

# Renewable Electricity in the *Annual Energy Outlook*

*AEO2014 results and status updates for the AEO2015*



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*For*

*Renewable Electricity Working Group*

*July 24, 2014*

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*Renewable Electricity Analysis Team*

# Agenda

- Review of AEO2014
  - Changes made for AEO2014
  - Review of Results
- Status of AEO2015
- Updates planned for AEO2015

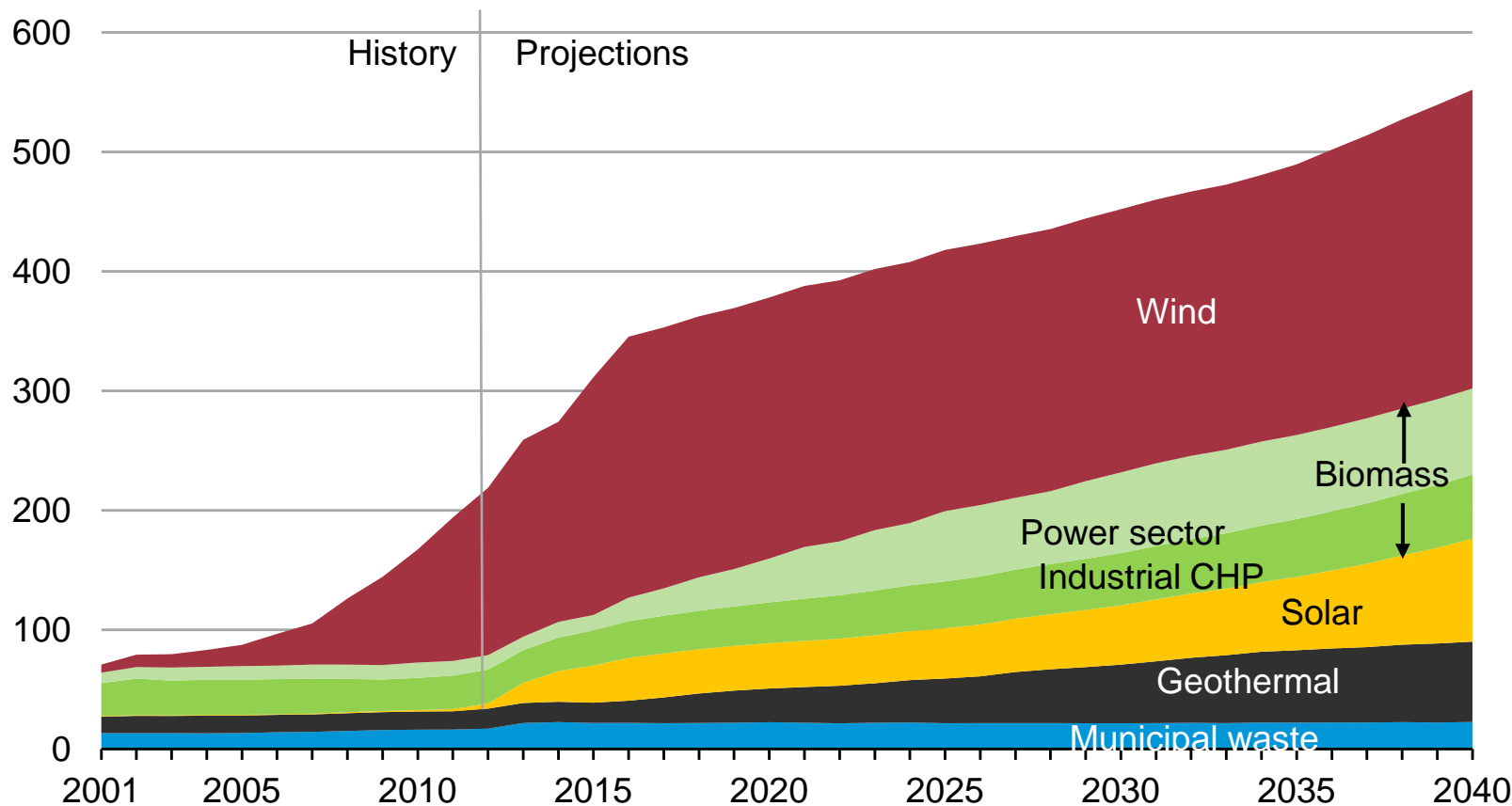
# Updates included in the *AEO2014*

Data Updates	Model Updates
Updates of planned capacity builds based on updated Form EIA-860 data	Integration of POLYSYS with NEMS to create model-interactive supply curves for agricultural residues & energy crops
Update of effective expiration dates for production tax credit	Updated handling of spinning reserves, with the required levels now better accounting for impact of intermittent generators (EMM)
Initial capital cost updated from SAIC report (used for AEO2013) based on EIA's learning model	RPS updates – several small adjustments, namely Colorado update for increasing muni/co-op target and removing bonus in-state credits.

