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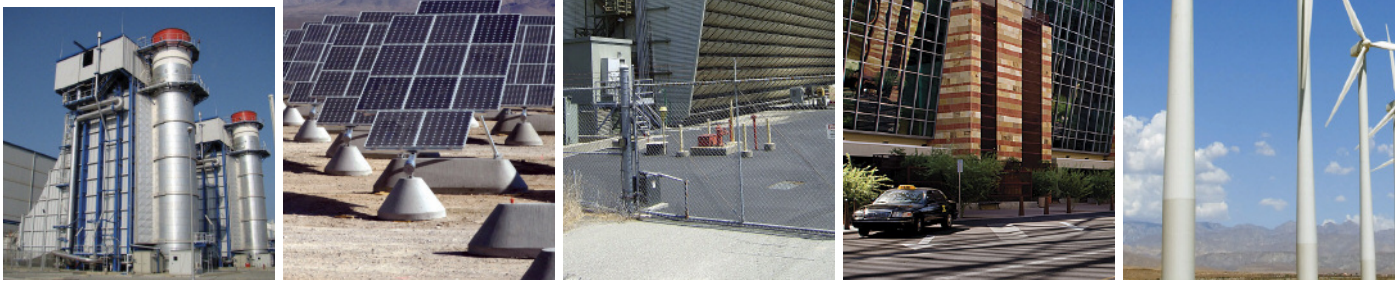
BENCHMARKING UTILITY CLEAN ENERGY DEPLOYMENT: 2016

Ranking 30 of the Largest U.S. Investor-Owned Electric Utilities on Renewable Energy & Energy Efficiency



Ceres, Inc., in partnership with Clean Edge, Inc.

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with
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Note: This version of the report includes updated renewable energy data for American Electric Power shown in Figure 10.

About Ceres

Ceres is a nonprofit organization mobilizing business and investor leadership on climate change, water scarcity and other sustainability challenges. Ceres directs the Investor Network on Climate Risk, a network of over 121 institutional investors with collective assets totaling more than $14.5 trillion. For more information, visit www.ceres.org or follow Ceres on Twitter: @CeresNews

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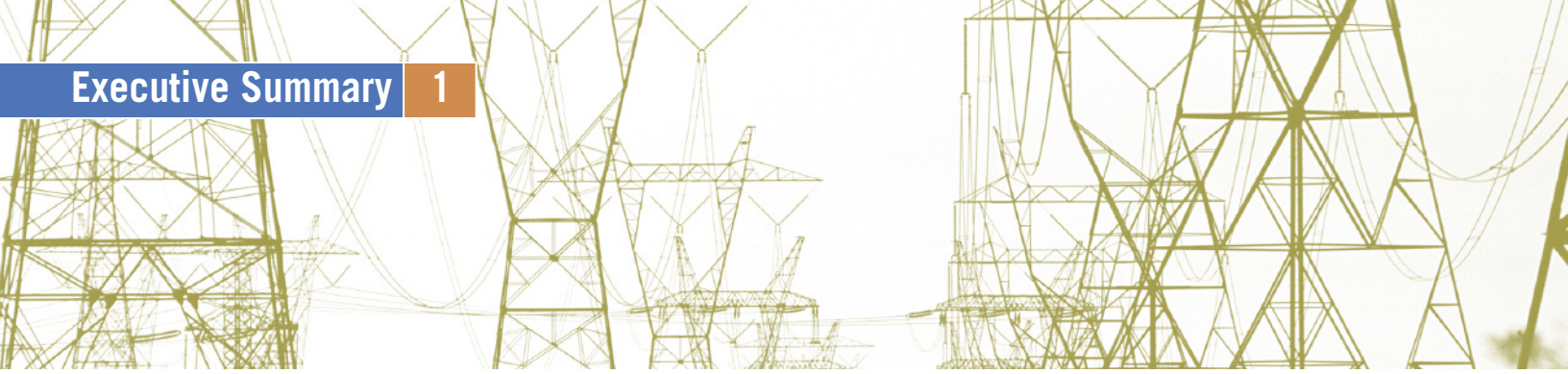


