

PA Climate Change Advisory Committee Meeting

September 13, 2016

About the BCSE

- The Business Council for Sustainable Energy (BCSE) is a coalition of companies and trade associations from the energy efficiency, natural gas and renewable energy sectors.
 - The Council advocates for policies at state, national and international levels that:
 - increase the use of commercially-available clean energy technologies, products and services
 - support an affordable, reliable power system
 - reduce air pollution & greenhouse gas emissions
-

2016 BCSE Members



2016

SUSTAINABLE ENERGY IN AMERICA

Factbook



Energy —
— Efficiency



Natural —
— Gas



Renewable —
— Energy

GET THE FACTS www.bcse.org

Bloomberg
NEW ENERGY FINANCE

The Business Council for
**Sustainable
Energy**[®]

No portion of this document may be reproduced, scanned into an electronic system, distributed, publicly displayed or used as the basis of derivative works without attributing Bloomberg Finance L.P. and the Business Council for Sustainable Energy. For more information on terms of use, please contact sales.bnef@bloomberg.net. Copyright and Disclaimer notice on the last page applies throughout. Developed in partnership with the Business Council for Sustainable Energy.

2016

SUSTAINABLE ENERGY IN AMERICA Factbook

Understanding the U.S. Energy Transformation

Home | About Us

Search

Share:   

It is a new era for American energy. In 2015, increased use of sustainable energy set the stage for a U.S. triple play of carbon reductions, cost savings and economic growth.

The 2016 edition of the Sustainable Energy in America Factbook – produced for the Business Council for Sustainable Energy by Bloomberg New Energy Finance, provides up-to-date, accurate market information about the broad range of industries – energy efficiency, renewable energy and natural gas – that are contributing to the country's move towards cleaner energy production and more efficient energy usage.

THE SUSTAINABLE ENERGY TRANSFORMATION

The energy productivity of the U.S. economy has **INCREASED BY 13%** from 2007 to 2015, and **2.3%** since 2014.



Get the 2016 Factbook



See State Spotlight

Browse the Brochure →



Watch the Video →



View the Slideshow →



Infographic



Get the Facts

- American energy productivity has increased by 13% from 2007 to 2015.
- 2015 was a record year for natural gas production, consumption, flows to power generation and volumes into storage.
- Renewable energy is a prominent part (20%) of the U.S. 2015 capacity mix, with 221GW installed across the country, a 57% increase over 2008 levels.
- Total U.S. investment in clean energy topped \$56 billion in 2015, the second highest level in the world.
- 2015 U.S. power sector carbon emissions fell to their lowest annual level since 1995.

Executive Summary



Industry Focus:

Energy Efficiency
Natural Gas
Renewable Energy

Quick Facts On:

Alternative Fuel Vehicles
Biomass/ Waste-to-Energy
Carbon Capture & Storage

Combined Heat & Power
Fuel Cells
Hydropower

State Spotlight

Learn about clean energy in the following states:

- Minnesota
- Nevada
- Pennsylvania
- Virginia
- See 2016 Factbook State & Regional Slides

Previous Factbook Editions

Download previous editions of the Factbook here.

2013



2014



2015



About the Factbook Partners

Bloomberg
NEW ENERGY FINANCE



The Business Council for
Sustainable Energy

Bloomberg New Energy Finance (BNEF) provides unique analysis, tools and data for decision makers driving change in the energy system. With unrivalled depth and breadth, BNEF helps clients stay on top of developments across the energy spectrum from our comprehensive web-based platform. BNEF has 200 staff based in London, New York, Beijing, Cape Town, Hong Kong, Munich, New Delhi, San Francisco, São Paulo, Singapore, Sydney, Tokyo, Washington D.C., and Zurich.

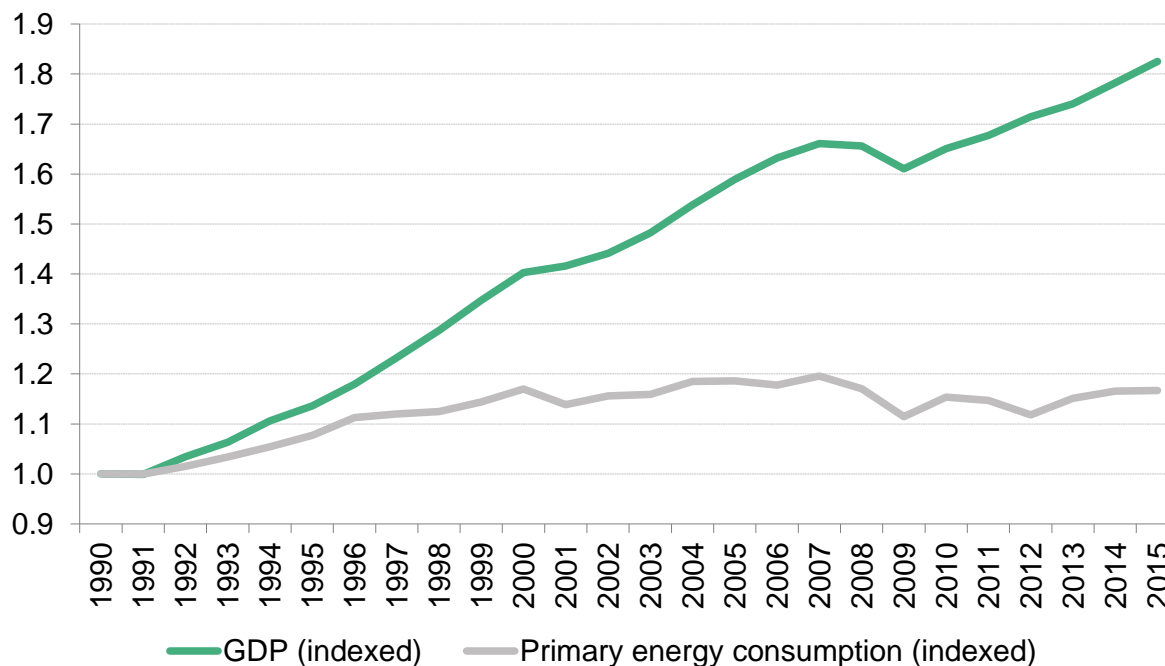
The Business Council for Sustainable Energy (BCSE) is a coalition of companies and trade associations from the energy efficiency, natural gas and renewable energy sectors. The Council membership also includes independent electric power producers, investor-owned utilities, public power, commercial end-users and project developers and service providers for energy and environmental markets.



