TATA POWER

TATA

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TPTCL'S E-NEWS LETTER

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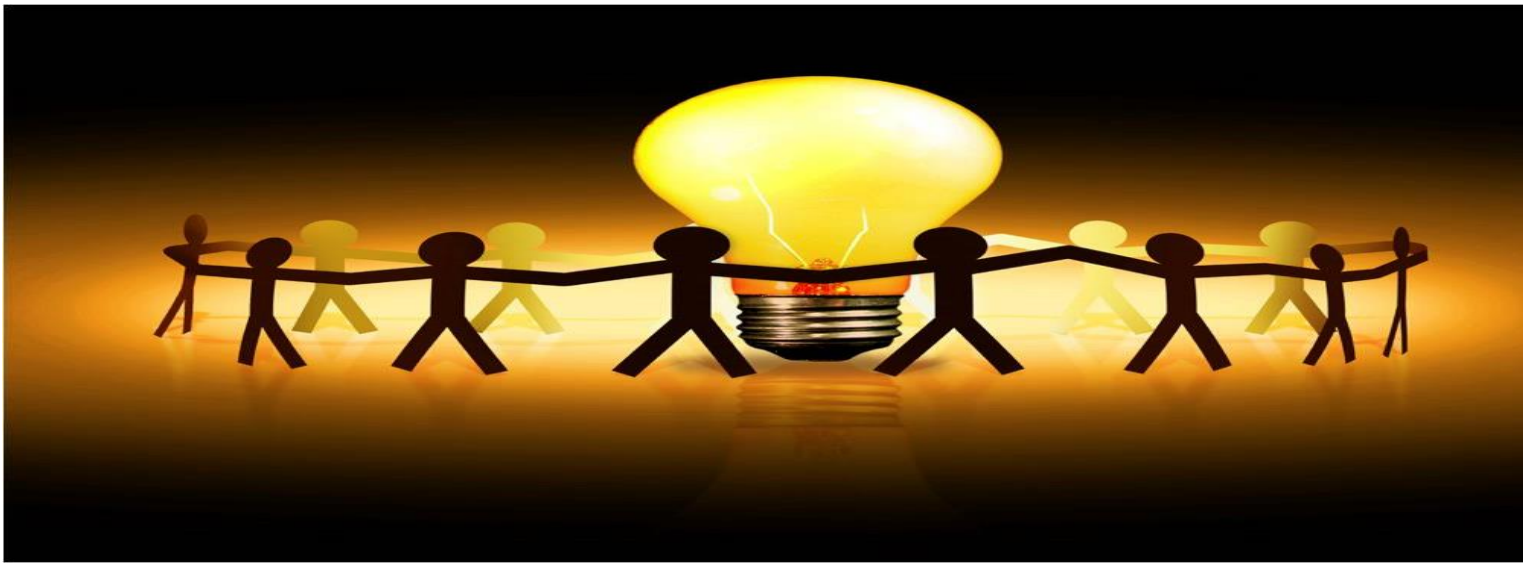
Tata Power Trading Company Limited (TPTCL)



Lighting up Lives!

Power Market News

Interregional power transfer grows 6.5 pc in Apr-Feb period of FY22

The volume of interregional transfer of electricity clocked 207,228 million kwh in the first eleven months (April to February) of FY22, up 6.5 per cent from its comparable level in FY21. In the April-February period of FY21, the total interregional electricity transfer had stood at 194,625 MU.

Regional Imports & Exports

(Apr-Feb, FY22 Vs FY21, in (%))

Region	Import	Export
NR	-1.3	75
WR	122.3	-10.1
SR	-10.5	221.7
ER	-29.7	5.2
NER	2.5	-11
Total	6.5	6.5

The Northern Region (NR) and the Southern Region (SR) continued to be net importers of electricity while the other three regions – Western (WR), Eastern (ER) and Northeastern (NER) – were net exporters. The rate of growth of interregional transfer appears to have slowed down progressively in FY22. Such growth in the first four months (April to July) of FY22 stood at a much higher 16.6 per cent. This fell gradually to 7 per cent in the first three quarters of FY22.

T&D India analysed interregional electricity transfer statistics released by the National Load Dispatch Centre (NLDC) and came up with the following observations:

- WR saw electricity imports more than double from 194,70 MU in the April-February period of FY21 to 43,276 MU in the same period of FY22. Correspondingly, there was a 10.1 per cent fall in exports. As a combined effect, WR became a net exporter worth 55,648 MU in FY22, as against a much higher 90,618 MU in the first eleven months of FY21.

- NR, which is a net importer of electricity, in fact exported a higher quantum of electricity in the April-February period of FY22 (at 25,338 MU) as against 14,478 MU in the same period of FY21.

- SR, which is also a net importer, saw higher exports in the April-February period of FY22 (14,794 MU) as against 4,598 MU in the same period of FY21. Most of the exports from SR were destined to WR. At the granular level, most of the SR-WR transfer took place through the 400kV Kolhapur-Kudgi and the 800kV Pugalur Raigarh HVDC lines.

- ER improved its net exporter status in the April-February period of FY22. This region saw a nearly 30 per cent fall in imports, supported by a 5.2 per cent growth in exports.

- The 765kV Angul-Srikulam double-circuit line was the busiest element in the April February period of FY22. This ER-to-SR line alone transferred around 15,232 MU of electricity in the said period. ***Source***

India ranked 3rd largest primary energy consumer in the world

As per India Energy Outlook 2021, published by International Energy Agency (IEA), India has been ranked third largest primary energy consumer in the world, said Minister of State for Petroleum and Natural Gas, Shri Rameswar Teli in Lok Sabha today. India's Hydrocarbon requirements are met through domestic production as well as through imports. The country imports oil and gas from various geographical regions including countries from the Middle East, Africa, Europe, North America, South America, and South-East Asia.

