Overview

Concerns about securing the primary energy supply with growing populations and shifting climates have given rise to policies that encourage the deployment of renewable resources on the electric grid. Many challenges and questions remain, however, regarding the effects of renewable power generation on the operations and performance of the electric grid. The Holistic Grid Resource Integration and Deployment (HiGRID) tool was developed as a platform for determining these effects for the purpose of intelligently advising the deployment of renewable power generation and supporting technologies.

Goals

- To determine and compare the effects of different renewable resources on the technical and economic performance of the electric grid.
- To advise the deployment of renewable resources and complementary technologies to reach renewable portfolio standard goals while minimizing technical and economic impact.
- To identify key technical obstacles that must be overcome to meet renewable portfolio standard goals.

Results

For California’s energy system, accommodating the behavior of renewable resources requires an increase in generator flexibility. Inflexible base-load power is unable to adjust to renewable variability, introducing curtailment of wind and solar power due to a mismatch between load and generation. An increased reliance on faster ramping generators is prevalent as well. Diversifying the renewable mix can provide some benefit. Complementary technologies can aid in reducing curtailment but at a cost and with certain limitations.

Recent Publications/Papers


Personnel

- Graduate Student: Brian Tarroja
- Staff: Brendan Shaffer
- Principal Investigator: Scott Samuelsen