

June 10, 2016

**MEMORANDUM FOR:** John Conti  
Assistant Administrator for Energy Analysis

Paul Holtberg  
Team Leader, Analysis Integration Team

James Turnure  
Director, Office of Energy Consumption & Efficiency Analysis

**FROM:** Buildings Consumption & Efficiency Analysis Team

**Subject:** Second *AEO2016* Buildings Sector Working Group Meeting  
Summary, workshop held on February 18, 2016

**Presenter:** Kevin Jarzowski

**Attendees:** 25 in person; 15 by phone or WebEx; full list at end

The buildings presentation provided a discussion of initial *AEO2016* model results and projections. Topics presented included the 2012 Commercial Building Energy Survey (CBECS) data release schedule; how building energy use may be affected by the Clean Power Plan (CPP), new federal (DOE) equipment standards and ENERGY STAR specifications; an expectation of lower electricity and natural gas prices; the substitution of non-proprietary commercial sector floor space outputs from the Macroeconomic Activity Module (MAM); and modeling costs and tax incentives for distributed generation. The presentation materials are provided as a separate attachment.

Discussion/questions:

1. **Clean Power Plan:** A participant asked if the CPP would be in *AEO2016*. EIA response: The CPP will be in the Reference case. A set of side cases, including a “no-CPP” case, will also be available. Results shared at this working group meeting do not reflect frozen runs or cases.
2. **Energy Efficiency (EE) Incentives and Rebates:** The effects of the CPP on building energy use will reflect utility rebates and incentives customers receive to purchase equipment that is more efficient. Incentives are modeled at the Census division level. Because EIA assumes incentive costs are passed on to customers, they are associated with higher electricity prices.
  - Question: Does EIA plan to move beyond using rebates to model EE investments? EIA response: We are working to include additional details. EIA plans to include the effects of state-level Energy Efficiency Portfolio Standards – akin to Renewable Portfolio Standards in the Electricity Market Module (EMM) – but not in time for the *AEO2016*.
  - Question: How can EIA show greater efficiency in buildings if it is already included in the Reference case? Response: EIA puts EE costs with transmission and distribution costs, rather than as part of electric rates, and allows additional EE to balance against other CPP compliance options (more natural gas, renewables, etc.).

3. **Investment time scale:** Question: what time scale does EIA use for EE investments?  
Response: EE investments may reflect a “lumpy capital” issue. The CPP compliance period extends to 2030. NEMS results are aggregated to nine Census regions. There may be investments that produce more efficiency gains at sub-Census-division levels than appear in gains at the aggregated division level.
4. **Distributed generation (DG) and solar photovoltaics (PV):** The recently extended federal investment tax credit (ITC), after a ramp-down phase, stays at 10% for commercial installations through 2040. Growth projections are based on historical (exogenous, not modeled) capacity additions.
- Question: Are PV modules or balance of system costs given higher weight in total cost projections? EIA response: Capital costs for modules from 2015 to 2025 are a larger share of costs.
  - Question: Which sectors are included in the DG learning function, particularly for PV costs? EIA response: That function is for costs for residential, commercial, and utility-scale PV. The model uses the lower of exogenous and learning costs.
  - Question: Is the PV load-shape passed to the EMM, and if so, how?  
EIA response: DG output is subtracted from purchased energy (for space cooling and “miscellaneous” uses in the residential sector, plus ventilation and lighting in the commercial sector), using annual averages. The net results are sent to the EMM, which has the responsibility for the load shape. The building sector does not produce load curves.
5. **Solar financing:** Question: Do EIA models reflect alternative PV financing methods, such as leasing or third-party ownership? Response: We looked at these, but made no decision on whether they were widespread enough to include. These alternatives can inform NEMS. A participant said DOE’s SunShot Catalyst is looking at this topic.
6. **Equipment standards:** Question: Do new DOE standards affect projections for electricity or natural gas consumption? Response: There are many more new standards for residential and commercial equipment that use electricity. They contribute to lower projections for residential and commercial electricity use in *AEO2016* than in *AEO2015*.
7. **Commercial floor space:** Commercial floorspace grows at a higher annual rate (1.1%) in *AEO2016* than in past Outlooks (1.0%), which could drive increased electricity use. But flatter projected natural gas prices may produce some shifts from natural gas to electrical equipment. Commercial sector natural gas prices are forecast to be 22% lower by 2040 in *AEO2016* than in *AEO2015*; we benchmark data to STEO through 2016. Because EIA removed proprietary floorspace data from the MAM, public data users will not need to purchase additional data to run NEMS.
8. **Summary:** Overall, few criticisms of our current modeling efforts. There was a sense of requests for the development of additional model capabilities based on some of the points above, including development of an updated demand curve that reflects increases in PV and EE. Participants would like to see higher levels of energy efficiency represented, beyond what can be achieved by utility rebates and incentives alone.

**Attending in person:** John Agan (DOE EPSA)  
Aaron Bergman (DOE - EPSA)  
James (Chip) Berry (EIA OES)  
Austin Brown (DOE – OSTI)  
Owen Comstock (EIA OEA)  
Edgardo Cureg (EIA OES)  
David Daniels (EIA OEA)  
Elke Hodson (DOE)  
Paul Holtberg (EIA OEA)  
Ruey-Pyng Lu (EIA OES)  
Bill McNary (EIA OES)  
Jack Mayernik (DOE EERE)  
Joelle Michaels (EIA OES)  
Vasyl Mytsak (EIA OES)  
Jay Olsen (EIA OES)  
Kelly Perl (EIA OEA)  
Amir Roth (DOE EERE)  
Ben Stravinsky (Energy Ventures Analysis)  
Jim Turnure (EIA OEA)  
Jenah Zweig (DOE EPSA)

**Attending by WebEx/Phone:**

Mark Ames (ASHRAE)  
Justin Baca (SEIA)  
Edward Barbour (Navigant Consulting)  
Alan Cooke (PNNL)  
Kenneth Dubin (OnLocation)  
Andrew Feierman (IMT - Institute for Market Transformation)  
Mark Friedrichs (DOE EERE)  
Hilary G. Grimes-Casey (Leidos)  
Patrick Luckow (Synapse)  
Shawn Rumery (SEIA)  
Elizabeth Titus (NEEP)  
Grace Vermeer (M.J. Bradley)  
Frances Wood (OnLocation)  
David White (Synapse)  
Evelyn Wright (Sustainable Energy Economics)

**EIA Buildings Team Attendees:**

Behjat Hojjati  
Kevin Jarzomski  
Kimberly Klaiman  
David Peterson  
Carol Brotman White