As per World Energy Outlook 2021 of IEA, the current share of India in global primary energy consumption is 6.1% and is likely to increase to about 9.8% understated policies scenario by 2050. The government has taken up the development of the National Gas Grid, City Gas Distribution Networks to cover major demand centres across the country to provide clean and green fuel to the Public. As per the Ministry of Power, a significant addition to Thermal (28,460 MW), Large Hydro (12,663 MW), and Nuclear Energy (8,700 MW) capacity is underway. The Government has also announced its aim of achieving 500 GW installed capacity from non-fossil fuel-based capacity (Hydro, Nuclear, Solar PV, Wind, Biomass, etc.) by 2030. ***Source***

No power crisis in India, generation capacity greater than peak demand: Power minister

India is not facing any power crisis as the installed electricity generation capacity stood at 395.6 gigawatts (GW) against the peak demand of 203 GW recorded in 2021-22, Parliament was informed on Tuesday. "There is no power crisis in the country. As on February 28, 2022, the installed generation capacity is around 395.6 GW, which is sufficient to meet the demand of electricity in the country. The peak demand experienced during the current year was only 203 GW," said Power Minister R K Singh in a written reply to the Rajya Sabha.

In another reply to the House, the minister told the House that as per the information compiled by the Central Electricity Authority (CEA), the import of coal reduced to 22.7 MT (million tonnes) during 2021-22 (April-January) as against 39 MT during the same period last year, mainly due to high imported coal price in the international market. The shortfall in imported coal has been compensated through the enhanced supply of domestic coal i.e. from 442.6 MT during 2020-21 (April-January) to 547.2 MT during 2021-22 (April-January). Thus, he stated, that the generation loss due to the reduction in import of coal has been compensated from higher generation from domestic coal-based plants.

"We aim to achieve 500 GW installed capacity from non-fossil fuel-based capacity (hydro, nuclear, solar, wind, biomass, etc.) by 2030. This will reduce the pressure on coal-based generation to a large extent," he also told the House. The reply showed that 938.36 billion units (BU) power is generated through coal-based thermal plants during April-February (2021-22) compared to 850.89 BU in the same period of 2020-21.

The power generation from coal-based power plants stood at 950.93 BU (2020-21), 961.21 BU (2019-20) and 987.68 BU (2018-19). The power was generated at the total coal-based monitored capacity of 203.89 GW in the country. The minister told the House that there was a decrease in the coal-fired electricity produced in the country during the financial year 2020-21 as compared to the previous year 2019-2020 due to the COVID-19 pandemic.

However, he stated that coal-fired generation has increased during the current year 2021- 22 (up to February 2022) as compared to the same period of the previous year. As on March 6, 2022, coal-based generation capacity is 2,03,889.5 MW out of the total capacity of 395,592.86 MW i.e. about 52 per cent.

As per optimal generation capacity mix projections for 2029-30 prepared by the Central Electricity Authority (CEA), the capacity for coal-based thermal projects will be about 267 GW in 2030. This is out of the total projected capacity of 817 GW i.e. about 32 per cent, due to the corresponding increase in non-fossil fuel-based electricity generation capacity

In another reply to the House, the minister said 1,16,766 MW of power generation capacity is under construction, including 72,606 MW renewable (including large hydro projects), 15,700 MW nuclear and 28,460 MW thermal. The increasing demand for power in the country is being met with a commensurate increase in power generation. A generation capacity of 15,978.84 MW has been added during the year 2021-22 (up to February 28, 2022), which includes 3,825 MW of thermal, 213 MW of hydro (above 25 MW capacity) and 11,940.84 MW from other renewable energy sources. ***Source***

IEEFA: Declining efficiencies of coal plants jeopardise India's COP26 emission targets

Thanks to renewables, India is making rapid strides in its energy transition and is not adding any new coal power assets. Yet, there is no policy thrust on enhancing the performance of existing coal plants, given these would facilitate integration of new renewables into the grid.

As in many developing countries, fossil fuels dominate in India's electricity generation. Coal still plays a major role in meeting the country's burgeoning energy needs, but there are gaping inefficiencies in energy use and carbon dioxide emissions. On the efficiency front, reduction targets for energy use specified for coal plants under the existing policy, i.e., Perform Achieve and Trade (PAT) introduced in 2012, were less than the energy saving potentials, resulting in substantial inefficiencies in energy use.

India has no actionable CO2 emissions reduction targets for electricity generation On the emissions front, as part of the Paris Agreement (2015), India agreed to reduce the emissions intensity of its GDP by 33-35 % from its 2005 levels by 2030, revising this to 45% during COP26 along with a reduction in projected emissions by 1 billion tonnes up to 2030. However, it does not have any actionable carbon dioxide (CO2) emissions reduction targets for the electricity generation industry as of now, even though the industry contributes the bulk of emissions.

India also enhanced the target for installed renewable energy capacity by 2030 from 450 gigawatts (GW) to 500GW and committed that 50% of its total electricity would be generated from renewable energy sources by 2030. Further, India pledged to achieve net-zero emissions by 2070. Not surprisingly, CO2 emissions levels in electricity generation have been increasing over time (see below). As per Central Electricity Authority (CEA) estimates, annual emissions in electricity generation are likely to increase from 922 million tonnes in 2018 to 1287 million tonnes by 2030.

