

June 16, 2021

**MEMORANDUM FOR:** Angelina LaRose  
Assistant Administrator for Energy Analysis

**FROM:** Jim Diefenderfer  
Director, Office of Long-Term Energy Modeling

**SUBJECT:** Summary of AEO2022 Joint Electricity-Renewable Electricity Working Group Meeting held on May 27, 2021

This memorandum summarizes the presentation we gave during the *Annual Energy Outlook (AEO) 2022* Electricity and Renewable Electricity Working Group meeting and the discussions that followed. The meeting recapped the AEO2021 results and highlighted the major modeling and data updates planned for AEO2022. The presentation for this meeting is available in a separate document on our website.

### **Overview**

AEO2022 will include the eight core side cases (High/Low Macro, High/Low Oil Price, High/Low Oil and Gas Resource and Technology, and High/Low Renewables Cost), along with the Reference case. We are considering topics for Issues in Focus articles, which may include running additional cases.

The first working group meeting provides an opportunity to identify issues or topics that might be better addressed through smaller, targeted working group discussions and to solicit stakeholder feedback to consider in future modeling efforts.

### **AEO2022 model and policy updates**

We began the meeting by presenting an overview of the results from AEO2021. We then shared our proposed modeling enhancements for AEO2022, including:

- Revising the dispatch operating modes to account for net load
- Implementing renewable capacity credit foresight
- Developing a methodology for retiring or repowering wind and solar plants
- Analyzing solar diurnal capacity factors to improve the representation of capacity credits for solar
- Reexamining the solar inverter loading ratio
- Reevaluating the market-sharing algorithm for technologies with substantially non-overlapping duty cycles

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- Evaluating learning-based cost reductions for offshore wind with offshore oil drilling activity
- Implementing an algorithm to account for the declining capacity credit for storage as a result of increased market penetration

We next outlined changes to current laws and regulations for AEO2022, which include:

- Extension of the Production Tax Credit (PTC) and Investment Tax Credit (ITC) that Congress passed as part of the omnibus spending package in December 2020
- Updates to the Cross-State Air Pollution Rule (CSAPR), which includes updates to seasonal nitrogen oxides budgets for 12 states for 2021–2024
- Removal of the Affordable Clean Energy (ACE) rule from the model, as of January 2021

### **Longer-Term Model Enhancements**

We ended the presentation portion of the meeting by discussing some long-term model enhancements that we may implement in the future but will not be a part of AEO2022, including:

- Improving deep decarbonization scenario analysis by incorporating a hydrogen module to provide an option for seasonal storage and a carbon-free reliability fuel
- Allowing for a net negative carbon sink, which would make meeting net-zero targets easier while maintaining gross positive fossil fuel-fired generation for reliability and seasonal use
- Allowing for spinning reserves from non-fossil fuel generating units
- Using a more granular production cost model based on 8,760 hours to inform long-term model inputs, structures, and results

We told participants that the details surrounding these possible model enhancements have yet to be determined, and we are currently welcoming outside input for consideration.

We then opened the meeting up for questions and comments regarding updates we are considering for AEO2022 and beyond.

### **Discussion**

The discussion following the presentation focused on a number of more detailed topics.

Several participants asked us how we plan to model transmission in both AEO2022 and future *Annual Energy Outlooks*, namely with regard to transmission and distribution spending and how transmission will play into renewable development. We explained that transmission is one of the areas we are thinking about improving in the model as part of our long-term model development activities. The National Energy Modeling System (NEMS) currently has some transmission features, but they are not sufficient to address the issues raised by the participants.

Participants were also interested in how we are continuing to model storage technologies, specifically longer-duration batteries and hydrogen. We explained that a four-hour battery is currently modeled both as stand-alone storage and as dedicated storage paired with solar in the model. Currently, we do not plan to add a longer-duration battery into the model for AEO2022. In addition, we are currently

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developing a hydrogen submodule for the model, but this submodule will probably not be ready for us to incorporate into NEMS for AEO2022.

One participant inquired about including the 45Q tax extension. We noted that the 45Q extension will be included in AEO2022, even though it was not on the slide about updated current laws and regulations.

### **Attendees**

We hosted the working group meeting entirely online, and 70 people attended, including both EIA staff and external participants.

### Guests

<b>Name</b>	<b>Affiliation</b>
Justin Baca	Solar Energy Industry Association
Wesley Cole	National Renewable Energy Laboratory
Matt Crozat	Nuclear Energy institute
Thomas Dandres	Environment Canada
Michelle D'Angelo	Con Edison
Naveen Dasri	Rhodium Group
Jacob Dubbs-Stubblefield	Western Area Power Administration
Nelson Eng	Con Edison
Michael Freels	Oregon Department of Energy
Kathy Gramp	Congressional Budget Office
Whitney Herndon	Rhodium Group
Bryan Just	American Petroleum Institute
Serpil Kayin	U.S. Environmental Protection Agency
Lauren Khair	National Rural Electric Cooperative Association
Ben King	Rhodium Group
Jordan Kislear	U.S. Department of Energy
Hannah Kolus	Rhodium Group
Aaron Krupkin	Congressional Budget Office
Michael Leitman	National Rural Electric Cooperative Association
Yanghe Liu	Entergy
Cara Marcy	U.S. Environmental Protection Agency
Emily Medine	Energy Ventures Analysis
Jim Moore	Spire Energy
Karen Obenshain	Edison Electric Institute
Eric O'Rear	Rhodium Group
Hannah Pitt	Rhodium Group
Alfredo Rivera	Rhodium Group
Sharon Showalter	OnLocation
Norman Sproehnle	ISO New England
Ken Walsh	Leidos
Robin White	Environment Canada

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David White	Synapse Energy
Robert Wilson	Covanta
Frances Wood	OnLocation
Paul Zummo	Public Power

EIA staff attendees

**Name**

Lori Aniti  
Katherine Antonio  
Erin Boedecker  
Richard Bowers  
Kien Chau  
Matt Chester  
Jim Diefenderfer  
Kenneth Dubin  
Kathryn Dyl  
Mindi Farber-DeAnda  
David Fritsch  
Tyler Hodge  
Thaddeus Huetteman  
Kevin Jarzomski  
Scott Jell  
Ari Kahan  
Mala Kline  
Augustine Kwon  
Angelina LaRose  
Mary Lewis  
Perry Lindstrom  
Vikram Linga  
Laura Martin  
Kyle Morley  
Kevin Nakolan  
Chris Namovicz  
April Patel  
James Preciado  
Andri Rizhakov  
Syne Salem  
Courtney Sourmehi  
Manussawee Sukunta  
Edward Thomas  
Bonnie West  
Stephen York

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