



The Future of Electricity Production in I-WEST Region

Date: March 24, 2022

Time: 10am – 2pm (MT)

No-cost registration is required to attend. [Click here to register](#)

The Intermountain West Energy Sustainability & Transitions (I-WEST) project is focused on delivering a regionally relevant technology roadmap to transition six U.S. states to a carbon-neutral energy economy. I-WEST encompasses Arizona, Colorado, Montana, New Mexico, Utah, and Wyoming. The project is taking a place-based approach, which prioritizes the geographical attributes, economic landscape, and societal readiness of the region. Learn more online at www.iwest.org.

Why join this workshop?

A transition to carbon-neutral energy over the next 10-15 years will directly impact electricity production and transmission in the I-WEST region. Many pathways exist, including renewables; hydrogen blending; carbon capture, use, and storage (CCUS); nuclear; biofuels; and technologies still to be developed. Each of these have interdependencies on local resources such as water, land, fuels, and human workforce. Understanding the resources, costs, and benefits for each technology will be important for developing a regional roadmap for carbon-neutral electricity.

This workshop will include participants from the power production and transmission sectors, industrial consumers, regional and rural co-ops, and university researchers. The primary goal is to discuss regionally relevant pathways to clean power production over the next 10-15 years. Guided panel discussions will seek to address the following:

- What are the technical challenges and barriers to deploying carbon-neutral electricity?
- What are the impacts of the “electrify everything” trend to the power grid?
- How can renewables be integrated into the grid at the community and regional scales?
- What are the resources, costs, and benefits of each technology pathway?
- How can reliability, costs, and the environment be balanced?

Workshop format

This workshop will include kick off with an overview of the I-WEST initiative, followed by moderated panel discussions with plenty of time for questions and answers.



The Future of Electricity Production in the I-WEST Region

Thursday March 24, 2022

10:00am – 2:00pm MST

Join from the meeting link

<https://lanl-us.webex.com/lanl-us/j.php?MTID=m6d527b52ab5487dc3ee2f30efc891af9>

Thursday, March 24, 2022

Time	Topic	Presenter/Moderators
10:00	Welcome, Introduction, & Workshop Objectives	George Guthrie
10:10	I-WEST State Profiles <ul style="list-style-type: none">Electricity Fuel Mix, Resources, Infrastructure, Population	Mary Ewers
10:30	Topic 1: Regional Technology Pathways to Carbon-Neutral Electricity: Emerging Projects & Future Opportunities—Limitations, Technology Readiness <ul style="list-style-type: none">RenewablesHydropowerNuclear - SMRBlue/Green Hydrogen with Natural Gas for Base LoadBiofuelsFossil + CCUS	Mike McGuirk
11:30	Break	Break
11:45	Topic 2: Balancing the Grid—Supply Must Equal Demand: Local & Intraregional Distribution; Exports to Other Regions <ul style="list-style-type: none">Integration of renewables and microgrids, smart gridPredicting Load growth from increased EV useImports and Exports to/from the I-WEST regionUtility Scale Battery StorageRTOs for balancing and transmission efficiencyAging Infrastructure, Resiliency, Reliability	Russell Bent

Meeting Agenda

The Future of Electricity Production

March 24, 2022 10:00am

Page 2

12:45	Break	Break
1:00	Topic 3: Nontechnical Considerations for Accelerated Transition: Equity, Societal Readiness, Economic Concerns, Policy Landscape, Workforce <ul style="list-style-type: none">● Transitioning a workforce● Rural and Tribal community adoption solutions● Regulatory uncertainty● Solutions for funding new technologies	Grant Stewart
1:45	Final Comments, Wrap up and conclusion	Mary Ewers

NOTE: Note text Note text Note text

Electricity Workshop

March 24, 2022

10-2 pm MT

The Intermountain West Energy Sustainability & Transitions (I-WEST) project is focused on delivering a technology roadmap to transition six states in the U.S. Intermountain West to a carbon neutral energy system. I-WEST encompasses Arizona, Colorado, Montana, New Mexico, Utah, and Wyoming. The project is taking a place-based approach, which prioritizes the geographical attributes, economic landscape, and societal readiness of the region so that the resulting technology roadmap reflects pathways that are regionally relevant and can be put on an accelerated timeline to deployment.

Workshop Goal and Format

The primary goal of this workshop is to discuss regional strategies to low-carbon (carbon-neutral) electricity production in the next 10–15 years. The workshop is divided into three general topic areas, which will consist of moderated discussions seeking broad input from a range of stakeholders within the region.

Topic 1: Regional Technology Pathways to Carbon-Neutral Electricity: Emerging Projects & Future Opportunities—Limitations, Technology Readiness

Overarching Questions:

1. What are the key strategies and technologies that are being pursued (or should be pursued) to transition regional electricity production to carbon neutral?
2. What are the key remaining technical challenges and barriers to deployment of these strategies & technologies?
3. What is the likely timeline for deployment and transition to lower carbon electricity?