In a recent study, we examined the efficiency levels of Indian coal plants, overall and in major operational areas, to examine whether any significant efficiency penalty was due to regulations. Improving plant performance via tighter regulatory norms and better operational practices has proved difficult in India due to its federal setup. Electricity generation is subject to different jurisdictions: State electricity regulatory commissions (SERCs) for state-owned plants and Central electricity regulatory commission (CERC) for Central and privately-owned plants. Norms and practices of SERCs vary from those of CERC, particularly in regulatory independence, tariff setting, operational discipline, operation and maintenance expenses.

Falling efficiency levels of Indian coal-fired power plants

We found that efficiency has decreased over time, both overall and in major operational areas of electricity generation, CO2 emissions and coal consumption. While analysing the actual performance of plants vis-à-vis their optimal performance, the greatest inefficiencies were observed in coal consumption (33.6% against optimal performance) and CO2 emissions (30.7%).

Deterioration in efficiency levels suggest that the regulatory environment for electricity generation in India has not sufficiently pushed the plants to improve their performance. Inefficiency in electricity generation is thus a manifestation of regulatory failure.

We believe that the declining trend in efficiency levels is likely to continue into the future for three reasons: the limited extent to which the regulator can influence or sanction plants for performance improvement, more so in case of SERCs; the existing regulatory paradigm of setting performance norms in electricity generation based on the past performance of plants and not on best practices/best performing plants; and regulators' laxity in norm-setting.

Less independent state-regulated plants are even less efficient than Centre-regulated plants

SERC-regulated plants are more inefficient than CERC-regulated plants with inefficiency levels at 24.5% and 19.0% respectively. This is because the norms of operational performance and practices such as the lack of regulatory independence followed by SERCs are at variance from that of CERC, in a manner that leads to underperformance in observed results vis-à-vis optimal for SERC regulated plants. SERCs would have to bridge this gap mainly through harmonising their regulatory norms and practices with that of CERC.

To this end, the Government of India has constituted a Forum of Regulators that allows exchange of ideas and best practices between CERC and SERCs and works towards uniformity of regulations among SERCs through the creation of Model Regulations. So far, efforts to harmonise the regulatory differences have failed, leading to the underperformance for SERC-regulated plants.

Regulators need to stipulate tighter energy efficiency and explicit CO2 emission norms for the Indian electricity generation industry

Using data envelopment analysis (DEA) techniques, we estimated the actual performance of plants both in coal usage and CO2 emissions vis-a-vis their optimal performance values and obtained the energy efficiency and CO2 emissions savings. We found substantial potential savings in energy efficiency (42.5% of excess coal usage) and emissions (31.6 % of excess CO2) in all plants put together (see table).

We observed that the electricity generation industry is adversely affecting the two main thrusts of the Government of India's climate policy, i.e., increasing energy efficiency and reducing CO2 emissions. To meet India's COP26 targets, it is imperative that existing coal plants lift their performance in energy use and CO2 emissions. Given the lack of CO2 emissions targets for electricity generation and the current lax energy saving targets, it is likely that energy and emissions performance will continue to deteriorate.

Energy Saving Potential and CO2 Emissions Reduction Potential For Indian Coal Power Plants

To arrest the deteriorating emissions performance, regulators must enforce explicit CO2 emissions reduction targets for plants based on their emissions reduction potential. This is vital since coal plants

contribute to nearly half of India's CO2 emissions and yet do not have any binding emissions reduction requirements which could potentially jeopardise India's march towards attaining its COP26 goals. ***Source***

India's energy transition will make it the biggest market: R.K. Singh

The Union power minister R.K. Singh emphasized that India, thanks to its ongoing energy transition, will be the biggest market in the world for electrical equipment, at least up to 2030. Singh was speaking at an event to launch "ELECRAMA 2023" – India's premier trade event organized by apex industry body Indian Electrical & Electronics Manufacturers' Association (IEEMA) – in New Delhi, on March 16, 2022.

R.K. Singh reiterated that the Indian power sector is in a multidimensional transformation phase. Every aspect of the power value chain is undergoing a transformation of sorts, the minister felt. For instance, in power generation, India has cumulatively added around 1,60,000 mw of non-fossil fuel generation capacity. This accounts for around 45 per cent of the total installed power generation capacity. Singh asserted that this target – for share of non-fossil fuel capacity – has been achieved at least nine years ahead of the committed date. In the power transmission sector, India has added 1.62 lakh ckm of transmission lines since 2015, Singh noted.

The biggest transformation is perhaps in the power distribution sector. Singh highlighted that India was undertaking the biggest electricity access programme anywhere in the world. Recalling the achievements under the nationwide household electrification scheme "Saubhagya", the minister said that in a period of just 17-18 months, electricity access was provided to over 28 million homes. This has been a global achievement, the minister said.

In rural areas, electricity availability has sharply improved from 12 hours a day in 2015, to around 23 hours per day today, on a national average basis. Power distribution will continue to see major investment, Singh asserted. This is where the engagement of the electricity equipment industry – and therefore IEEMA members – will deepen, Singh said. Over the past two years, over Rs.2 trillion has been invested in the power distribution sector, and over the next 4-5 years, another Rs.3 trillion will be deployed, especially under the Revamped Distribution Sector Scheme (RDSS).

Import substitution

R.K. Singh strongly felt that India's dependence on imports should reduce. He believed that several electrical equipment items currently imported could very well be produced domestically. Confident that India will be the biggest market for the power sector, up to 2030 at least, Singh expressed his view that the world should come and manufacture here (in India). India has embarked on "energy transition at a scale that has not been seen anywhere in the world, Singh felt.

