AEO Buildings Working Group Meeting Notes – December 8, 2015

The first Buildings Working Group meeting for AEO 2016, hosted by Erin Boedecker of EIA, was held on the afternoon on December 8, 2015. The purpose of this first meeting was to present the assumptions and changes for AEO 2016. The next meeting will present the results from a stable set of runs. Some of the key items discussed were:

Modeling Scope – AEO 2016 will be a full version (like AEO 2014) with many side case alternatives considered—"but still somewhat limited compared with previous releases." There will be no early release of the Reference case. The buildings model calculates annual end-use energy consumption on a census region level that is then transformed by other NEMS model elements to more detailed loads as needed by the electricity module.

Federal Standards – The assumptions will be updated to reflect the most recent federal standards. For equipment standards these are: general service fluorescent lamps, commercial ice makers, commercial oil-fired water heaters, commercial packaged air conditioners and heat pumps, and commercial clothes washers. Energy Star standards will include: televisions/displays, set-top boxes, dehumidifiers. Improved motor standards will be reflected in the equipment that uses them.

Building Codes – States are assumed to meet goals defined in ARRA, and then continue trends in code adoption. However, as of June 2015, 11 states had no commercial building codes and 14 had not upgraded to IECC 2009.

Clean Power Plan (CPP) – A previous analysis of the proposed CPP was done on AEO 2015. The final CPP rule is different in a number of ways from the proposed one. The CPP will be included in the AEO 2016 Reference case. There will be modeling of major end-use equipment and residential shell rebates to represent utility programs. Costs for this will be then passed on to the electricity module. AEO 2016 will include additional rebate modeling capability for distributed generation and combined heat and power (CHP) to align with the final CPP rulemaking.

Tax Credits – Will represent the 2016 expiration of investment tax credits for solar PV etc., unless changed by Congress in a timely fashion.

End Use Technology – Major updates for residential and commercial lighting, and commercial ventilation and refrigeration. Updating residential fuel/technology switching costs. Residential equipment updates based on historical shipments.

Commercial Buildings – New floorspace modeling methodology no longer using proprietary data. Only minor differences are expected. 2012 Commercial Building Energy Consumption Survey (CBECS) data not ready for this AEO, likely in the next one. Inputs will continue to be based on the 2003 CBECS data. EIA has typically used hurdle rates in the Commercial Demand Module supplied by Johnson Controls. These are no longer available and EIA is requesting input on new data sources.

Distributed Generation – Cost performance updates for PV in alignment with "Tracking the Sun VIII." Will use the latest Leidos draft PV cost estimates, which are a bit lower. Also update CHP cost and performance data, but they do not decline so much. Considering alternative modeling approach for residential solar PV penetration at a more geographically detailed level. This alternative approach would consist of an econometric penetration model with a logit function, at the zip code level. The current

payback model with focused solar "niche" markets operates very similarly to NREL's SolarDS—this new approach would be a departure from that. The approach of choice for AEO is still to be determined. Interconnection limitations based on DSIRE and other sources which relax over time.

Other Updates – Historical fuel consumption based on MER and STEO. Also updates on weather data and projections, distributed generation capacity, CHP generation. Will also look at commercial hurdle rates.

Comments or Suggestions Sought – "Other" electricity use. Water heater interactions with clothes and dish washers. Costs of energy efficiency programs. Building code compliance.

We see the following as current priority issues:

- **CPP Implementation:** A major change is the representation of some utility EE programs as part of the evaluation of the CPP. How this is done will have a major effect on the results going forward. The chosen implementation should properly account for CEIP credits.
- **Other Electricity Use –** This has been a big catchall in the buildings sector and it would be useful to have a better understanding of that this represents.

We plan to follow up on these issues with EIA. Please send us any question, comments or suggestions you have at this stage of the AEO 2016 development process.

David White & Patrick Luckow, Synapse Energy Economics, 12/9/15.