

System Expansion Modeling Workshop



ESIG

ENERGY SYSTEMS
INTEGRATION GROUP

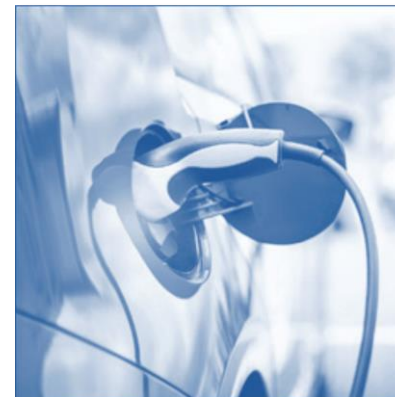
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Welcome to an Energy Systems Integration Group (ESIG) Workshop!



- ESIG is a member-driven organization that addresses technical challenges for transforming energy systems. We do this through collaboration, education and knowledge sharing.
- 250+ members worldwide broadly focused on decarbonization and integration of energy systems
- Workshops, webinars, reports available freely on our website (<https://www.esig.energy/>) and on YouTube ([@EnergySystemsIntegrationGroup](#))
- We create task forces to address topics such as multi-value transmission benefits or grid-forming technology or electrification and these task forces do analysis, run simulations, synthesize best practices, etc.



Integrated Planning has Many Dimensions



- Generation (G) and Customer/load (C)
 - Including storage, DERs, electrification
- Transmission (T) and distribution (D)
- Economics and reliability
- Gas and electricity
- Integration with other energy sectors including industry, hydrogen and other molecules

Today we're talking about economic "optimization" of these dimensions

The need for system expansion modeling



- Capacity expansion modeling finds the least cost generation solution. Because the modern power system is more interactive, we want to consider G&T&D&C holistically
- We can do a lot with existing tools to meet the needs of the modern power system:
 - Co-optimize G&T (<https://www.esig.energy/capacity-expansion-modeling-for-transmission-planning/>)
 - Modeling over larger regions can show how T can reduce the need for G.
 - DERs are typically an input, but they could be a resource instead
 - Retail rates could be modeled as resources – time-of-use rates may act like storage; critical peak pricing may act like a gas peaker
- But there is a lot we *can't* do. Ideally we would at least co-optimize G&T&D but this is computationally infeasible
 - How do we consider hosting capacity constraints on the D system, or include the cost of D upgrades in the optimization?
 - If storage is needed, should it be sited on the T or D system?
- Also how should we think about flexible load more generally?

Generation

Customer/Load

Transmission

Distribution

Agenda



- 1:05 pm MT Integration Across Transmission and Distribution
 - *Dr. Bryan Palmintier, Group Manager of T&D Interactions, NREL*
- 1:35 pm MT Use and Applications of the WISDOM model for co-optimizing G&T&D
 - *Dr. Chris Clack, Vice President of Integrated Energy Systems Planning, Pattern Energy*
- 2:05 pm The Australian Energy Market Operator's Integrated System Plan
 - *Luke Falla, Principal Engineer, Australian Energy Market Operator*
- 2:35 pm Coordinated Grid Planning in New York
 - *Dr. Schuyler Matteson, Clean Energy Planning Lead, NY Department of Public Service*
- 3:05 pm Incorporation of DER Contributions into Resource Planning
 - *Obadiah Bartholomy, Manager of Distributed Energy Strategy, Sacramento Municipal Utility District*
- 3:25 pm Closing remarks
 - *Aaron Burdick, Director of Integrated System Planning, E3*

Thank you to Breakthrough Energy for sponsoring this workshop!