December 2019 Newsletter and Research Highlights

The ESCA group recently sent out the fifth installment of its public newsletter. Download the PDF version of the December 2019 newsletter. If you would like to sign up for the ESCA public mailing list, please email eea@epri.com

Back Pocket Insight: Impacts of Recent State Renewable Policies in the U.S.

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 Systems and Climate 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 ESCA 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 timeframe. For more information about this analysis, please contact David Young at dyoung@epri.com.

Peer-Reviewed Publication – "Economic drivers of wind and solar penetration in the U.S."

In November 2019, ESCA 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 CO_2 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 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 ESCA 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 (dyoung@epri.com), Delavane Diaz (ddiaz@epri.com), or Nils Johnson (njohnson@epri.com).

September 2019 Newsletter and Research Highlights

The ESCA group recently sent out the third installment of its public newsletter. Download the PDF version of the September 2019 newsletter. If you would like to sign up for the ESCA public mailing list, please email eea@epri.com

Back Pocket Insight: A Primer on Wind and Solar Value Deflation

This EPRI brief investigates how the economic value of additional wind and solar capacity decreases as their penetration rises. Key takeaways include:

- Value deflation is driven not only by the weather-dependent variability of wind and solar but also by the lower revenues earned for their highest-output hours and their low output during high-priced hours.
- Studies of deep decarbonization do not find that single technology pathways (e.g. 100% renewables) to be least cost, in part due to value deflation.
- Metrics like the levelized cost of electricity neglect decreasing value and increasing system costs.
- Despite these effects, wind and solar deployment will increase moving forward, but how much varies by region and how uncertainties (e.g. cost, policy) unfold.

EEA participation in IPCC author workshop

EEA staff are internationally-recognized experts in the scientific research community. As such, they regularly participate on scientific panels, such as the Inter-Governmental Panel on Climate Change (IPCC) and the Integrated Assessment Modeling Consortium (IAMC). Program 201 has had a long history over decades of international expert participation that has had substantial direct and indirect benefits for EPRI, its members, and the public.

EPRI participation elevates EPRI's and the staff's scientific reputation and credibility, provides an impactful forum for sharing EPRI research methods and insights, and enhances EPRI staff expertise through engagement with other experts, helping set scientific research agendas. In July 2019, two ESCA staff, Steve Rose and Delavane Diaz, attended the Working Group II Lead Author Meetings for the IPCC Sixth Assessment Report (AR6) in Kathmandu, Nepal. Working Group II assesses the vulnerability of socio-economic and natural systems to climate change, negative and positive consequences of climate change and options for adapting to it. Specifically, Rose and Diaz are contributing to chapters on climate resilient development pathways. The Working Group report is expected to be released in 2021. For more information about EPRI's participation, please reach out to Steve Rose (srose@epri.com) or Delavane Diaz (ddiaz@epri.com).