**2015: A YEAR OF
MILESTONES**

Bloomberg
NEW ENERGY FINANCE

US energy overview: Economy's energy productivity: GDP and primary energy consumption (indexed to 1990 levels)

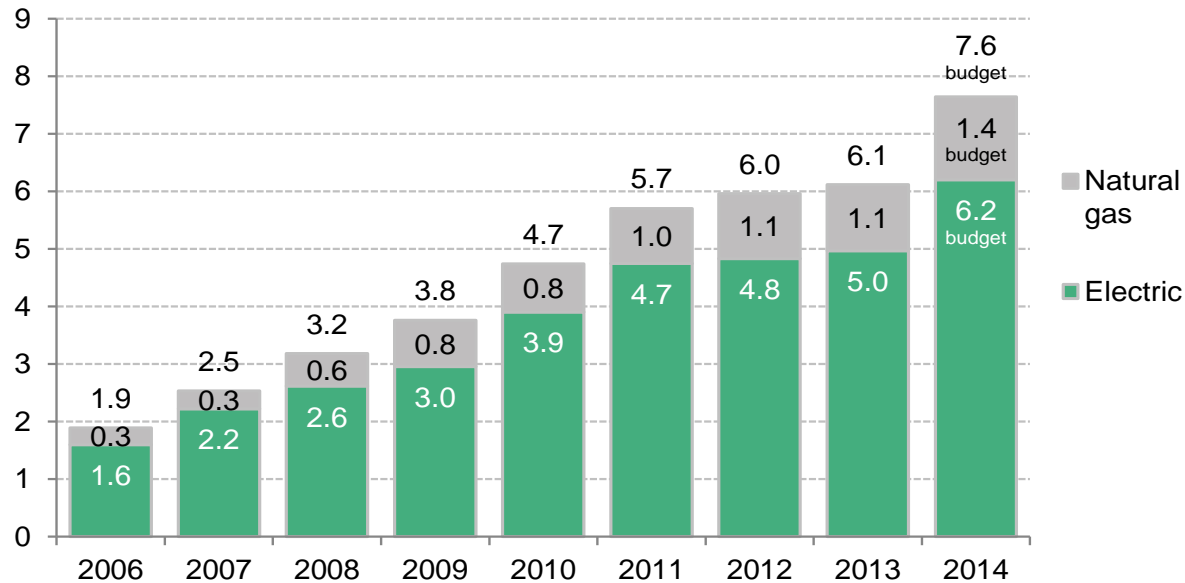


- The US economy is increasingly energy productive, resulting in a decoupling between growth in GDP and growth in energy consumption. As US GDP expanded 83% over the last 25 years, energy consumption only ticked up 17%.
- By one measure (US GDP per unit of energy consumed), productivity has improved 56% since 1990, 13% since 2007, and 2.3% between 2014 and 2015.

Source: US Energy Information Administration (EIA), Bureau of Economic Analysis, Bloomberg Terminal

Notes: Values for 2015 energy consumption are projected, accounting for seasonality, based on latest monthly values from EIA (data available through September 2015). GDP is real and chained (2009 dollars); annual growth rate for GDP for 2015 is based on consensus of economic forecasts gathered on the Bloomberg Terminal as of January 2016.

Financing: US utility energy efficiency spending and budgets (\$bn)

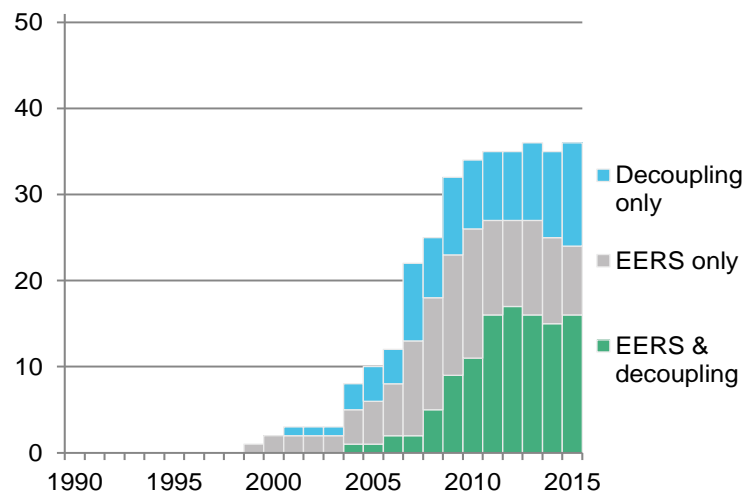


- From 2006 to 2011, US utility expenditure for energy efficiency grew 25% per year.
- The budgeted amount for 2014 would represent a 25% growth between 2013 and 2014.
- Maryland was the state with the largest increase in utility budgets for energy efficiency, with an increase from \$119m in 2013 to \$292m in 2014.
- In December 2015, US Congress renewed the energy-efficient commercial buildings tax deduction and nonbusiness (ie, residential) Energy-efficient Property Credit that retroactively reinstates tax credits for projects completed in 2015 and 2016.

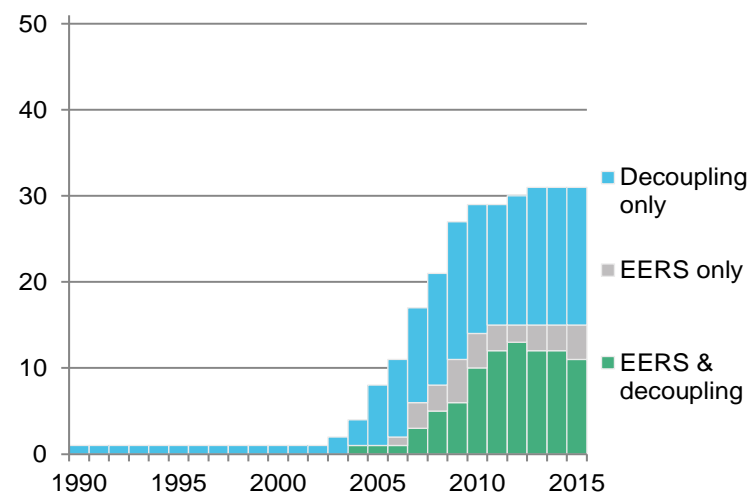
Source: CEE, ACEEE, Bloomberg New Energy Finance

Policy: US states with EERS and decoupling legislation for electricity and natural gas, 2015 (number of states)

