



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 – AN UPDATE

~ by ~

**NATHALIE VOISIN & STEPHANIE WALDHOFF**  
Pacific Northwest National Laboratory (PNNL)

**Tuesday, November 14, 2023 • 11:00 AM – Noon (PT) • TEAMS ONLY**

[\(Click here to join the meeting\)](#)

### 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. Bulk power grid decarbonization and electrification of transport have been identified as first priorities to meet those goals. Bulk power grid long term planning is traditionally performed in three steps: decarbonization roadmap design and scenario analytics, power plant siting and power grid resource adequacy studies, and finally reliability and economics studies. Those steps are most often performed in silos resulting in inconsistent datasets across stakeholders for the different steps. Furthermore, representing climate intelligence and modeling indicators of 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 Platform (GODEEEP) 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. The platform addresses the coupling and modeling gaps toward informing decision-making with models run under consistent scenarios and inputs, resulting in outcome data that are consistent across multiple metrics and scales, and tools to explore them. Additional notable innovation includes open source coincident wind-solar-load and hydropower datasets to characterize energy droughts, and the ability to evaluate equity impacts of the decarbonization scenarios by looking at measures of residential energy security and the effects of new and retiring power plants on local jobs and incomes. The associated datasets are open-source and open-access, all available for collaboration. In this presentation we focus on the platform and innovations through the lenses of end-use cases. Specifically, we develop insight on how decarbonization roadmaps impact local communities and how climate intelligence can be leveraged to develop market opportunities and incentivize storage management operations in support of power grid reliability.

### Bios

---

**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.



**Dr. Stephanie Waldhoff** is a senior research economist at Pacific Northwest National Laboratory's Joint Global Change Research Institute (JGCRI) in College Park, MD. Her research focuses on the long-term effects of climate change as they relate to the economy. Dr. Waldhoff's work has a particular emphasis on feedbacks between the climate and economy, interactions between climate change impacts and mitigation policy, and the implications of these on measures of human well-being. She has extensive experience developing and using complex multi-sector dynamics modeling to inform decision-making. She has served on the Scientific Steering Committee of the Integrated Assessment Modeling Consortium from 2014 to the present and has been an Advisory Board member on multiple international research

projects. Dr. Waldhoff also holds a joint appointment with the University of Maryland's School of Public Policy. Prior to joining JGCRI, Dr. Waldhoff was an economist in the United States Environmental Protection Agency's Climate Change Division. There she led the Division's long-term Integrated Assessment modeling and estimation of the economic damages from climate change impacts. She received her BA and PhD (Public Policy) degrees from the University of Chicago.