Detailed Questions to Prompt Additional Dialog:

- a. In decisions to move forward on transitioning electricity production, what is the relative importance of intra-regional demand and demand from other regions? How is the potential growth in electric vehicles being factored into regional electricity planning?
- b. What is the potential within the region for blending hydrogen with natural gas to reduce CO₂ emissions associated with electricity production? And how impactful would this strategy be?
- c. What is the highest percent of renewables & clean energy that we can reach in the region in the next 10–15 years? What is the most likely level we can reach?
- d. Is hydrogen production during off-peak load times an important strategy in the region for renewable electricity producers with wind/solar?
- e. What role can/should/will nuclear play in the region as part of transition to low-carbon electricity? Are small modular reactors a significant part of this strategy? CANDU reactors?

Roundtable Discussion Questions

- f. What strategies are being considered/implemented to manage the Duck Curve within the region (i.e., the variation in production & demand and potentially resulting imbalances)? What is the relative importance of intra-regional and inter-regional demand in terms of impacting the management strategy?
- g. How can we replace the baseload and ramping capabilities that NG currently provides for the system? One major consideration is the need to repower large units such as at San Juan and Four Corners into Synchronous Condenser duty. The high voltage system needs significant inertia and VAR support...spinning iron.
- h. For each low-carb pathway (solar, wind, microgrids, batteries, CCUS, nuclear, biofuels) is it better to have smaller decentralized facilities vs. larger centralized facilities?
- i. What are the resources and infrastructure needed to make biofuels a viable route to electricity production?
- j. What enabling technologies/industries or raw materials are required for each pathway to be sustainable?

Topic 2: Balancing the Grid—Supply Must Equal Demand: Local & Intra-regional Distribution; Exports to Other Regions

Overarching Questions:

- 1. How are individual strategies considering the impact of new technologies on the reliability of the grid? Are there key technology gaps that, if filled, could lower concerns about reliability and could enable more options for transitioning electricity production?
- 2. As new technologies are deployed within the region, what is the relative impact on grid reliability of intra-regional versus inter-regional demand? What investments (technology or infrastructure) will be important for the region to ensure grid reliability while facilitating rapid transition of electricity production?
- 3. How do concerns on balancing the grid factor intersect with the regional potential for increased local electricity production (e.g., increased home-scale solar; community-scale grids; etc.)—particularly within rural parts of the region?

Detailed Questions to Prompt Additional Dialog:

- a. At what price point (\$\$) does it make sense to invest in utility scale batteries? Is it better to invest in renewables and use natural gas to balance (baseload)? Or is it better to invest in renewables and BESS (Battery Storage Systems) to balance?
- b. What are the advantages/disadvantages of grid intertied battery systems? Frequency response? Fire Safety?
- c. Are renewables sufficient for charging BESS?
- d. What are the grid considerations for deploying CCUS and hydrogen production?
- e. What is impeding the build out of new high voltage transmission lines?

Roundtable Discussion Questions

- f. What would decentralized grid operations look like if the trend is towards Distributed Energy Resources (DER) (PV or microgrids < 5MW)?
- g. How will the 'electrify everything' trend impact the temporal dispatch of electricity and grid capacity? Will it eventually impact I-WEST power exports to California?
- h. What are the smart-grid technologies needed for balancing residential two-way charge/dispatch (solar or vehicle to grid)?
- i. Besides other investments, what transmission/generation expansion is needed? What are the key infrastructure investments needed to deploy low-carbon pathways?

Topic 3: Nontechnical Considerations for Accelerated Transition: Equity, Societal Readiness, Economic Concerns, Policy Landscape, Workforce

Overarching Question:

- 1. What are key nontechnical considerations for facilitating the rapid transition to low-carbon electricity within the region?

Detailed Questions to Prompt Additional Dialog:

- a. With the broad geographic variation in the region—urban centers vs. rural communities; Sovereign Nations; communities with long-standing economies tied to the existing energy infrastructure; etc.—what considerations are important in identifying transition strategies that are equitable?
- b. How will the workforce be impacted by transitioning to low-carbon electricity production in the region? What regional impacts should be mitigated relative to stranded workforce? Workforce needed for the new energy technologies? What types of jobs will emerge in the development of a low-carbon electricity economy, and what is their nature (skill sets, duration, compensation, etc.)? Are there opportunities to transition existing electricity workforce to these new types of jobs?
- c. How will the combined impacts of an evolving climate AND an evolving electricity system impact regional communities? What considerations are important relative to identifying a transition strategy? Is water availability a factor or a concern throughout the region?
- d. How do we fund more innovation and deployment of new technologies for the energy transition within the region?
- e. What is the current landscape (policy; economic) relative to incentivizing the transition to new, low-carbon electricity production? What are key gaps that may impede deployment?
- f. What is the societal readiness for transitioning electricity generation in the region? What could be done to facilitate a higher level of readiness?
- g. What is needed to enable greater access to markets outside of the region (e.g., West Coast)?