NEMS Buildings Sector Working Group Meeting

AEO2013 Preliminary Results

Erin Boedecker
Owen Comstock
Behjat Hojjati
Kevin Jarzomski
David Peterson
Steve Wade

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WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES
DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE

Overview

- Recap of project list presented at last working group meeting
- AEO2013 and AEO2012 comparison
  - Sector growth
  - Energy prices
  - Heating and cooling degree days
- Residential sector results
- Commercial sector results
- Distributed generation

Recap from last working group meeting

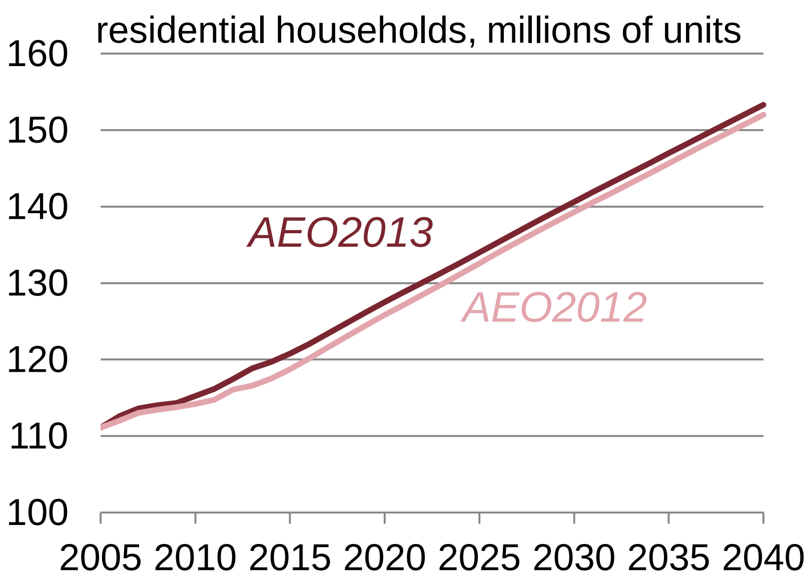
- Buildings projects
  - Revised long-term weather assumptions
  - SEDS 2010 and AER 2011 calibration
  - Annual updates (weather, historical generation and capacity for distributed generation, interconnection limitations, etc.)
  - Photovoltaic cost path
- Residential projects
  - Begin to incorporate RECS 2009 data
    - End-use consumption data still not available
  - Input file restructuring
  - Lighting submodule and technology update
  - Equipment retirement methodology
  - Housing decay rates

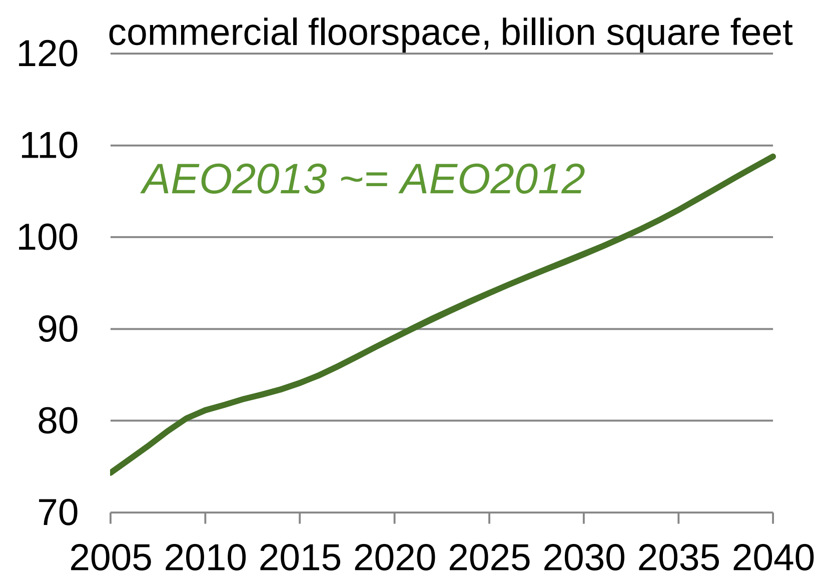
Recap, continued

- Commercial projects
  - Technology update for lighting, ventilation, and refrigeration equipment
  - Input file restructuring
  - Update hurdle rate distribution
  - Data center consumption

Main drivers

Little change in sector growth





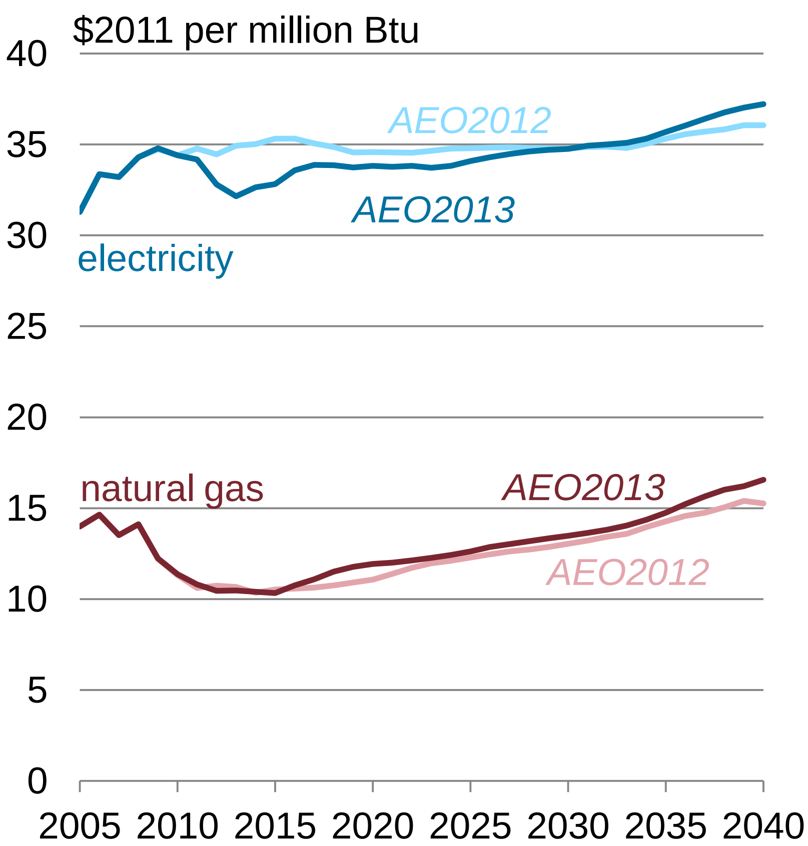
Real disposable personal income down 3% by 2040 relative to *AEO2012*

