Climate change could disrupt transition to renewable energy

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The draft Karnataka Renewable Energy Policy 2021-2026, issued by the Karnataka Renewable Energy Development Limited recently, targets developing 20 GW of renewable energy (RE) projects in the state with and without energy storage. The state plans to build RE parks and develop solar, wind, solar–wind hybrid, biomass, waste-to-energy, and mini and small hydro energy projects. Among various projects, the promotion of rooftop and floating solar projects is also planned.

The RE installed capacity in Karnataka as of August 2021, is about 15,211 MW—of which almost 50% is solar. The Government of Karnataka has also recently announced its plans to unveil a new solar power policy in October.

While transitioning to RE reduces the reliance on fossil fuels and helps slow down the impacts of climate change, RE resources are dependent on climate variables such as precipitation, temperature, irradiation and wind, making them susceptible to climate change. Climate hazards are a challenge to renewable energy as they adversely impact the performance of the energy systems and their reliability. It is therefore important to understand the vulnerability of the energy sector from a demand perspective as well as the supply side.

Risks for solar energy

According to an assessment of climate risks to the power sector in the state by Bengaluru-based think tank Center for Study of Science, Technology and Policy, a warmer and wetter future with more frequent and extreme rainfall events can be expected for Karnataka from 2021 to 2050. Various districts will perhaps experience 1.4°C to 2.4°C warmer maximum temperatures in summer, 11% to 22% higher mean annual rainfall and two to six additional heavy rainfall events of 51 to >100 mm per day. In some districts like Bagalkot and Chitradurga, heavy rainfall events that have not occurred in the past are projected.

These changes have implications for renewable energy, particularly solar energy. An increase in temperature would affect the efficiency of solar cells adversely, increase operational costs and lower the power output.

Similarly, changes in cloudiness, solar irradiation, wind speed (as a result of increased precipitation) and heavy rainfall events would affect solar power output.

Strong winds and high temperatures could cause material damage from debris and accelerated ageing of transformers. High temperatures could also lead to thermal expansion of transmission and distribution lines, impacting the power carrying capacity of the lines. Heavy rainfall could cause damage to the power infrastructure. On the demand side, high temperatures could increase cooling requirements and irrigation pumpset demand. This could cause a gross mismatch in the generation,

supply and demand for power with cascading adverse impacts on the quality of life and economy.

Mainstream risks

Climate change is a long-term event, with changes projected to occur over the next couple of decades. Not factoring in climate risks while formulating policies for the expansion of solar power or other RE projects could undermine even the best-laid plans. This is because climate change will impact both supply and demand.

Climate projections and risk assessments provide useful estimates for decision-making and need to be considered while developing policies. The cost of not considering them might jeopardise investments, which can have cascading effects on the economy. It is, therefore, imperative for the proposed new solar policy of the Government of Karnataka to factor in climate considerations. This is the only way in which the state can ensure reliable and sustained access to power.

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