Renewable Electricity in the *Annual Energy Outlook 2014*

For

Renewable Electricity Working Group

AEO2014 Second Meeting

September 26, 2013

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Agenda

- Status of AEO2014 and future development plans
- Data and model updates
  - PTC expiration update
  - Capital costs
  - Transmission
  - 860 (planned capacity) data
  - Polysys integration
  - Spinning reserves
  - RPS updates
- Preliminary Results for the AEO2014 Reference case

Status of AEO2014

- Most planned model and data updates are now completed.
- We expect that the Reference case for the AEO2014 will be frozen by mid-October.
- Side cases are expected to be frozen by the end of 2013. We anticipate completing the “No Sunset” and “Extended Policies” side cases per their usual specification. We will also include a “low-cost renewables” side-case but are still developing the exact scenario.

Changes in release cycles for EIA's AEO and IEO

- 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*).
- Starting with *IEO2013*, which was released in July, 2013, EIA adopted a two-year production cycle for both the *IEO* and *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.

	2014	**2015**
International Energy Outlook	**Interim Edition will be released in mid 2014**, focusing on the liquids projection, which is used as part of the *AEO2014*. Summary tables and a short analysis will be included.	**Full Edition will be released in the spring 2015**
Annual Energy Outlook	**Full Edition will be released in spring 2014**, including analysis of energy issues and many alternative scenarios.	**Interim Edition will be released in late 2014 or early 2015** and will only include the Reference, Low and High Economic Growth, and Low and High Oil Price cases. The shorter version will include tables for these cases and short discussions.

Data Updates

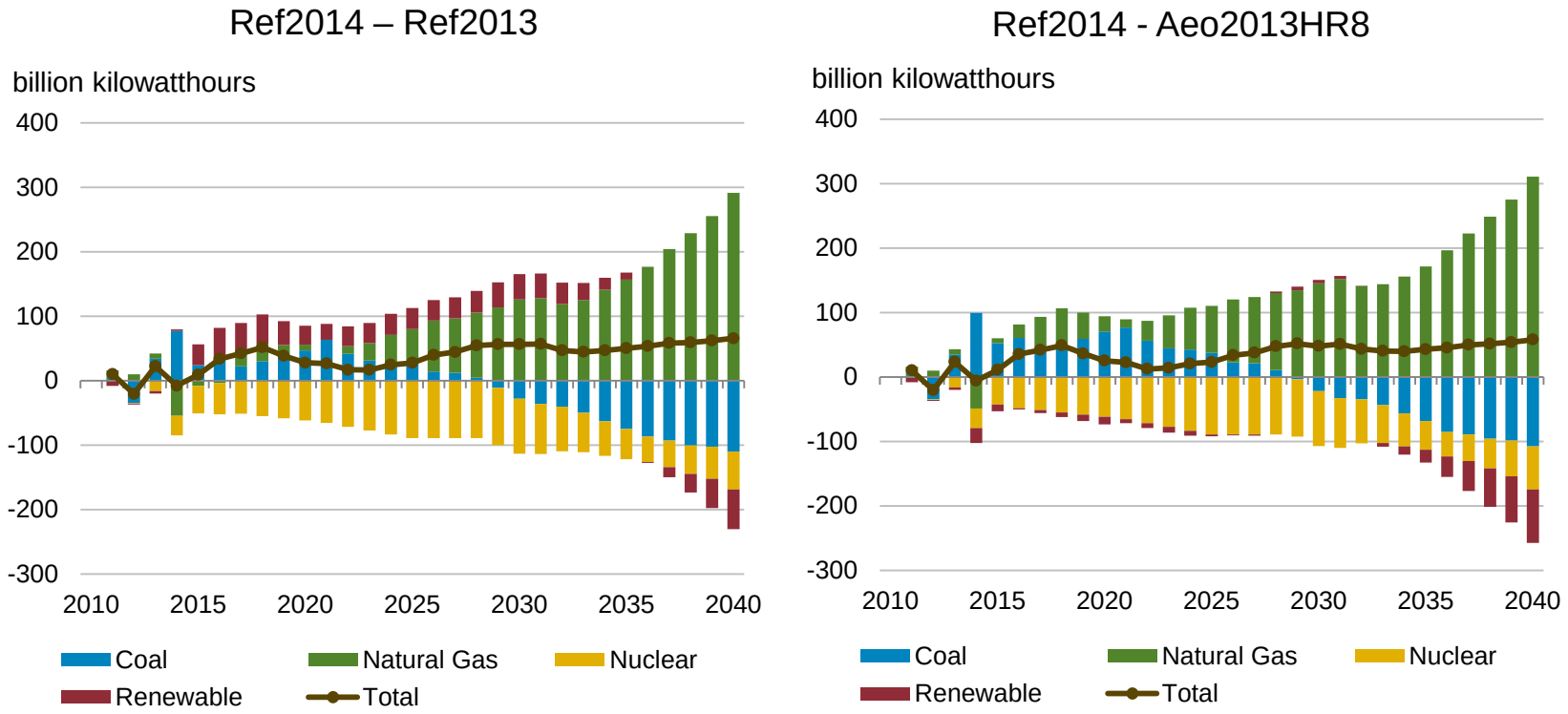
- Capacity updates are still being finalized. EIA's statistics team is working to get the most up-to-date information on some smaller PV generators and planned coal retirements.
- PTC effective expiration dates adjusted to either 2015 (wind, MSW) or 2016 (other PTC-eligible fuels) based on updated IRS guidance.
- Capital cost assumptions were not updated for the AEO2014. EIA commissioned a cross-technology review of capital and O&M costs for the AEO2013, and will continue to use those. Costs are still consistent with published data such as LBNL's "Tracking the Sun".
- Inter-regional transmission transfer capability limits were updated.

