Publication:	Business World	Edition:	Online
Date:	November 2, 2021	Link:	http://www.businessworld.in/article/Energy-Storage-An-Impediment-In-India-s-Energy-Transition-Drive/02-11-2021-410773/

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BW BUSINESSWORLD

Energy Storage: An Impediment In India's Energy Transition Drive

India's energy transition drive will get a fresh momentum after Prime Minister Narendra Modi's announcement of meeting the target of net zero emissions by 2070 at COP26 in Glasgow. While there have been significant addition in India's installed renewable power generation capacity in recent years, issues of energy storage will have to be addressed to accelerate this drive and make renewable energy more affordable.

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Last month in October, India had a severe power crisis looming over due to a coal shortage across the country. On several days of the month, the coal stock situation at numerous thermal power plants was supercritical i.e., coal stock of less than four days. However, due to the onset of autumn and heavy rainfall in several parts of the country in the last weeks of October and the government's efforts to ramp up coal supplies to power plants, the power demand moderated and the coal stock situation at the power plants inched towards normalcy.

Nonetheless, the media reports covering the whole crisis, letters by some chief ministers to the PMO to ensure adequate coal supplies and some advisory messages by distribution companies to consumers to use electricity judiciously created a sort of panic among the masses. These events again highlighted India's dependence on fossil fuels. Just like any other crisis, people started discussing alternatives to prevent such a crisis in future. An obvious alternative is new and renewable energy where India has now set a new target of an energy capacity of 500 GW by 2030 at COP26. According to the latest data by Ministry of Power, India at present has 154.825 GW of Non-Fossil Fuel based installed generation capacity which translates into 39.8 per cent share in India's total installed generation capacity.

In an interview with BW Businessworld last month, Union Minister for Power, New and Renewable Energy, R.K. Singh said that India is the fastest growing country in terms of energy transition. He further stated that in the coming years nearly 50 per cent of India's installed generation capacity will be from non-fossil fuel-based sources. However, one of the biggest impediments in this transition drive which the Union Minister pointed out was regarding energy storage and its pricing.

In another conversation with a leading publication, the Minister said, "I am adding huge quantities of renewables and I'm also adding storage which increases costs. I can't increase the cost for the people beyond a point. If the price of storage comes down soon enough, probably we are not going to be starting any new coal-based projects."

So why is storage of energy so difficult?

According to MK Battery, a US based company which deals in energy storage states that solar energy is less predictable and it can fluctuate seasonally and even hour to hour as local weather changes. Also, solar energy is only produced when the sun is shining on the solar panels, which means that there are several hours each day where the panels are producing no energy at all. Energy storage helps to access this energy when the sun has gone down.

The biggest challenge with solar power storage is simply that the batteries used for this application are still quite costly, and they are large. The more power you need, the larger your battery will need to be. On average, a solar energy storage solution from one of the leading solar installers costs upwards of $5,000 depending on size, adding a significant chunk of change to the already high price of solar panels.

Sameer Gupta, Chairman & Managing Director, Jakson Group believes that batteries are the most practical solution available for storage which is indeed expensive. However, there is innovation happening on alternate chemistries of batteries and disruption is expected to bring down storage cost.

"If we look at distribution, the key would lie in storage of distributed energy (produced at consumption site). With local manufacturing of Lithium-Ion batteries (for auto and stationary application), its cost is likely to come down to <$100/KWh, in next 2-3 years' time. This will substantially bring down the cost of battery energy storage systems. The Government is also likely to announce PLI to promote manufacturing of Electrolysers and fuel cells, in order to bring down the cost of hydrogen," Gupta adds.

Focus On Decentralised Renewable Energy

Devidayal Solar Solutions on the other hand believe in Decentralised Renewable Energy (DRE). DRE is recognized as renewable energy (solar, wind, small hydro) distributed both through the grid and through mini-grids and off-grid installations. "While the scale of DRE is small, energy-efficient appliances running on solar with storage are now becoming increasingly affordable and available to rural communities. DRE should clearly be a part of the larger clean energy transition plan for India," says Tushar Devidayal, Founder, Devidayal Solar Solutions.

The deployment of decentralized renewable energy is fuelling a disruptive transformation of the energy sector. The rapid growth of decentralized renewable energy technologies changes the structure of the energy sector towards a multi-actor set-up in which large utilities interact with self-producing consumers and mini-utilities.

"The key stakeholders in the energy and power sector, including the Government, policymakers and administrative bodies, and ground-level action takers, among others, should all come together to take strategic steps to make DRE mainstream in rural India, and pave the way towards a sustainable and inclusive future where such crisis-like scenarios due to over-dependency on fossil fuel can be avoided or averted entirely," says Ananth Aravamudan, Senior Advisor & Practice Lead – Energy, Villgro.

India's energy transition drive will get a fresh momentum after Prime Minister's announcement at COP 26 in Glasgow regarding India meeting the target of net zero emissions by 2070. Currently, 70% of all power in India is generated by coal, and while it is one of the cheapest producers of solar energy in the world, storage issues as illustrated above can become a big impediment in India's energy transition efforts. At the same time, Prime Minister Modi's ambitious Hydrogen Mission needs attention as well as advancements in hydrogen technology and storage will also be needed to help India's industrial sector wean itself off coal. This is unlikely to happen until around 2040 without heavy investments in research and development towards low carbon technologies such as Photolysis and other biogenic methods to produce Hydrogen.