Electricity



Natural Gas

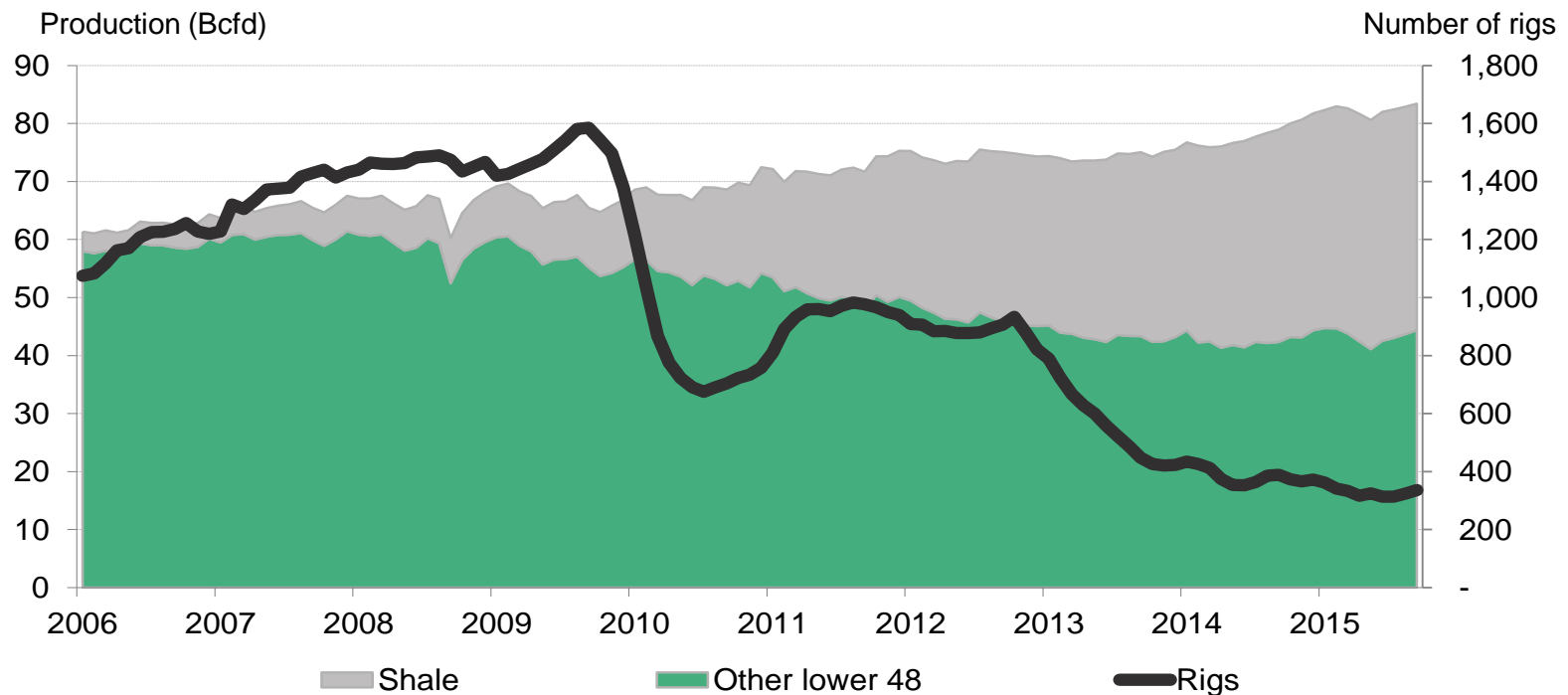


- The key policy story of the past decade has been the uptake of EERS targets and decoupling legislation among US states. However, momentum has slowed since 2010.
- Florida and Indiana removed their EERS schemes in 2014. In 2015, the “freeze” on the Ohio electricity EERS came into effect – this allows utilities that have achieved certain levels of savings to remove their efficiency programs.
- Louisiana, Washington and Minnesota added decoupling policies for electricity in 2015 (the latter two states already had gas decoupling legislation). Meanwhile, similar policies in Wisconsin drew to a close.
- Delaware, Utah and New Hampshire are working towards adopting EERS policies and electricity decoupling is planned for Colorado, Mississippi, Missouri, Nevada and New Mexico.

Source: ACEEE, Bloomberg New Energy Finance

Notes: Decoupling includes all lost revenue adjustment mechanisms, but no longer includes pending policies as per a methodology change in ACEEE reporting.

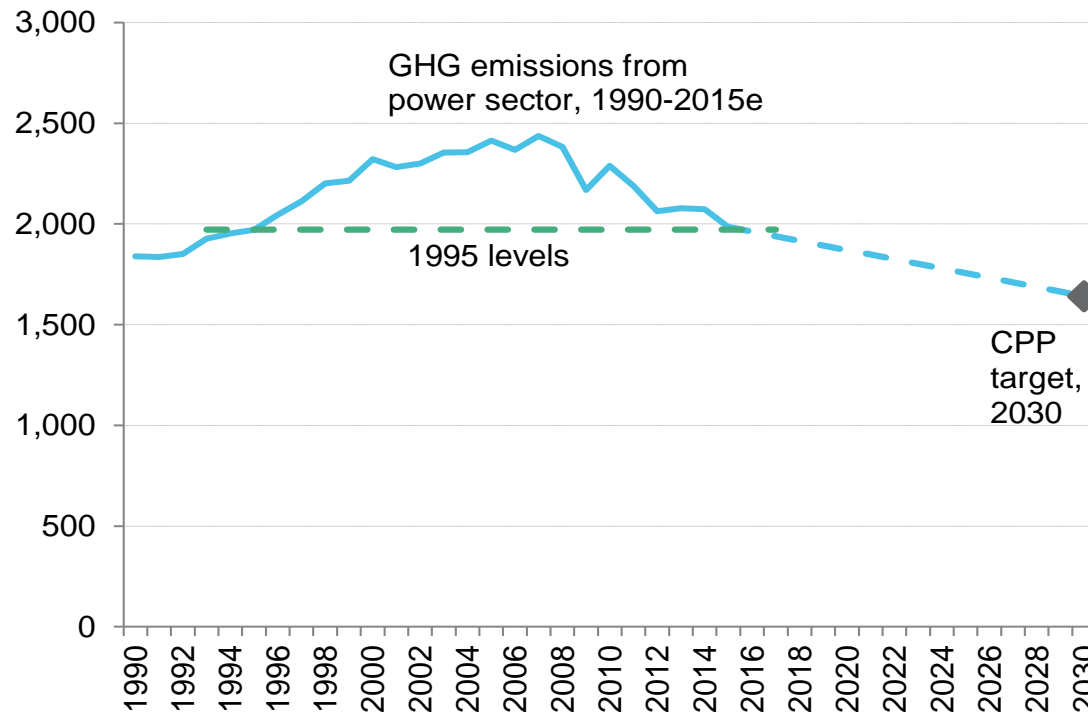
Deployment: US natural gas production and gas-directed rig count (Bcfd, rigs)



- Natural gas production in 2015 was up 7% from 2014 levels, 26% from 2007 levels. Shale production now accounts from almost half of total.
- Technological improvements in efficiencies (like pad drilling and longer laterals) and drilling in productive “sweet spots” has allowed production to increase even as rig counts drop.

Source: Bloomberg New Energy Finance, EIA, Baker Hughes. Data up through the latest comprehensive numbers available (September 2015).