Model Updates

- Integration of POLYSYS with NEMS to create model-interactive supply curves for certain types of biomass.
- Spinning reserve requirement accounts for operational impacts of maintaining operating reliability reserves
  - Done in part to better represent the general cost of maintaining system reliability
  - Also improves accounting for impact of intermittent generators
- RPS updates – several small adjustments, no repeals. EIA incorporated Colorado's changes (strengthening muni/co-op requirement and removing bonus credits for in-state generation) into the AEO2014.

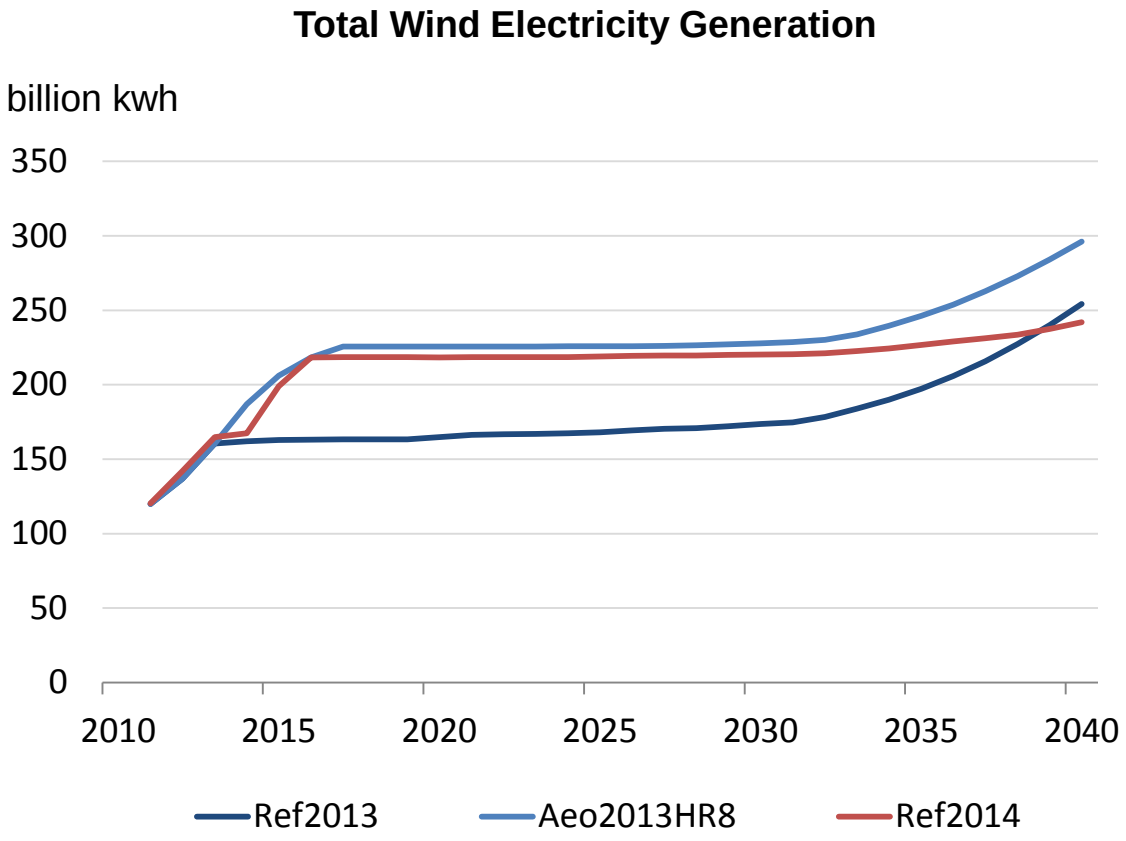
Nuclear, coal, and renewable capacity additions are down in the latter part of the projection, primarily displaced by new gas capacity; however, total capacity is generally higher in the AEO2014.

