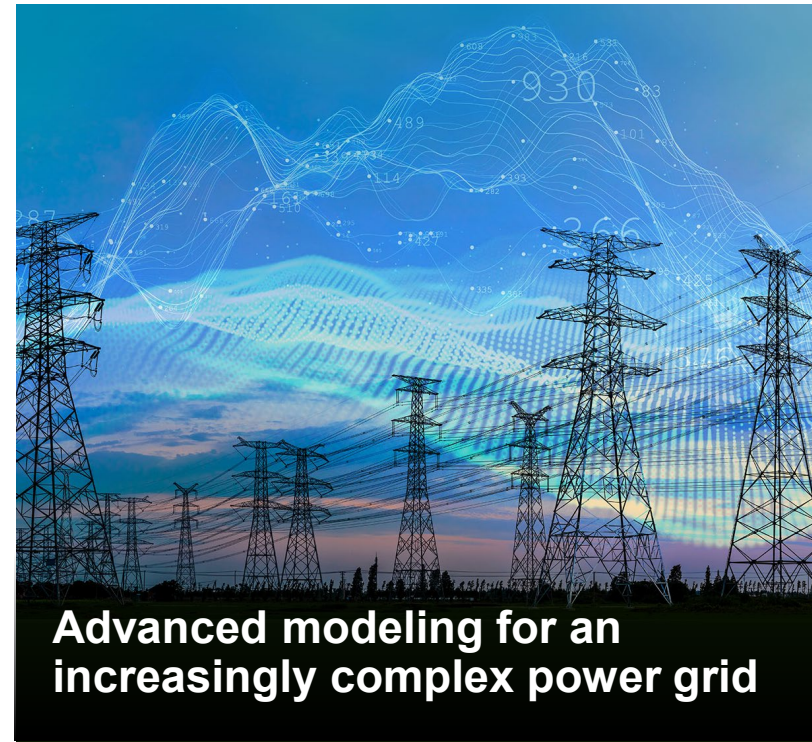


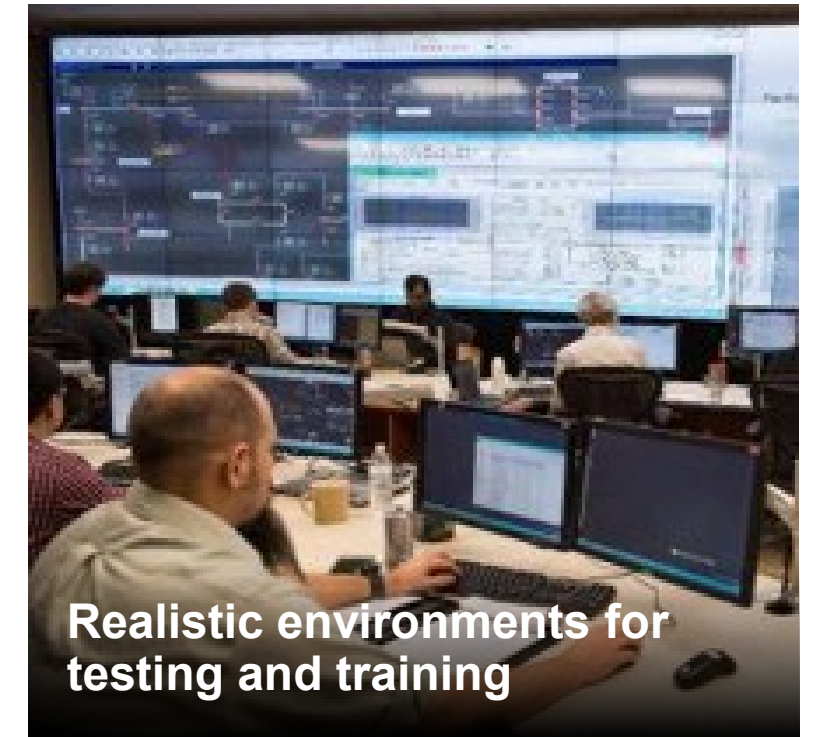


# The PNNL-WSU Advanced Grid Institute

*Modernizing the power grid and  
building the workforce to run it*



Advanced modeling for an increasingly complex power grid



Realistic environments for testing and training



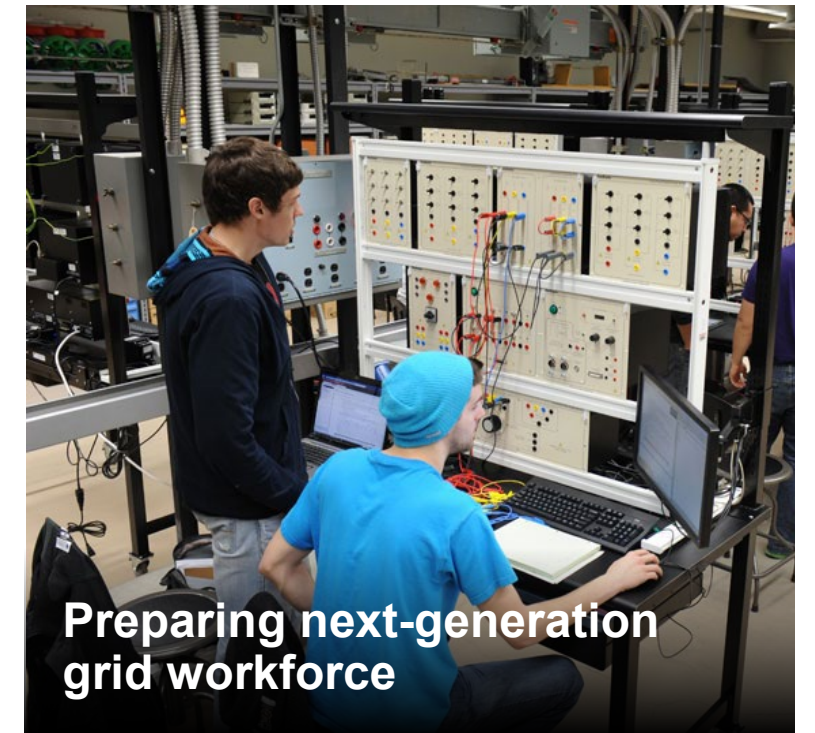
Jeff Dagle, PNNL



Noel Schulz, WSU



Convening industry thought leaders and stakeholders



Preparing next-generation grid workforce



**MISSION:** To promote the research and evolution of advanced grid modeling to support planning and operations of complex power system of the future and its workforce.

**VISION:** To be recognized as the leading engineering source that will enhance the North American power system and influence the rest of the world.

### ➤ Joint Projects

- ✓ 10 multi-year projects with aggregate business volume of >\$50M
- ✓ Collaborative execution of “Grid Sandbox” Laboratory Directed Research and Development (LDRD) project
  - Analytics for grid architectural design and all-hazard assessment
- ✓ Sponsored multiple AGI-focused Distinguished Graduate Research Program (DGRP) PhD fellows

### ➤ Collaborative Commitment

- ✓ 6 joint appointments since inception (one has since transferred to another university)
- ✓ Internal “AGI Days” symposia conducted for PNNL/WSU staff with seminars/presentations
- ✓ Interacting with WSU EE candidates for faculty positions

### ➤ Publications / Presentations

- ✓ Several top-tier journal and conference presentations
- ✓ Monthly presentations as part of WSU ESIC seminar series

### ➤ External Engagement

- ✓ Strategic plan developed and implemented with internal and external stakeholders
- ✓ Quarterly newsletter

## AGI Advisory Board

- Formed in December
  - ✓ First meetings in January
- Future Meetings – Quarterly
  - ✓ Virtual for January, April and November.
  - ✓ In-Person: August 31, 2023
- Strong regional focus and representation