US energy overview: Greenhouse gas emissions from the power sector (MtCO₂e)



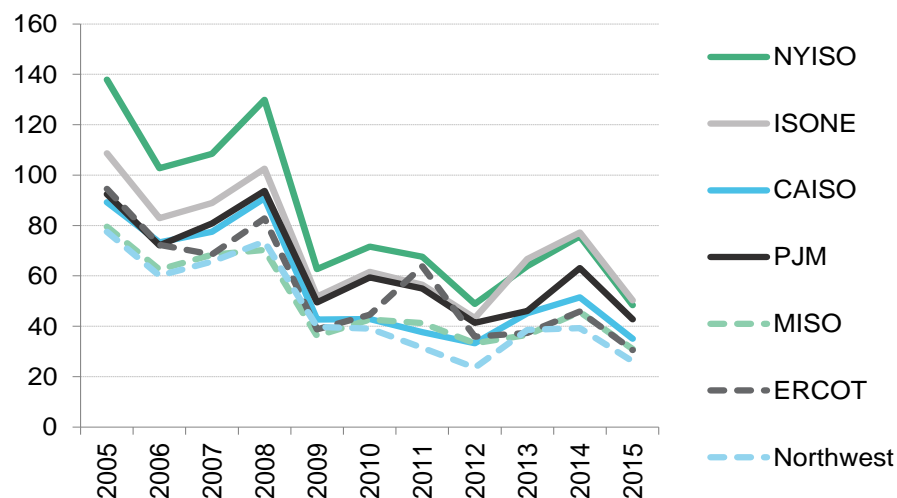
- In 2015, power-sector emissions sunk to their lowest levels (1,985Mt) since 1995 as cleaner-burning natural gas has displaced generation from coal-fired power plants.
- Emissions are 18% below 2005 levels.
- The Clean Power Plan targets a 32% cut from 2005 levels by 2030.

Source: Bloomberg New Energy Finance, EIA, EPA

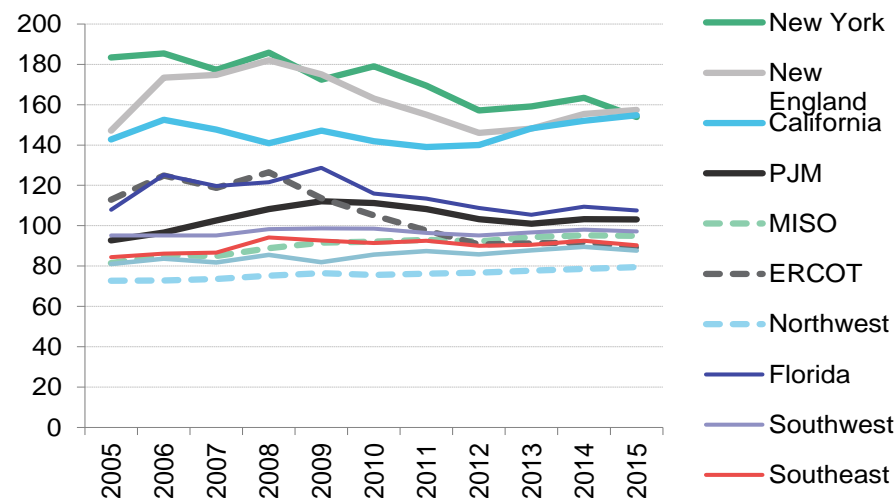
Notes: Values for 2015 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through September 2015).

US energy overview: Retail and wholesale power prices

Wholesale power prices (\$/MWh)



Average retail power prices (\$/MWh)

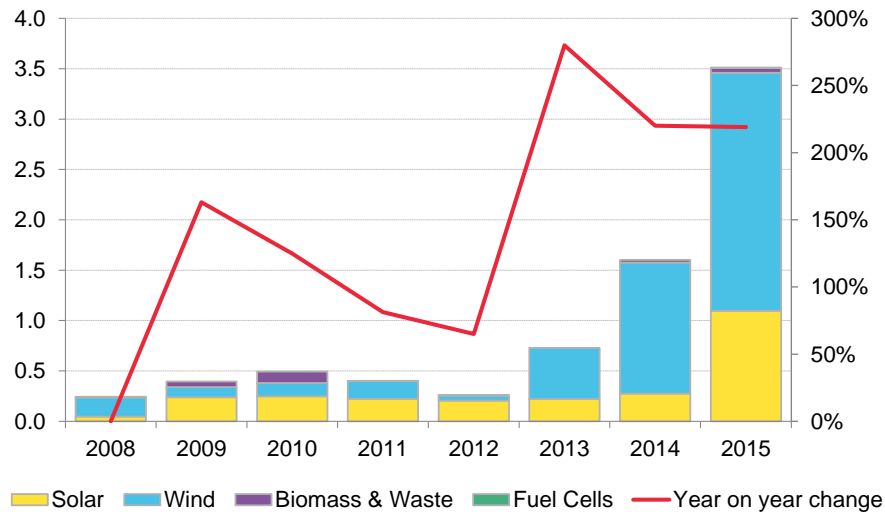


- Wholesale prices fell by about a third in 2015, as natural gas prices fell and more renewables connected to the grid.
- Retail power prices in most regions remain well below the peak prices seen in 2008-09.
- In 2015, retail electricity rates fell by 1.3% on average nationwide. New York (-5.8%) and Texas (-2.7%) saw the biggest year-on-year declines.
- Exceptions included California and New England where retail prices rose marginally (1.8% and 1.3%, respectively).

Source: Bloomberg New Energy Finance, EIA, Bloomberg Terminal Notes: Data through end-November 2015. Wholesale prices taken from proxy power hubs in each ISO. Prices are in real 2014 dollars.

Finance: Corporate procurement of clean energy

Renewable capacity contracted by corporations, by technology, 2008-15 (MW)



Key players in corporate procurement



- Corporate procurement of clean energy doubled in 2014 and again in 2015, breaching 3.5GW.
- Wind and solar are the energy technologies of choice. When procurement levels were low between 2008 and 2012, solar generally made up the majority of MW. After corporate procurement took off in 2013, however, wind has made up the dominant portion of procurement.
- Google has been the largest player to date, procuring 71MW of solar and 1.6GW of wind. Amazon is second, with 80MW of solar and 458MW of wind contracted in 2015 alone. Large individual projects include Facebook's 202MW purchasing power agreement (PPA) with Shannon Wind Farm in Texas, and Apple's 153MW PPA with First Solar.