Residential growth in both single-family and multifamily housing

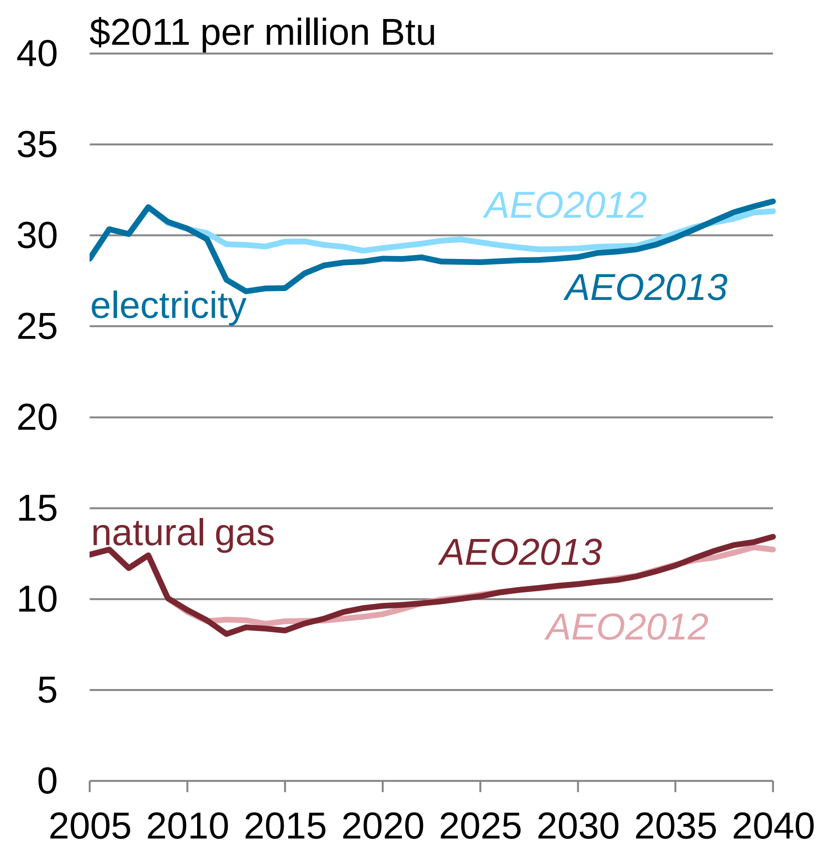
Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Electric prices slightly lower



Residential

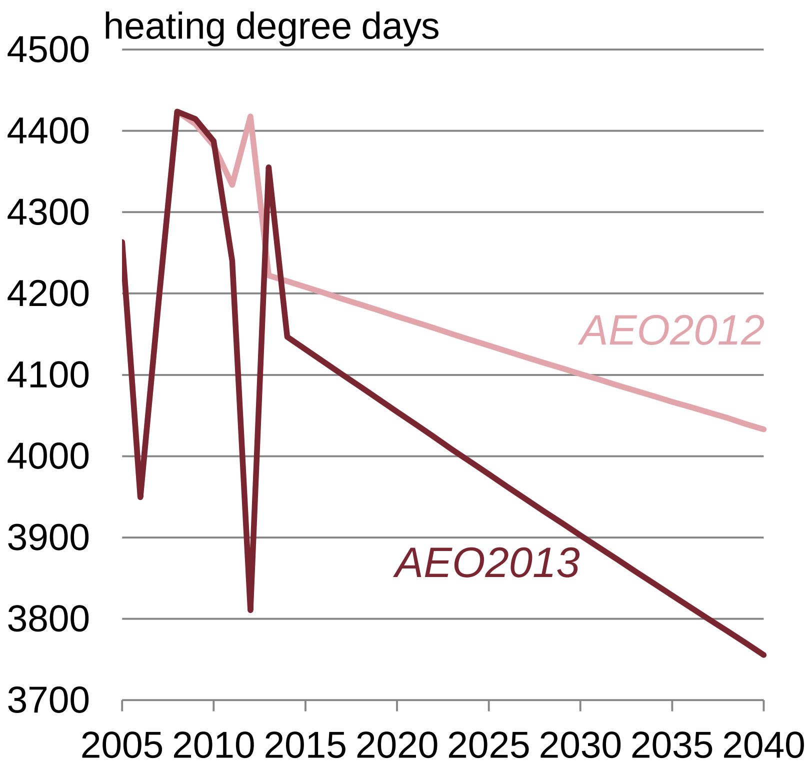


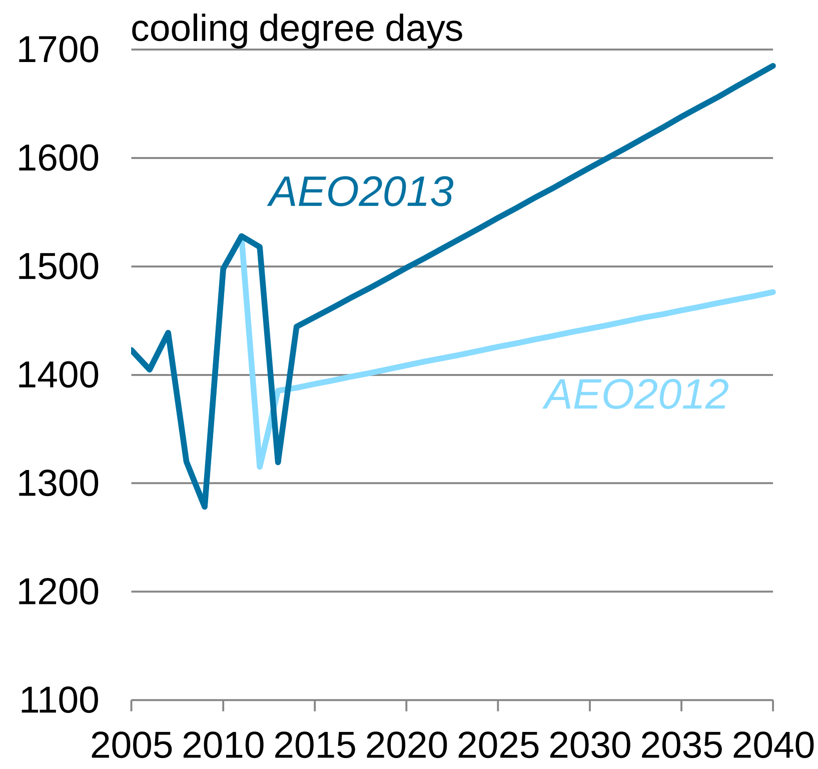
Commercial

Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Less heating, more cooling than *AEO2012*





