

June 19, 2018

**MEMORANDUM FOR:** Ian Mead  
Assistant Administrator for Energy Analysis

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

**SUBJECT:** Summary of AEO2018 Electricity Working Group Meeting held on May 9, 2018

This memorandum summarizes the presentation given during the first AEO2019 Electricity Working Group meeting and the resulting discussion that took place. The presentation materials are available in a separate document on EIA's website.

### **Background**

At the outset, EIA mentioned that AEO2019 will be a short AEO cycle and will include the 6 core side cases (High/Low Macro, High/Low Oil Price, High/Low Oil and Gas Resource and Technology cases), along with the Reference case.

EIA staff explained that the first working group meeting is being held earlier in the development cycle than in the past to discuss the results in the recently released AEO2018 and solicit stakeholder feedback for consideration in future modeling efforts earlier in the development process. The first set of working group meetings also provide an opportunity to identify issues or topics that might be more effectively addressed through smaller, targeted working group discussions.

Afterwards, a summary of AEO2018 results were presented and EIA staff addressing issues that had been raised in early coverage of the release:

- Inadequate reflection of coal generation at risk
- Shift in the composition of projected non-hydro renewables additions over the long term
- Turnaround in load growth between recent history and mid-term projections
- Virtually all renewables additions after the early 2020's are solar PV, rather than a balance of solar and wind

The meeting then proceeded with a discussion of the laws and regulations impacting AEO2019 before soliciting comments on future NEMS Electricity Market Module (EMM) modeling efforts.

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## **Model updates (AEO2019)**

A number of model updates will need to be considered to represent current laws and policies in the AEO2019 Reference case:

- Incorporating the impact of tax reform on the electric sector (the Tax Cuts and Jobs Act of 2017) as well as the Section 45Q tax credit for Carbon Capture and Storage
- Continue to monitor the status of any revised regulations associated with EPA's announced intention to replace the Clean Power Plan (CPP)
- Accounting for new regional-level programs, including California's recent extension of its carbon cap-and-trade program to 2030 (AB 398) as well as the Regional Greenhouse Gas Initiative
- Modeling state programs providing subsidies to non-emitting generation (zero emission credit) programs, including New Jersey's newly-approved Senate Bill 2313 law (signed by the governor on May 23, 2018) in addition to the Illinois and New York programs

In addition to updates in current laws and policies, the following updates are being considered for AEO2019:

- Incorporating results from the Sargent & Lundy on Generating Unit Annual Capital and Life Extension Costs for fossil generators
- Updating the method to identify generation-at-risk for purposes of supporting endogenous retirement projections
- Presenting results from alternative approaches to value electric generation system reliability/resilience characteristics approaches
- Updating new generator cost and performance characteristics; soliciting comments on which generating technologies to include for further analysis

The following modeling updates are also being considered for incorporation after AEO2019:

- Updating regional definition to account for the changes in the structures of the ISO/RTOs and regional power market developments
- Revisiting electric T&D spending projections to account for the potential long term cyclical pattern in electric system T&D spending
- Evaluating of the relationship between annual electric utility expenditure patterns and existing generator unit performance
- Assessing the capital cost and performance of new electric generating technologies

## **Discussion**

The discussion following the presentation focused on electricity demand, side cases, and technological representation in addition to a few other miscellaneous topics.

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### Electricity demand

EIA staff noted that electricity demand growth resumed after having declined in recent history and was asked why load would start to grow again when we've seen flat demand in recent years. EIA staff responded that under current laws and regulations, existing energy efficiency standards are reflected for the residential and commercial sector so demand for electricity will overtake the impact of those standards over time. The composition of the industrial sector is changing over time and will be more reliant on electricity. Industries that use a lot of electricity, such as metal-based durables, are expanding more quickly than other energy-intensive industries.

As a follow-up question, EIA staff was asked if the industrial sector driving load growth is consistent with the growth in renewable builds. EIA staff responded that the model doesn't build specific technologies to meet specific demand uses. Rather, it takes into account the load shape and builds a mix of technologies to best meet overall demand.

### Alternative side cases

One participant mentioned that it would be interesting to see some high and low demand side cases that are not driven by macroeconomic conditions (*i.e.*, high demand driven by electric vehicles or low demand driven by increased energy efficiency). EIA responded that a number of different policy cases would be coming out shortly in the AEO2018 Issues in Focus article, entitled *Alternative Policies in Power Generation and Energy Demand Markets* (which was subsequently released on May 14, 2018).

### Technology representation in NEMS

Another participant asked if coal with 90% Carbon Capture and Sequestration (CCS) was the only generating technology with CCS modeled in AEO2018 and pointed out that DOE's Office of Fossil Energy has done an analysis on the 45Q CCS credit that they will forward for EIA review. EIA staff responded that for AEO2018 EMM still modeled coal with both 30% and 90% CCS, both of which would satisfy EPA's New Source Performance Standard for CO<sub>2</sub> emissions from coal steam electric generating units, which EPA has under review.