Change in Generation between Ref2014 and AEO2013 Runs



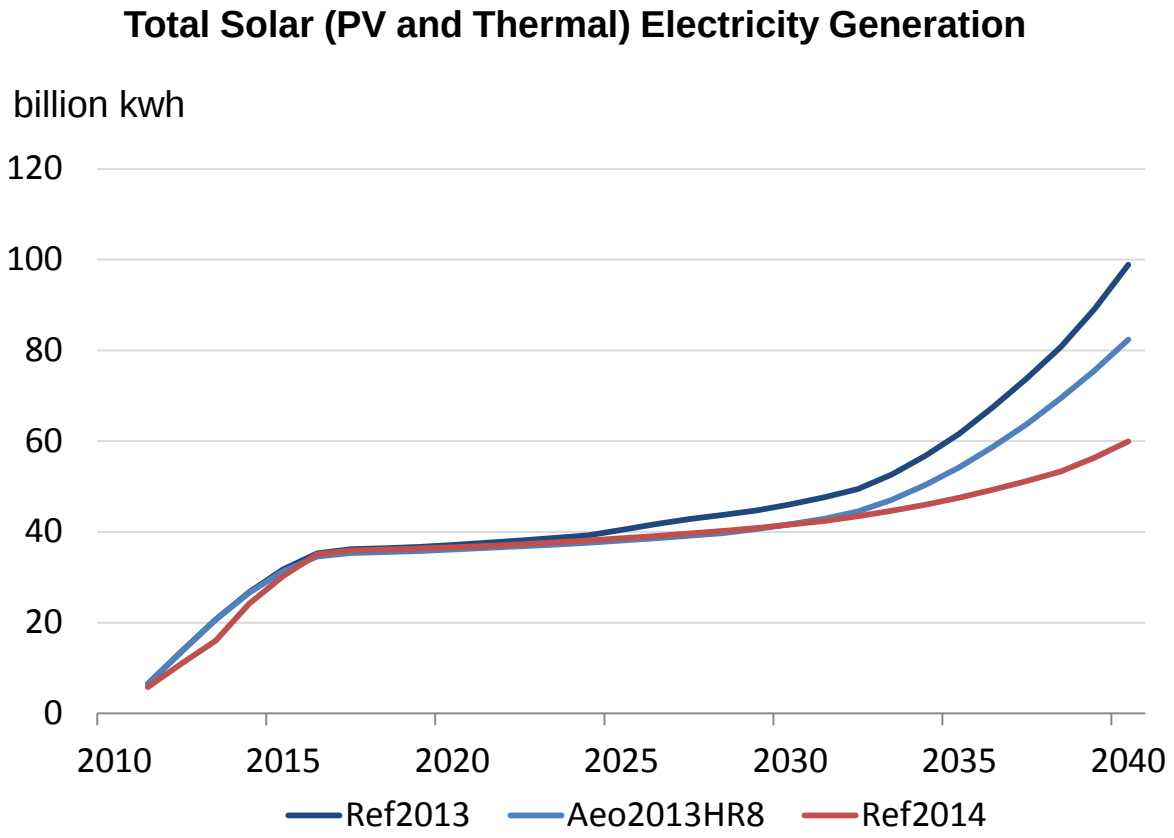
Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

The projection for near-term increase in wind generation is similar to the Aeo2013hr8 case – however, there is less growth after 2030.