Corroborating the views of R.K. Singh was Alok Kumar, Secretary, Union power ministry. Alok Kumar strongly expressed that the main objective and benefits of this energy transition should flow to the local people, including local employment opportunities. "India will not be able to sustain a situation where the rewards of this growth go to other countries," Alok Kumar cautioned.

Role of IEEMA

Alok Kumar also acknowledged the Indian electrical equipment industry for having met the demand arising out of the massive rural and household electrification works undertaken in states like Uttar Pradesh, in the recent past. "IEEMA has risen to the occasion and has contributed to the transformation of the Indian power sector," Alok Kumar remarked.

Energy transition

The main objective of ELECRAMA 2023 would be to address issues on energy transition. As pointed out by Vipul Ray, President, IEEMA, "The 15th edition of ELECRAMA will focus on opportunities in positioning India at a fulcrum of futuristic technologies and solutions required for sustainable growth, and towards our commitment towards Net Zero."

Vipul Ray also highlighted IEEMA's vision for the year 2047. IEEMA has envisioned per capita energy consumption to grow 8 times – reaching 10,000 kwh in 2027 from around 1,200 kwh now. [Per capita consumption is the average annual consumption, per person.] Ray also recalled Prime Minister of India, Narendra Modi's vision of making India energy independent by 2047. Pledging IEEMA's support to this national objective, Vipul Ray said that this was a big encouragement to the electrical equipment industry.

In his address, Rohit Pathak, Senior Vice President, IEEMA, said that India's energy transition goals would rest on six key planks – clean energy and storage at scale; Green corridors & quality transmission network; digitalization and reliability of distribution networks; electrification of transportation; urbanization & smart factories/buildings; and, green hydrogen ecosystem.

Green hydrogen

Much emphasis was laid on green hydrogen as a focus area – not just for ELECRAMA 2023 but as an enabler of India's energy transition. R.K. Singh strongly felt that green hydrogen could be an area where India can acquire global dominance. "We want to emerge as the world's largest source of green hydrogen," Singh asserted. The minister also alluded to the possibility of introducing new official mandates where "grey" hydrogen would need to be replaced by green hydrogen, and "grey" ammonia with green ammonia – in industries like fertilizers.

All about electricity

Recounting the success of ELECRAMA over the years, Jitendra Agarwal, Chairman, ELECRAMA 2023, observed that the number of exhibitors has increased from around 100 in 1990 (the first edition) to over 1,200 in the latest edition in 2020. Agarwal expressed confidence that the upcoming edition of ELECRAMA will only aggrandize the event's scale. The event will aim to showcase futuristic technologies and will be equipped with other features like World Utility Summit, Reverse Buyer Seller Meets, Innovation Hub, etc. Agarwal said that electricity will be the preeminent form of energy in the years to come. "The future of energy is electricity and we (IEEMA) are all about electricity," was how Agarwal summarized IEEMA's role in India's electricity sector – both as a representative of the industry in government forums, and as organizers of the world's largest trade exhibition in the power sector – ELECRAMA. ***Source***

How IMD's weather watchers power the national grid

In summer time, when Delhi often simmers at 42 degrees Celsius till late evening with night temperatures hovering at 28-29 degrees, massive thunderstorms often bring down temperature by as much as 10 degrees. While the common Delhiites are greatly relieved as the mercury plummets, the power companies used to have a tough time adjusting to the crash in power demand. However, that is a thing of the past with improved weather forecasts by the India Meteorological Department (IMD).

It is but natural that the power demand fluctuates with the changes in weather -- temperature and humidity, including heat waves, rainfall / thunderstorms, snowfall, cyclones, solar radiation and wind speed -- anything and everything has a bearing on the consumers' need for power. So, the power

suppliers -- both generation companies and distribution companies -- are constantly on their toes to meet this change in demand.

It is here that as part of the dedicated, customised weather forecast for Power System Operation Corporation Ltd. (POSOCO), the power generation companies are able to plan their schedules better. For instance, in case of expected thunderstorms as mentioned above, the power generation companies are getting alerts well in advance, starting with 72 hours, coming down to Now Cast service (which gives forecasts for next three hours). When the companies know that the next day the power demand is likely to go down massively for a few hours, they plan their generation accordingly.

The national load dispatch centre (NLDC) and the state load dispatch centre work (SLDC) in tandem with the power generation companies and power distribution companies across India. Power distribution companies plan demand so as to avoid under-drawl as going against demand will not just invite a penalty for them but also runs a risk of disturbing the grind balance, said a power expert.

Helped with IMD alerts, it is not just the power distribution companies but also the power producing companies that can plan their output. "In case of the thunder storm prediction a day ahead, the states surrender their power demand, which helps plan reduced generation at regional levels. The Earth System Science Organisation, India Meteorological Department (ESSO-IMD), under the Ministry of Earth Sciences, and Power System Operation Corporation Ltd. (POSOCO) had signed a Memorandum of Understanding on May 18, 2015 for optimum use of weather information / forecast in the power sector.

"As part of this deal, the ESSO-IMD provides weather warnings about likely occurrences of thunderstorms, heat waves, cold waves, rainfall, fog, etc., over various states up to the next 72 hours. We provide short and extended range forecasts ... We also provide state / region wise monthly / seasonal outlooks of weather conditions," said R.K. Jenamani, senior scientist at the IMD.

An actual example of how such a forecast helped in Uttar Pradesh was cited in a report prepared by IMD and POSCO together earlier in January 2022. It relates to severe fog conditions in the Indo-Gangetic plains. "It was observed that due to tripping of 765kV Anpara C-Unnao line, line loadings of other 400kV lines, especially 400kV Anpara-Sarnath D/C increased beyond permissible limits (> 700MW per circuit). Operating these lines on such high loading posed a threat to grid security," it said.

