

Applications of E3-India for mapping regional impacts of renewable capacity addition targets on the Indian Economy

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The government of India through the Ministry of New and Renewable Energy (MNRE) is playing a proactive role in promoting the adoption of renewable energy resources by offering various incentives, such as generation-based incentives, capital and interest subsidies, viability gap funding, concessional finance, and fiscal incentives, etc.

Renewable energy accounts for 17.5 percent of total energy sources in India as of April 2017. India's overall installed capacity has reached 329.4 GW, with renewables accounting for 57.472 GW. A nationwide campaign has been launched to achieve five times more renewable capacity by 2022 and 40 percent by 2030. The mission also aims to achieve grid parity and parity with coal-based thermal power by 2030 and feed 100 GW of solar power by 2022.

The government has increased its goal and amended the targets from 40 GW to 60 GW of wind power, 10 GW of biomass, and 5 GW of small-scale hydropower by March 2022. Additionally, hydropower and biomass power mandates are set by the government, resulting into 175GW of Renewable Energy in 2022. In terms of meeting its ambitious 2022 targets, as of 31 March 2017, wind power was more than halfway toward its goal, whilst solar power was less than 13 percent of the way to its highly ambitious target, although expansion is expected to be dramatic in the near future. Bioenergy was at just above the 80 percent mark, whilst small hydropower was already 85 percent of the way to its target.

Overall India is 33 percent of the way toward meeting its 2022 renewable installed power capacity target of 175 GW. Even though the nation is trying to expand its renewable use, the country's coal-fired fleet remains strong with a 59 percent share of the total energy mix—and is a major source of carbon emissions. In response, India has voluntarily pledged to the UNFCCC to reduce the emissions intensity of its Gross Domestic Product by 33-35 below 2005 levels by 2030.

Given this backdrop, the current study attempts to evaluate the economic and environmental impacts of the renewable energy (RE) production mandates for 2030 at the national and regional

level in India using the E3 model. To do so, several scenarios based on the targets were developed and compared with the business-as-usual conditions. The results indicate the increases in industrial output and employment, as well as reductions in prices of other sectors, and carbon dioxide and other GHG emissions.