# Non-Hydro Renewable Generation more than doubles between 2012 and 2040 in the Reference case

## Non-hydro renewable generation in the AEO2014 Reference case

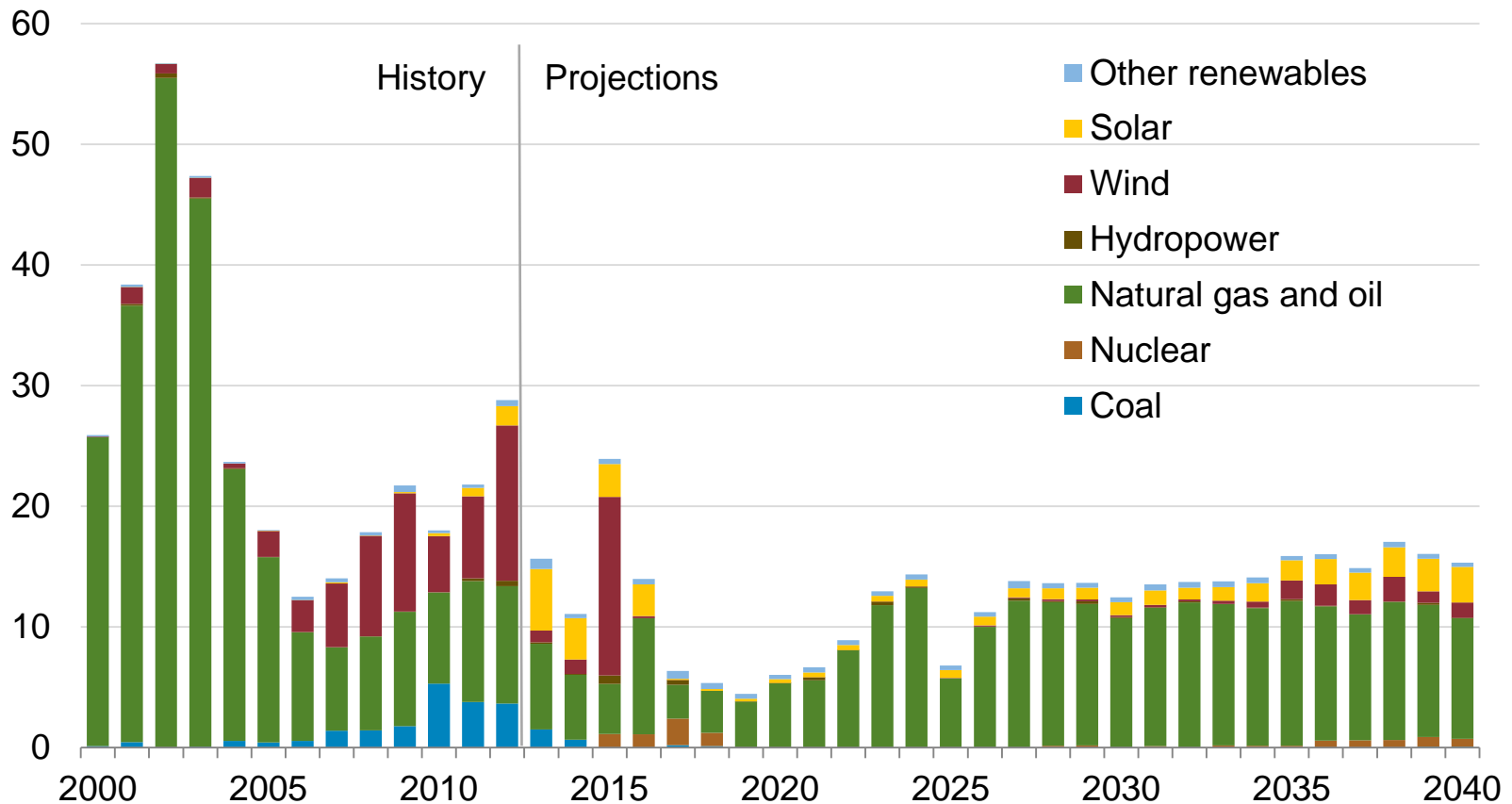
billion kilowatthours



Source: EIA, Annual Energy Outlook 2014

