

Despite India's renewables push, it's fossil, fossil burning bright

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Despite a four-time jump in the country's renewable-energy capacity since 2014, the mainstay of power supply in India continues to be coal-based thermal power.

The installed capacity of green-energy sources, chiefly solar and wind, grew to 136 gigawatt (Gw) in March 2024 against 35 Gw in March 2014.

But its contribution to electricity supply has increased to only 12 per cent to date, the data analysed by *Business Standard* showed.

Its technical limitations restrict the share of renewable energy in the electricity grid.

With a record hot summer and with unprecedented weather events feared this year, India's grid operators are falling back on coal.

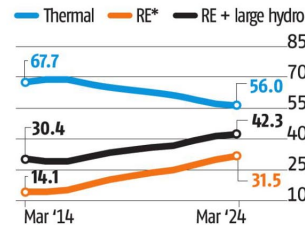
The plant load factor (PLF) for renewable energy is in the range 16-18 per cent and thermal is 70 per cent.

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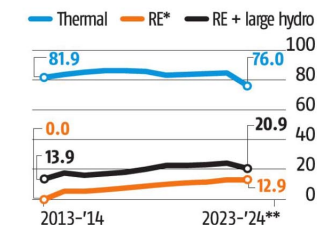
BEHIND THE CURVE

% share of installed capacity



*Renewable energy; sources: National Power Portal, Central Electricity Authority

% share in electricity supply



**Till Feb 2024; sources: Central Electricity Authority, GRID India

Renewables...

With this, the share of renewable energy (excluding hydro) in the energy-generation mix remained at about 14 per cent in FY24, despite the share of renewable energy in the installed capacity at about 32 per cent as in March 2024, said Girishkumar Kadam, senior vice-president and group head (corporate ratings), ICRA.

With hydro missing, gas unavailable, and renewable energy sources sans storage largely unpredictable, close to 80 per cent of daily demand is being met through coal-run power plants. Senior executives at GRID India, India's grid operator, say renewable energy is meeting 25-30 per cent average electricity demand during solar hours (ie daytime) and nil during night. This translates into coal running 24 hours.

"After running during the day, suddenly 40 Gw of solar and wind goes offline at night. Around 32 per cent of instantaneous demand can be met by renewable energy but coal needs to be brought down. But it cannot be taken below a certain threshold. So it keeps running at full capacity during the day as well. Effectively, coal is running the show despite enough renewable energy," said a senior official at the National Load Despatch Centre (NLDC), Delhi.

Several officials of regional load despatch centres (RLDCs) agree.

"Demand is growing but the share of renewable energy is not growing that much. So, all that incremental demand is falling on coal. With rooftop solar, the demand push on the grid will come down but its installation will increase in a few years," said an RLDC official in the northern region.

By adding large hydro to the mix, the installed capacity of renewable energy goes up to 187 Gw and supply contribution to 30 per cent. Large hydro was defined as renewable energy as early as five years ago. But this year hydro power is expected to be low during peak demand months due to late snowfall.

Duck curve problem

The Indian grid is expecting novel issues every peak renewable-energy season, which coincides with high-demand summer months. The grid operators call it the duck curve (high supply and low demand). India's electricity load would earlier peak during daytime, ie office hours or commercial electricity demand. But in recent years, a new peak has emerged during evening hours, driven by domestic electricity demand

with more electrified households, increased usage of electronic items, especially air conditioners and refrigerators in rural and urban areas.

"When demand peaks during evening hours, solar and wind are not available. And during morning and afternoon, when solar is available, demand is not that much. This duck curve, when supply is high and demand low, could get precarious in coming years as the solar share rises," said a grid official, adding that storage will help in tackling the duck curve problem. "As the generation pattern of solar is not in sync with the load pattern observed, hybrid renewables, along with storage requirement, is critical to ensure the round the clock (RTC) availability of power and for effective integration of RE power in the grid. However, the extent of improvement in the cost competitiveness of such RTC power

remains a key monitorable, which is critically dependent on the trend in capital cost for storage segment, particularly battery storage," Kadam said in an emailed response to the paper.

Grid officials say the current worry is extreme weather events in one pocket of the grid. Those shift the load and voltage of that area.

"As dispatch gets skewed, these regions start importing/exporting more suddenly and cause stress and congestion in the system," the person said.

The more unpredictable electricity demand patterns become, the more reliance increases on predictable coal. Kadam said ICRA expected the share of renewable energy, including hydro, in energy generation to increase considerably to 35-40 per cent by 2030, supported by capacity addition in renewable energy.