nuclear plants. It generally takes five years to make one SMR.

NITI Aayog will also issue guidelines and regulations keeping in mind the safety standards and the impact on local communities.

The decision is in line with India's commitment to reduce carbon emissions by half by 2030 and to become a net-zero carbon emitter by 2070. By volume, it is currently the third-largest emitter of carbon dioxide. Its per capita emissions, however, are lower than the global average.

In a written reply to Lok Sabha on Wednesday, minister of state Jitendra Singh said that India will commission 20 nuclear plants by 2031. They will generate an additional 15,000 MW.

The first of these 20 nuclear power plants, a 700 MW unit, is expected to be commissioned in 2023 at Kakrapar in Gujarat, which already

has three atomic power generating units operational. The 500 MW Prototype Fast Breeder Reactor at Kalpakkam is likely to be operational in 2024, followed by two 1,000 MW units at Kudankulam in 2025.

Two 700 MW units at Rawatbhata in Rajasthan are likely to be completed by 2026, while another two 1,000 MW units are likely to be completed at Kudankulam by 2027. Two 700 MW units are expected to be completed at Gorakhpur in Haryana by 2029, Singh said.

Nuclear fusion may offer India a clean-energy pathway

Earlier this month, scientists at the National Ignition Facility of the Lawrence Livermore Laboratory (LLL) in the US announced a “major scientific breakthrough" in nuclear fusion. Nuclear fusion technology is a less evolved but more promising pathway to clean energy than nuclear fission. Nuclear fusion technology is a less evolved but more promising pathway to clean energy than nuclear fission. Fission is a reaction in which the nucleus of an atom splits into smaller nuclei in such a way that a large amount of energy is released. This happens when heavy elements like uranium and plutonium split. In an opposite way, fusion is a reaction in which two or more atomic nuclei are combined in such a way that there is a release of energy. This typically happens when light elements combine in an ‘exothermic’ reaction. The periodic table of elements splits at about nickel (atomic weight 62); lighter elements are more ‘fusible’ and combine to release energy, while heavier elements are more ‘fissionable’ and split to release energy.

The science and subsequent technology of nuclear fission began with the discovery of uranium in 1789 by Martin Klaproth, a German chemist. William Rontgen discovered ionising radiation (x-rays) a century later and Pierre and Marrie Curie gave the name ‘radioactivity’ to the phenomenon of decay with energy release. The great experimental physicist Ernest Rutherford demonstrated radioactivity and performed the first artificially induced nuclear reaction in 1917. Rutherford established the nuclear structure of the atom and radioactive decay as a nuclear process. The use of the term ‘fission’ and experimental calculation of the energy released were first made by German physicists Lise Meitner and Otto Frisch, working under Niels Bohr, in 1939. This provided empirical proof of Einstein’s theoretical work on mass energy equivalence first proposed in 1905. Rapid strides were made during and after World War II, first to develop fission bombs and then to adapt fission for civilian nuclear technology. Since that time, much effort has gone into making nuclear reactors safe and reliable.

The history of nuclear fusion has a different arc. While hydrogen had been produced for many centuries, it was only identified as an element by Henry Cavendish in 1766. Helium was discovered a century later by Jules Janssen and Norman Lockyer. It was not until 1920 that Arthur Eddington, an astrophysicist, suggested that hydrogen-helium fusion could be the source of stellar energy. While fusion was achieved in the operation of the first hydrogen bomb in 1952, sustained and controlled fusion with a positive energy yield had not been demonstrated until the recent success of the LLL experiment.

Similar to fission, Einstein’s mass energy equivalence provides the theoretical framework for fusion as well.

Fusion can involve many different elements that are light. Scientists are currently focusing on the deuterium-tritium (DT) fusion reaction (both are heavy isotopes of hydrogen). Scientists at the LLL targeted 192 laser beams on a DT target smaller than the size of a pea. The

resulting strike generated helium gas, neutrons and large amounts of energy. The significance of the recent announcement is that for the first time, more energy was produced from the fusion reaction than went into the lasers used to power the reaction. The experiment produced 3.15 megajoules of energy relative to the 2.05 megajoules of energy expended for the lasers, an efficiency ratio of 1.5 times. Scientists at LLL are confident of 4- or 5-times conversion ratio from a similar reaction within a few years.