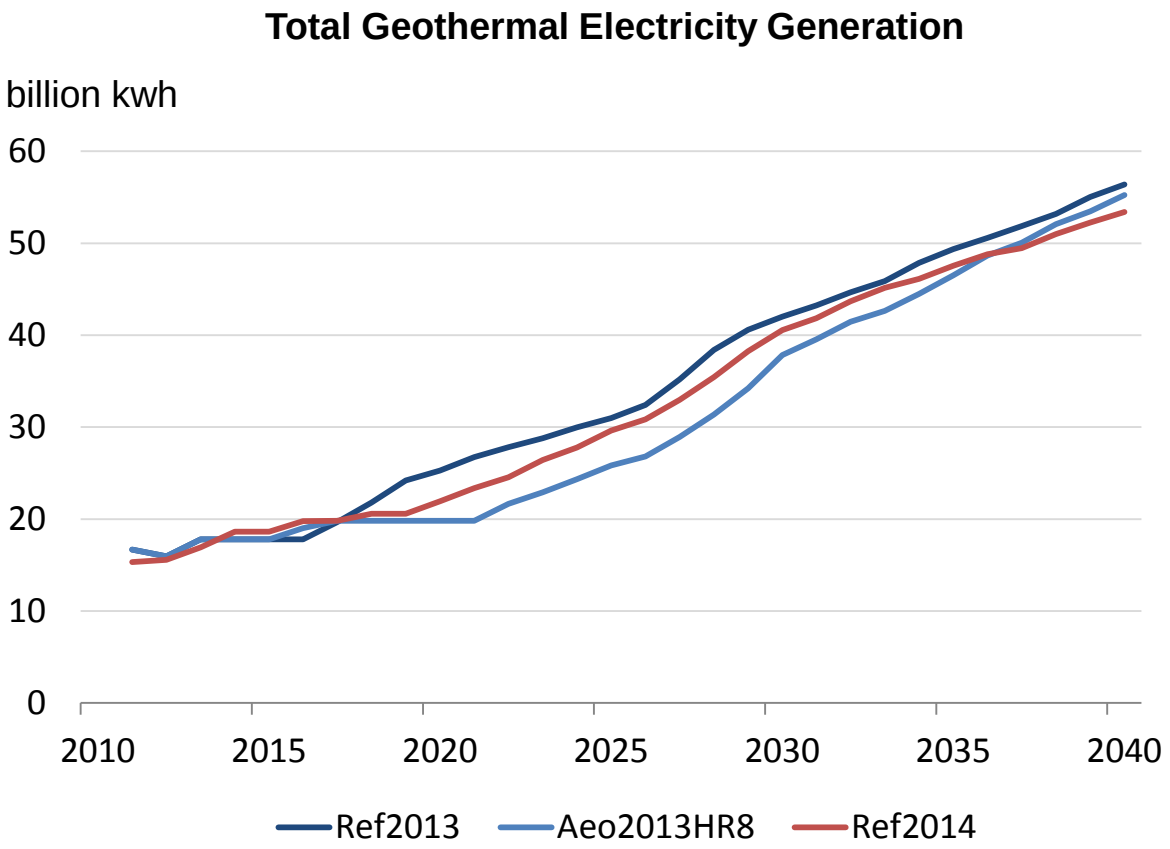
Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

AEO2014 solar generation grows less over the projection period than in the AEO2013, particularly in the electric power sector.



