Charting the Course to Clean Energy for Three Utah Cities

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Three Utah cities—Salt Lake City, Park City, and Moab—have formed a unique partnership with the state's primary electric utility company to participate in the Solar Energy Innovation Network. The focus of our team's work is to inform local government leadership and on-the-ground decision makers about the challenges and contributions that renewable and distributed energy resources might make toward meeting the cities' energy needs and goal of continuing the transition to a clean, affordable, and resilient electricity supply.

Rocky Mountain Power, which serves the three Utah cities, plans to increase the percentage of renewable generation in the electricity supply over the coming years through the development of utility-scale renewables. The cities, however, also seek to contribute to the transition to cleaner energy. To complement utility-side efforts and be "good grid citizens," the cities wanted to better understand the potential of demand-side measures, such as energy efficiency and distributed energy resources, to reduce demand and meet load. They were also interested in how electric vehicles and beneficial electrification within buildings might contribute to load growth over time.

The Innovation Network helped us explore these questions by connecting us to researchers at the National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory, both of whom specialize in modeling demand-side resources. Together, we designed a methodology to develop three scenarios that represent different levels of demand-side resource adoption over a 15-year period. We drew on existing models and analyses conducted by the laboratories to create projections for demand-side technology deployment in Utah, specifically. Understanding the range of possibilities will inform city discussions with the utility and decisions on how to prioritize our efforts and design effective programs.

Building the Three Demand-Side Resource Scenarios

The Utah team chose Rocky Mountain Power's existing forecast from the most recent integrated resource plan (IRP) as a "business as usual" baseline and worked with the utility to understand how it accounts for trends in energy efficiency, distributed generation, and beneficial electrification in its IRP. Because the cities aim to significantly increase efficiency, distributed generation, and beneficial electrification efforts, we developed two alternative scenarios that represent higher levels of demand-side measures and electrification. One scenario represents an economically feasible level of adoption, and another respresents a technically feasible level of adoption. Together, the three scenarios provide information to the cities and their utility about the range of impact each individual measure could potentially have on future load.

One major challenge of implementing the analysis methodology was identifying sources of comparable data with which to build the scenarios. Data on energy efficiency potential proved to be the most challenging. All of the existing energy efficiency forecasts represent a level of efficiency deployment that is closer to a business-as-usual approach, but the Utah team wanted to identify a high-efficiency forecast that envisions transformative advancements in efficiency. To develop a more aggressive efficiency scenario, the team first worked with Lawrence Berkeley National Laboratory researchers to compare Rocky Mountain Power's assumptions regarding energy efficiency in the IRP with assumptions of other utilities. The goal was to determine how the level of efficiency adoption might change under different avoided cost assumptions. This analysis allowed us to iterate on the utility's forecast, but did not result in a significantly higher level of efficiency deployment that would represent transformative change. So the team asked the Rocky Mountain Institute to develop a more ambitious energy efficiency scenario from the bottom up using data from a variety of studies to help identify a portfolio of policy solutions that could bring the ambitious scenario to fruition.

The team drew on the National Renewable Energy Laboratory's Standard Scenarios to inform the potential contribution of distributed generation and beneficial electrification within each of the scenarios. And we employed the National Renewable Energy Laboratory's analysis and results from the EVI-Pro model to determine the future contribution of electric vehicle charging to the future system load. A list of these resources is given below.

The results of the completed scenario analysis are summarized by several waterfall charts, which indicate the difference between the business-as-usual case (the utility IRP case) and the other two scenarios. These graphics are an easy way to show the range of each technology's potential impact and inform the cities' decisions as they compare options for accomplishing their clean energy goals.

Why the Scenario Analysis Is Important

The scenario analysis adds a quantitative perspective to a complex energy future that includes multiple stakeholders and new technologies such as distributed energy, advanced inverter and demand-side management capabilities, behind-the-meter energy storage, and electric vehicles. Increased use of rooftop solar will reduce the per-capita electricity load that needs to be supplied by the utility, while electric vehicles and air source heat pumps for space and water heating will increase the load. Some emerging technologies, such as battery storage, don't generate energy but contribute greater flexibility and resiliency to the grid. It is essential to understand these longterm trends to build a picture of potential energy usage in 2032. By discussing and exploring the range of options, the utility and cities can work together to meet the needs of all parties and provide clean, resilient, and affordable energy into the future.

Next Step: A Roadmap to Achieving City Goals

Armed with the information from the scenario analysis, the cities will now focus on developing solutions and strategies to achieve their renewable energy goals, which will include policy and program options, design considerations, and stakeholder engagement ideas. The scenario analysis and these implementation pathways will be documented in an energy roadmap that will serve as a broad strategic plan relevant to the state, with context that is specific to Salt Lake City, Park City, and Moab. Other cities that are interested in evaluating a transition to clean energy resources may learn from the Utah roadmap; the diverse characteristics of the three Utah cities—from a metropolitan capital to a ski town—offer a diversity of perspectives from which any community can learn.

The roadmap will:

- Outline key strategies for each community to acquire resources to meet clean energy goals while keeping costs low and improving the flexibility of the grid
- Inform decisions on prioritizing programs, pilot projects, policy efforts, etc.
- Identify areas in which accelerated action or attention is necessary or desirable
- Identify areas in which deployment projections fall short of the cities' targets
- Suggest future research or analysis that is needed
- Identify key opportunities for the cities and utility to work together to accelerate progress.

A final roadmap will be available in late 2019 on the Utah Clean Energy website. To learn more about progress toward a renewable and distributed energy future for Utah, contact Kate Bowman.