ES SEMINAR SERIES
12:30-1:30 pm
11/03/2021
Zoom

Nathalie Voisin

Climate Resilience of Hydropower

Abstract: Hydropower is part of both water and energy systems, making its operations exposed to climate from different directions. In this presentation, I will present perspectives on the climate resilience of hydropower. We propagated 55 years of historical water availability onto the western power grid representing 2010 infrastructure and load conditions. We demonstrated that inter-annual water variability alone could lead to system operating cost varying by +/-10% and that seasonal climate projections could help with system maintenance planning. Surprisingly, neutral ENSO was found to be the most challenging period for planning from a grid perspective while it differs from a basin scale water management perspective. Furthermore, hydropower provides unique operational characteristics - such as cost effective flexibility - to support the integration of renewable energies into the power grid. The representation of hydropower in power system models is key to evaluate not only the reliability of the future western power grid but also to inform hydropower operators about associated future operating needs. By reviewing the representations of hydropower in both water and power systems, I will discuss the disconnection in perceived hydropower opportunities between system operator and hydropower operators long term planning process.

Bio: Dr. Nathalie Voisin is a Chief Scientist in the Earth System Predictability Group at the Pacific Northwest National Laboratory where she leads inter-disciplinary research on regional water-energy dynamics for the Department of Energy. Dr. Voisin holds a dual appointment as Assistant Professor in Civil and Environmental Engineering at the University of Washington. Her expertise lies in coupling climate, hydrology and water resources management models with power system models including production cost and aggregated building energy demand models.

Papers: Voisin, N., et al. "Opportunities for joint water–energy management: sensitivity of the 2010 Western US Electricity Grid Operations to Climate Oscillations." Bulletin of the American Meteorological Society 99.2 (2018)

Oikonomou, Konstantinos, et al. "Core process representation in power system operational models: Gaps, challenges, and opportunities for multisector dynamics research." *Energy* (2021).