



THE WSU-PNNL ADVANCED GRID INSTITUTE

## PACIFIC NORTHWEST REGIONAL STUDY ON GENERATION OPTIONS FOR RELIABILITY AND RESILIENCY

~ by ~

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Tuesday, November 29 • 11:00 AM – Noon (PT)  
• In-person EME 26 • **TEAMS** [Click here to join meeting](#)

### ABSTRACT

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In February of 2021, the National Academies of Science, Engineering and Medicine (NASEM) released a congressionally mandated report on “[The Future of Electric Power in the United States](#).” Over the last several years the US federal government and multiple states have put into place legislation, policies, and goals around reducing fossil fuel use for electric generation, integrating a growing number of electric vehicles, and other areas that affect the planning and operations of the electric grid.

A team from the PNNL/WSU Advanced Grid Institute (AGI) began looking at similar topics from the NASEM report related to the Pacific Northwest (PNW) and State of Washington. Using the state and federal policies and goals coupled with PNW electric utility Integrated Resource Plans, the team looked at annual, seasonal, monthly, and daily trends of existing generation resources including hydroelectric, wind and solar resources within the State of Washington as the coal is removed as a generation source as well as additional renewable sources are added.

Our presentation will discuss the trends seen from this review as they relate to generation options that the utilities within Washington and the PNW will provide the reliability and resiliency needs resulting from changing climate conditions including impacts of annual and seasonal variations in hydroelectric power and non-dispatchable renewable energy sources.

### BIOS

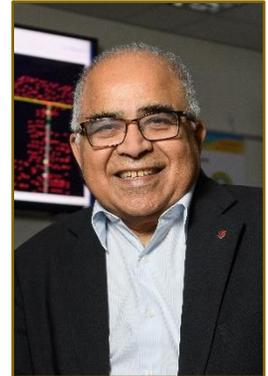
**Jeff Dagle** has worked at Pacific Northwest National, operated by Battelle of the US Department of Energy, since 1989. In 2018, he was named co-director of the Advanced Grid Institute, a joint institute with WSU. He has led numerous projects in the areas of transmission reliability and security. Other career accomplishments include leading the data requests and management tasks for the US-Canada Power System Outage Task Force investigation of the August 2003 blackout. Mr. Dagle has served on National Academies of Science and Engineering committees in 2014, 2016, and 2019 that produced key reports related to the electric power grid. He is a Senior Member of IEEE and National Society of Professional Engineers (NSPE). He received BS and MS degrees in EE from WSU in 1989 and 1994, respectively, and is a registered professional engineer in the State of Washington.





**Dr. Sanjeev Pannala** is working as a Research Assistant Professor at Energy System Innovation Center, Washington State University Pullman. His research interests include distribution system resiliency, event detection algorithms, ADMS, and microgrids. He worked on the India-UK HEAPD project from October 2014-January 2018 to earn his PhD at the Indian Institute of Technology Roorkee (IITR), India. Later, he joined as a research associate (RA) under the UIASSIST Project at the Indian Institute of Technology Roorkee (IITR), India, from Feb 2018-May2019. He received the Doctoral POSOCO Power System Award in 2020 for contributions during Ph.D.

**Dr. Anjan Bose** is a Regents Professor and the Distinguished Professor of Power Engineering at Washington State University. He has over 40 years of experience in the power industry and academe. His pioneering work in developing and implementing real time analysis software for power grid control centers was cited in his election to Fellow of the Institute of Electrical & Electronics Engineers (IEEE). His work in the development of real time simulators, which are used around the world for training grid operators, was cited in his election to the National Academy of Engineering. He was also recognized by the IEEE with their Outstanding Power Engineering Educator Award, the Third Millennium Medal and the Herman Halperin Electric Transmission & Distribution Award. He has consulted on power system operation for numerous companies and governments all over the world.



**Dr. Noel Schulz** is the Edmund O. Schweitzer III Chair in Power Apparatus and Systems with the School of Electrical Engineering and Computer Science, Washington State University (WSU), Pullman, WA, USA. She has been a Chief Scientist at the Pacific Northwest National Laboratory (PNNL) since February 2020, serving in joint appointment as part of the PNNL/WSU Advanced Grid Institute (AGI). In August 2021, she became Co-Director of AGI. She received BSEE and MSEE degrees from Virginia Tech, Blacksburg, VA, and PhD in EE from the University of Minnesota, Minneapolis, MN, USA. Dr. Schulz has been active for over 28 years in teaching, research, and service at six US universities. Her research interests include computer applications in power system planning and operations including AI techniques, renewable energy, storage and microgrids. She has been active in IEEE Power and Energy Society (PES) and served as IEEE PES President in 2012 and 2013. She is an IEEE and ASEE Fellow. In 2021, she was elected to the Washington State Academy of Science.