# Capacity additions for all fuel types are moderate from approximately 2016-2025

Annual capacity additions by fuel source, Reference case  
gigawatts

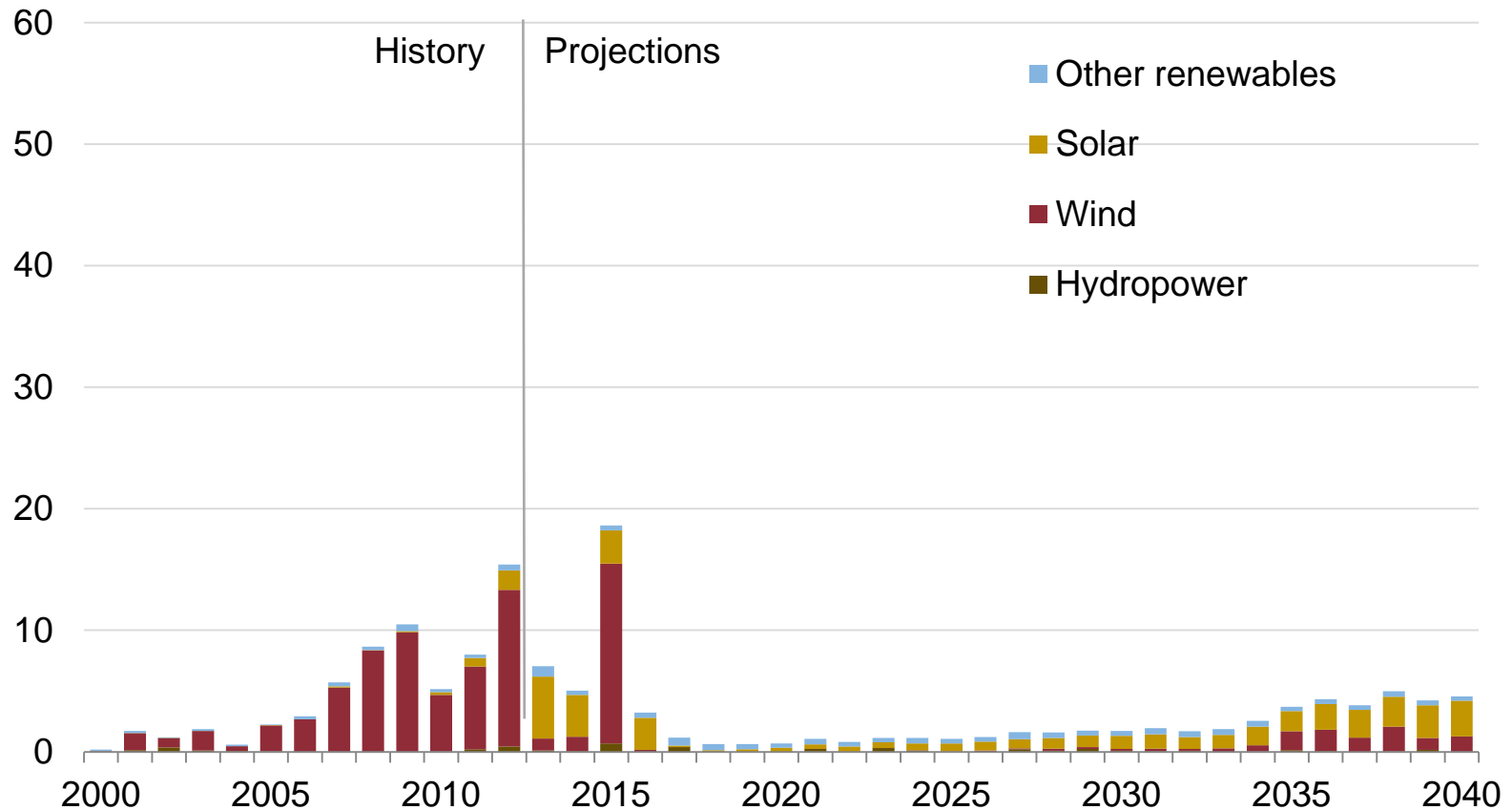


Source: EIA, Annual Energy Outlook 2014

