



THE WSU-PNNL ADVANCED GRID INSTITUTE

PATHWAYS TO NET-ZERO IN THE WESTERN US CONSIDERING THE IMPACTS OF CLIMATE CHANGE, RESILIENCE TO CLIMATE EXTREMES, AND EQUITY

~ by ~

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Tuesday, February 28, 2023 • 11:00 AM – Noon (PT) • TEAMS ONLY

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ABSTRACT

Motivated by climate change and its recognized impact on the infrastructure, environment and human health, the Biden Administration has set an ambitious goal of getting to net-zero greenhouse gas emissions by 2050. Getting to net-zero emissions is a game changer for our society and has impacts on the long-term planning for all sectors of the economy. Representing climate intelligence and social and environmental equity in long-term planning is a necessary innovation to complement traditional bulk power system long-term planning. PNNL's Grid Operations, Decarbonization, Environmental and Energy Equity (GODEEEP) platform aims to develop a unique high-resolution integrated modeling capability to evaluate the investment, operational, and equity challenges of alternative strategies to decarbonize the U.S. economy by 2050. We leverage the Global Change Analysis Model (GCAM) to create multiple pathways toward a net-zero economy by 2050. This talk will focus on the innovative downscaling of those net-zero pathways with the inclusion of climate intelligence to evaluate future grid operations. Specifically, we develop reproducible workflows, downscaling tools to site generators, and develop wind, solar, and load hourly time series at a nodal resolution. The associated datasets are all being made available for collaboration. We leverage those capabilities to evaluate the reliability and economics of the future operations of a decarbonized grid, develop insight on how battery storage should be sited and operated in high renewables generation portfolios, and support the industry in characterizing energy droughts for their own planning.

BIO

Dr. Nathalie Voisin is chief scientist for regional water-energy dynamics in the Earth System Predictability and Resilience group at PNNL, where she leads multi-institutional water-energy projects valued at millions of dollars. Her research focuses on advancements in hydrometeorological forecasting and coupling of human-Earth system models to unlock new understanding around critical energy-water systems. She holds a dual appointment as Associate Professor at University of Washington in the Civil and Environmental Engineering Department, and has been associate editor for Water Resources Research since 2017. She is a co-author of the Fifth National Climate Assessment – Energy chapter. She holds a Ph.D. from the University of Washington in Civil and Environmental Engineering, a M.Sc. in Atmospheric and Oceanographic Sciences from McGill University in Canada and M. Eng and B. Eng in Fluid Mechanics and Hydraulics Engineering from ENSEEIHT in France.

