Website shines light on renewable energy resources

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The web portal provides near real-time data for renewable resources across the Southwest. Credit: CALS - Communications and Cyber Technologies Department

A team from the University of Arizona and eight southwestern electric utility companies have built a pioneering web portal that provides insight into renewable energy sources and how they contribute to the region's electricity grid.

University of Arizona researchers and a group of partners have developed a tool that will help utility companies better understand the long-term impact of renewable energy on the [power grid](#) and provide insight on how to integrate these resources in the future in the most cost-efficient and reliable way for consumers.

The tool—a web portal—gathers, analyzes and displays real-time data from eight Southwestern utility companies, painting a broad picture of energy sources and use across the region. The information will help companies determine what actions to take for backup power planning over the next several years as the percentage of renewable energy usage grows.

By 2025, Arizona utility companies are required to generate 15 percent of their energy from the sun, wind, biogas, biomass, geothermal and other renewable resources. But the power generated by some of these [renewable resources](#) is variable. For instance, a cloudy day will change the amount of power generated by a solar array, a stormy day could generate more wind power, and solar generation drops completely at night —right about the time when customers turn on their lights, increasing energy demand.

By using this tool to obtain a deeper understanding of these opportunities and challenges, utility companies will be able to provide customers with a more reliable and efficient power grid, even as variable resources become a larger percentage of the overall power generated.

The web portal was designed to be available for viewing on a variety of devices. Credit: CALS - Communications and Cyber Technologies Department

"Integrating solar and wind resources onto the grid while maintaining the total load and resource balance is the challenge for balancing authorities such as TEP," said Sam Rugel, Tucson Electric Power's director of systems control and reliability. "This tool will help quantify and communicate that challenge in a more efficient and effective way for us and our customers as we move forward."

Part of the portal is accessible to the general public, marking the first time in the Southwest that so many utility companies have coordinated their efforts to allow this amount of near real-time data to be publicly available.

"The data are available for anyone to download and analyze, and people from all over the world have accessed the site," said Will Holmgren, the

UA physics post-doctoral researcher who led the development of the website. "We're using the data to understand the challenges and opportunities inherent in expanding renewable energy usage in the existing power grid in the Southwest."

The project began in 2012, when the UA Renewable Energy Network, or UAREN, a University-wide initiative designed to support the expanded use of abundant, clean and economical renewable energy, brought together UA researchers and regional utility companies to provide a more complete picture of the challenges that affect energy production and demand. The companies—Arizona Public Service, Arizona's Generation & Transmission Cooperatives, El Paso Electric, Imperial Irrigation District, Power New Mexico, Salt River Project, Tucson Electric Power and Western Area Power Administration—are part of the Southwest Variable Energy Resource Initiative, or SVERI, which was formed in 2012 to study the impact of variable energy resources on the grid in the Southwest.

Funding for the project is provided by SVERI and managed by UAREN.

"The UA Renewable Energy Network has helped link important leading research in renewable energy power production forecasts at the University of Arizona to real-world applications by the Southwest regional electric utility companies," said Ardeth Barnhart, UAREN program director. "The models of near real-time data in the UAREN SVERI portal will support planning decisions for the increased use and integration of renewable energy into a complex electrical grid."

[The SVERI Public Access Data Portal](link) displays a variety of graphs designed to provide a better understanding of the mix of renewable and traditional energy generation in the Southwest: how much energy is being generated overall, how much of that energy generation is from renewable or variable resources, such as solar and wind, and what the

total load, or energy demand, is for the utility companies. The data are gathered from more than 150 power facilities across the region, including 75 variable energy resources.

The website offers a date range selection and an interactive map of [renewable energy](#) [power](#) stations across the region, as well as an option to download the data. It also includes a glossary to help visitors understand technical or scientific terminology.

Provided by University of Arizona