# Renewable capacity additions slow following the expiration of the federal tax credits, but pick up in the final decade of the projection

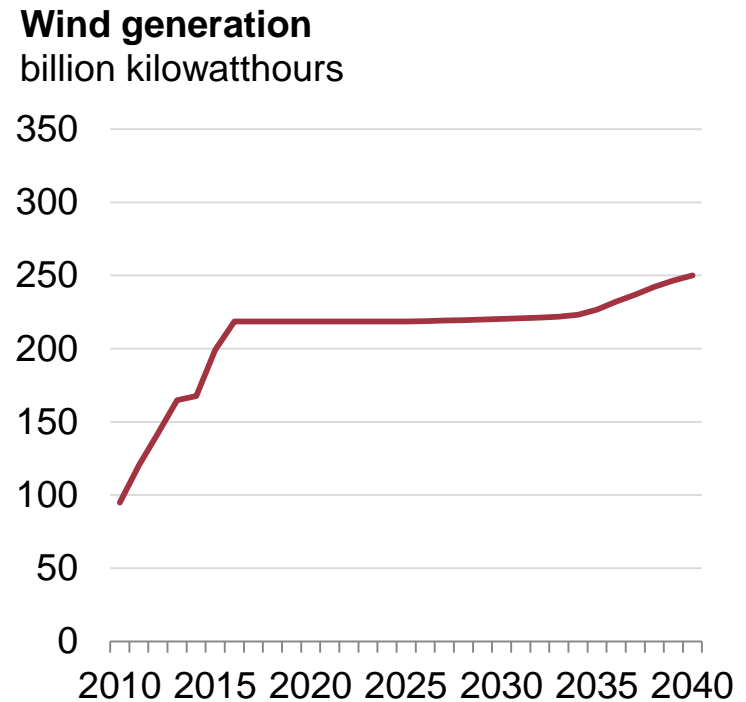
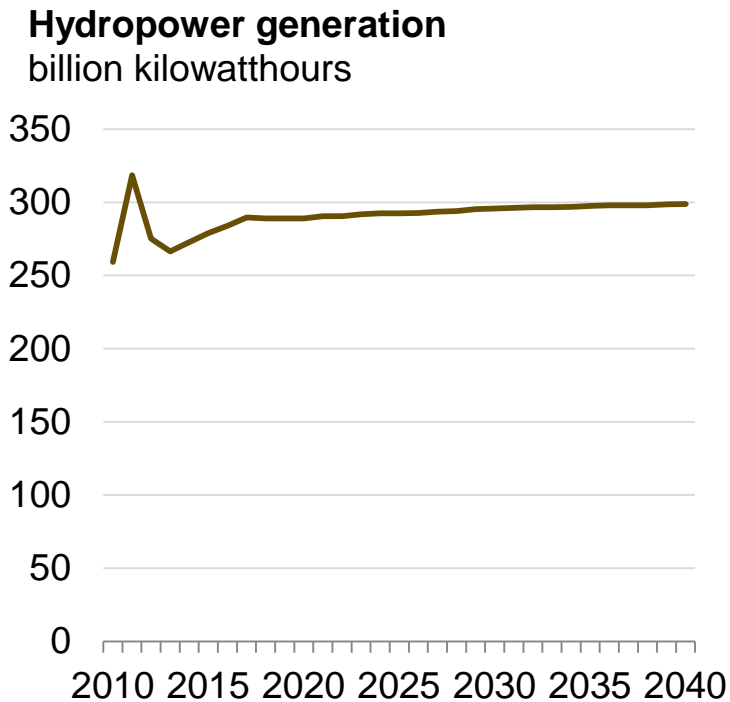
Annual renewable capacity additions by fuel source, Reference case