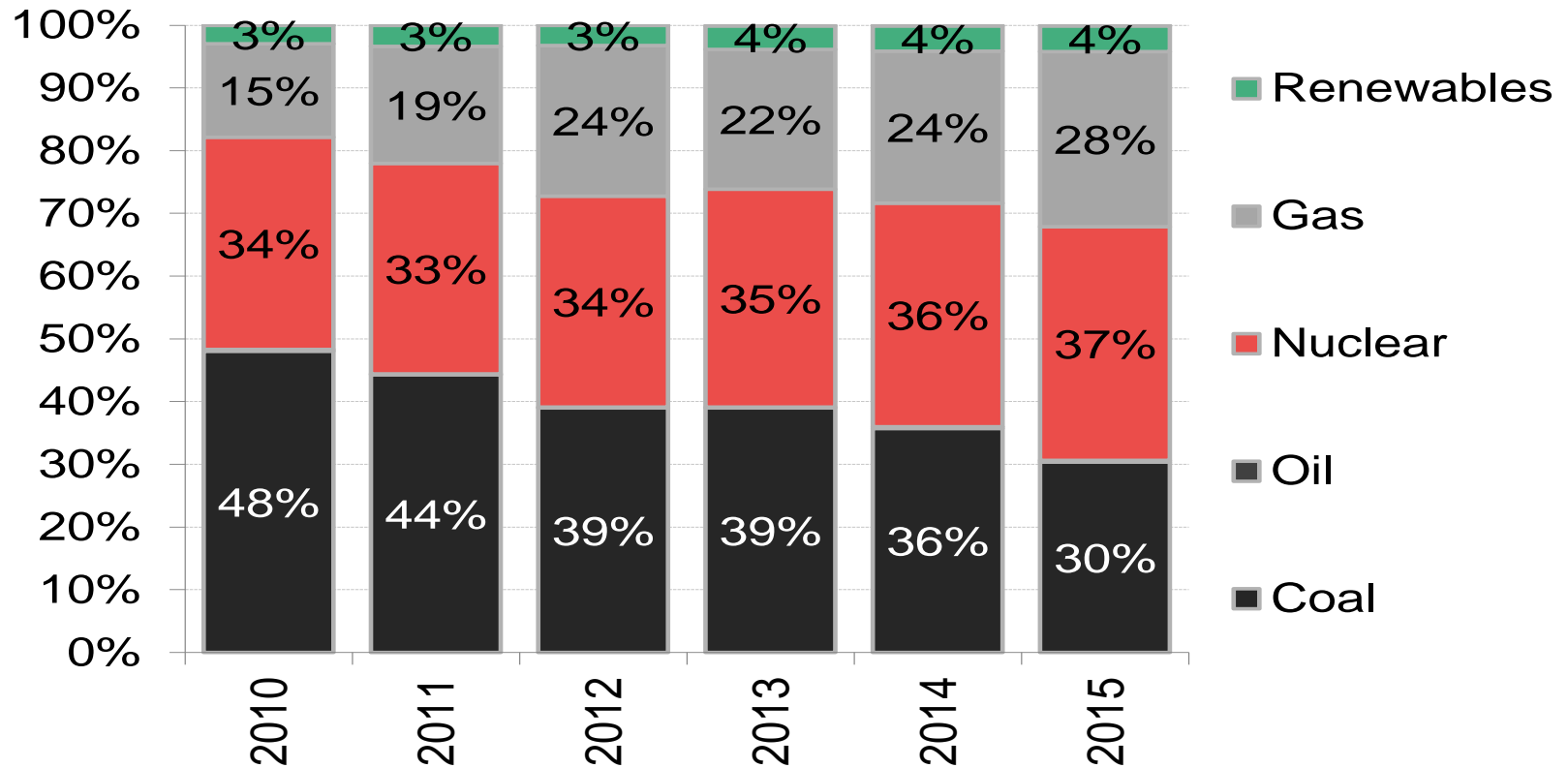
Source: Bloomberg New Energy Finance, company announcements Note: this slide has been updated to reflect two late-reporting commitments from Google for 0.4GW of wind contracts.

July 2016

STATE ENERGY FACTSHEET: PENNSYLVANIA

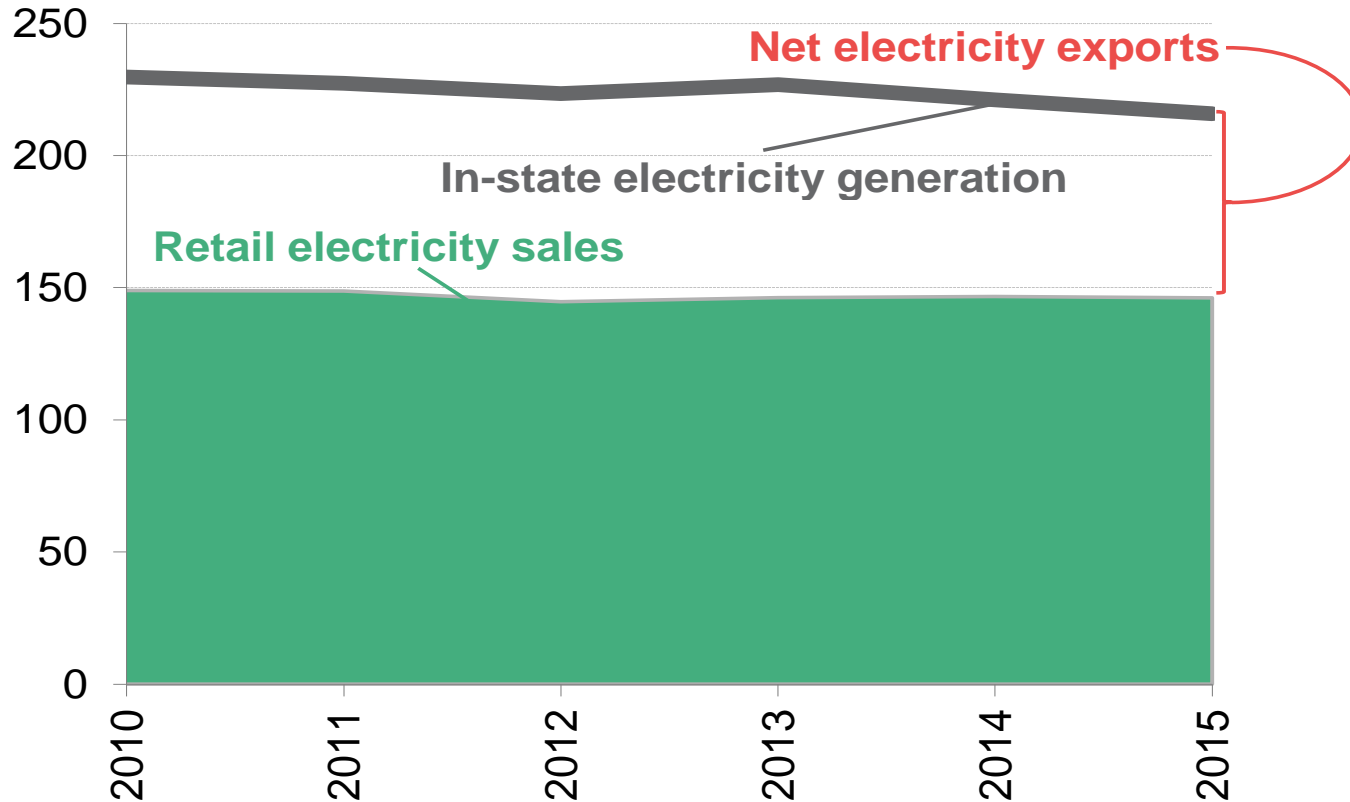
Bloomberg
NEW ENERGY FINANCE

PA ELECTRICITY GENERATION MIX BY TECHNOLOGY, 2010-15 (%)



