Multi-Disciplinary Modeling Approach to Forecasting Distributed Energy Resource Adoption
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Abstract
Electric utility planners are grappling with the uncertainty of where and how many distributed energy resources (DERs) will be adopted by customers in their service territories. Rapidly declining prices, increasing customer awareness, and a growing number of vendors and implementers have led to fast growth of solar PV, battery storage and electric vehicles in some parts of the country, resulting in a shake up in utilities’ traditional business operations. High DER adoption can create financially significant impacts on reliability of localized distribution systems, electric rate design and cost recovery mechanisms, and system-wide electric generation resource adequacy needs. This presentation will discuss how Lumidyne Consulting’ s Spatial Integration of Distributed Energy Resources (SPIDER™) model is helping utility planners develop spatially granular forecasts of the adoption and load impacts of DERs.

The SPIDER™ model uses a multi-disciplinary modeling approach to adoption forecasting that Lumidyne staff has been refining for the past 15 years. It relies on methods from system dynamics, technology diffusion theory, economic engineering, discrete choice theory, Monte Carlo uncertainty analysis, and linear, nonlinear and mixed-integer optimization. Discussion will focus on the key outputs, core model components and linkages, and the underlying modeling platform. Time permitting, the presentation will include a brief interactive demonstration of the SPIDER™ model.

Biography
James Milford has been working in the clean energy industry for the last 18 years, with 13 years of that experience focused on advanced modeling and analysis. He has worked with clients from gas and electric utilities across North America, the US Department of Energy, the Environmental Protection Agency, the US Navy, and many other organizations in the energy industry. He is currently a Cofounder and Director of Technology at Lumidyne Consulting, which is a boutique consultancy specializing in custom modeling to advance clean energy. His former position as Managing Consultant and Rocky Mountain Modeling Lead at Navigant Consulting helped utilities design, implement and evaluate demand side management programs. While at Navigant, Mr. Milford also helped create and lead a practice-wide Modeling Center of Excellence, which strived to develop and disseminate modeling best practices. He also worked as an Engineer in the National Renewable Energy Laboratory’s Energy Forecasting and Modeling Group developing models to analyze the impacts of renewable energy on the electric grid. He holds an MS in Engineering and Technology Management from the Colorado School of Mines and a BS in Electrical Engineering from the University of Colorado.