

Buildings Working Group Meeting

AEO2016 Model Updates



Office of Energy Consumption and Efficiency Analysis

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By

Buildings Energy Analysis Team

Overview

- AEO release: this year versus last
- Federal standards and ENERGY STAR specifications
- Energy efficiency and distributed generation
- End-use technology characterizations
- Commercial floorspace and CBECS
- Annual updates
- Discussion

AEO2016 release will include more than *AEO2015*, but still somewhat limited compared with previous releases

- Multiple side cases
- More features and analysis
 - Issues In Focus, Legislation & Regulations
- Updated model documentation
- No early release of Reference case

Policy assumptions – equipment

- Federal equipment standards
 - DOE rulemakings from this year to be incorporated
 - general service fluorescent lamps
 - commercial ice makers
 - commercial oil-fired water heaters
 - commercial packaged air conditioners and heat pumps
 - commercial clothes washers
- ENERGY STAR specifications
 - televisions/ displays, set-top boxes, computer monitors, and dehumidifiers.

Policy assumptions –building codes

- States assumed to meet goals defined in ARRA, then continue trends in code adoption
 - Residential: IECC 2009 or better by 2017
 - Commercial: ASHRAE 90.1-2007 or better by 2016; ASHRAE 90.1-2013 or better by 2024

Policy assumptions – Clean Power Plan (CPP)

- Changes first incorporated for EIA's [Analysis of the Impacts of the Clean Power Plan](#), focusing on the preliminary EPA rule for existing power plants
- Modeling of major end-use equipment and residential shell rebates by Census division to represent utility programs
 - Equipment rebates and estimated utility program administrative costs sent to Electricity Market Module of National Energy Modeling System (NEMS)
- *AEO2016* will include additional rebate modeling capability for distributed generation and combined heat and power (CHP) technologies to align with final CPP rulemaking

Policy assumptions – tax credits

- Tax credits
 - Includes American Taxpayer Relief Act of 2012 enacted January 2013
 - extends residential equipment and envelope credits for 2013
 - only manufacturer credits included for 2012 – credits had expired at the end of 2011
 - 2016 expiration of investment tax credit for solar PV, small wind, fuel cells, geothermal heat pumps, solar water heaters
 - EPACT 2005, EIEA: 30% of cost with no upper limit (except fuel cells)
 - commercial solar tax credit reverts to 10% after 2016
 - 2016 expiration of investment tax credit for microturbines, CHP
 - EPACT 2005 (microturbines only), EIEA : 10% of installed cost

End-use technology characterizations and other contractor data

- Major end-use technology menu updates
 - Residential and commercial lighting
 - Commercial ventilation and refrigeration
- Residential fuel/ technology switching costs
 - Costs associated with switching fuels and/or equipment types for space heating, cooling, water heating, cooking, and clothes dryers
 - Includes costs in addition to the equipment itself, such as ductwork, piping, exhaust, other installation and removal costs associated with fuel switching
- Residential efficiency of equipment stock
 - Historical shipment data for residential equipment, segmented by efficiency range (i.e., shares of ENERGY STAR and non-ENERGY STAR equipment)

Commercial buildings

- New floorspace modeling
 - Macroeconomic Activity Module (MAM) no longer outputs proprietary McGraw-Hill new commercial floorspace for use by Commercial Demand Module (CDM) and Natural Gas Transmission and Distribution Module (NGTDM)
 - CDM now uses annual floorspace growth rates from MAM, and NGTDM uses CDM floorspace
 - MAM now produces growth rate projections based 1970 through 2019, which yields different mix of commercial floorspace from previous AEOs
- 2012 Commercial Building Energy Consumption Survey (CBECS)
 - The 2012 CBECS will NOT be included in the *AEO2016* because consumption and expenditure public use microdata will not be available until February 2016 at the earliest

Distributed generation technology characterization, alternative modeling options, and interconnection limitations

- Cost/performance updates
 - PV costs align with *Tracking the Sun VIII* for 2015 installations
 - draft report from Leidos for projected cost and performance – still a work in progress, but PV cost declines do not “level off” as much/as soon as in past AEOs
 - draft report also includes combined heat and power cost and performance
- Alternate modeling option for residential solar PV capacity penetration
 - econometric penetration model with logit function coefficients and ZIP code-level data instead of niche/ payback model oriented more toward customer-owned systems
 - currently investigating benefits/issues for both options
- Interconnection limitations based on Database of State Incentives for Renewables & Efficiency (DSIRE) and other sources

Annual updates

- Sectoral historical energy consumption by fuel
 - Monthly Energy Review
 - STEO
- Usual historical annual updates
 - weather data and projections
 - distributed generation capacity
 - combined heat and power generation
- Annual review/updates
 - annual “look” at commercial hurdle rates

Comments/Discussion

- Comments or suggestions for *AEO2016*
 - thoughts on growth of “other” electricity use (high, low, approach?)
 - references/research on approaches to incorporating water heating interactions for residential clothes washers and dishwashers
 - references/research – comprehensive look at energy impacts and costs of energy efficiency programs
 - references/research on building code compliance
- General comments or suggestions

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