From the inputs of the weather portal regarding spread of fog, Uttar Pradesh SLDC was advised to back down generation in Anpara complex and increase generation in other plants to meet its load, in the interest of grid security. "Low generation in Anpara complex ensured that in the event of tripping of 765kV Anpara C-Unnao line or any other 400kV line in Anpara complex due to fog, the loading of other lines did not exceed operating limits. This provided the operator an increased time window for corrective action," the example mentioned.

It is not just the regular weather events such as thunderstorms or fog but the extreme weather events when the accurate forecast helps much more to avoid damage. For instance, cyclones cause heavy rains, large storm surges, and strong winds that often damage power elements in the distribution and transmission systems causing widespread interruption of power supply to the affected areas. On the one hand, the affected communities and the disaster managers face distress, on the other hand, the power companies bear losses.

"As increase in the intensity and frequency of extreme weather events poses challenges to secure and reliable power system operations, prior information of weather conditions facilitates power system utilities

to advance operation planning, secure system operation and early restoration of the affected area which in turn reduce expenditures also," power sector expert said.

Enhanced role for IMD forecast as RE usage increases

The Government of India has set a target of 500 GW of non-fossil generation by 2030 as part of the ambitious climate action under Paris Agreement 2015. So, with an increase in share of the renewable energy (RE) resources, which are highly dependent on weather, the challenges for system operators would further increase.

A large part of it is to come from wind and solar power. "If a solar power plant manager knows how much temperature it will reach the next day, whether it would be cloudy or not, then the expected output can be planned. The power generator can also inform the grid operator about the planned lesser generation," said Solar Energy Society of India (SESI)'s president Prafull Pathak.

"In our power sector, RE is treated as unreliable and therefore, an accurate weather forecast is far more important. Moreover, unlike earlier years, we can now very well rely on IMD forecasts for planning power generation, revised and re-scheduled output etc," Pathak said. It is not just the solar sector but the overall RE sector that is highly dependent on weather. And therefore, as the January 2022 report had pointed out, it is not just sufficient to act after weather-related events have taken place to increase the efficiency of the power sector and to make it weather resilient but proactive steps are required to minimise the possible adverse impacts. ***Source***

Beginning 2023, India to start building nuclear power plants in 'fleet mode'

With the first pour of concrete for a 700 MW atomic power plant in Karnataka's Kaiga scheduled in 2023, India is set to put in motion construction activities for 10 'fleet mode' nuclear reactors over the next three years. The first pour of concrete (FPC) signals the beginning of construction of nuclear power reactors from the pre-project stage which includes excavation activities at the project site.

"The FPC of Kaiga units 5&6 is expected in 2023; FPC of Gorakhpur Haryana Anu Vidyut Praiyonjan units 3 & 4 and Mahi Banswara Rajasthan Atomic Power Projects units 1 to 4 is expected in 2024; and that of Chutka Madhya Pradesh Atomic Power Project units 1 & 2 in 2025," officials of the Department of Atomic Energy (DAE) told the Parliamentary panel on science and technology.

The Centre had approved construction of 10 indigenously developed pressurised heavy water reactors (PHWR) of 700 MW each in June 2017. The ten PHWRs will be built at a cost of Rs 1.05 lakh crore. It was for the first time that the government had approved building 10 nuclear power reactors in one go with an aim to reduce costs and speed up construction time.

Bulk procurement was underway for the fleet mode projects with purchase orders placed for forgings for steam generators, SS 304L lattice tubes and plates for end shields, pressuriser forgings, bleed condensers forgings, incoloy-800 tubes for 40 steam generators, reactor headers, DAE officials said.

Engineering, procurement and construction package for turbine island has been awarded for Gorakhpur units three and four and Kaiga units five and six, they added. Under the fleet mode, a nuclear power plant is expected to be built over a period of five years from the first pour of concrete. Currently, India operates 22 reactors with a total capacity of 6780 MW in operation. One 700 MW reactor at Kakrapar in Gujarat was connected to the grid on January 10 last year, but it is yet to start commercial operations. The

PHWRs, which use natural uranium as fuel and heavy water as moderator, have emerged as the mainstay of India's nuclear power programme.

India's first pair of PHWRs of 220 MW each were set up at Rawatbhata in Rajasthan in the 1960s with Canadian support. The second reactor had to be built with significant domestic components as Canada withdrew support following India's peaceful nuclear tests in 1974. As many as 14 PHWRS of 220 MW each with standardised design and improved safety measures were built by India over the years. Indian engineers further improvised the design to increase the power generation capacity to 540 MWe, and two such reactors were made operational at Tarapur in Maharashtra. Further optimisations were carried out to upgrade the capacity to 700 Mwe. ***Source***

Powering water conservation: Thermal power generation will need to integrate tech & process innovation to ensure judicious use of water

The post-pandemic era, rising population, rapid economic growth, and climate change are triggering enormous water availability challenges worldwide. We are at a critical juncture where the crises of food, energy and water calls for switching to sustainable development practices. In January 2022, World Economic Forum (WEF) released its latest Global Risk Report, listing natural water crisis among top 10 risks to humanity. As of now, around 36% of global population (2.8 billion people) live in areas of high-water scarcity; this could rise to over 50% by 2050.

The looming crisis has led to water becoming another traded commodity like gold and oil, putting basic human rights in the hands of financial institutions and investors. As water scarcity worsens, the rivalry across sectors and geographies will only get exacerbated. This will make businesses very vulnerable during crisis, particularly because they will be given the last priority for water allocation. This puts more pressure on them to optimise water use.