Nuclear fusion releases nearly four million times more energy than coal, oil or gas, by fuel weight, and four times as much as fission technology. Fusion can be generated from ubiquitous sources, be extremely efficient and clean, and leave no radioactive residue. Despite that promise, self-sustaining, positive net-energy fusion technology has proved to be difficult to engineer until now. In addition to the LLL announcement, 2022 has been a landmark year for fusion technology developments. In January this year, China's EAST reactor established a record-breaking sustained reaction of 17 minutes. Soon thereafter, UK scientists at the Joint European Torus (JET) laboratory announced that they had generated a record breaking 59 megajoules of sustained fusion energy.

Even though there has been significant progress, international collaboration will be required to surmount continuing practical challenges. India joined the US, UK, EU, Japan and Russia in a consortium to establish ITER, a collaborative international project to develop fusion for peaceful purposes. In continuation, 35 nations, including India, are collaborating to build the world's largest tokamak, a magnetic fusion device capable of demonstrating the feasibility and scaling of nuclear fusion. India's own attempt at an experimental fusion reactor continues with the SST-2 tokomak at the Institute of Plasma Research in Gujarat.

India is not endowed with required resources either for hydrocarbon energy or nuclear fission-based energy. Recent advancements in the science and technology of nuclear fusion should accelerate our interest and investment in fusion. India's declared net-zero goal in 2070 allows us enough time for fusion to become a practical and preferred complement to renewables.

Edited by **Mr Amarjit Singh MBE, Hon Editor, IEF**

Published by **Mr S S Rawat, Head (Admn), IEF**
Printed by Mr B Bhambhani, SG, IEF on behalf of
INDIA ENERGY FORUM
Registration No. DELENG/2007/20915
408 PHD House, 4/2 Siri Instituonal Area, August Kranti Marg, New Delhi – 110 016

Webinar on Deviation Settlement Mechanism (DSM) Regulations, 2022 of CERC To be held 7th February 2023 on Zoom

Background Note

(Prepared by Shri Rakesh Nath, Chairman, Energy Sector Regulations Group, IEF)

1. CERC notified the UI Regulations,2009 on 1.4.2009 with the objective of maintaining grid discipline as per IEGE through commercial mechanism of UI charges by controlling users in schedule, dispatch and drawl of electricity. The UI charge was linked to grid frequency. UI rate at 50.3 Hz was zero and 735 p/kwh at 49.2 Hz. These regulations provided necessary financial incentives/disincentives to the users to maintain grid discipline. The regulations were amended twice mainly to modify the UI rates and imposing a limit on drawl (12% or 150 MW) when frequency is below 49.8 Hz. The UI mechanism brought a dramatic improvement in the frequency regime of the regional grids.

2. In the year 2014, CERC notified DSM Regulations with the objectives to maintain grid discipline and grid security through control mechanism for settlement of deviations from schedule by the users. The deviation charge was linked to grid frequency (zero at 50.05 hz and 824 p/kWh at 49.7 hz). there was also a provision of additional deviation charge for excess over the specified volume limits.

3. DSM Regulations,2014 were amended on five occasions from 2014 to 2019. In the third amendment in 2016, volume limit was increased for RE Rich States. By 4th amendment in 2018, the deviation charge was linked to price discovered in Day Ahead Market (DAM) along with the grid frequency.

4. In the 5th amendment notified in the year 2018, sign change rule was introduced under which in every 7th block the sign of deviation was required to be changed and failure to do so attracted a penalty.

5. The frequency regime of the grid improved considerably over the years. The frequency spectrum of the national grid from FY 2018-19 to 2021-22 has been as under:

Frequency Profile of National Grid

Year	% of time when frequency was			Average (Hz)	Max. (Hz)	Min (Hz)
	Below 49.90 Hz	Between 49.90-50.05 Hz	Above 50.05 Hz			
2018-19	11.89	76.15	11.96	49.98	50.30	49.57
2019-20	6.53	72.90	20.56	50.00	50.34	49.55
2020-21	5.28	77.92	16.80	50.00	50.39	49.57
2021-22	7.52	75.08	17.41	50.00	50.34	49.50

Source: CEA Annual Report

6. DSM Regulations,2022 has been made effective from 5.12.2022 with the objective to ensure, through a commercial mechanism, that the users of the grid do not deviate from and adhere to their schedule of drawl and injection of electricity in the interest of security & stability of the grid. The deviation charge has been delinked to frequency. Any deviation is required to be managed by the NLDC/RLDCs as per Ancillary Services Regulations and the users shall pay the deviation charges for deviation in injection/drawl linked to the weighted average ancillary services charges computed on the basis of total quantum of ancillary services deployed and net charges payable to the ancillary services providers for all regions for the time block. However, for one year or such time as may be notified by the CERC, the deviation charges would be linked to the highest of the weighted average ACP of Day Ahead Market segments or weighted average ACP of Real Time Market segment or weighted average Ancillary Service Charge of all regions for that time block.

