Independent Statistics & Analysis

U.S. Energy Information Administration

October 21, 2021

MEMORANDUM FOR: Angelina LaRose

Assistant Administrator for Energy Analysis

FROM: Jim Diefenderfer

Director, Office of Long-Term Energy Modeling

SUBJECT: Summary of *Annual Energy Outlook 2022* (AEO2022) Working Group for Electricity, Coal, and Renewables held on September 21, 2021

The working group presentation summarized the preliminary results from the *Annual Energy Outlook 2022* (AEO2022) for electricity, coal, and renewables. The presentation materials included these updates and are available as a separate document on EIA.gov.

Overview

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

The second working group meeting was an opportunity for stakeholders to comment and provide feedback on the model development work we have done since the first working group meeting on May 27, 2021, and to comment on preliminary AEO2022 results.

Model updates

EIA staff summarized the model updates and enhancements for AEO2022 and shared some general preliminary results for AEO2022. We also outlined changes we made in the model to current laws and regulations that will be reflected in AEO2022, which include:

- Updated Oregon's and Delaware's renewable portfolio standards based on new state legislation
- Extended production tax credit (PTC) and investment tax credit (ITC) based on legislation passed in December 2020
- Removed the Affordable Clean Energy (ACE) rule
- Updated the Cross-State Air Pollution Rule (CSAPR)
- Removed Ohio's zero energy credit (ZEC) program for nuclear power plants

WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES ONLY.
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We then discussed our model updates and enhancements for AEO2022, which include:

- Improved market sharing algorithm by adjusting build decisions among competitive technologies within the Electricity Capacity Planning (ECP) submodule
- Revised operating modes that are available for baseload technologies to allow them to operate with more flexibility within a season and allow them to respond to changes in net load based on regional intermittent generation
- Implemented a new declining capacity credit algorithm for standalone storage
- Updated biomass supply curves and improved interaction between the supply curve and oil prices
- Updated solar inverter loading ratio (ILR) for standalone solar photovoltaic (PV) from 1.20 to 1.30 to align with the updated ILR implemented for hybrid PV included in AEO2021
- Enabled a mechanism to allow wind generators to be retired based on economics
- Reconciled U.S. coal exports with our International Coal Market Module (ICMM)
- Revised U.S. coal transportation rates based on our survey data from 2017 to 2019
- Updated Coal Market Module (CMM) base year to 2020 for coal supply

We concluded the presentation with a discussion on preliminary results for AEO2022, which include:

- Lower electricity demand following updates in the commercial sector as well as increased self-generation
- Higher capacity additions compared with AEO2021, at nearly 50 gigawatts (GW) more planned additions and nearly 38 GW unplanned additions
- More retirements from coal plants and older, less efficient natural gas plants than in AEO2021 because of lower projected electricity prices, lower electricity demand, and higher capacity additions for renewables
- Solar PV continues to account for the majority of renewables capacity additions, contributing to higher capacity additions of standalone energy storage than in AEO2021
- Less wind capacity additions than in AEO2021 , despite the PTC extension, as a result of competition from solar and natural gas
- Higher natural gas-fired generation in the near term but remaining near the same level over the longer term, as in AEO2021, despite lower natural gas prices

We informed participants that the results are still preliminary and the final AEO2022 is scheduled to be released in late January 2022.

In addition, we noted that we are actively tracking several pieces of legislation in the news related to electricity and coal, namely the Infrastructure Investment and Jobs Act and the Build Back Better Act (the reconciliation bill introduced in Congress in fall 2021). These proposed legislation packages include extensions and updates to both the PTC and ITC, as well as a new policy design, the Clean Electricity/Energy Payment Plan (CEPP). We are closely following the development of these proposals and assessing how to model them. The complexity of incorporating them into the model and the timing of the legislations' enactment will influence our approach for AEO2022.

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The meeting then opened for questions and comments about updates we are considering for AEO2022 and beyond.

Discussion

The discussion following the presentation was brief; participants asked only a few clarifying questions.

One participant asked about our efforts to model bi-facial solar PV to account for the increased efficiency of bi-facial panels compared with traditional silicone panels. We answered that the performance profile of bifacial panels (as measured by hourly or seasonal output profiles) doesn't differ enough from other PV technologies in the model to warrant separate representation. However, because it has higher overall conversion efficiency, its potential impact on electricity markets is already accounted for in the model through cost reductions for the existing PV technology.

Another participant pointed out that we did not mention the update to the Maryland renewable portfolio standard (RPS). We did not provide an answer during the meeting on this topic, but after review of the updated legislation, we confirmed that the Maryland RPS update included minor changes to the interim year targets and removed black liquor gasification biomass as a compliant technology. We do not include black liquor gasification as a potential technology for modeling, and the interim years for the Maryland RPS are non-binding for AEO2022. Although the wording of the policy has changed, no change would occur from a modeling perspective as a result of the updated legislation.

Finally, a participant asked if we model 8,760 hours in future years. We responded that the National Energy Modeling System (NEMS) does not model 8,760 hours in any year but models representative hours based on time of day (morning, midday, night) and season (winter, summer, spring, and fall). A few years ago, we also added a module to the EMM to evaluate renewable generation and battery storage based on a notional 24-hour by 12-month by 2-day structure.

Attendees

We hosted the working group meeting entirely online, and 55 people attended, including EIA staff and external participants.

Guests

Misha Adamantiades	U.S. Environmental Protection Agency
Justin Baca	Solar Energy Industries Association
Kelsey Bartz	American Clean Power Association
Michael Caravaggio	Electric Power Research Institute
Brendan Casey	American Clean Power Association
Wesley Cole	National Renewables Energy Laboratory
Hana Colwell	American Clean Power Association
John Hensley	American Clean Power Association
Lauren Khair	National Rural Electric Cooperative Association
Hannah Kolus	Rhodium Group
Trieu Mai	National Renewables Energy Laboratory
Cara Marcy	U.S. Environmental Protection Agency

Jim Moore	Spire Energy
Karen Obenshain	Edison Electric Institute
Aaron Pfeifer	Union Pacific
Paul Pierce	U.S. Geological Service
Sharon Showalter	OnLocation
Norman Sproehnle	ISO New England
Kirsten Verclas	National Association of State Energy Officials
Kenneth Walsh	Leidos
Frances Wood	OnLocation

EIA staff attendees

Greg Adams	Mary Lewis
Lori Aniti	Vikram Linga
Lindsay Aramayo	Nilay Manzagol
Erin Boedecker	Laura Martin
Richard Bowers	Elizabeth May
Kien Chau	Carolyn Moses
Jim Diefenderfer	Kevin Nakolan
Kathryn Dyl	Chris Namovicz
Mindi Farber-DeAnda	Albert Painter
David Fritsch	April Patel
Tyler Hodge	James Preciado
Thaddeus Huetteman	Syne Salem
Kevin Jarzomski	Andrew Smiddy
Scott Jell	Manussawee Sukunta
Slade Johnson	Edward Thomas
Mala Kline	Neil Wagner
Augustine Kwon	Stephen York