

A long-term assessment of net-employment in India's power sector

Assessing the co-benefits of decarbonizing the power sector

Synopsis

In India, total installed power generation capacity stands at 346 GW as of December 2018. Coal technologies dominate the power sector with an installed capacity of about 196 GW followed by large hydro at 45 GW. Renewable energy technologies cumulatively account to 21% of generation capacity with an installed capacity of 72GW. Gas based generation and nuclear has a small share of 7% and 2% respectively.

In recently years, owing to the rapid decline in cost of generation for renewable energy technologies, the pace of deployment has accelerated. In the year 2017-18 only, India installed about 12 GW of solar and wind capacity. This is higher than the 4.5GW of thermal capacity added during the same period. India has ambitious plan to further accelerate the share of renewable energy in overall electricity mix. This, however, lead to a debate over whether a shift from thermal based generation to renewables would lead to loss of jobs or would there be a net increase in employment in power sector.

The Council on Energy Environment and Water (CEEW) and Skill Council for Green Jobs (SCGJ) with support from the Institute for Advanced Sustainability Studies (IASS) has conducted a study to assess the net-employment in the power sector owing to various uncertainties over share of different generation technologies. Net-employment is result of any possible gain and loss of employment across different technologies. The study undertakes a value chain-based approach to estimate workforce involved at different stages of entire life cycle of different technologies. Employment coefficients (jobs/MW) is derived based on primary data from various sources. Separate employment coefficients are calculated for direct jobs, during project implementation and operations and maintenance

and indirect jobs for manufacturing machinery/equipment used in a power plant. Renewable energy technologies tend to be more labour intensive than conventional technologies, creating 3.45 job-years/MW and 1.27 job-years/MW respectively for utility solar and wind installations. Rooftop solar sector, given the small and distributed installation creates 24.72 job-years/MW, significantly higher than any other technology.

A long-term assessment is undertaken to assess net-employment in the power sector in India. The assessment is based on three different scenarios as below:

1. **Reference (BAU):** Scenario representing climate policies rolled out till 2016, and an ambitious high GDP growth as envisaged by the Indian Government
2. **INDC:** Scenario including various climate policies and targets formulated in India’s INDC submission
3. **Ambition (AMBI):** Scenario with a high mitigation ambition (beyond INDC and towards a “well below 2 degree Celsius”) and keeping development at the forefront

The scenarios are developed by the Energy and Resources Institute (TERI) using MARKAL model. Table 1 summarises the total installed capacity for respective technologies in the year 2050 in each scenario.

Scenario	Reference	INDC	Ambition
Coal	888	739	478
Gas	93	134	124
Large Hydro	75	75	75
Nuclear	27	27	27
Solar	156	250	557
Wind	126	135	222
Small Hydro	20	20	20
Biomass	19	19	19
Others	5.0	5.0	5.0
Total	1409	1403	1527

The assessment suggests an additional workforce requirement of 2.5 lakh in the AMBI scenario compared to reference scenario, in 2050. The addition workforce would be primarily employed in the renewable energy sector owing to higher share of solar and wind capacity. In the year 2050, power sector would employ 10.34 lakh in reference scenario, 12.45 lakh in INDC scenario and 12.87 lakh in Ambition scenario.

In addition, coal mining would employ 6.12 lakh in reference scenario, 5.19 lakh in INDC scenario and 2.89 lakh in Ambition scenario. The study finds that as we shift from coal-based generation to renewables, coal mining sector would be impacted the most. Between reference and ambition scenario, the workforce requirement decreases by about 52% as the coal generation capacity reduced to 478 GW from 888GW.

The COBENEFITS project

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COBENEFITS is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag. For more information please visit: www.cobenefits.info

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