

September 1, 2020

MEMORANDUM FOR: Angelina LaRose
Assistant Administrator for Energy Analysis

FROM: Jim Diefenderfer
Director, Office of Electricity, Coal, Nuclear, and Renewables Analysis

SUBJECT: Summary of AEO2021 Joint Electricity-Renewables Working Group Meeting held on August 6, 2020

The working group presentation summarized the results from the *Annual Energy Outlook 2020* (AEO2020) and discussed the expected data and modeling updates for AEO2021 in relation to both electricity and renewables. These updates are included in the presentation materials provided in a separate document on EIA's website.

Overview

AEO2021 will include the eight core side cases (High/Low Economic Growth, High/Low Oil Price, High/Low Oil and Gas Supply, and High/Low Renewables Cost), along with the Reference case.

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

Additionally, EIA is assessing the implications of the global disruption related to the COVID-19 pandemic. We highlighted the upcoming macro/industrial working group meeting and planning underway for EIA to host a series of workshops on the heightened uncertainty surrounding energy outlooks over the near- and long-term. Attendees were encouraged to contact EIA staff for an invitation to those meetings.

Model updates

EIA staff began the meeting by presenting an overview of the updates in AEO2020, including

- Comprehensive update to power-sector technologies capital costs
- Included State requirements for offshore wind
- Reintroduced the Low Renewables Cost and High Renewables Cost cases and adoption of those side cases into our annual set of core side cases that run with each AEO cycle
- Updated renewable portfolio standards

The meeting outlined possible updates for AEO2021, divided into three categories: projects either already completed or to be completed, possible projects, and long-term projects.

Some of the projects to be completed or already completed for AEO2021 include

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- Adopt a dynamic regional redefinition capability in the Electricity Market Module (EMM) but omit a new regional definition for AEO2021
- Include solar photovoltaic (PV) plus storage as an option for capacity expansion
- Update long-term resource multipliers for the new regions established in AEO2020 (We used proxy values during previous AEO cycle.)
- Implement revised landfill gas submodule
- Include small modular reactors (SMR) in utility-capacity expansion plans
- Treat distributed generation differently. (All building sector distributed generation will be dispatched within the EMM at capacity factors determined by the end-use models.)

Some possible projects for AEO2021 include:

- Determine an approach to decrement capacity credit for storage for high levels of storage penetration (This approach is one we will consider developing but will not likely implement for AEO2021.)

Some long-term projects that we will not complete for AEO2021 but we discussed to allow comment include:

- Revise methodology for transmission and distribution spending projections
- Add costal wind as a designated technology type (currently only represented as a regional difference in capital cost)
- Investigate utility integrated resource plans (IRPs) for potential use as a side case (EIA does not plan to change its precedent; *current laws and regulations* will remain the basis for Reference Case input assumptions.)

We also explained to participants that we have not determined the final details surrounding possible updates, and we are currently welcoming outside input for consideration.

We opened the presentation for questions and comments regarding the updates we are considering for AEO2021 and beyond.

Discussion

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

Several participants asked for clarification on the capital costs first used in AEO2020. One participant asked how the cost assumptions compare with the annual baseline published by the National Renewable Energy Laboratory (NREL), and another asked about the basis for the small-modular reactor capital costs. We provided a link to the most recent [capital cost study](#) commissioned by EIA. We explained that some of the capital costs used as inputs, such as for PV, are slightly lower than the 2019 NREL baseline but the fossil-fuel technology costs are fairly well aligned.

Attendees also expressed great interest in the brief discussion of the investigation EIA staff is undertaking to evaluate utility integrated resource plans in the context of decarbonization targets. Participants were interested in how EIA plans to incorporate the IRP targets into AEO2021 or future AEO cycles. We pointed out that we neither plan to integrate the existing utility IRPs research into the AEO2021 Reference case, nor do we plan to change our precedent. *Current laws and regulations* will

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remain the basis for input assumptions for the Reference case. We did add that the IRP research could lead to a future *Issues in Focus* article or another similar report, but we currently do not have a specific plan.

The last questions participants asked were about storage modeling. Participants were interested in whether EIA had considered other storage technologies beyond battery storage, specifically newer battery storage technologies the U.S. Department of Energy’s Energy Storage Grand Challenge is investigating. Other participants asked how EIA staff models battery storage arbitrage value. We currently model a four-hour battery storage technology for capacity expansion and dispatch and pumped hydroelectric storage for dispatch. Currently, we do not plan to add new storage technologies for AEO2021, but we constantly review emerging storage technologies for possible inclusion in future AEO cycles. Regarding modeling arbitrage value, we responded that battery storage will pick up the arbitrage value, such as when storing electricity generated by solar photovoltaic units as well as providing capacity value to the grid, but frequency response or other grid services are beyond the resolution of the model.