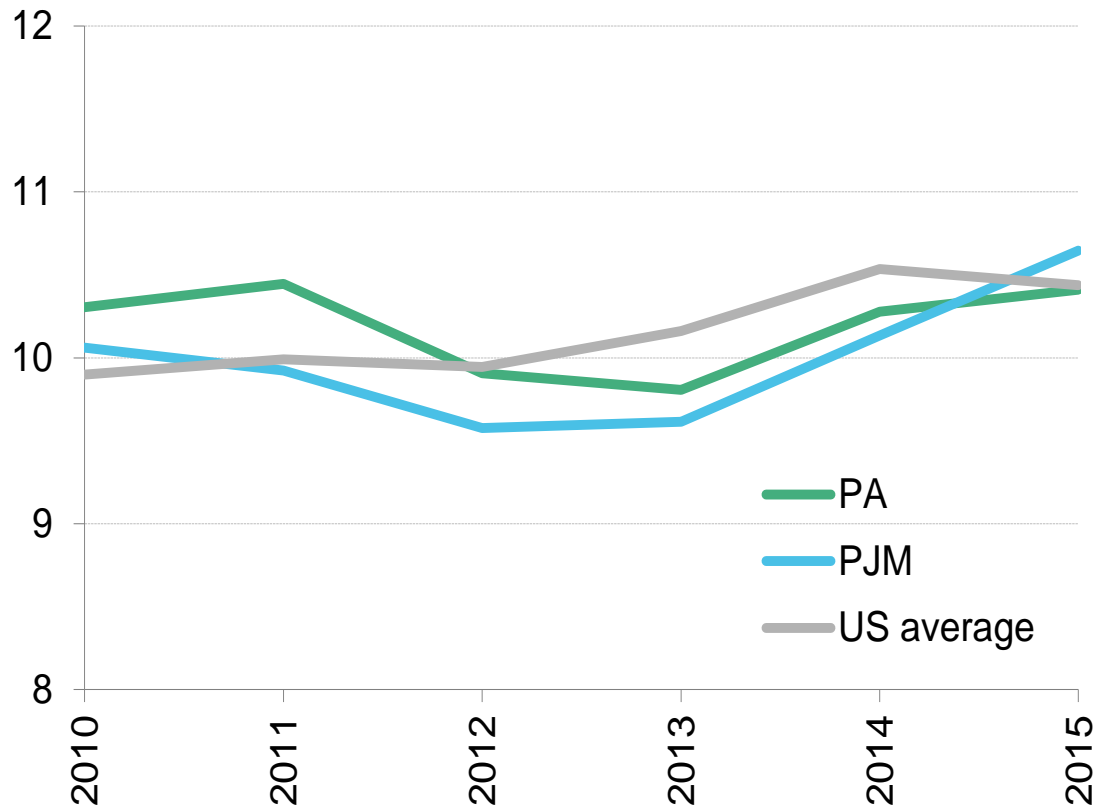
Source: Bloomberg New Energy Finance, EIA

PA ELECTRICITY SALES AND GENERATION, 2010-15 (TWH)



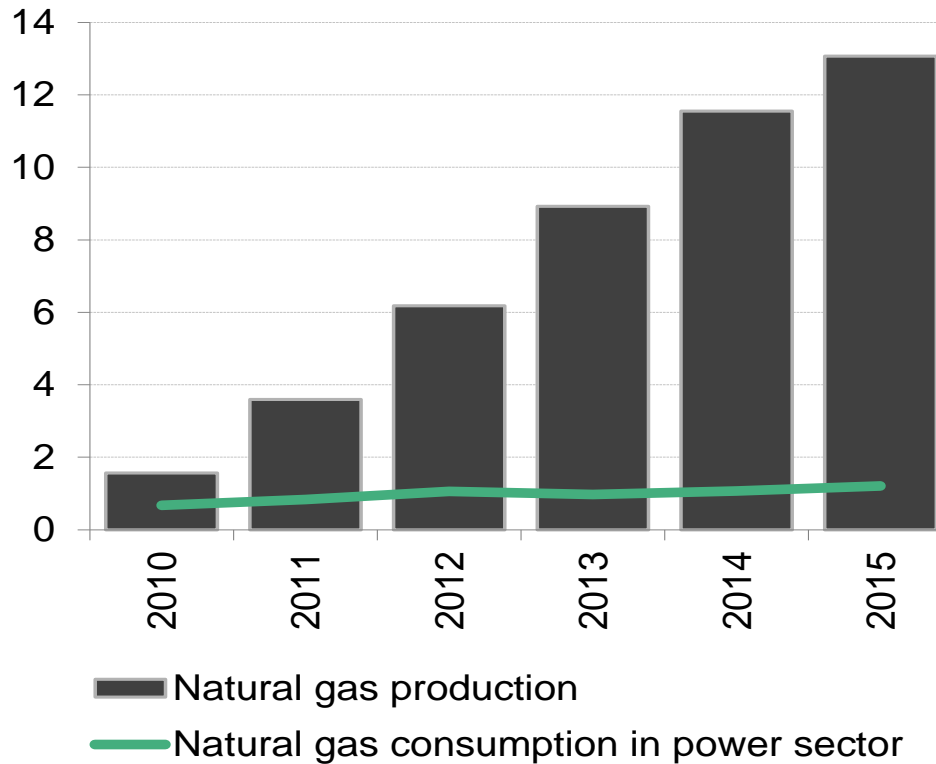
Source: Bloomberg New Energy Finance, EIA

PA ELECTRICITY PRICES RELATIVE TO REGIONAL (PJM) AND US AVERAGES, 2010-15 (¢/KWH)