**Larry Bekkedahl | Senior Vice President, Advanced Energy Delivery | Portland General Electric**

“The Advanced Grid Institute has been and continues to be a thought leader in developing the Smart Grid. The combination of leading researchers from PNNL, and the best in class power engineering from WSU has created an outstanding collaborative effort for utilities and the electric industry. AGI brings together innovation that will lead the way to decarbonization efforts.”

**Scott Corwin | Executive Director | Northwest Public Power Association**

“I am truly excited to be a part of this cutting-edge collaboration working to enhance the power systems of the future. The focus on advancements in capability, resilience, and reliability of power systems dovetails well with NWPPA’s mission around workforce development and sound energy policy.”

**Judith Estep | Chief Technology Innovation and Strategy Officer | Bonneville Power Administration**

“The AGI offers collaborative research opportunities that can help BPA address some of the industry’s biggest challenges around cybersecurity and grid integration. The program also provides a platform for university students to work on relevant industry projects and connect with leading researchers; it’s an excellent way to build a pipeline of regional engineering talent.”

**Eleanor Ewry | Supervisor Strategic System Planning | Puget Sound Energy**

“As utilities move towards a future of increasing energy needs, the Advanced Grid Institute provides much needed support for understanding how to analyze the grid of the future. Organizations like AGI are instrumental in helping to understand the impacts and benefits of new technologies on grid resilience and to integrate these technologies into day-to-day operations. I am thrilled to be part of this Board as we navigate a changing energy landscape and look forward to the benefit AGI will bring to advancing a fully integrated grid.”