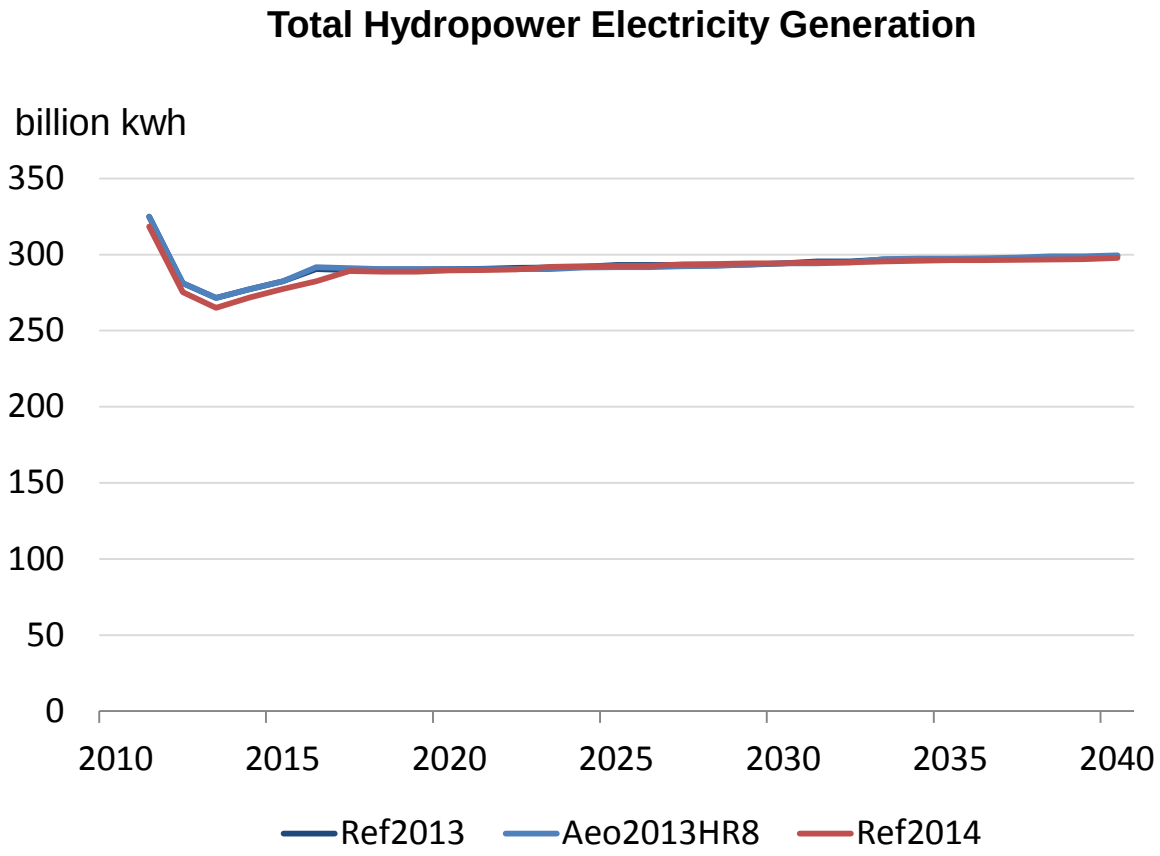
Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

Geothermal growth is similar to AEO 2013.



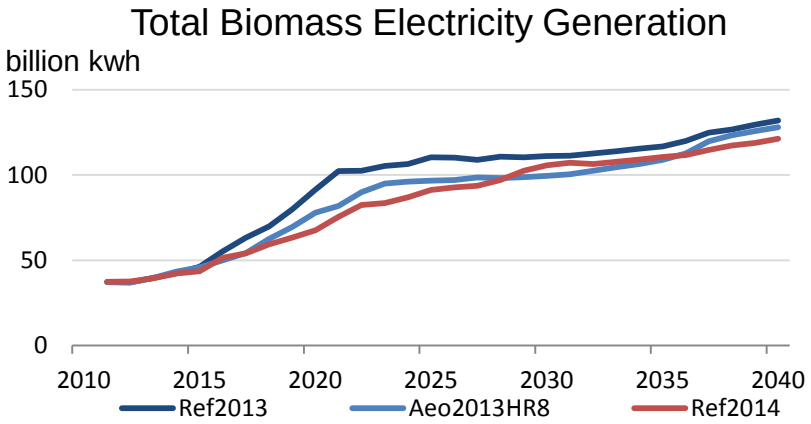
Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

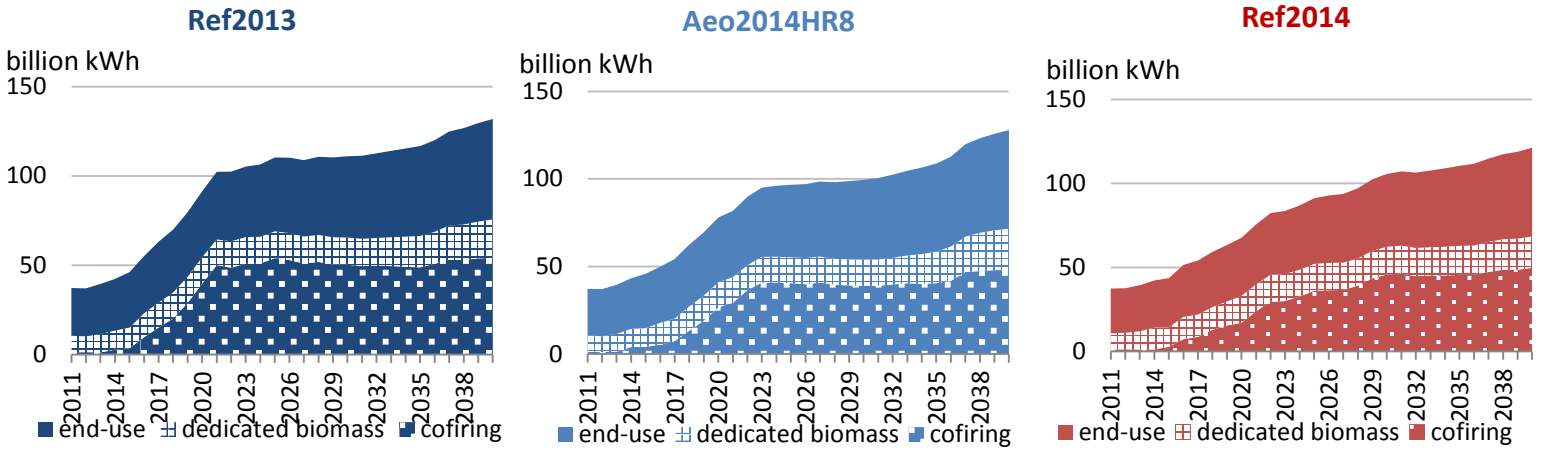
Hydro projections continue to show very modest growth, but continues to be the leading source of renewable generation through 2040.



Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

Biomass generation nearly triples by 2040 in the Ref2014 case, due to growth in cofiring and industrial/refining CHP generation. However, Ref2014 near-to-midterm cofiring growth is less rapid than Ref2013.

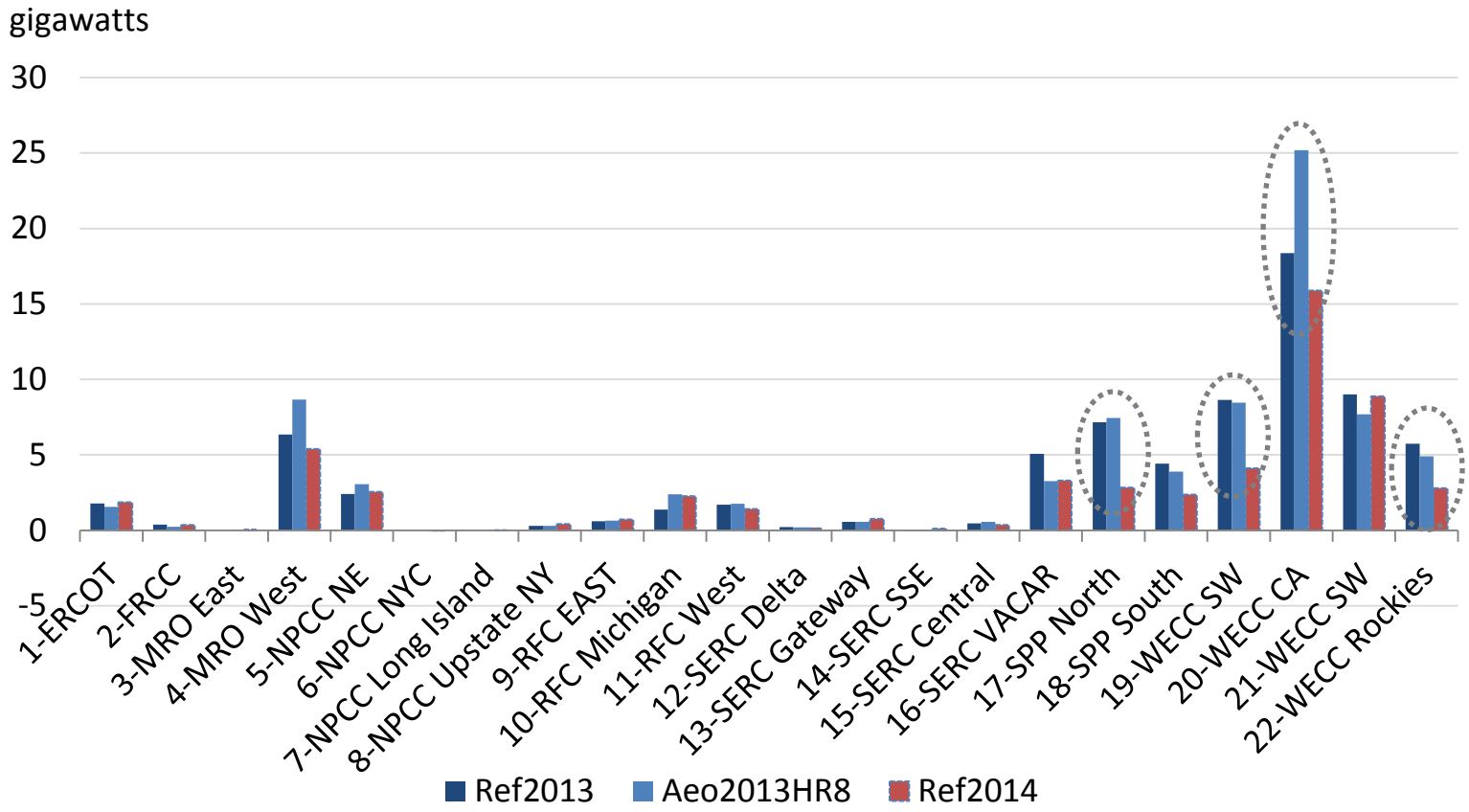




Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

Most of the decline in growth occurs in several key Western regions: WECC California, WECC SW (Arizona/New Mexico), WECC Rockies (Colorado) and SPP North (Kansas/Missouri).

