

Paths Towards Universal Electricity Access: Increasing Social Welfare using Optimization

Electricity goals around the world tend to focus on increasing social benefit through one of two avenues: (1) increasing overall system sustainability or (2) increasing access to electricity. These goals guide the transition of the power system. In pursuit of these goals decision makers will need modeling tools that can inform decisions, in a way that is flexible enough to include a wide range of preferences and goals. It is clear that the future generation mix of the power system will change, but the most sustainable solution, will change based on a country's goals. This talk focuses on the UN Sustainable Development Goals, and electricity access in developing countries. Here we present an optimization model that can be used by decision makers to determine the best method of grid expansion to meet electricity access goals subject to system and budget constraints. The model incorporates a stakeholder's preference for equality leading us to find that the more stakeholder's care about equality the more they invest in transmission infrastructure. When equality is ignored larger power plants are built near the capital city in lieu of transmission investments.