2005 – 2011 = history

2012 – 2013 = recent estimates of history + NOAA near-term forecast

2014 – beyond = EIA forecast using 30-year linear trend

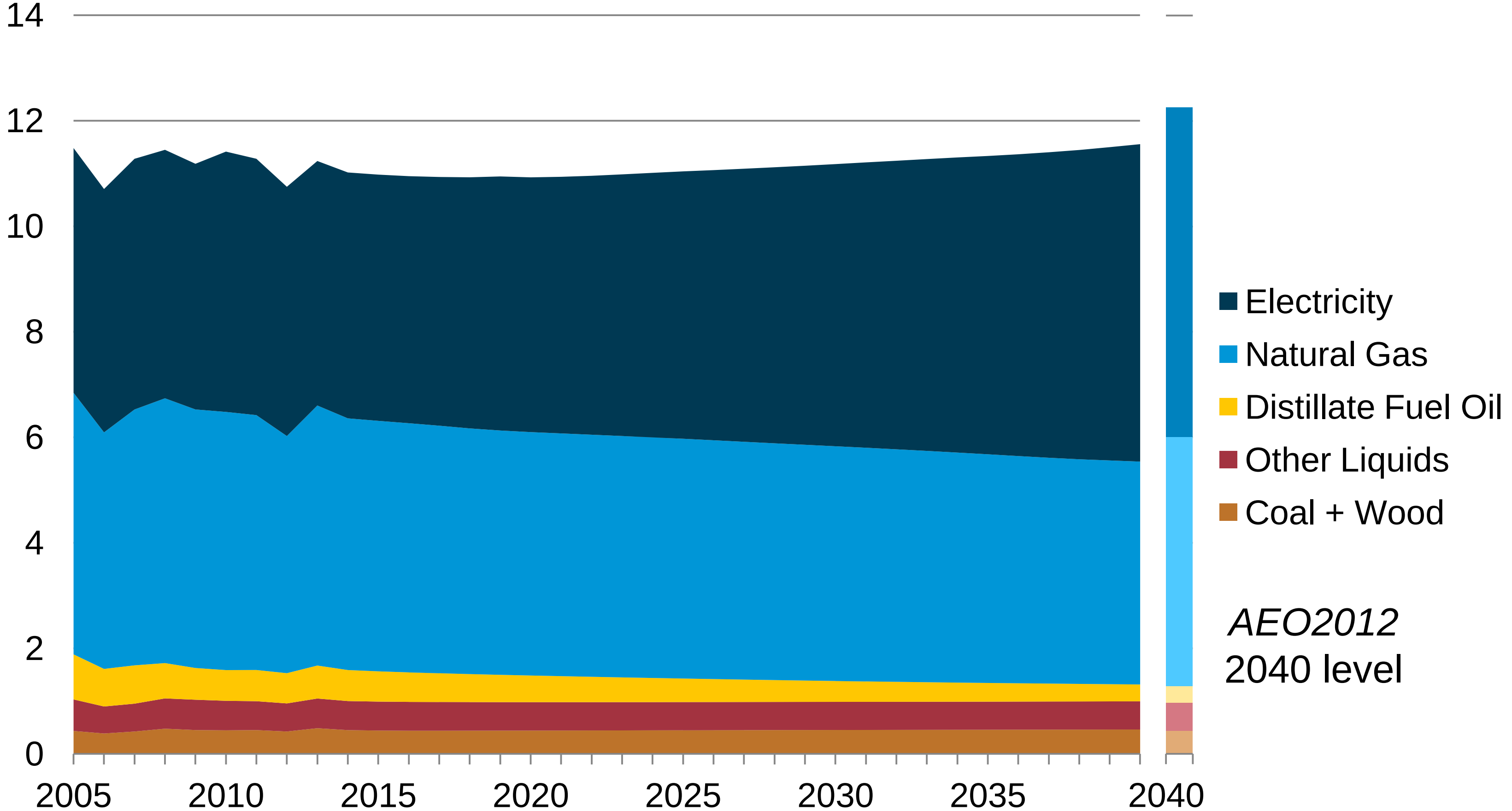
Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Residential results