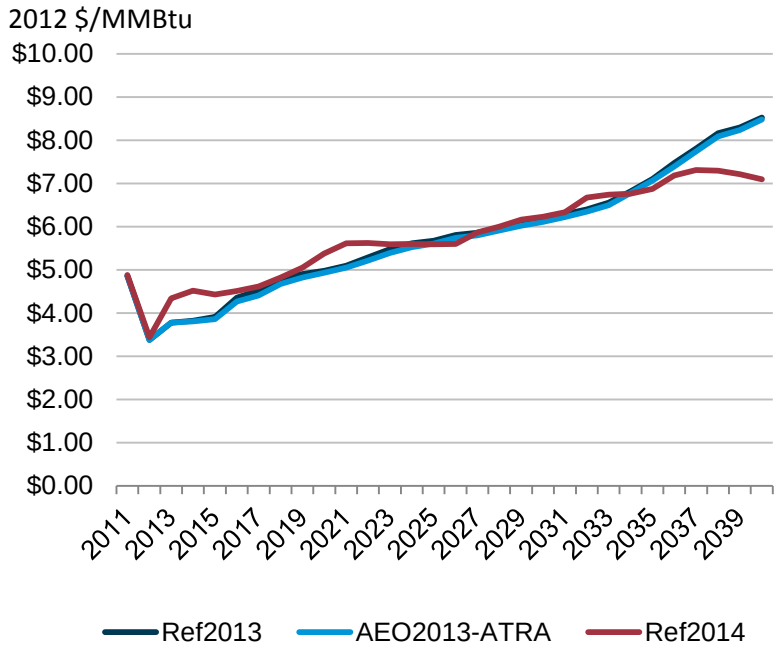
Growth in Renewable Capacity by Region (2011-2040), *AEO2013* v. *AEO2014*



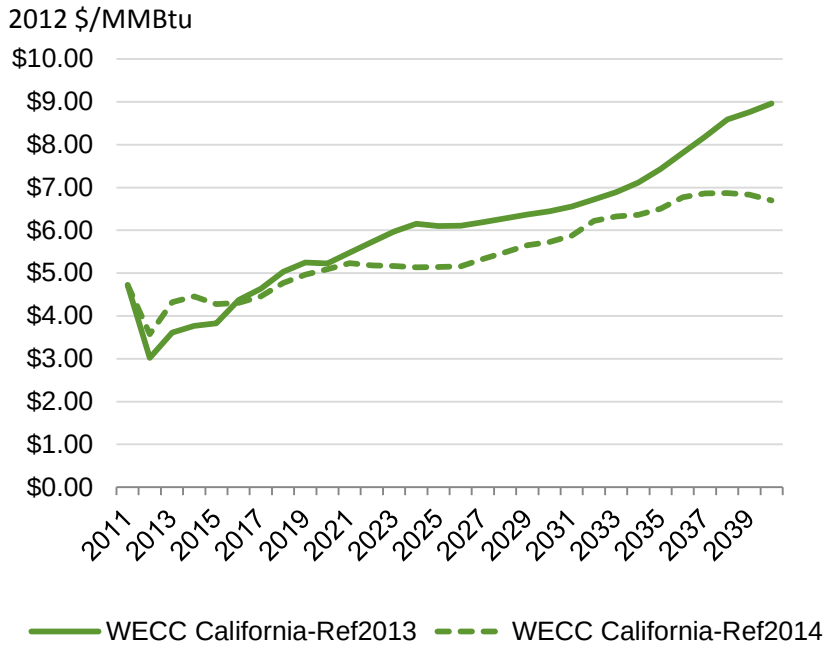
Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

Although national natural gas prices are similar in the AEO2013 and AEO2014 through much of the projection, differences are more pronounced and start earlier in California and other Western regions.