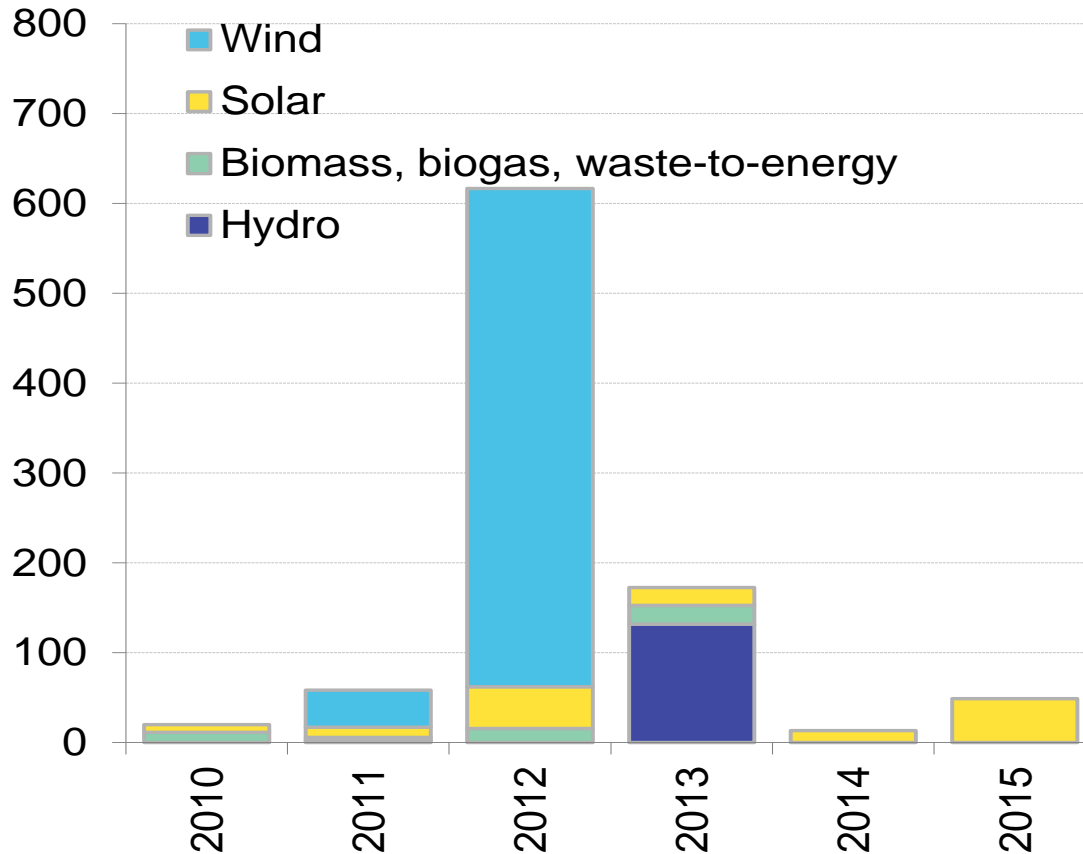
Source: Bloomberg New Energy Finance, EIA Note: PJM is PA's wholesale power market, composed of 13 neighboring states.

PA NATURAL GAS PRODUCTION AND POWER SECTOR CONSUMPTION, 2010-15 (BCFD)



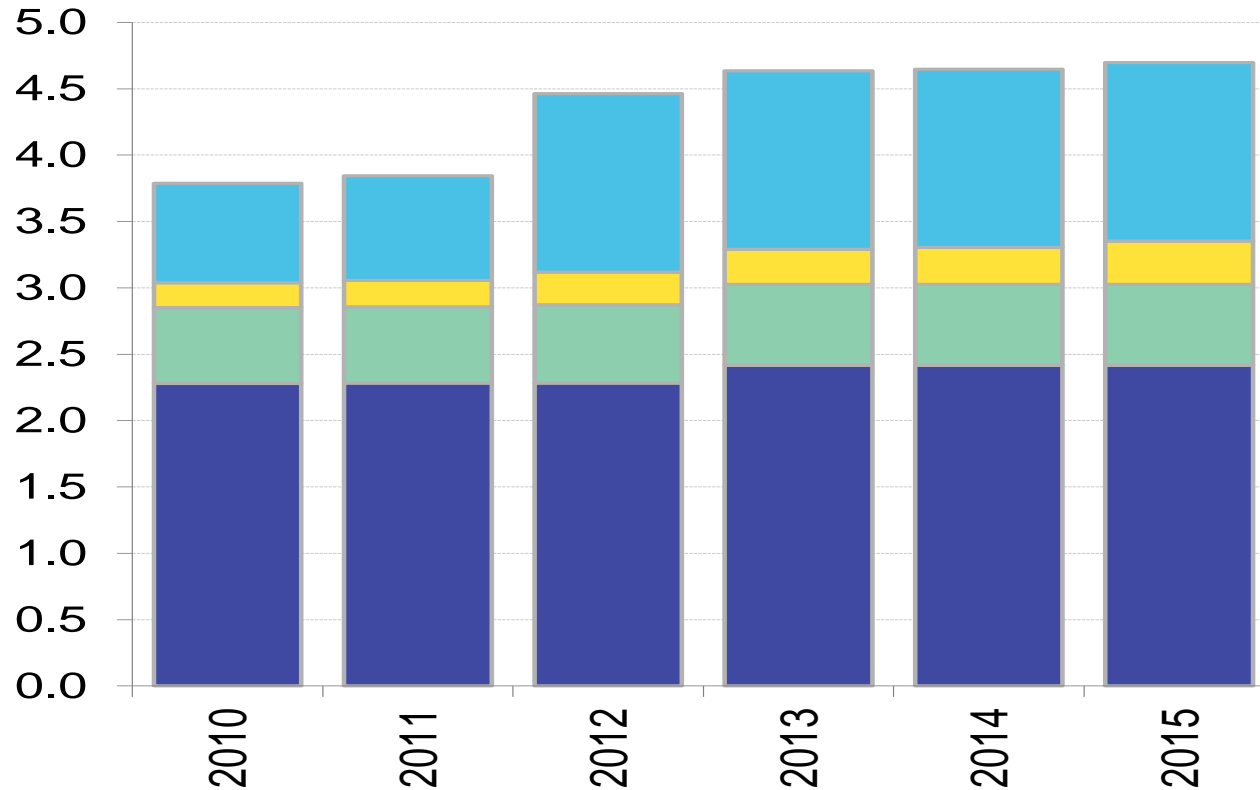
Source: Bloomberg New Energy Finance, EIA

PA RENEWABLE CAPACITY ADDITIONS, 2010-15 (MW)



