

# Wind and solar can reliably supply 25 percent of Oahu's electricity need, new study shows

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This is the Kahuku Wind Project, which was included in the Oahu Wind Integration Study. Credit: Hawaiian Electric Company

When combined with on-Oahu wind farms and solar energy, the Interisland Wind project planned to bring 400 megawatts (MW) of wind power from Molokai and Lanai to Oahu could reliably supply more than 25% of Oahu's projected electricity demand, according to the Oahu Wind Integration Study (OWIS).

For the purposes of the research project, the OWIS released today studied the impact on the Oahu grid of a total of 500 MW of [wind energy](#) and a nominal 100 MW of solar power, though a good deal more utility-scale and customer-sited solar power is expected on Oahu.

The study found that the 500 MW of wind and 100 MW of solar power could eliminate the need to burn approximately 2.8 million barrels of low sulfur fuel oil (LSFO) and 132,000 tons of coal each year while maintaining system reliability, if a number of recommendations are incorporated, including:

- Provide state-of-the-art [wind power](#) forecasting to help anticipate the amount of power that will be available from wind;
- Increase power reserves (the amount of power that can be called upon from operating generators) to help manage wind variability and uncertainty in wind power forecasts;
- Reduce minimum stable operating power of baseload generating units to provide more power reserves;
- Increase ramp rates (the time it takes to increase or decrease output) of Hawaiian Electric's thermal generating units;
- Implement severe weather monitoring to ensure adequate power generation is available during periods of higher wind power variability;
- Evaluate other resources capable of contributing reserve, such as fast-starting thermal generating units and load control programs.

The study notes that assuring reliability will require further studies, upgrades to existing and new infrastructure, as well as specific requirements on the [wind farms](#) to be connected to the Oahu system. With these and other proposed changes, the technical analysis suggests, Oahu can accommodate increased wind and solar projects with minimal limits on output of renewable resources.

The Oahu Wind Integration Study was conducted by the Hawaii Natural Energy Institute (HNEI) at the University of Hawaii at Manoa, General Electric (GE) Company and the Hawaiian Electric Company (HECO). The National Renewable Energy Laboratory (NREL), part of the U.S. Department of Energy (US DOE), assembled a technical review committee with representatives of industry and academia which met throughout the project to review findings. NREL also contracted the private firm AWS Truepower to develop wind and solar power profiles that were used in the study.

"The findings of this study show it is feasible to integrate large-scale wind and solar projects on Oahu but also have value beyond Hawaii. Both large mainland utilities and relatively small and/or isolated grids that wish to integrate significant amounts of renewable energy while maintaining reliability for their customers can learn from this study," said Dr. Rick Rocheleau, HNEI director.

Projects such as this one that enable increased implementation of alternative energy sources are made possible by the efforts of U.S. Senator Daniel Inouye, Senate appropriations chair, to ensure that the Department of Energy is adequately resourced to make these critical investments in energy technology. Additional funding was provided by Hawaiian Electric Company.

"GE has been working closely with HNEI and HECO to assess innovative solutions to help Oahu meet its [electricity demand](#) with very high levels of renewable resources," said Hamid Elahi, GE Energy Consulting general manager. "GE is proud to be working closely with HECO and other forward-thinking utilities which are leading the industry in solving some of the most important challenges that face our grids."

Robbie Alm, Hawaiian Electric executive vice president, said, "To reach

our renewable energy goals we need to use all the resources available to us. For Oahu, this includes the utility-scale solar, roof-top solar, waste-to-energy and on-island wind that we are pursuing. But on-island resources are not enough to meet Oahu's power needs.

"We know that more [solar power](#) is possible on Oahu than was studied by the OWIS. However, this baseline study is an essential first step for the Interisland Wind Project. It shows that the technology may present challenges but these can be overcome. The questions now are financing, environmental impact and whether the affected communities can live with the project with community benefits. "

Provided by University of Hawaii at Manoa

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