gigawatts



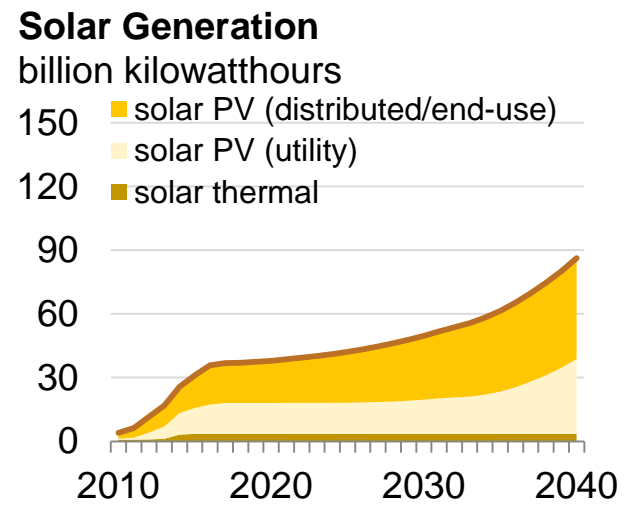
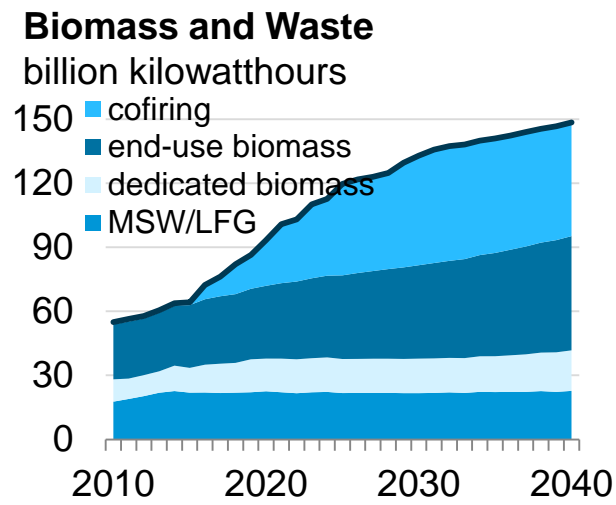
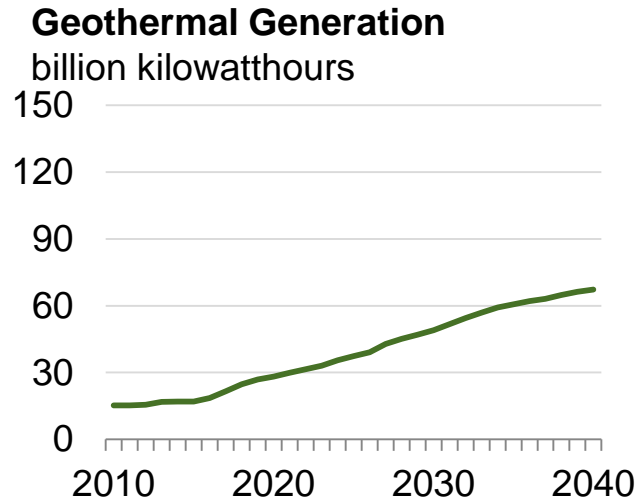
Source: EIA, Annual Energy Outlook 2014