## AGI Welcomes Advisory Board Members



As we start a new year, we are pleased to welcome our Advisory board members to the Advanced Grid Institute (AGI) team. These industry leaders and experts will provide strategic counsel, advice, and recommendations to help continue to bolster AGI’s research and work in advanced grid modeling to support the planning and operation of complex power systems of the future.

**John Gibson | Innovation Lab Director and Chief R&D Engineer | Avista**

“Avista has a rich history of innovation. Today, we continue to invest in innovation with intention because we believe that in order to achieve the clean energy future that we all want, we must continue to innovate. By working together through the Advanced Grid Institute, we can help chart the course for a clean energy transition that will propel the energy industry forward.”

**Tim Nies | Energy Services Manager | Energy Northwest**

“The sum of the parts is always greater than the whole. I am excited for the opportunity to collaborate and leverage our community assets.”

**Uzma Siddiqi | Sr. Manager of Grid Modernization and Strategic Technology | Seattle City Light**

“As we move towards a shared goal of a decarbonized electrical grid, which is also more reliable, resilient, and equitable, our challenge is the integration of new technologies into the existing system. The Advanced Grid Institute (AGI) is addressing this need. I am excited to be on the AGI Industry Advisory board to support this transformation of the grid and help advance the economic opportunities, climate resilience, and environmental benefits from these innovative technologies.”

**Rich Wallen | General Manager / Chief Executive Officer | Grant County PUD**

“I am excited to be on the board to help play a guiding role to enhance the power system and influence decisions as we move to a more robust, reliable, and diverse grid to support all sources of generation for the clean energy future.”

**Greg Zweigle | R&D Fellow Engineer | Schweitzer Engineering Laboratories**

“The AGI is an important collaboration between WSU and PNNL and is making significant contributions to improve the safety, reliability, and economics of electric power systems worldwide.”



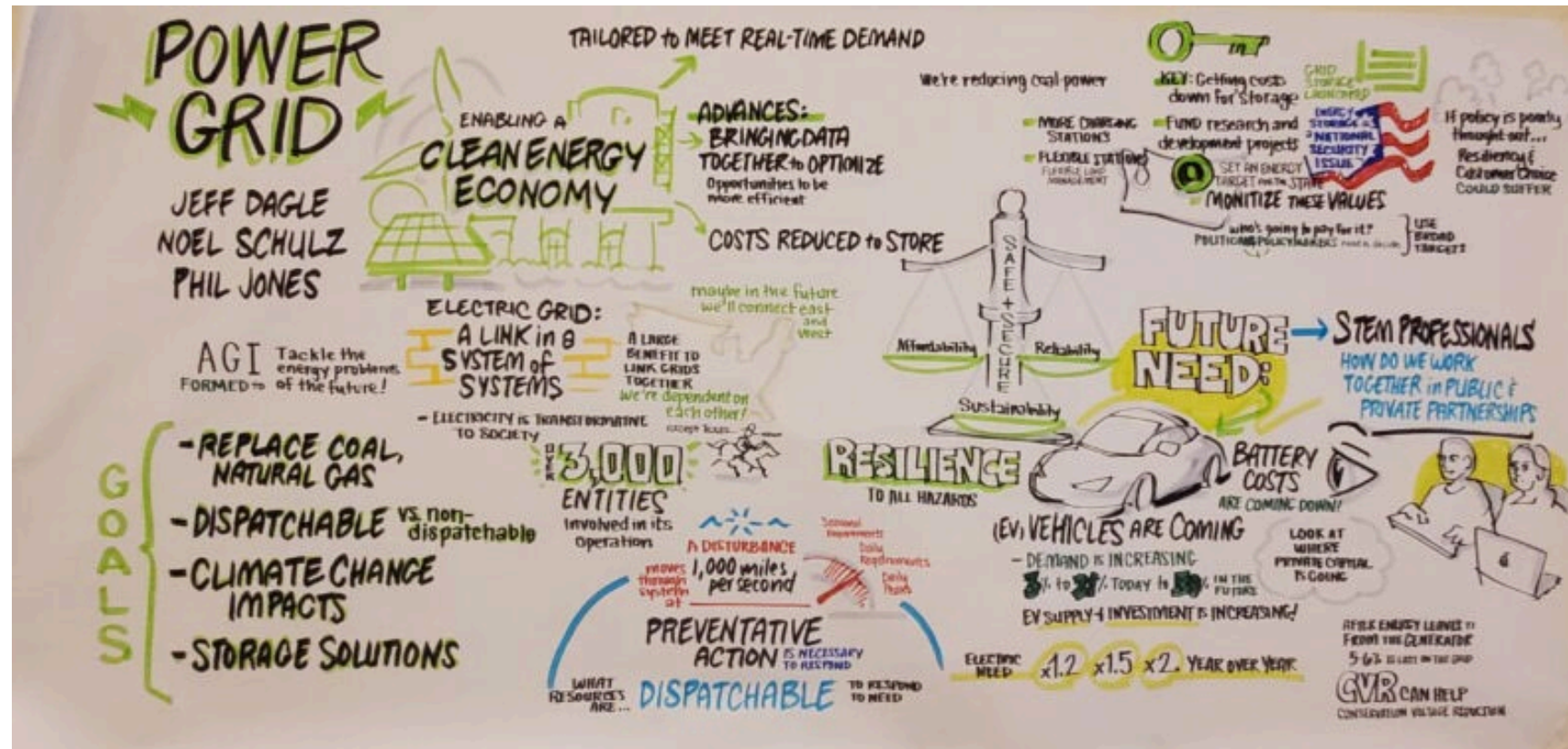
# Recent Regional Engagement: Tech Alliance Policy Matters Summit – Dec 14, Seattle