Attendees

The working group meeting was the first entirely online working group hosted by EIA, and 88 people attended, which includes EIA staff and external participants.

Guests

First Name	Last Name	Affiliation
Misha	Adamantiades	U.S. Environmental Protection Agency
Aqeel	Adenwala	Energy Ventures Analysis, Inc.
Jim	Ahlgrimm	U.S. Department of Energy
Brian	Atkins	Southern Company
Justin	Baca	Solar Energy Industries Association
Jose	Benitez	U.S. Department of Energy
Ann	Benso	Grenergy Renovables
Nate	Blair	National Renewable Energy Laboratory
Marc	Chupka	Energy Storage Association
Wesley	Cole	National Renewable Energy Laboratory
Leslie	Coleman	National Mining Association
Holley	Copeland	Southern Company
Paul	Donohoo-Vallett	U.S. Department of Energy
Diana	Friedman	U.S. International Trade Commission
Rachel	Goldstein	Solar Energy Industries Association
John	Hensley	American Wind Energy Association
Warren	Hess	Midcontinent Independent System Operator

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Jonathan	Ho	National Renewable Energy Laboratory
Aditya	Jayam Prabhakar	Midcontinent Independent System Operator
Rob	Jennings	Energy Ventures Analysis, Inc.
Tina	Kassrsberg	U.S. Department of Energy
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
Danielle	Koren	U.S. Department of Energy
Michael	Leitman	National Rural Electric Cooperative Association
Yanghe	Liu	Energy
Jennifer	Macedonia	JLM Environmental Consulting
Trieu	Mai	National Renewable Energy Laboratory
Cara	Marcy	U.S. Environmental Protection Agency
Nihal	Mohan	Midcontinent Independent System Operator
Jim	Moore	Spire Energy
Patricia	Mueller	U.S. International Trade Commission
Karthik	Munukutla	Midcontinent Independent System Operator
Karen	Obenshain	Edison Electric Institute
James	Okullo	Midcontinent Independent System Operator
Hannah	Pitt	Rhodium Group
Sandra	Sattler	Union of Concerned Scientists
David	Shin	American Petroleum Institute
Sharon	Showalter	On Location
Paul	Spitsen	U.S. Department of Energy
Tom	Stanton	National Regulatory Research Institute
Adam	Stern	American Wind Energy Association
Chen-Hao	Tsai	Midcontinent Independent System Operator
Boddu	Venkatesh	ICF
Celeste	Wanner	American Wind Energy Association
David	White	Synapse Energy
Tom	Wilson	Electric Power Research Institute
Frances	Wood	On Location
Bob	Woodfield	General Electric
Paul	Zummo	Public Power

EIA staff attendees

First Name	Last Name	Affiliation
Greg	Adams	U.S. Energy Information Administration
Lori	Aniti	U.S. Energy Information Administration
Lindsay	Aramayo	U.S. Energy Information Administration
Erin	Boedecker	U.S. Energy Information Administration

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Michelle	Bowman	U.S. Energy Information Administration
Kien	Chau	U.S. Energy Information Administration
Michael	Cole	U.S. Energy Information Administration
David	Daniels	U.S. Energy Information Administration
Jim	Diefenderfer	U.S. Energy Information Administration
Kenneth	Dubin	U.S. Energy Information Administration
Kathryn	Dyl	U.S. Energy Information Administration
Meera	Fickling	U.S. Energy Information Administration
David	Fritsch	U.S. Energy Information Administration
Tyler	Hodge	U.S. Energy Information Administration
Thaddeus	Huetteman	U.S. Energy Information Administration
Kevin	Jarzomski	U.S. Energy Information Administration
Scott	Jell	U.S. Energy Information Administration
Slade	Johnson	U.S. Energy Information Administration
Augustine	Kwon	U.S. Energy Information Administration
Angelina	LaRose	U.S. Energy Information Administration
Perry	Lindstrom	U.S. Energy Information Administration
Vikram	Linga	U.S. Energy Information Administration
Nilay	Manzagol	U.S. Energy Information Administration
Laura	Martin	U.S. Energy Information Administration
Fred	Mayes	U.S. Energy Information Administration
Mark	Morey	U.S. Energy Information Administration
Kevin	Nakolan	U.S. Energy Information Administration
Chris	Namovicz	U.S. Energy Information Administration
Andri	Rizhakov	U.S. Energy Information Administration
John	Staub	U.S. Energy Information Administration
Manussawee	Sukunta	U.S. Energy Information Administration
Edward	Thomas	U.S. Energy Information Administration
Bonnie	West	U.S. Energy Information Administration

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