EPRI ELECTRIC POWER RESEARCH INSTITUTE — ENERGY AND ENVIRONMENTAL ANALYSIS GROUP

NEWSLETTER AND RESEARCH HIGHLIGHTS

Greetings,

We are pleased to provide you with the fifth installment of the EEA newsletter. As a reminder, all the announcements included in this email as well as past announcements can be found on the EEA website.

EEA Research Highlights

"Impacts of Recent State Renewable Policies in the U.S."

EPRI Back Pocket Insight>> Read

Access the Back Pocket Insight

In the year prior to November 1, 2019, several state-level clean electricity policies were promulgated aimed at reducing electric sector CO_2 emissions. Updates to renewable portfolio standards, clean energy standards, and offshore wind mandates, along with federal incentives including the production and investment tax credits, are creating a complex, interrelated policy environment. Using the US-REGEN model, EPRI's Energy and Environmental Analysis Group analyzed the impacts of recent state policies on electric sector CO_2 emissions and costs, including sensitivities to lower wind costs and higher natural gas prices.

The EPRI EEA analysis finds that these recent state policies do increase renewable generation between 2015-2050, but could also cause up to 13GW of existing nuclear to retire earlier than otherwise expected, resulting in little change in net CO_2 emissions while adding 0.6%-0.9% to NPV electric sector costs in the same time frame. For more information about this analysis, please contact David Young.

"Economic drivers of wind and solar penetration in the U.S. "

Read

Access the Article

In November 2019, EEA researchers John Bistline and David Young published an article entitled, "Economic drivers of wind and solar penetration in the U.S." in the journal, *Environmental Research Letters*. Using analysis from the US-REGEN model, this article offers insights into which technological and market drivers contribute to economic renewable penetration, and into the range of possible renewables shares in the future U.S. generation mix.

Key takeaways include:

- Future wind and solar cost declines and CO2 emissions policy are the most important drivers for new renewable capacity over other generation options.
- Very cheap energy storage does not enable 100% wind and solar generation, but it does help lower system costs in the electric sector.
- Unlimited, free inter-regional transmission does not enable 100% wind and solar generation, with or without cheap storage.
- Even in the most extreme scenarios, 100% wind and solar generation is never the least-cost solution to meeting load in the U.S. as decreasing value at higher deployment eventually outpaces cost reductions.
- The economics of new wind and solar are a complex function of many factors, so ultimate market diffusion is uncertain and requires detailed analysis to evaluate.

EEA Events

38th Annual Seminar on Fuels, Power Markets, and Resource Planning

On November 13-14, 2019, EPRI's Project Set 178B hosted its annual seminar, which delivers and expands upon EPRI's research findings and explores topics of growing urgency to electric company generation, transmission, and distribution planners, fuel and asset managers and staff involved in market design, corporate strategy and risk management.

Now in its 38th year, this seminar is supported and hosted by EPRI's research program on *Resource Planning for Electric Power Systems*.

The 2019 seminar offered three independent sessions spanning 1.5 days that focused on the following topics:

- The Role of Natural Gas in Achieving Deep Decarbonization
- Integrating Electric Company Generation, Transmission, and Distribution Planning; and
- Impact of CO_2 Emissions Reductions on Electric Company Operations and Systems Planning.

In addition, the seminar featured a keynote address by FERC Commissioner Bernard McNamee and a Special Topic focused on the evolution and impact of the German *Energiewende*. For more information about the seminar, please contact Adam Diamant.

Sixth Annual Expert Workshop in Electricity Decarbonization

The Sixth Annual Expert Workshop: Challenges in Electricity Decarbonization jointly hosted by EPRI and the International Energy Agency (IEA) focused on the growing number of mid-century electric sector emissions targets announced by governments and electric utilities throughout the world, near- and long-term strategies to achieve those targets, and potential challenges likely to be encountered along the way. The workshop series brings together leading experts from government, academia, think-tanks and the private sector from around the world to share experiences relating to decarbonizing the electricity system.

This year's workshop focused on potential pathways and associated challenges by which utilities may drive their emissions close to zero (or beyond) by 2050. The workshop took place from October 17-18 in Paris, France, and consisted of sessions on the following topics:

- National and sub-national actions to deeply reduce electric sector greenhouse gas emissions

- Electric utility ambitions for decarbonization
- Market, policy and technology challenges associated with high shares of renewables
- Role of long-distance transmission and cross-border energy flows in countries' decarbonization efforts
- Innovative strategies to facilitate the task of deep decarbonization

The agenda and presentations from the workshop can be found on the EEA website. For more information about the workshop, please contact David Hunter.

EEA participation in INFORMS

EEA staff are recognized experts in the scientific research community. As such, they regularly participate in scientific conferences such as INFORMS. Program 201 has had a long history of expert participation that has had substantial direct and indirect benefits for EPRI, its members, and the public. In October 2019, three EEA researchers presented at the 2019 INFORMS conference in Seattle, Washington.

David Young presented on capturing the value of battery storage in generation capacity expansion models through scenario analysis using US-REGEN. Delavane Diaz presented on US-REGEN modeling efforts related to regional and local characteristics related to evaluating the potential role of electric technologies to meet energy needs and the resultant impacts on energy system and environmental outcomes.

Finally, Nils Johnson presented an analysis of the load implications of large-scale electric vehicle deployment and the potential impacts of vehicle charging on the US electricity supply system through 2050. For more information about EPRI's participation, please reach out to David Young, Delavane Diaz, or Nils Johnson.

Member Center

The EEA Group conducts its research as part of EPRI Programs 201 (Energy, Environmental, and Climate Policy Analysis) and 178 (Integrated Energy Planning, Market Analysis, and Technology Assessment). Examples of recent program-specific research topics include:

- CO_2 Emission Rate Metrics Calculator for Assessing Potential Impacts of the Affordable Clean Energy Rule (3002017303) – Program 201-B
- Combined-Cycle Plant Life-Cycle Management: Engineering and Economic Considerations for O&M Planning Staff (3002017532) – Program 178-A
- Solar Plus Storage Cost Assessment and Design Considerations (3002016636) – Program 178-A and Program 201-C

For more information about these programs, please contact David Young (P201) or Adam Diamant (P178).

Thank you for your continued interest in our work. If you have any questions or would like to sign up for future communications from the EEA Group, please email eea@epri.com.

Best,
EPRI Energy and Environmental Analysis Group

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