



A review of challenges from increasing renewable generation in the Indian Power System

EPRG Working Paper 2031

Cambridge Working Paper in Economics 20106

Ramit Debnath, Vibhor Mittal, Abhinav Jindal

Abstract

About 70% of India's current energy mix comprises of coal, and the increase in generation from renewable energy (RE) sources is affecting the health of the power system. We investigated this effect through a cross-sectional of asset utilisation, cost and the social disruption caused by accelerating RE into the Indian Power System. We also derived a challenge-roadmap for the power system using bibliometric analysis. The review-driven interpretivist results revealed that increasing RE generation is pushing the coal plants to operate in low-loading conditions, causing heightened wear and tear of the plant as they are not suitable for flexible operation. It had tremendously increased the operation and maintenance costs of the brownfield plants. While there is a growing scope for cross border trade of electricity, the existing regulatory mechanism poses severe implementation challenges. Social disruption due to shift from coal-economy illustrated a holistic view of the political economy of the Indian power system that can potentially cause large-scale conflict and disrupt the national economy at an unprecedented scale. Policy implications outlined by our study for the draft Electricity (Amendment) Bill 2020 include scoping a socio-technical framework which supports just energy transition through better financial support mechanisms for flexible operation of coal plants. Focusing on clean-up over shut-down of coal plants and facilitating investments in battery storage technologies and cross-border electricity trade as RE and conventional fuel reach market parity.

Keywords Power System; Flexibility; Coal economy; Social disruption; Energy Transition; Electricity Bill 2020

JEL Classification Q4, Q42, Q48

Contact rd545@cam.ac.uk
Publication November 2020
Financial Support Bill and Melinda Gates Foundation, OPP1144