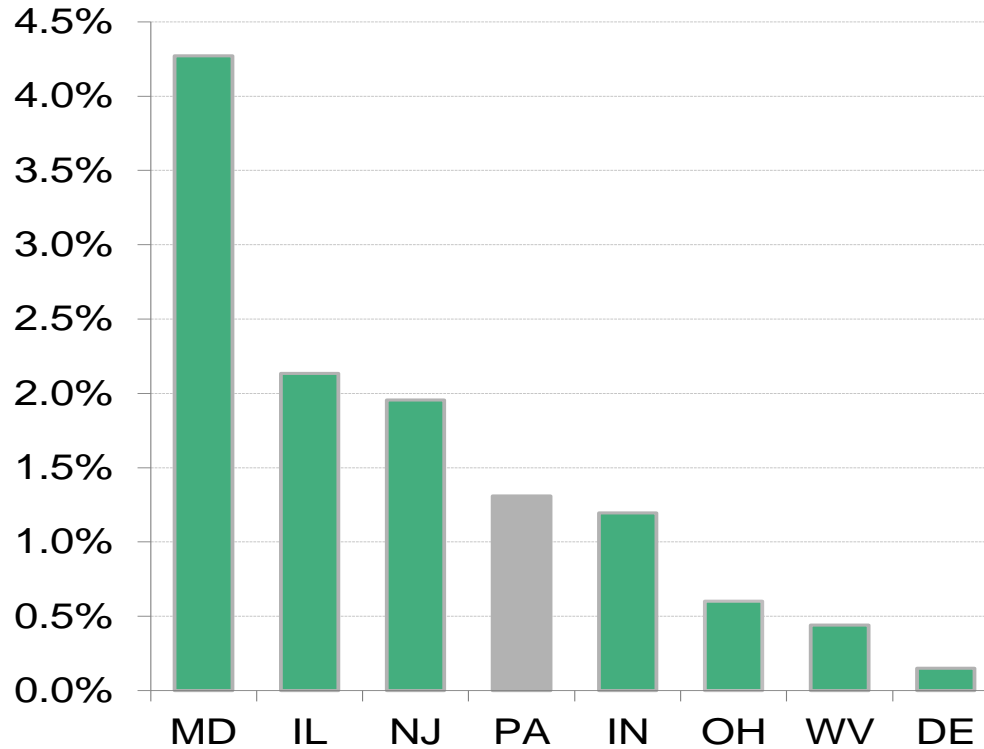
Source: Bloomberg New Energy Finance, EIA Note: includes BNEF data on distributed (ie, residential, commercial, and industrial) solar capacity.

PA CUMULATIVE RENEWABLE CAPACITY, 2010-15 (GW)



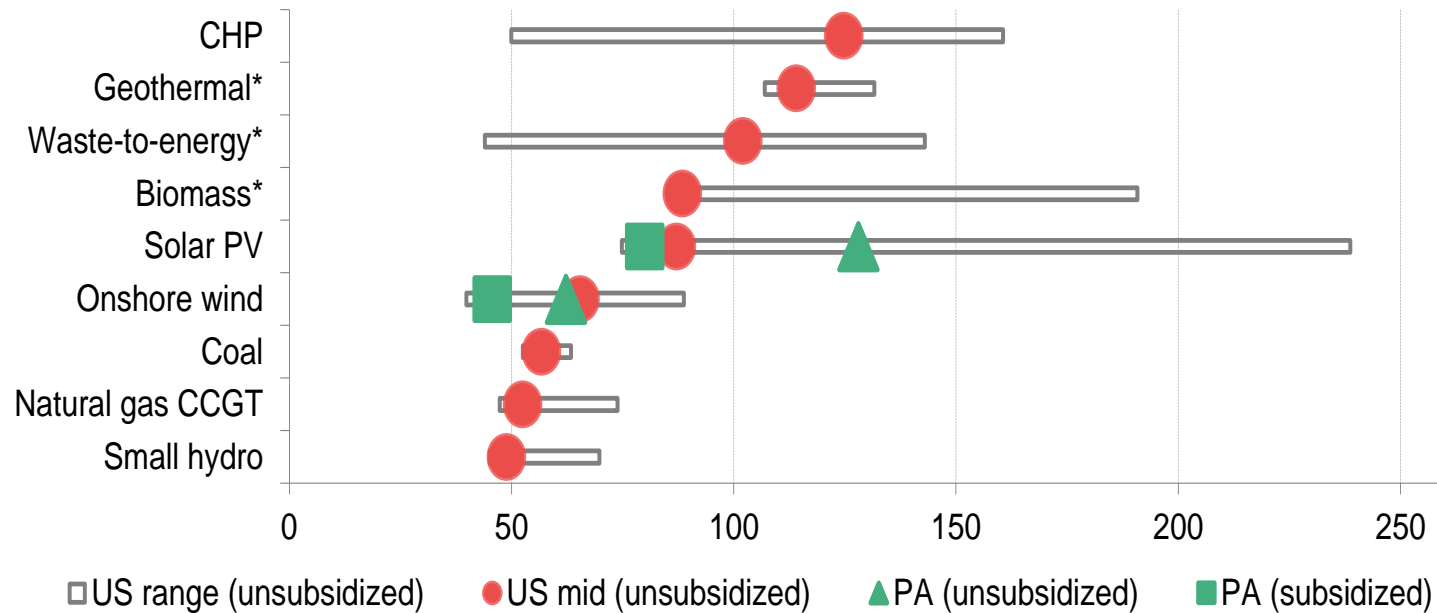
Source: Bloomberg New Energy Finance, EIA Note: includes BNEF data on distributed (ie, residential, commercial, and industrial) solar capacity.

STATES' UTILITY ELECTRICITY EFFICIENCY BUDGETS AS A FRACTION OF STATE-WIDE ELECTRICITY REVENUE, 2014 (%)



Source: ACEEE

UNSUBSIDIZED LCOE OF SELECT TECHNOLOGIES IN THE US COMPARED TO SUBSIDIZED AND UNSUBSIDIZED LCOE OF ONSHORE WIND AND SOLAR PV IN PA, H1 2016 (\$/MWH)



Source: Bloomberg New Energy Finance. Notes: *LCOE for waste-to-energy in this report is a global estimate; biomass and geothermal LCOEs are Americas region estimates; all other LCOEs in Figure 13 are either US or PA-specific. Variations in PA versus US average result from variations in capacity factor, capex and financing rates. Bars indicate the range of unsubsidized LCOE for each technology in the US. Key policies such as the \$23/MWh Production Tax Credit (PTC) and accelerated depreciated (MACRS) bring down unsubsidized LCOEs to subsidized levels. LCOE for combined heat and power (CHP) is for reciprocating engines with CHP. LCOE for small hydro assumes 56% capacity factor, but this can vary significantly depending on annual rainfall conditions.

Contact Us

*Lisa Jacobson, President
Business Council for Sustainable Energy
805 15th Street, NW, Suite 708
Washington, DC 20004
ljacobson@bcse.org*