Residential consumption lower, shares fairly stable

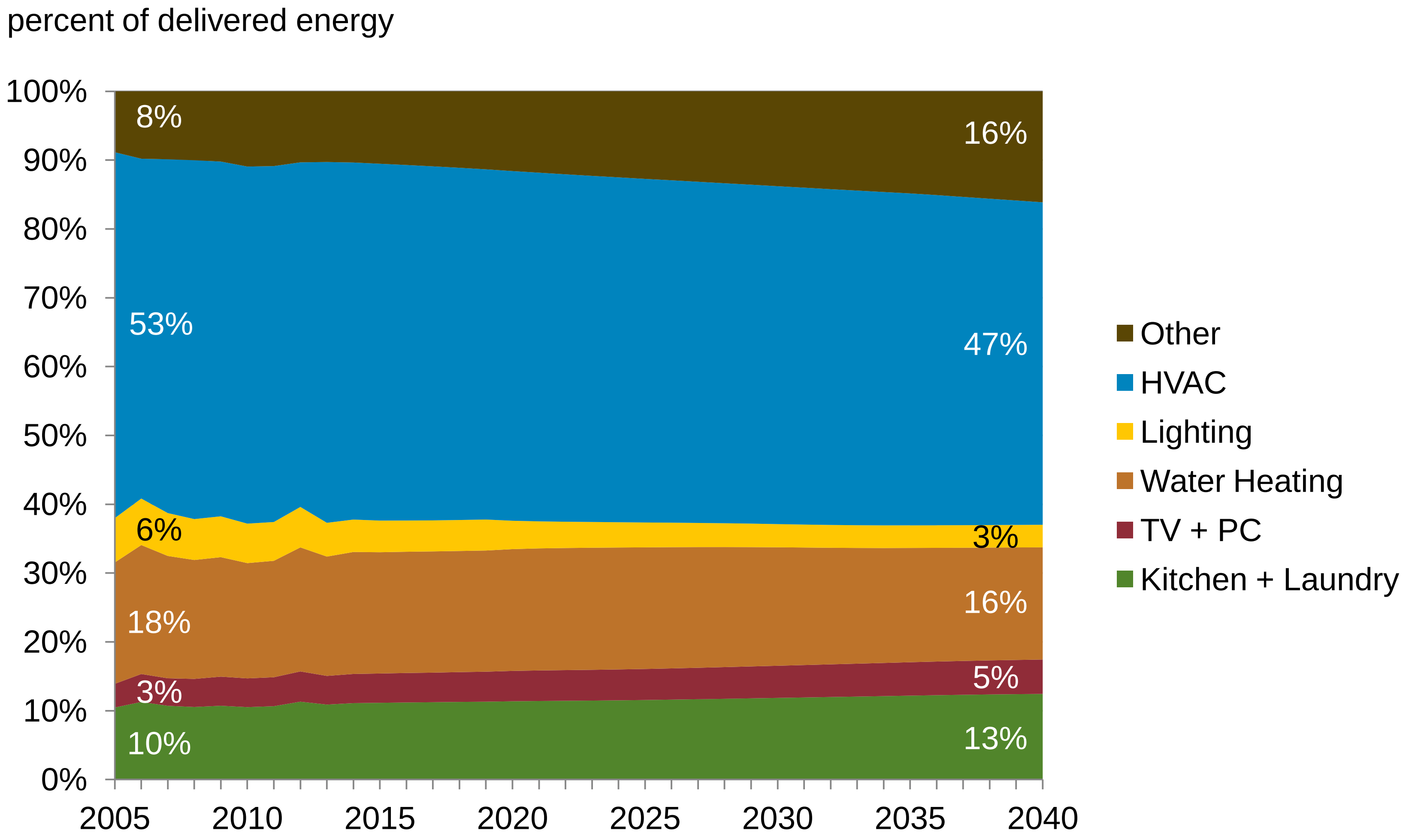
consumption by fuel, quadrillion Btu



Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

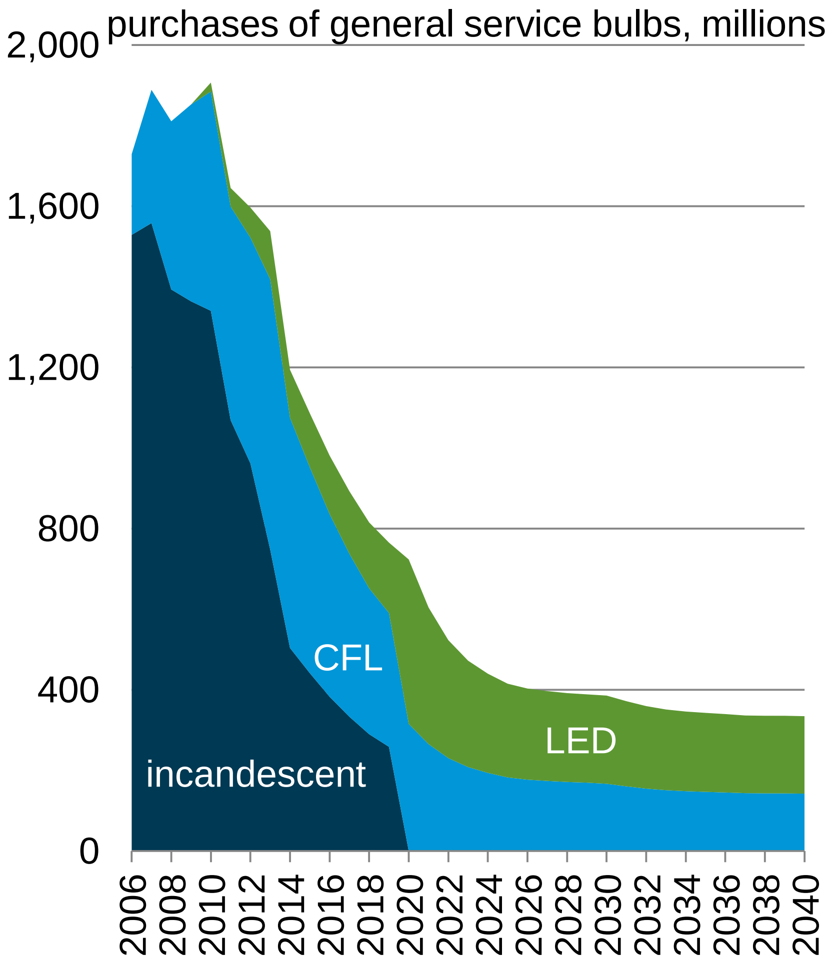
Residential consumption dominated by HVAC



Source: EIA, ref2013.d100112a

PRELIMINARY RESULTS / NOT FOR CITATION

Updated lighting characterization

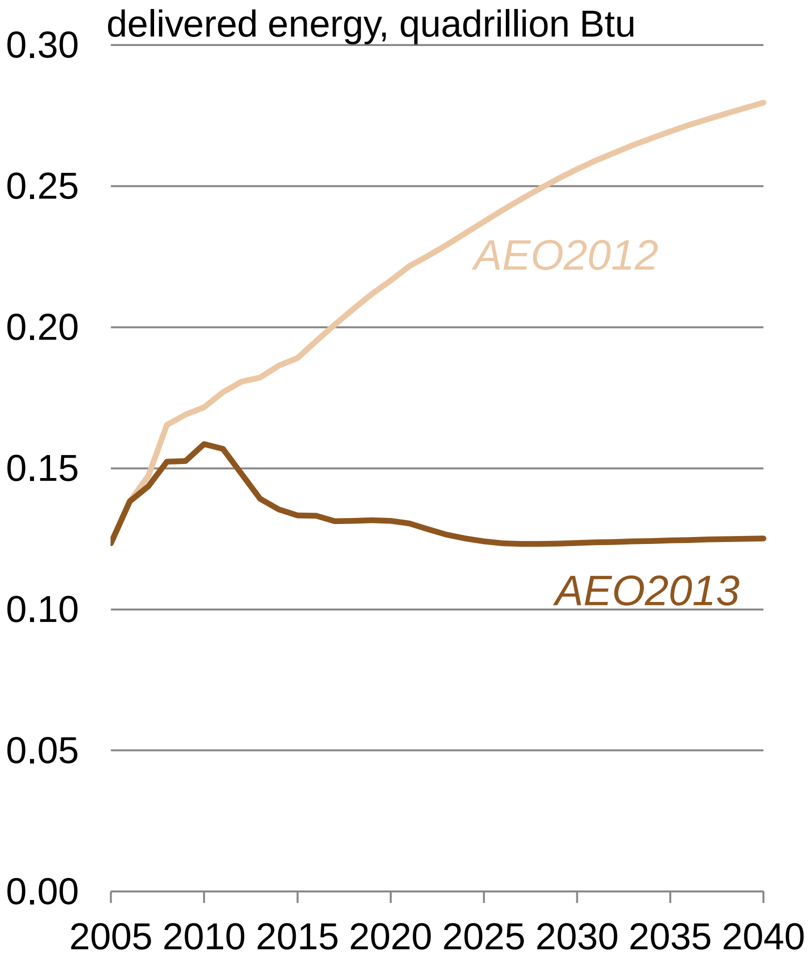


- New lighting technology menu based on Navigant Consulting report
  - No incandescent bulbs available after 2020 standard
  - EISA2007 Tier II standard
- DOE 2010 lighting market characterization

Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Updated personal computer shipments

