

Effects of Solar Photovoltaic Penetration in Texas

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Motivation:

As solar photovoltaic (PV) technology becomes less expensive and society focuses on cleaner energy sources, the Electric Reliability Council of Texas (ERCOT) will see a greater amount of installed solar PV generation in the electric grid. Our research aims to understand the benefits and challenges associated with a large amount of solar PV generation in ERCOT and to observe how different technologies and policies might improve its integration into the grid.

Methodology:

By using a unit commitment and dispatch (UC&D) model of ERCOT, we are able to simulate large amounts of installed solar PV generation and see how the market reacts. These simulations reveal how prices, pollution, water consumption, fuel mix, and other metrics are affected by increasing solar PV penetration.

We can also use this model to observe how electricity storage, demand response, carbon taxation, and other technologies and policies affect the ability of solar PV generation to integrate into the electric grid.