# Hydro continues to be the leading single source of renewable generation in the Reference case



Source: EIA, Annual Energy Outlook 2014

# Geothermal, biomass, and solar all contribute to the growth of non-hydro renewable generation



Source: EIA, Annual Energy Outlook 2014



# Annual Energy Outlook 2015

# The AEO2015 will be abridged compared to previous editions

- To focus more resources on rapidly changing energy markets and how they might evolve over the next few years, the U.S. Energy Information Administration is revising the schedule and approach for production of the *International Energy Outlook (IEO)* and the *Annual Energy Outlook (AEO)*.
- Under this approach, a full edition of the *IEO* and *AEO* will be produced in alternating years and an interim, shorter edition of each will be completed in the off years. The AEO2015 will be the first short version of the Annual Energy Outlook.

	2014	2015
<i>International Energy Outlook</i>	Interim Edition to be released summer 2014	Full Edition will be released in spring 2015
<i>Annual Energy Outlook</i>	Full Edition released in spring 2014	Interim Edition will be released in early 2015. The shorter version will include an abbreviated discussion and results from select cases: <ul style="list-style-type: none"> <li>• Reference</li> <li>• Low and High Economic Growth</li> <li>• Low and High Oil Price</li> </ul>

# Model and data updates for the AEO2015 will be complete by early September

- AEO Modelers are in the process of implementing data and model updates.
- All data and model changes to be complete by 9/3/2014
- Reference case frozen by 10/1/2014
- AEO2015 release scheduled for mid-December 2014

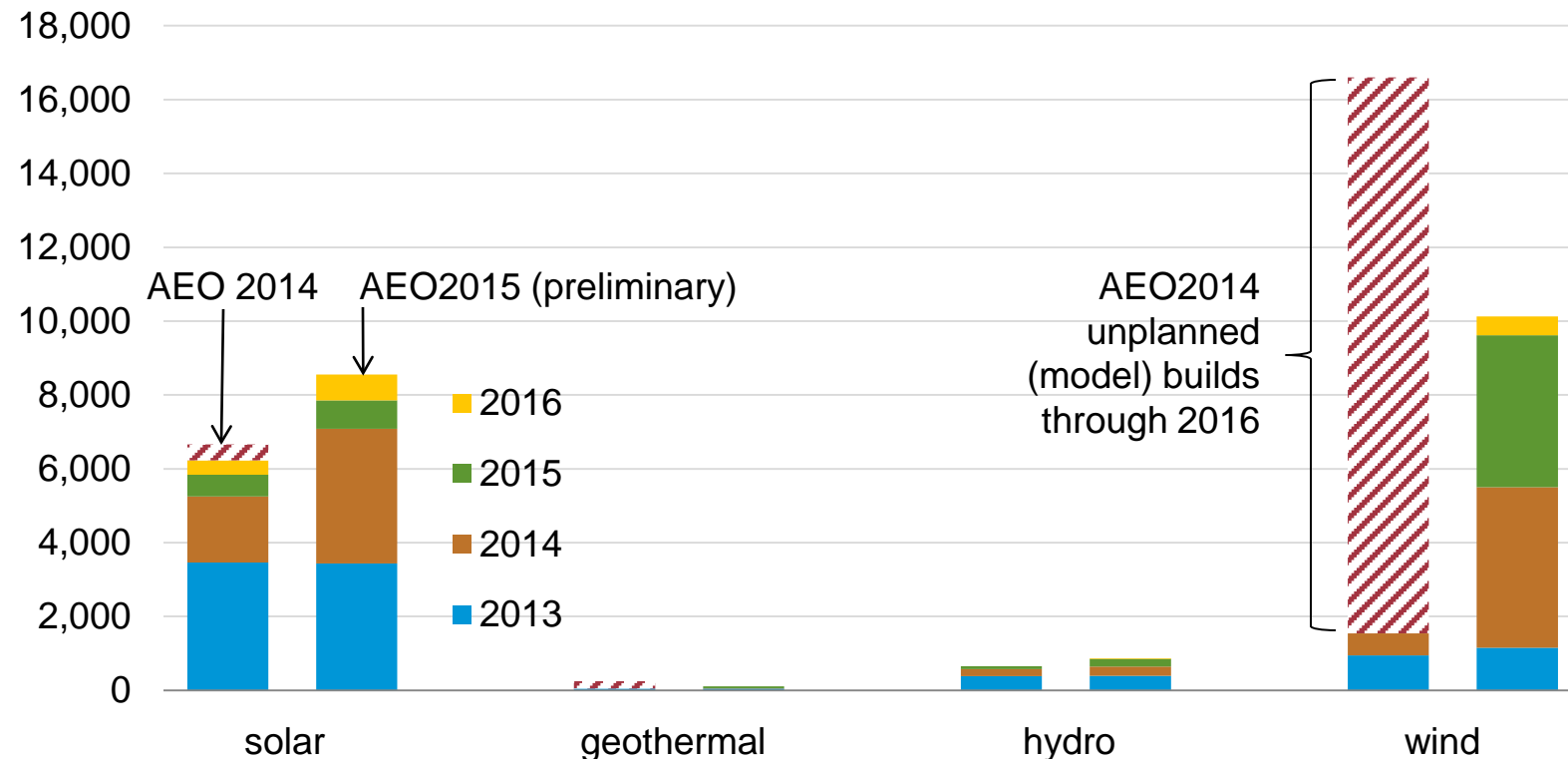
# Due to abbreviated schedule, there will be relatively few updates for AEO2015

