

December 19, 2016

MEMORANDUM FOR: Ian Mead
Assistant Administrator for Energy Analysis

James Turnure
Director, Office of Energy Consumption & Efficiency Analysis

FROM: Buildings Consumption & Efficiency Analysis Team

Subject: First *AEO2017* Buildings Sector Working Group Meeting Summary, workshop held on August 30, 2016

Presenter: Kevin Jarzowski

Attendees: 12 in person; 7 by phone or WebEx; full list at end

The buildings presentation provided a discussion of the updates underway and anticipated for *AEO2017*. Topics presented included *AEO2017* content and schedule; extension of projections to 2050; incorporation of the 2012 Commercial Building Energy Survey (CBECS); alternate modeling methodology for residential solar photovoltaic (PV) penetration; updates to federal (DOE) equipment standards, end-use technology characterizations, and historical estimates; and energy efficiency program assumptions for the Clean Power Plan (CPP). The presentation materials are provided as a separate attachment.

Discussion/questions:

- 1. Clean Power Plan:** EIA models energy efficiency program incentives through regional rebates for major end-use equipment and residential shell efficiency measures. Costs and savings are calculated relative to a baseline case without CPP and provided to the power sector to use in compliance and price calculations.
 - Question: Will the CPP be in the *AEO2017* Reference case, even with the court stay in place? EIA response: The CPP will be in the Reference case.
 - Question: What assumptions are being used for administrative costs? EIA response: Administrative costs are assumed to add 50% to the cost of providing incentives. This assumption is based on EIA-861 survey data reporting of “other” costs for energy efficiency programs.
- 2. Energy Efficiency (EE) Incentives and Rebates for Current EE Programs:** EIA plans to include rebates and incentives customers receive to purchase equipment that is more efficient as part of current EE programs. Incentives are modeled at the Census division level. Behavior parameters will be adjusted to achieve end-use consumption similar to what is currently in the Reference case without rebates for current EE programs.
 - Question: How does EIA capture the effects of demand response and other programs? EIA response: Any effects of demand response or similar programs are only included

implicitly if impacts are reflected in the end-use survey data and in historical annual consumption data.

3. **2012 CBECS:** Question: Did the AEO2015 to AEO2016 change in the way commercial floorspace growth is calculated affect the projections for the year 2012; could this account for some of the differences in floorspace projections for 2012 using 2003 CBECS and floorspace estimates from the 2012 CBECS? EIA response: The commercial growth rate being calculated is the same. In AEO2015 and before, the Commercial Demand Module obtained floorspace levels from the Macroeconomic Activity Module (MAM) by MAM building type and Census division and calculated growth in the commercial module. Now, the commercial module obtains the growth rate by MAM building type and Census division directly from the MAM.

- Question: Did the low level of heating degree days (HDD) in 2012 affect the 2012 CBECS estimates and the projections based on those estimates? EIA response: The model looks at the differences between base year (i.e., CBECS year) weather and weather for the current projection year and adjusts heating and cooling requirements based on those differences.

4. **Distributed generation (DG) and solar photovoltaics (PV):** Penetration of residential solar PV capacity is now based on an econometric penetration model with logit function coefficients and ZIP code-level data rather than the niche/payback model used in previous AEOs.

- Question: Will EIA compare the alternative PV method with those built by others, for example NREL? EIA response: EIA will compare the new PV method with other methods and hopes to complete an analytic report on this topic.

- Question: How does EIA model the “construction start” provision of the solar investment tax credit? EIA response: EIA currently assumes construction/installation of distributed PV systems can be completed within the year. Installations completed after the years stated in the legislation are not considered eligible for the tax credit.

-Follow-up comment: Allowing an extension of a year or maybe two would better reflect what will actually occur given the “construction start” provision. Look at 1603 grants for an example of how this has occurred. EIA response: EIA will take a look and evaluate whether the assumption should be modified for the next AEO.

5. **Technology menus:** Question: What is meant by commercial ventilation? EIA response: EIA includes the air distribution system in the commercial ventilation category.

- Question: How often are technology menus updated?

EIA response: We typically update technology characteristics every three years. Not all major end-uses are updated at the same time. AEO2017 includes updates for residential and commercial lighting, commercial ventilation and commercial refrigeration. A participant said three years is more than enough for heating, ventilation and air conditioning. Some technologies like lighting may need to change more often. EIA attendees stated that we look at LED pricing every year and hope to subscribe to a service that tracks LED pricing.

6. Equipment standards and building codes:

- Question: What is the cutoff for representing new DOE standards in the projections?

EIA response: Standards that are finalized before we put “pens down” for the Reference case are included. Often “pens down” occurs in mid- to late-September.

- Question: Are building codes represented at the Census division level?

EIA Response: Residential building codes are represented at the Census division level; commercial building codes are more general. However, shell indices for new construction vs. existing commercial building stock are developed at the Census division level. This means that although commercial shell improvement occurs at the same rate nation-wide, the shell integrity of the building stock in the base year varies by Census division and building type.

- Question: Does EIA do any projections regarding LEED?

EIA Response: We do not model LEED characteristics at this time. As time and information allow, we will continue to consider the option of including LEED.

7. Extension to 2050: Question: Are climate considerations included in the extension to 2050?

EIA response: EIA will continue to use the same methodology as in recent AEOs for projecting weather. We use a historical trend based on the last 30 years of heating and cooling degree days data from the National Oceanic and Atmospheric Administration (NOAA). State level projections are developed using the trend for population-weighted degree days and aggregated to Census division level using projected state-level population to capture population shifts within Census divisions.

8. Summary: Overall, few criticisms of our current modeling efforts. Participants also discussed the difficulty in aligning integrated models with end-use modeling and DOE Building Technologies Office interest in looking at the strengths and weaknesses of adoption and uptake models. All are interested in following our progress in modeling energy efficiency programs.

Attending in person: Owen Comstock (EIA OEA)
David Daniels (EIA OEA)
Tyler Hodge (EIA OEA)
Cara Marcy (EIA OEA)
Jack Mayernik (DOE EERE)
Amir Roth (DOE EERE)
Manussawee Sukunta (EIA OEA)

Attending by WebEx/Phone: Justin Baca (SEIA)
Kenneth Dubin (OnLocation)
Andrew Feierman (IMT - Institute for Market Transformation)
Etan Gumerman (Nicholas Institute-Duke University)
Carolyn Goldthwaite (NEEP)
Andrew Nicholls (PNNL)
Rachel Wilson (Synapse)

EIA Buildings Team Attendees: Erin Boedecker
Behjat Hojjati
Kevin Jarzomski
Kimberly Klaiman
David Peterson