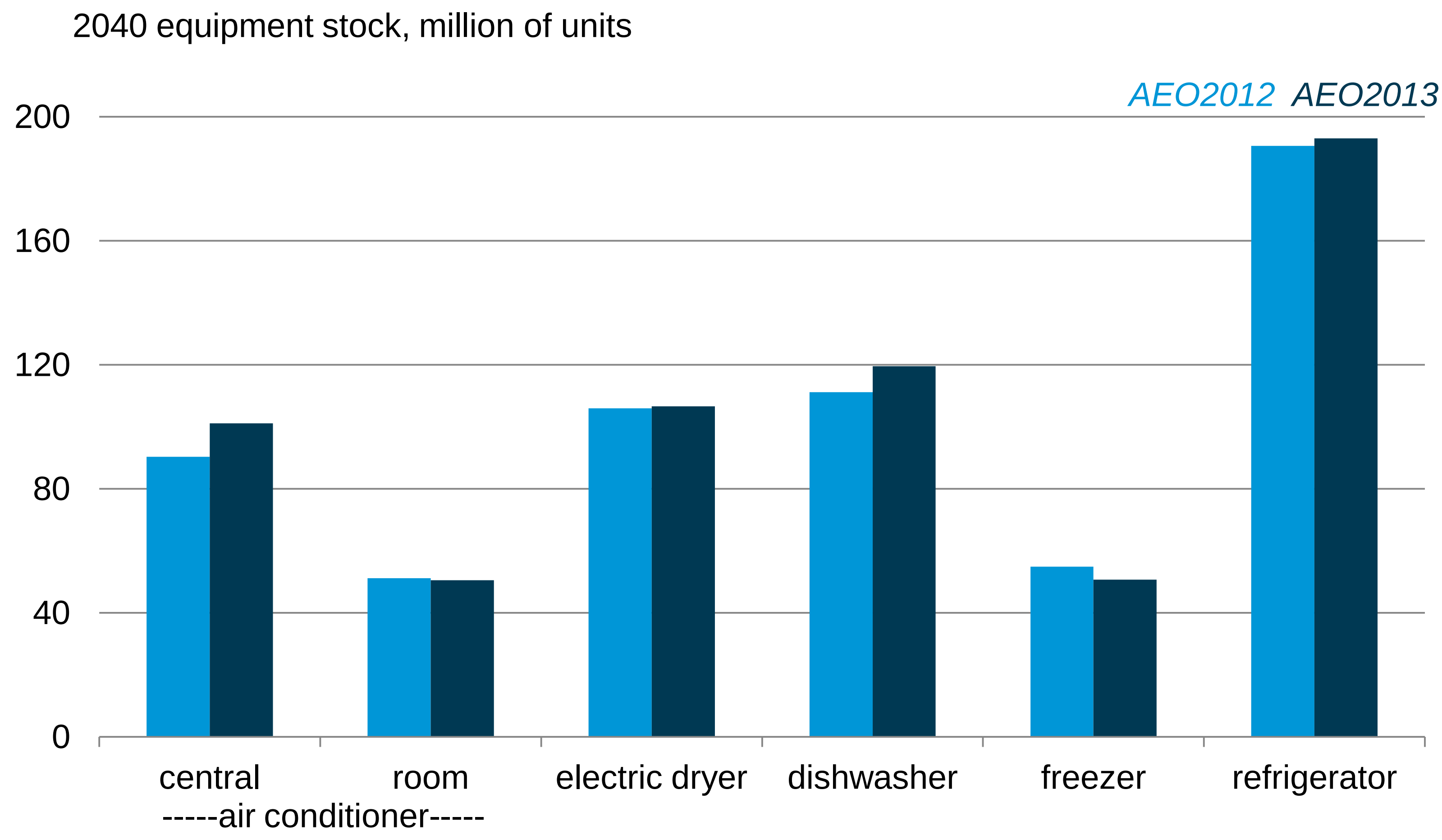


- Updated historical and projected desktop and laptop shipments based on publicly available International Data Group (IDG) information

Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Updated RECS appliance penetration in new construction