In our country, industry is the major water consumer after agriculture. As per the report of National Commission for Integrated Water Resource Development, the water requirement by 2050 in high use scenario is likely to be at 1,180 BCM, whereas the present-day availability of surface water is 695 BCM. The UNEP Finance Initiative highlighted the dynamics of water-related security with implications on businesses' debt-servicing ability, credit worthiness, and reputation, core for arriving at ESG ratings. Drivers of water efficiency in several industrial sectors have drawn the attention of experts. I will focus on avenues for judicious water management in the power sector, considering that water is critical for power generation.

Public policy perspectives of water efficiency have changed significantly since nationally determined contributions and recent net-zero considerations have dominated the public discourse over the past 4-5 years. It is essential to examine water use across the value chain. The Centre gave impetus to improve water use efficiency by limiting it for thermal power plants. The sector, in turn, examined dry cooling with reference to technical and economic parameters to determine expected reduction in water usage. Around four years ago, the ministry of power also stressed on raising energy efficiency in the power sector. This was also when efforts to integrate renewable energy with thermal power gained momentum. Accordingly, the NTPC became signatory to UN Global Compact's CEO Water Mandate. Inspired by the elements of governance, NTPC is evolving as a water steward, evident through our innovative seven-pronged approach adapted to installations with long commercial life—

1. Mutually reinforcing a wastewater recycling system: This includes ash water recirculation and the toe drain recirculation in ash handling systems. As a preemptive strategy, dry bottom ash handling systems also help reduce water use.

2. Increasing cycles of concentration in cooling water systems: A typical 660 MW closed cycle coal power plant (Super critical technology) operating at 85% PLF consumes around 16 MCM of water annually with ash water re-circulation system. Most of it is used in cooling (70%), followed by ash handling operations with flue gas desulphurization systems (8%) and demineralization (3%). These proportions vary depending on technology functions, fuel type, cooling systems, and operating efficiency/ load. The plant can save an additional 16% water through reduction in blow-down quantity just by increasing the cycles of concentration in circulating cooling water systems.

3. Ensuring zero liquid discharge: Storm and plant water drains are separated to secure significant water savings.

4. Rainwater harvesting

5. A graded system to re-use and re-cycle effluents within plants

6. Implementation of dry cooling systems: This is a viable option to reduce water use. Air cooled condensers have been integrated into NTPC's operations at two power stations that are currently under construction and are designed to reduce water consumption by about 75%.

7. Using alternate water for meeting all freshwater requirements: NTPC's Ratnagiri Gas and Power Private Limited (RGPPL), Maharashtra, through strategic actions taken for rainwater harvesting and water reuse in plant processes, met 139% of its sweet water requirements internally in 2020-21 and supplies excess sweet water to the nearby villages.

A higher share of renewables in India's power mix will alleviate the stress on water availability long-term. This includes opportunities to use renewable energy to extract water, supply, reuse and treat, and implement integrated firm-level regulations and market responses to reduce water related risks due to mismanagement. Largely, thermal power generation and freshwater withdrawal will either move to catchments that face lower water stress or adopt low-water-use cooling technologies. Upscaling the aforementioned technologies and process innovations to all thermal stations of country will be beneficial in the short and medium term. Arriving at nature-based solutions to enhance adaptation outcomes is crucial to ensure that water is used judiciously. Such interventions will strengthen India's Jal Jeevan mission and ensure that clean drinking tap water reaches to all corners of our nation. ***Source***

Ministry of Coal puts 122 mines on auction

The Ministry of Coal on Wednesday said it has put on auction 122 coal and lignite mines under the commercial auction process. Addressing the fifth tranche of auction launch, Union Minister of Coal, Mines and Parliamentary Affairs Pralhad Joshi said 42 coal mines have already been auctioned successfully so far. In a statement, the ministry said it "has placed on offer 122 coal/lignite mines today under commercial auction of coal mines, including 18 new coal mines."

Sharing the details of mines under different tranches for auction, it said there are 109 coal mines under 15th Tranche of Coal Mines (Special Provisions) Act, 2015 and 5th Tranche of Mines and Minerals

(Development & Regulation) Act, 1957. Of the 109 mines on offer, 59 are fully explored mines and 50 are partially explored mines.

Four coal mines are under second attempt of 14th Tranche of Coal Mines (Special Provisions) Act, 2015 and Second Attempt of 4th Tranche of Mines and Minerals (Development & Regulation) Act, 1957. Total 9 coal mines are under 2nd attempt of 13th Tranche of Coal Mines (Special Provisions) Act, 2015 and Second Attempt of 3rd Tranche of Mines and Minerals (Development & Regulation) Act, 1957.

Key features of auction process include introduction of National Coal Index, ease in participation with no restriction for prior coal mining experience, full flexibility in coal utilisation, optimized payment structures, efficiency promotion through incentives for early production and use of clean coal technology. Further, incentives are being contemplated by Ministry of Coal.

"The commencement of sale of tender document shall start from Wednesday. Details of the mines, auction terms, timelines etc. can be accessed on MSTC auction platform. The auction shall be held online through a transparent two stage process, on the basis of Percentage Revenue Share," the coal ministry said. ***Source***

Transmission charges payable by DICs for the billing month of Apr'22

The Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses), Regulations 2020 came into force with effect from 1.11.2020. In these New Regulations, STOA charges will be determined based on monthly state transmission charges and there shall not be any separate injection and drawl PoC charges, for STOA. Further, DISCOMs having long term Access are not required to make any payment against POC charges for STOA transaction.