### Additional topics

A participant queried whether EIA had considered non-regulatory driven demand for renewables or whether there were other reasons for developing PV. EIA staff responded that the decision to add renewable capacity is modeled in EMM as an economic decision and the companies are mainly doing it to save money, but staff noted that the new residential PV model incorporates factors beyond just economics.

Another participant noted that if EIA is modeling the contribution to reliability and resilience of generating technologies out to 2050, then EMM would need to reflect the prospect for innovation and technology change for different generation types through 2050. Technologies that are unable to contribute to certain attributes now, may be able to in the future, with which EIA agreed.

One participant asked whether EMM models a learning curve adjustment for heat rates. EIA responded that EMM reflects a heat rate cost adjustment for new plants which declines over time, so later builds are more efficient than current builds, as described in the Assumptions document.

Finally, one last participant asked whether there is background information on battery storage available in AEO2018. EIA noted that it would be releasing a report on battery storage shortly (subsequently published on May 21, 2018).

## **Attendees**

### Guests (in person)

| <b>Name</b>          | <b>Affiliation</b>              |
|----------------------|---------------------------------|
| Mikhail Adamantiades | Environmental Protection Agency |
| Paul Donohoo-Vallett | U.S. Department of Energy       |
| Sarah Forbes         | U.S. Department of Energy       |
| Ronald Hagen         | U.S. Department of Energy       |
| Paul Spitsen         | U.S. Department of Energy       |

### Guests (WebEx/phone)

| <b>Name</b>       | <b>Affiliation</b>                              |
|-------------------|---|
| Justin Baca       | Solar Energy Industries Association             |
| Mark C Bowles     | Entergy   |
| Kikelomo Buari    | Southern Company                                |
| Wesley Cole       | National Renewable Energy Laboratory            |
| Leslie Coleman    | National Mining Association                     |
| Whitney Herndon   | Rhodium Group                                   |
| Lauren Khair      | National Rural Electric Cooperative Association |
| Michael Leff      | Con Edison                                      |
| Britny Lockridge  | Southern Company                                |
| Jim Moore         | Spire   |
| Jay Ratafia-Brown | Leidos  |
| Jorge Reyes       | NJ Department of Environmental Protection       |
| Sandra Sattler    | Union of Concerned Scientists                   |
| Robert Schmitt    | U.S. Department Of Energy                       |
| Sharon Showalter  | OnLocation Inc.                                 |
| Alexander Smith   | Federal Energy Regulatory Commission            |
| Bill Stevens      |   |
| Mark Strohfus     | greenergy                                       |
| Lynsey Tibbs      | Southern Company                                |
| Chen-Hao Tsai     | Midcontinent Independent System Operator        |
| Kenneth Walsh     | Leidos  |
| David White       | Synapse   |
| Evelyn Wright     | Sustainable Energy Economics                    |

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EIA Staff (in person)

| <b>Name</b>          | <b>Affiliation</b>                     |
|----------------------|--|
| Greg Adams           | U.S. Energy Information Administration |
| Erin Boedecker       | U.S. Energy Information Administration |
| Michelle Bowman      | U.S. Energy Information Administration |
| John Conti           | U.S. Energy Information Administration |
| Jim Diefenderfer     | U.S. Energy Information Administration |
| Kenneth Dubin        | U.S. Energy Information Administration |
| David Fritsch        | U.S. Energy Information Administration |
| Marta Gospodarczyk   | U.S. Energy Information Administration |
| Elias Johnson        | U.S. Energy Information Administration |
| Jeffrey Jones        | U.S. Energy Information Administration |
| Augustine Kwon       | U.S. Energy Information Administration |
| Perry Lindstrom      | U.S. Energy Information Administration |
| Cara Marcy           | U.S. Energy Information Administration |
| Laura Martin         | U.S. Energy Information Administration |
| Ian Mead             | U.S. Energy Information Administration |
| Christopher Namovicz | U.S. Energy Information Administration |
| Shirley Neff         | U.S. Energy Information Administration |
| Michael Scott        | U.S. Energy Information Administration |
| Manussawee Sukunta   | U.S. Energy Information Administration |

EIA Staff (WebEx/phone)

| <b>Name</b>    | <b>Affiliation</b>                     |
|----------------|--|
| Lori Aniti     | U.S. Energy Information Administration |
| David Daniels  | U.S. Energy Information Administration |
| Tyler Hodge    | U.S. Energy Information Administration |
| April Lee      | U.S. Energy Information Administration |
| Nilay Manzagol | U.S. Energy Information Administration |

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