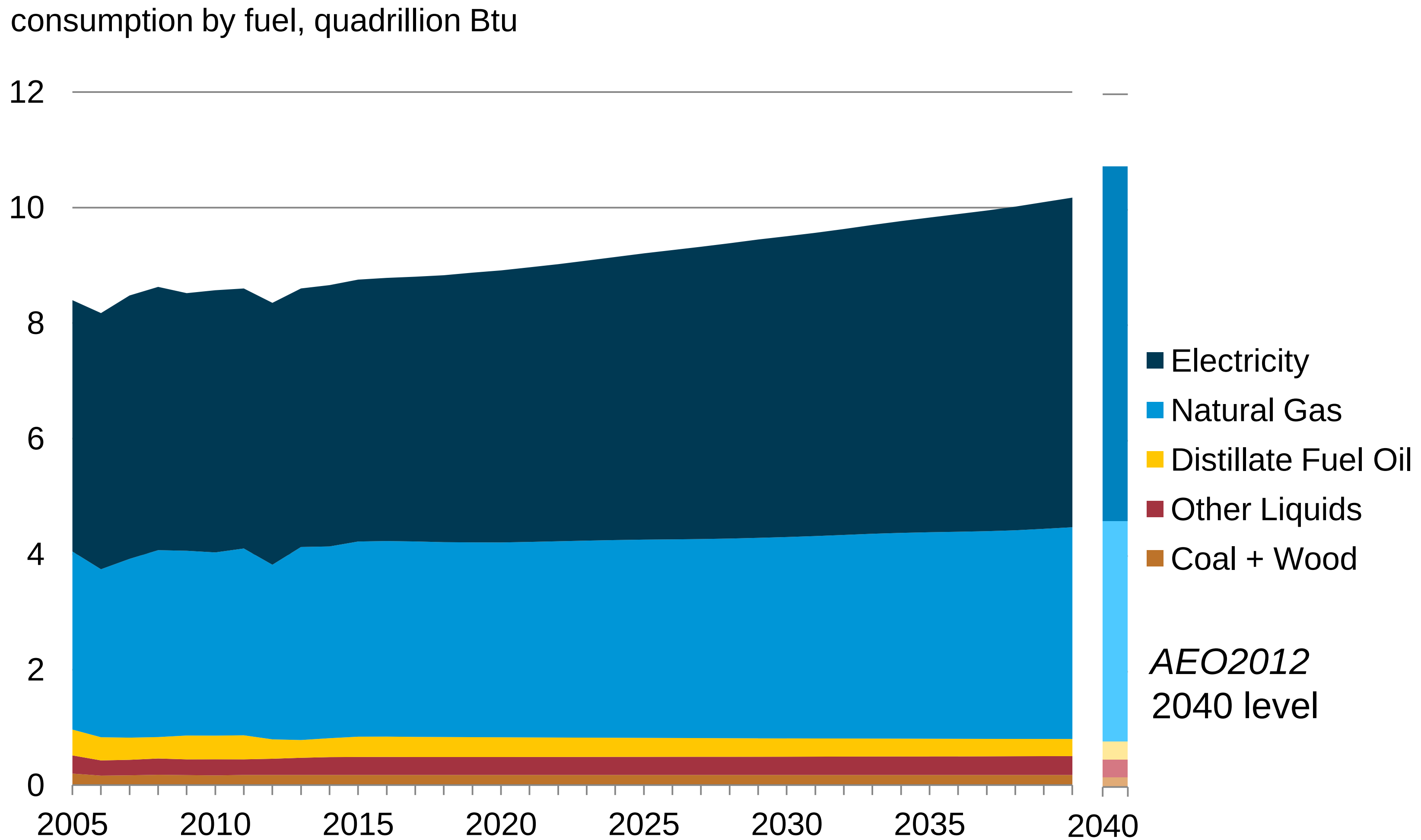


Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Commercial results

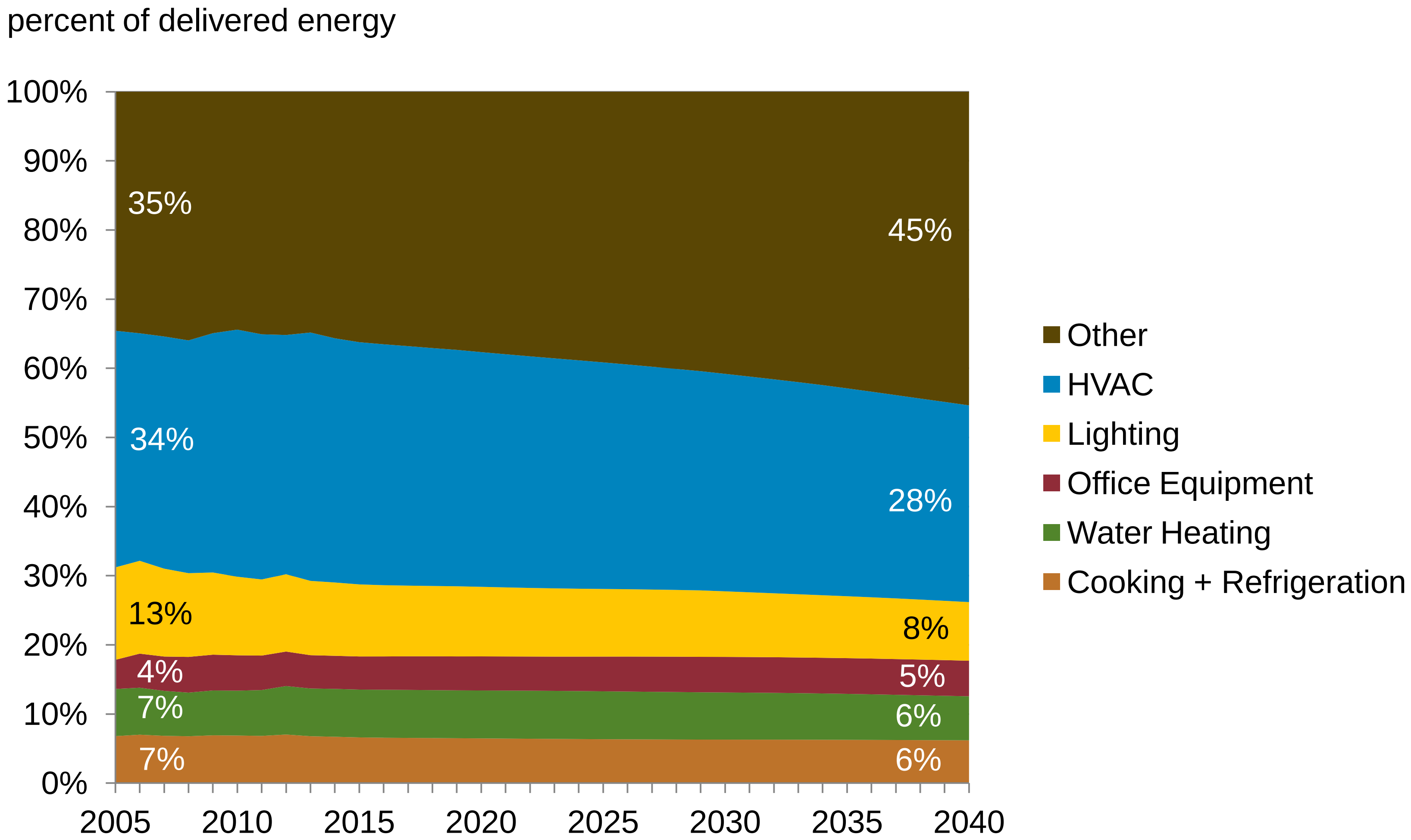
Less electricity growth leads to lower commercial fuel consumption in *AEO2013*



Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

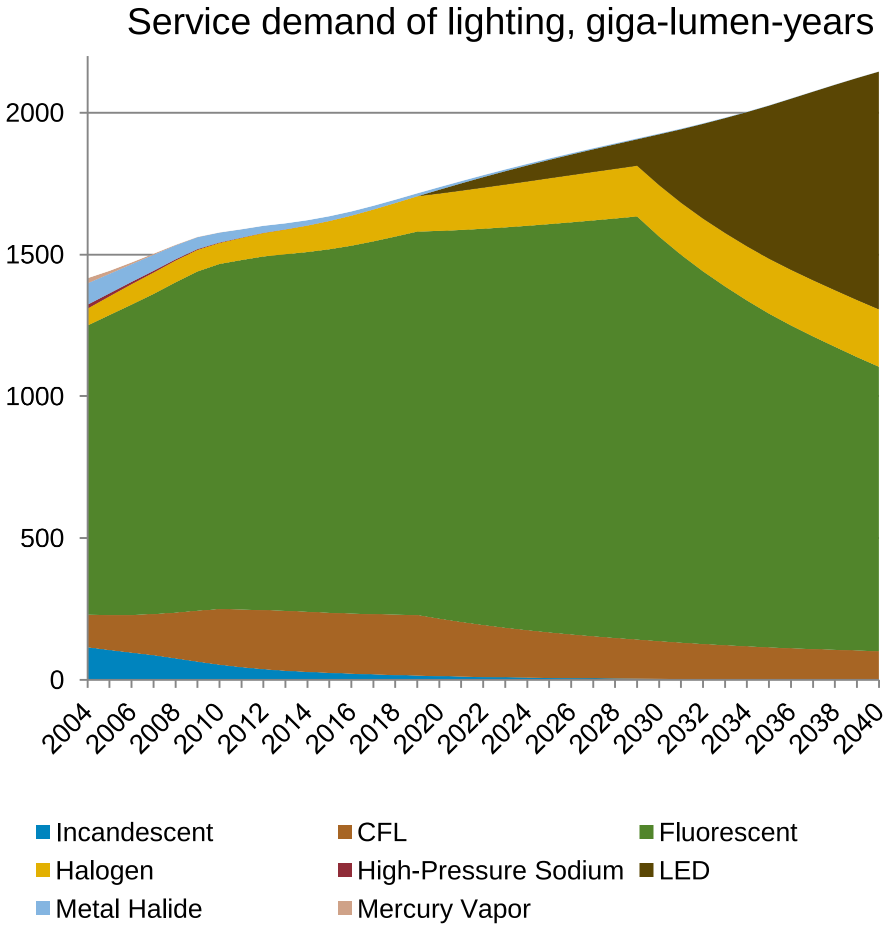
Commercial consumption growth dominated by 'other'



Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Updated lighting characterization

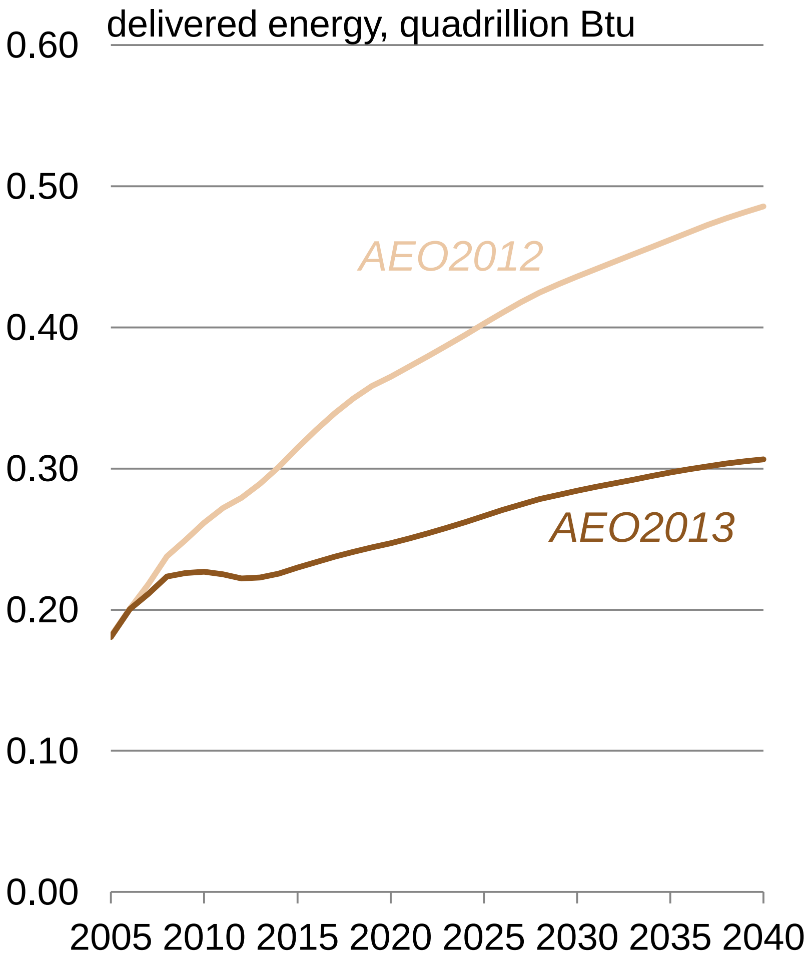


- New lighting technology menu based on Navigant Consulting report
  - No incandescent bulbs available after 2020 standard

Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

Updated data center consumption



- Updated assumptions for data centers based on latest report by Jonathan Koomey
- Projected growth of data centers substantially lower than previous report due to recession