Delivered Natural Gas Prices to the Electric Power Sector, National

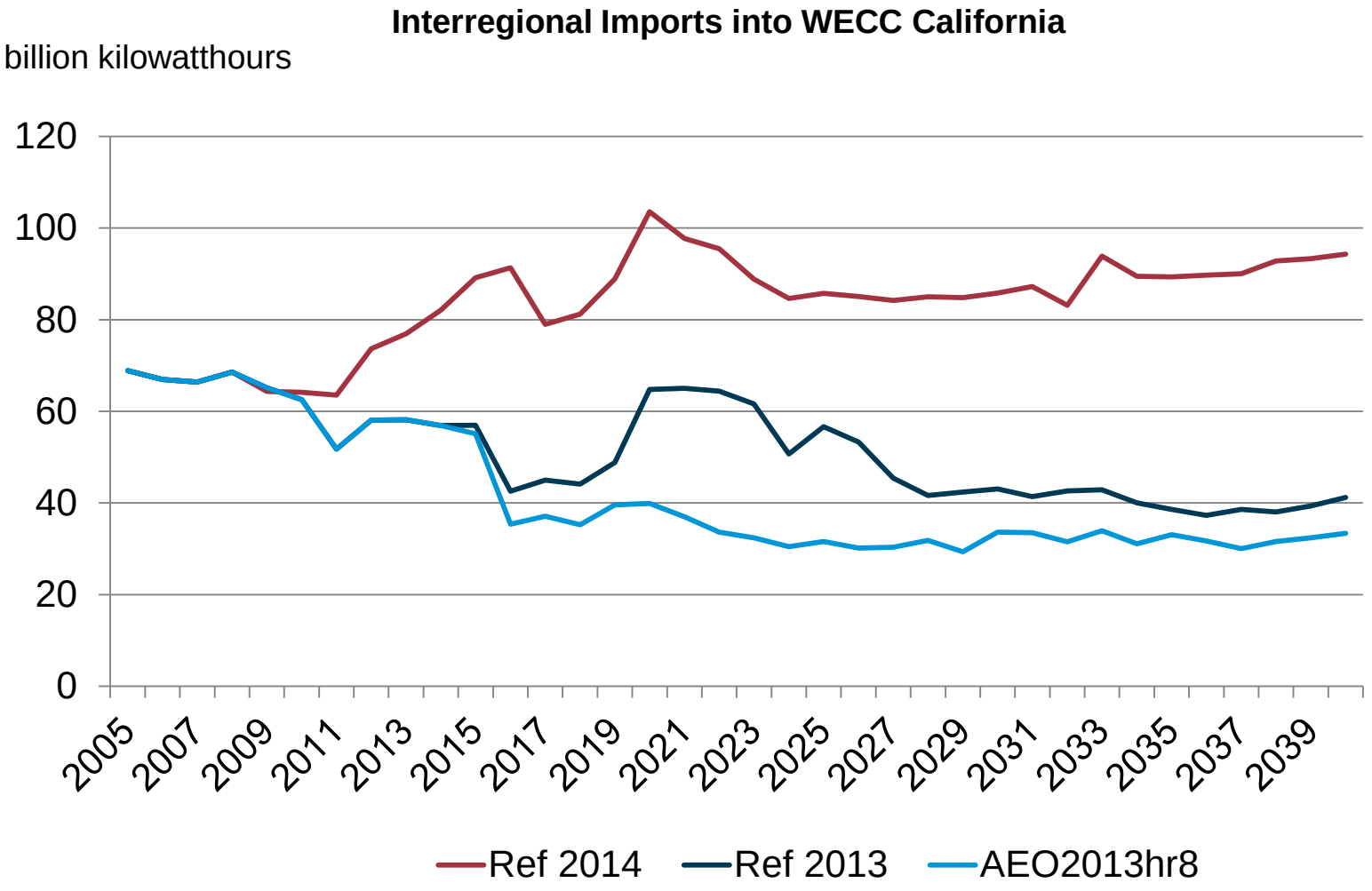


Delivered Natural Gas Prices to the Electric Power Sector, WECC California



Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

Capacity builds in California are significantly reduced as a result of increased regional imports



Source: National Energy Modeling System, runs ref2013.d102312a, aeo2013hr8.d021213a, ref2014.d092313a

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