

Power Sector for the Developing Asian Regions by 2050: Modelling the strategic vision

Biggest challenge for the less developed countries of this century in Asia is how to innovatively expand the sustainable energy system. How can the advantage of low share in historical emissions, relatively low per capita emissions and emerging electrification trend be leveraged by the region? While planning for energy system expansion, integration of end-use demand side mitigation options provides multiple human wellbeing and sustainable growth benefits, helps in democratizing business through granular technology choice within end-use sectors, creating new employment opportunities. Optimizing the energy supply sector which is going to be dominated by wide-scale electrification, integrating demand side solutions is an essential step for faster access to affordable clean energy. It delivers multiple co-benefits along dimensions of human wellbeing and sustainable development. Demand side mitigation options unleash business opportunity through expansion of digitalization, integration of advanced technology in modernizing distribution network, market expansion for energy efficient appliances, regional power-trade while increasing penetration of renewable energy and demand side flexibility into the system. Model based power sector planning for emerging Asian countries help identifying new economic opportunities and wider societal benefits while decarbonizing the sector. We developed customized open-source national scale PyPSA model for power sector expansion plan for Bangladesh and Thailand. Open source IDEEA model developed for India and for selected states/regions of India for power sector planning show how strategically alternative pathways to midcentury zero carbon goal can be planned. National scale optimization models and use of national data sources clearly shows that even with carbon constraints, new investment opportunities in new sectors exist. They can deliver acceptable, affordable, and accessible energy service provision systems. Such scientific evidence building and communication for deliberation on a possible new development trajectory among various social actors is necessary to create a socio-political mobilization process for change.