Source: EIA, ref2013.d100112a; ref2012.d020112c

PRELIMINARY RESULTS / NOT FOR CITATION

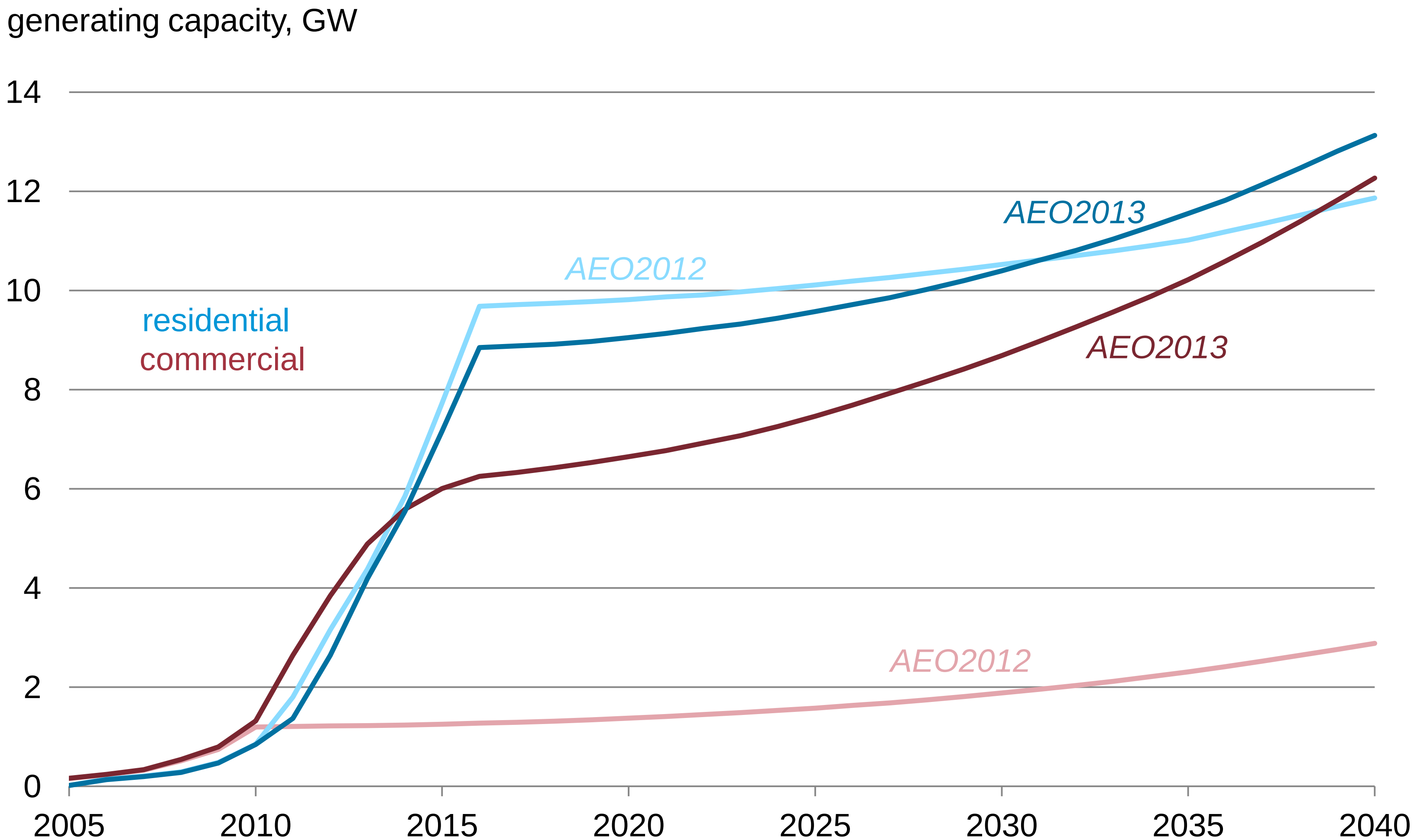
Distributed generation

- Photovoltaic system cost path
  - Updated 2010 system costs based on Tracking the Sun IV (LBNL, 2011)
    - No change from AEO2012 for residential, 7% lower for commercial
  - Reduced future costs based on NREL bottoms-up potentials although did not directly incorporate 2020 costs
    - Residential, Commercial, and Utility-Scale Photovoltaic (PV) System Prices in the United States: Current Drivers and Cost-Reduction Opportunities (NREL, 2012)
    - 14% lower for residential in 2020, 18% lower for commercial in 2020

Distributed generation (continued)

- Other DG changes
  - Increased number of positive cumulative cash flow years for residential to 8 from 5.
  - Increased penetration into existing commercial construction to 1/10 penetration into new construction.
  - Increased program-based exogenous penetration for commercial between 2011 and 2016.
- Updated historical capacities
  - 2010 +6%; 2011 +33%
- Preliminary results
  - 2020 roughly 40% more PV than AEO2012; 60% more in 2035

More photovoltaic capacity in 2040, especially in commercial



Source: EIA, ref2013.d100112a; ref2012.d020112c

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We welcome your thoughts and suggestions

Erin Boedecker
Erin.Boedecker@eia.gov
202-586-4791

Behjat Hojjati
Behjat.Hojjati@eia.gov
202-586-1068

David Peterson
David.Peterson@eia.gov
202-586-5084

Owen Comstock
Owen.Comstock@eia.gov
202-586-4752

Kevin Jarzomski
Kevin.Jarzomski@eia.gov
202-586-3208

Steve Wade
Steven.Wade@eia.gov
202-586-1678

EIA Information Center

InfoCtr@eia.gov

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(202) 586-8800

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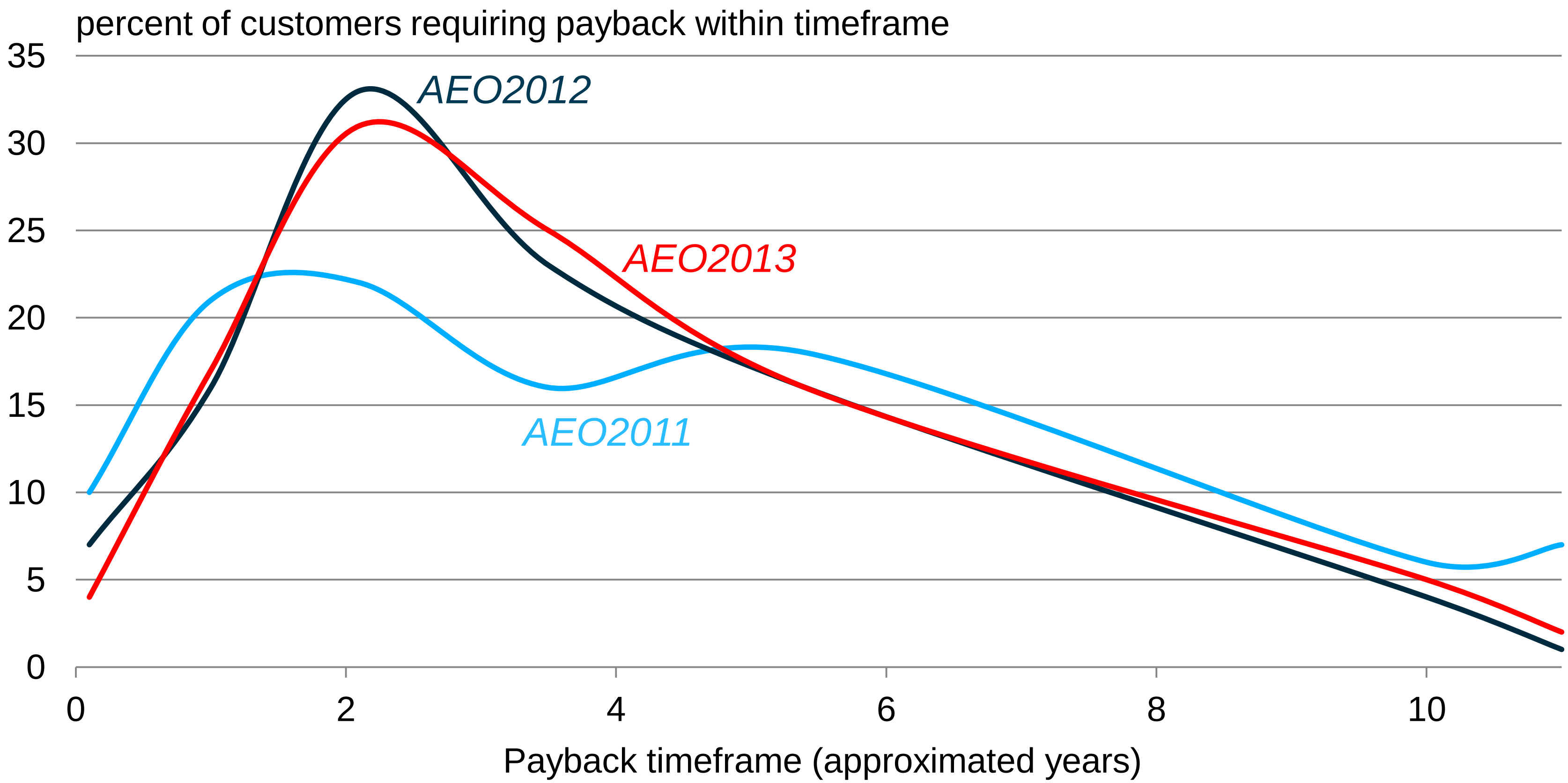
Supplemental slides

Update to hurdle rate inputs

- Notes on hurdle rates
  - Calculated from implied rates of return (based on surveyed investment decisions) and set equal to the 10 year Treasury note rate plus a premium
  - Premium distributions for the 7 major end-uses
  - Premiums generally assumed constant over the projection, but can be changed by year
  - Different assumptions for years affected by ARRA spending

Commercial – Distribution of required payback periods updated for *AEO2013*



Note: for new and replacement purchases only, non-ARRA years

Source: EIA, ref2013.d100112a; ref2012.d020112c

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