- Planned capacity additions, based on updated EIA survey (EIA-860) data
- Continued refinement of POLYSYS integration
- Re-evaluation of overnight capital cost assumptions
- Update of state renewable portfolio standard targets (Ohio's two-year target freeze, others?)
- Calibration with the Short Term Energy Outlook
- *EIA continues to model only current laws and policies, so proposed EPA rules will not be included in AEO2015*
- *Currently working on for AEO2016 – solar performance input updates, wind supply curve updates, geothermal site-specific cost updates.*

# Survey data updates for the 2013 data cycle will result in increased planned builds, particularly for wind and solar, 2014-2016

Planned capacity additions in the AEO2014 v. preliminary AEO2015

megawatts



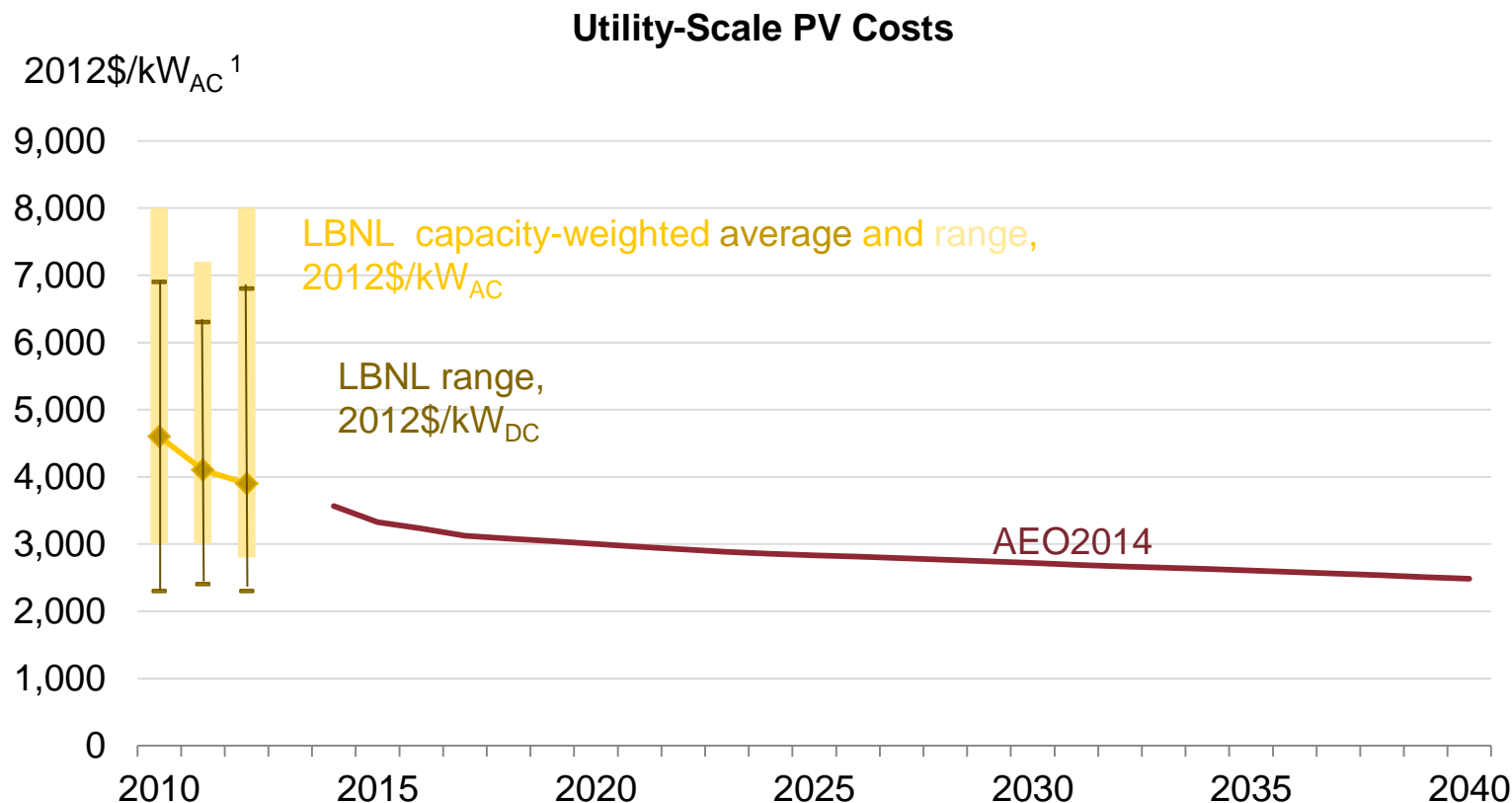
Source: EIA, Annual Energy Outlook 2014 and Form EIA-860

**Note: Planned builds for AEO2015 are preliminary and expected to change. Figure does not include unplanned (model built) capacity additions**

# AEO2015 will include improvements to the initial (AEO2014) POLYSYS integration

- AEO2014 marked the first instance of full POLYSYS integration. POLYSYS will continue to run as an integrated submodule of the Renewable Fuels module, with some refinements:
  - Improving representation of regional planting decisions, reacting to regional prices
  - Improved modeling of expectations
  - Update of USDA baseline
- POLYSYS, which provides dynamic supply curves for agricultural residues and energy crops, is expected to primarily be a tool for “high biomass” scenarios. In the Reference case world, urban wood/wood waste and (to a lesser extent) forestry supply curves tend to meet the vast majority of biomass demand.

Trade press indicates that PV costs have continued to decline; EIA will review data for 2013 and 2014 to determine if initial assumption or learning parameters require updates



Sources: EIA, Annual Energy Outlook 2014 and LBNL, Utility-Scale Solar 2012.

<sup>1</sup> All costs are reported on an AC basis except the noted LBNL range



# For more information

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Annual Energy Outlook | <http://www.eia.gov/forecasts/aeo/>