Transmission Charges for Short Term Open Access (STOA)			
Sl. No.	**State**	**Region**	**STOA rate (paise/kWh)**
1	Delhi	NR	40.68
2	UP	NR	41.14
3	Punjab	NR	37.96
4	Haryana	NR	47.07
5	Chandigarh	NR	35.71
6	Rajasthan	NR	57.11
7	HP	NR	36.86
8	J&K	NR	38.50
9	Uttarakhand	NR	47.06
10	Gujarat	WR	44.18
11	Madhya Pradesh	WR	43.65
12	Maharashtra	WR	47.35
13	Chhattisgarh	WR	35.70
14	Goa	WR	39.11
15	Daman Diu	WR	41.34
16	Dadra Nagar Haveli	WR	44.95

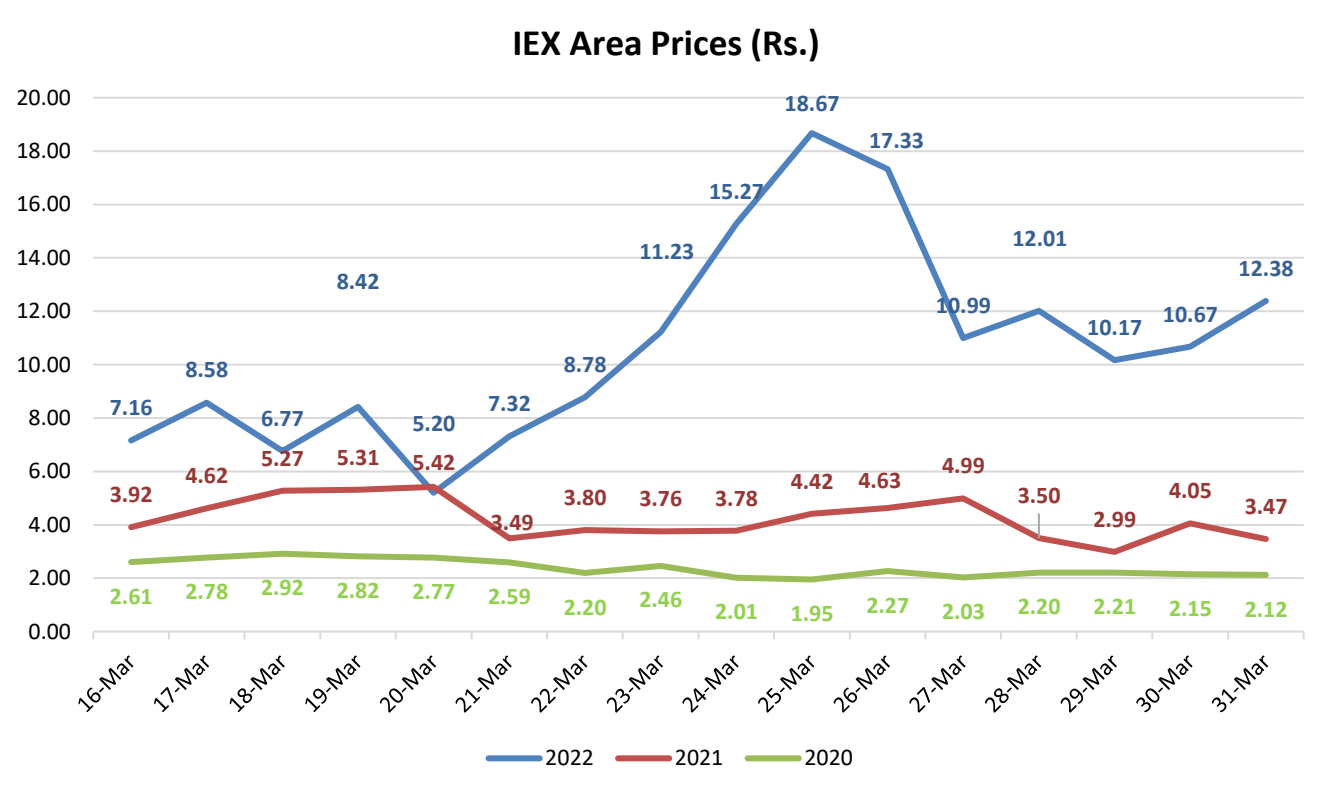
17	Andhra Pradesh	SR	63.41
18	Telangana	SR	44.44
19	Tamil Nadu	SR	40.10
20	Kerala	SR	38.57
21	Karnataka	SR	42.73
22	Pondicherry	SR	34.29
23	Goa-SR	SR	28.05
24	West Bengal	ER	36.14
25	Odisha	ER	45.29
26	Bihar	ER	38.84
27	Jharkhand	ER	40.02
28	Sikkim	ER	34.59
29	DVC	ER	38.64
30	Bangladesh	ER	30.56
31	Arunachal Pradesh	NER	36.85
32	Assam	NER	34.66
33	Manipur	NER	38.94
34	Meghalaya	NER	34.87
35	Mizoram	NER	39.69
36	Nagaland	NER	50.35
37	Tripura	NER	39.25