7. Under these regulations, for a general seller the deviation charge is zero up to 2% deviation beyond which they are penalized for over or under injection irrespective of grid frequency. ROR generating stations, wind and solar generators and generating stations based on municipal waste have been provided a margin and crossing the percentage deviation beyond these margins make them liable for a penal charge.

8. A buyer, for any under drawal shall be paid lower than its normal rate and for over drawal, for percentage deviation more than a limit (10% up to 100 MW for other than RE Rich State and 10% up to 200 MW for RE Rich State) deviation charges shall be payable irrespective of frequency.

9. The deviations are inevitable, particularly with the increasing percentage of RE in total resource portfolio, and unless excessive, do not threaten the grid security. The DSM Regulations 2022 aim to avoid any deviation despite of being beyond the control of the users and not threatening grid security. As a consequence of implementation of these regulations, some generating companies in the normal course of providing mandatory primary regulation of frequency through automatic governor action as per the provisions of IEGC are getting penalized. Similarly, some buyers are also getting penalized at very high deviation charges for over and under drawl for situation which is beyond their control.

10. As a result of implementation of the DSM Regulations,2022, the users have been subjected to very high deviation charges, sometimes as high as Rs 40 per kWh. On the other hand, the frequency regime deteriorated. CERC reviewed the situation and by order dated 26.12.2022 in a Suo-Motu proceeding capped the deviation charges to Rs 12/kWh. Some of the observations of CERC are:

    a. Though the grid connected entities are trying to adhere to their schedule, there may be a tendency to over schedule so as to avoid payment of deviation charge for over-drawal or under-injection. The combined effect of this tendency (especially over-injection by the generators and under drawal by the discoms, coupled with Reserve Regulations of Ancillary Service (RRAS) Up dispatch in some blocks) has resulted in the system frequency remaining high for a significant amount of time.

    b. The primary response support from the generators has not been up to the desired level and in some cases, the response is observed to be less than what was seen in the period prior to the DSM Regulations, 2022.

    c. Capacity short-fall during the morning and evening peaks have made it challenging to deploy adequate resources under Secondary Reserve Ancillary Services (SRAS) and RRAS to manage large frequency fluctuations, sometimes necessitating pressing into service RLNG based generation into service by system operator to mitigate the capacity shortfall for Ancillary Services. As a result, there have been occasions when the system frequency as also the applicable DSM rate have remained high.

11. It has been proposed to discuss above issues in the Webinar and come out with suitable recommendations.


765 kV GIS Substation, Jharsugda


Statcom Project at Lucknow


MCPI Haldia CHH Project, customer Mitsubishi

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- TECHNO continues to implement inventive technologies as per industry trends to cut across competition and participate in less-crowded but highly valuable segments. TECHNO is the first mover in several markets of the power sector.
- When POWERGRID proposed the use of the STATCOM technology, owing to its better reactive power controllability, TECHNO partnered with the Chinese manufacturer, Rongxin to Install STATCOM at Six Substations.
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- Towards growing Government preference for the private sector's role in the power transmission and distribution segment, TECHNO has set up and owns a 102KM, 400KV Transmission Link with 2 Nos. 400/220/132KV Substations of 2400MVA capacity in Haryana and 1 No. 400/220 KV GIS S/S of 1000MVA Capacity in Nagaland in PPP Model (under construction).
- TECHNO is focusing on opportunities in overseas market in Africa and SAARC countries. It has successfully completed a project valued at $18 million in Uganda and are executing a 500 kV substation project valued at $26 million in Afghanistan.
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- In Transmission, Techno is well acknowledged Country leader having already executed 7 Nos. 765 KV and more than 55 Nos. of 400 KV Substations, both AIS and GIS Types on EPC basis.
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Awards

- Techno's Performance has been recognised by the Government of India and other Giants in Power Sector. To mention a few,
- Award from PGCIL in 2018 for being the "Best Player in 765KV AIS Substation Construction in India".
- IEI Industry Excellence Award – 2016 for demonstrating highest order of Business Excellence from IEI.
- Conferred with Best Performance & Safety Award in 2016, 2015, 2014 and 2013 from PGCIL.
- Received Safety Award from NTPC in 2018 for 'Best HSE Performance' at Kudgi site

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ISO 9001:2015, ISO 14001 : 2015, ISO 45001 : 2018

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