**DEC. 14, 2022**  
IN PERSON: SEATTLE AIRPORT MARRIOTT  
HYBRID OPTION AVAILABLE  
TECHNOLOGY-ALLIANCE.COM

## INNOVATION BASICS

**B** BLOCK CHAIN   **F** FUSION ENERGY   **I** IMMUNO THERAPY   **P** POWER GRID   **Q** QUANTUM

BUILDING BLOCKS OF THE INNOVATION ECONOMY



Fall 2022



THE WSU-PNNL ADVANCED GRID INSTITUTE

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

~ by ~

**JEFF DAGLE, PACIFIC NORTHWEST NATIONAL LABORATORY  
SANJEEV PANNALA, WASHINGTON STATE UNIVERSITY (WSU)  
ANJAN BOSE, WSU  
NOEL SCHULZ, WSU/PNNL**

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

**ABSTRACT**

In February of 2021, the National Academies of Science, Engineering and Medicine (NAEM) 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 NAEM 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.

# AGI/ESIC Webinars

## SPRING AGI WEBINARS

### Join Us!

Please save the date and plan to join us and others who are connected with AGI for our upcoming webinars. [Click this link for updated information on webinars.](#)

- **January 31, 2023 (11 a.m. Pacific) | *Attack Graph Driven Cyber-Physical System (CPS) Resilience Assessment*** with Sumit Purohit, PNNL Senior Data Scientist, Physical and Computational Sciences Directorate.
- **February 28, 2023 (11 a.m. Pacific) | *Pathways to Net-zero in the Western US Considering the Impacts of Climate Change, Resilience to Climate Extremes, and Equity Strategies*** with Nathalie Voisin, PNNL Chief Scientist - Regional Water-Energy Dynamics and Joint Appointee with UW.
- **March 28, 2023 (11 a.m. Pacific) | *Transactive Energy: Enabling DERs to Provide Grid Services*** with Monish Mukherjee, PNNL Power Systems Research Engineer.
- **April 25, 2023 (11 a.m. Pacific) | *Resilient Communities via Risk-driven Infrastructure Planning and Automated Restoration*** with Anamika Dubey, WSU Huie-Rogers Endowed Chair Associate Professor of Electrical Engineering & Joint Appointee with PNNL and Wei Du, PNNL Senior Research Engineer IV.



## AGI Industry Day

AGI Industry Day 2022 – Aug 31, 2022

- Hybrid Approach
  - 70 on-site
  - 100 on-line
- 76 Different Organizations
  - 14 utilities
  - 17 universities
  - DOE, EEI, & state agencies
  - Staffers from two WA Senators and one rep
- 5 Sessions including WA Clean Energy Projects, PUC and Industry panels
- [Website with videos August 2022 AGI Industry Day | Advanced Grid | Washington State University \(wsu.edu\)](https://www.wsu.edu/industry-day)

## AGI Industry Day 2023

August 30, 2023 9 am – 4 pm

Theme: **Pathways Toward A Clean Energy Grid**

Hybrid – WSU Tri-Cities Campus and On-line

Working on agenda now. Open to suggestions for speakers!

Please plan to attend!



## Other AGI External Communications

- Quarterly E-Newsletter continues
- Social Media – Twitter and LinkedIn
- AGI Blog  
<https://natlab.wsu.edu/grid/blog/>
- Collaboration with PNNL Communications and WSU VCEA Communications on content creation



# Advanced Grid Institute

<https://natlab.wsu.edu/grid/>

**Jeff Dagle, Co-Director**  
Pacific Northwest National Laboratory  
+1 (509) 375-3629  
jeff.dagle@pnnl.gov

**Noel Schulz, Co-Director**  
Washington State University  
+1 (509) 335-0980  
noel.schulz@wsu.edu