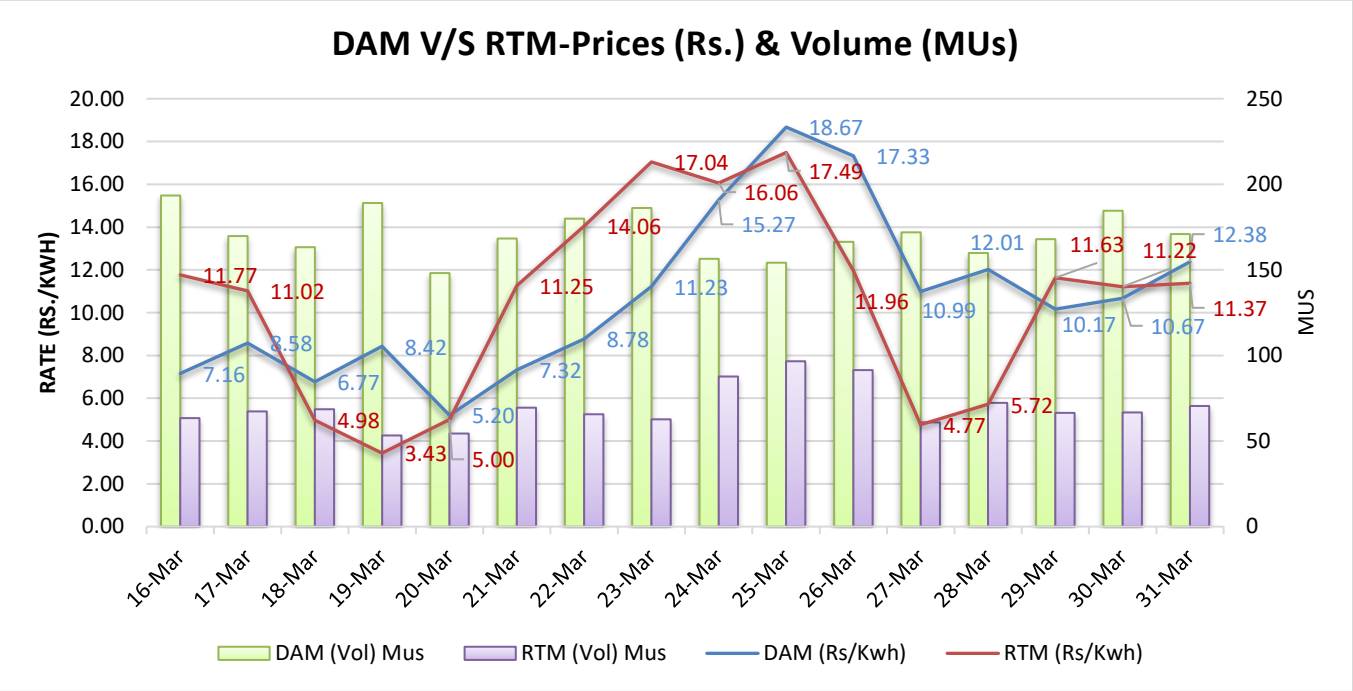
Bilateral Tender Results: -

Sl. No.	Quantum (MW)	Supply Period	Time Blocks (Hrs.)	Price (Rs. /kWh)	LOI Status
Andhra Pradesh Power Co-Ordination Committee (APPCC)/Short/22-23/RA/7					
1	1000	01.04.2022 to 30.04.2022	06:00 to 10:00	15.88	Awaited
2	1000	01.04.2022 to 30.04.2022	18:00 to 22:00	15.88	
TAMILNADU ELECTRICITY BOARD/Short/22-23/RA/17					
1	1000	04.04.2022 to 30.04.2022	00:00 to 24:00	9.55	Awaited
2	1000	01.05.2022 to 20.05.2022	00:00 to 24:00	9.00-9.55	
Maharashtra State Electricity Co Ltd/Short/22-23/RA/21					
1	700	01.04.2022 to 30.04.2022	00:00 to 24:00	11.86	Awaited
2	700	01.05.2022 to 31.05.2022	00:00 to 24:00	11.86	
3	700	01.06.2022 to 30.06.2022	00:00 to 24:00	11.96	
PFC Consulting Limited/Short/22-23/RA/20 (UPPCL)					
1	600	01.05.2022 to 31.05.2022	00:00 to 06:00	10.00-11.48	Awaited
2	1500	01.05.2022 to 31.05.2022	18:00 to 24:00	14.90-16.69	

3	1600	01.06.2022 to 30.06.2022	00:00 to 06:00	10.00-11.48	
4	2200	01.06.2022 to 30.06.2022	18:00 to 24:00	14.90-16.69	
5	1000	01.07.2022 to 31.07.2022	19:00 to 24:00	14.90-16.69	
6	1500	01.08.2022 to 31.08.2022	19:00 to 24:00	14.90-16.69	
7	300	01.09.2022 to 30.09.2022	19:00 to 24:00	14.90-16.69	
HARYANA POWER PURCHASE CENTRE(A JOINT FORUM OF UHBVN&DHBVN)/Short/22-23/RA/24					
1	750	07.04.2022 to 30.04.2022	00:00 to 24:00	-	Awaited
2	750	01.05.2022 to 31.05.2022	00:00 to 24:00	-	
3	750	01.06.2022 to 30.06.2022	00:00 to 24:00	6.2	
4	750	01.07.2022 to 31.07.2022	00:00 to 24:00	6.20-11.00	
5	750	01.08.2022 to 31.08.2022	00:00 to 24:00	6.20-11.00	
6	750	01.09.2022 to 30.09.2022	00:00 to 24:00	6.20-11.00	
7	750	01.10.2022 to 15.10.2022	00:00 to 24:00	-	

IEX Price Trends





Weather (Estimated for next fortnight)

City	Max Temp	Min Temp	Precipitation (Probability)
DELHI	40	24	1%
MUMBAI	33	25	1%
KOLKATA	34	27	5%
CHENNAI	36	28	12%

(Source - Accuweather)

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