How Nuclear Energy Can Aid India's Net-Zero Journey

To achieve a renewable future and adhere with the international emission reduction pledges, India should look for energy alternatives that are reliable, scalable, and sustainable

Photo Credit :

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India has committed to reduce Green House Gas (GHG) emission to ‘net Zero’ by 2070 and obtain capacity to support 50 per cent of national energy demand through renewable power by 2030, at The UN Climate Change Conference in Glasgow (COP 26).

Our nation is currently facing a big challenge - rapidly scaling up generation capacity to meet the rising energy demand while also framing policies for reducing the carbon emission to honor climate pledges. This entails reducing coal-based power generation, which currently forms around 75 per cent of India’s total energy basket, and shifting the focus on increasing green energy capacity. In the domain of popularising green energy sector, there have been some encouraging developments.

According to the Global Status Report (2022), India added the third-largest renewable power capacity in the world, following China and the United States. India has significantly increased investment in building renewable energy capacity. In the 2021-2022 fiscal year, the country's investment in green energy have skyrocketed to 125 percent, amounting to total 14.5 billion dollars.

However, according to a new report by BloombergNEF, even this increase in pace of investment will not be enough to achieve the country's green energy targets of 2030. It states that India needs to invest around $223 billion to achieve its renewable energy targets of 500 GW by 2030.

India's plans to scale up renewables is plagued by regulatory, project and financial risks. A report by the Council of Energy, Environment and Water (CEEW) and the Indian Institute of Sustainable Development (IISD) highlighted that India's stipulated subsidies for renewable energy plummeted by 59 per cent since 2017. Further, with inconsistent policies and uncertain future, the private sector does not see an opportunity to consider renewable projects as a viable alternative to conventional carbon emission intensive energy sources.

This is particularly a concern in Uttar Pradesh, Haryana and Punjab which remain way behind their 2022 renewable targets. With the current pace of growth in green energy capacity, adding on an average 8GW per year, except in 2020 -- India added 12 GW of capacity, the country will not be able to achieve the target of adding 40 GW renewable capacity per annum.

World has accepted that climate change and global warming is not a mere myth but a harsh reality. India, this year, witnessed unrelenting heatwaves for 86 days with hottest month of 'March' in the history of 120 years. This led to an unprecedented surge in the use of air-conditioning.

With increased power demand, coal inventories were overburdened for power generation that lead to shortage of its supplies by 100 million units for more than 8 days, this summer. The situation forced Coal India, for the first time in years, to import coal and the centre had to invoke the emergency Section 11 of the electricity act, to direct all coal-based industries to generate power at full capacity.

To achieve a renewable future and adhere with the international emission reduction pledges, India should look for energy alternatives that are reliable, scalable, and sustainable. Solar, wind and hydro based power-generation capacity demand specific climatic conditions and topographical specifications, limiting its reliability and

scalability. Land requirement is another major roadblock for large scale economic viability of both solar and wind power.

Nuclear energy emerges as one of the largest sources of base load power generation that has minimal carbon emission. The European Union has categorised nuclear power as green energy source. Nuclear plants in the current times adopt robust safety standards and procedures to ensure that the power generated is cheap and environment friendly.

Unlike solar or wind energy, it does not come with the challenges of grid stability. In addition, the land requirement for per megawatt-hour of electricity generation for nuclear is significantly lower than any other green (or for that matter, conventional) energy sources, requiring 0.7 m2 per Mwh. Cost is often cited as one of the primary concerns in undertaking big nuclear projects. However, as the BloombergNEF report shows, renewables are appearing to be more costly while a lot less reliable as compared to nuclear.

For India, rather than chasing the ‘miracle cure’ to balance the energy demand and achieving carbon neutrality, nuclear is the best solution. The country has experience in building and operating nuclear reactors of more than 50 years. It has the technical capabilities and expertise to scale up nuclear power projects in order to meet the expectant demand.

While India needs to significantly increase the scope of big nuclear power projects, the emergence of Small Modular Reactors (SMR) can be a cost-effective, compact and powerful bridging option to increase green energy supply in the country. Installing SMRs on industrial sites replacing coal plants will generate employment, reduce construction costs, transmission issues and air pollution.

India also needs to pave the way, and encourage, private investment in nuclear energy sector. The country’s policy to link the startup ecosystem to the nuclear sector through tech-development and incubation centre is a positive initiative in the direction of a green future. Further efforts need to be made to increase the capacity of power generation.

By creating a favorable policy environment for private sector investment and re-orienting public investment from the costly and unreliable energy sources to nuclear, India can soon achieve the emission targets as well as energy self-sufficiency.

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