Benchmarking Utility Clean Energy Deployment: 2016

Benchmarking Utility Clean Energy Deployment: 2016 reflects clean energy progress by the largest electric utilities in the United States at a time when worldwide momentum toward clean energy has never been greater. The historic Paris Climate Agreement, forged by 195 countries in December 2015, punctuated a year in which global clean energy investments and renewable energy installations reached all-time highs. The year was also marked by record high global temperatures and several of the strongest hurricanes and typhoons on record, providing yet more evidence of the economic and human cost of climate change and the urgency of accelerating clean energy use globally.

This report provides a window into how the global transition toward clean energy is playing out in the U.S. electric power sector. Specifically, it reveals the extent to which 30 of the largest U.S. investor-owned electric utility holding companies are increasingly deploying clean energy resources to meet customer needs.

The 30 holding companies evaluated in the report represent 119 electric utility subsidiaries located throughout the U.S.[1] Collectively, these companies accounted for nearly 60 percent of total U.S. electric industry sales in 2014, the most recent year for which data is available and the reporting year in which these companies are benchmarked.[2]

While these utilities differ widely in size, geography, resource profiles and ownership of generation assets, they all share an obligation to provide the public with safe and reliable service at reasonable rates, and a responsibility for maintaining and modernizing the electric distribution grid. As such, their role in enabling widespread U.S. clean energy deployment is vital.

The report assembles recent data from more than 10 sources, including state Renewable Portfolio Standard (RPS) annual reports, U.S. Securities and Exchange Commission 10-K filings, and Public Utility Commission reports, to show how some of the largest U.S. electric utilities stack up on renewable energy and energy efficiency performance. To our knowledge, it is the only single source of information on how U.S. electric utilities rank in terms of their actual deployment of clean energy solutions.

Benchmarking these companies provides an opportunity for transparent reporting and analysis of important industry trends. It fills a knowledge gap by offering utilities, regulators, investors, policymakers and other stakeholders consistent and comparable information on which to base their decisions. And it provides perspective on which utilities are best positioned in a shifting policy landscape, including likely implementation of the U.S. EPA's Clean Power Plan aimed at reducing carbon pollution from power plants.[3]

1 This report, like the 2014 edition, excludes two large electric utility holding companies, Energy Future Holdings and Reliant Energy, because little if any data about their clean energy performance could be found.

2 Collectively, these 30 holding companies sold 2.24 billion megawatt-hours (MWh) of electricity in 2014, compared with total U.S. retail electricity sales of 3.76 billion MWh; see U.S. Energy Information Administration (EIA), "Electric Power Monthly, Table 5.1: Sales of Electricity to Ultimate Customers," last updated April 28, 2016, http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_01.

3 In February 2016, the U.S. Supreme Court halted the Clean Power Plan's implementation until legal challenges are resolved. Despite this, many observers feel the plan is likely to move forward following a ruling by the D.C. Circuit Court that's expected in fall 2016. See Brad Plumer, "What Antonin Scalia's death means for Obama's climate plans," Vox.com, February 14, 2016, http://www.vox.com/2016/2/14/10989694/scalia-obama-climate-plan.

Key Developments

Here are just a few of the major developments affecting utility deployment of clean energy since Ceres published the first edition of this *Benchmarking* report in 2014:

- **World leaders have committed to act on global warming.** The targets and timetables established in the Paris Agreement represent an unprecedented level of international cooperation and commitment to avert the worst impacts of climate change. Achieving these ambitious goals will require worldwide clean energy investment to increase by an additional $1 trillion *per year* through 2050—what Ceres calls the "Clean Trillion." A significant component of this investment is needed to build new renewable power generation.
- **Policy support for clean energy in the U.S. is stronger than ever.** Recent five-year extensions of the federal investment tax credit (ITC) and production tax credit (PTC) will drive tremendous additional deployment—and further cost reductions—of wind and solar power regardless of how EPA's Clean Power Plan is implemented.[4] Further, several states including California, Hawaii, New York, Oregon and Vermont have strengthened already-robust renewable energy commitments, with new RPS targets ranging between 50 and 100 percent.
- **U.S. clean energy deployment has reached all-time highs.** The U.S. added a record 7.3 gigawatts (GW) of solar photovoltaic (PV) capacity and 8.6 GW of wind in 2015, bringing total installed capacity to 25.6 GW for solar PV and 74.4 GW for wind.[5] In other words, U.S. solar PV and wind capacity grew by more than 28 percent and 11 percent, respectively, *in a single year.* Looking specifically at utility-scale resources, solar and wind represented more than 60 percent of U.S. total net capacity additions in 2015.[6] Further cost declines in renewable technologies, particularly solar PV, are expected to reinforce and accelerate this trend. Similarly, investment and savings from U.S. electric sector energy efficiency programs have reached unprecedented levels.[7]
- **Energy storage—a potentially grid-transforming technology—has grown by leaps and bounds.** California's first-in-the-nation energy storage mandate helped to catalyze nearly 250 percent growth in U.S. energy storage deployments from 2014 to 2015, with eight-fold growth predicted over the next five years.[8] Energy storage could play a critical role in enabling utilities to add much greater levels of variable renewable energy resources to the grid.
- **State policy approaches to address the recent rapid expansion of distributed solar PV have become a top-tier concern.** All but four U.S. states took some type of solar policy action in 2015. Twenty-seven states considered or enacted changes to net metering policies, which compensate customers for the rooftop solar energy they provide to the grid, while 61 utilities in 30 states requested increases in monthly fixed charges for residential customers.[9]
- **Some state utility regulators have begun actively exploring new regulatory models to enable new utility business models.** The best known of these, New York's Reforming the Energy Vision (REV) initiative, has taken a ground-up approach to reinventing the state's electricity marketplace, with utilities serving as "distribution system platform providers" that increasingly rely on demand-side management, efficiency improvements, and distributed energy resources to meet consumer needs.
- While this report benchmarks clean energy performance at the holding company level, it's important to note that **some utility subsidiaries are achieving even higher levels of renewables penetration.** Berkshire Hathaway's MidAmerican Energy, for example, currently gets 41 percent of its generation capacity from wind power (at year-end 2015) and has announced a vision of getting to 100 percent renewables.[10]
- **Corporate and consumer demand for clean energy and continually improving economics are driving utility clean energy procurement above and beyond policy requirements.** With power purchase agreement (PPA) prices for utility-scale solar PV falling to all-time

4 John Larsen, Whitney Herndon, and Kate Larsen, "What Happens to Renewable Energy Without the Clean Power Plan?," *Rhodium Group Note*, February 25, 2016, http://rhg.com/notes/renewable-energy-without-the-clean-power-plan.

5 GTM Research and Solar Energy Industries Association (SEIA), "U.S. Solar Market Insight Report: 2015 Year-In-Review," March 9, 2016, available at http://www.greentechmedia.com/research/subscription/u.s.-solar-market-insight (registration required); American Wind Energy Association (AWEA), "U.S. Wind Industry Fourth Quarter 2015 Market Report," http://awea.files.cms-plus.com/FileDownloads/pdfs/4Q2015%20AWEA%20Market%20Report%20Public%20Version.pdf.

6 Robert Walton, "Solar and wind comprise 61% of 2015 capacity additions, gas contributes 35%," *UtilityDive.com*, January 11, 2016, http://www.utilitydive.com/news/solar-and-wind-comprise-61-of-2015-capacity-additions-gas-contributes-35/411813/.

7 Consortium for Energy Efficiency, "2015 State of the Efficiency Program Industry," March 18, 2016, http://library.cee1.org/sites/default/files/library/12628/CEE_2015_Annual_Industry_Report.pdf; Annie Gilleo, "Electricity savings keep rising, year after year," *ACEEE Blog: Data Points*, January 26, 2016, http://aceee.org/blog/2016/01/electricity-savings-keep-rising-year.

8 GTM Research and Energy Storage Association, "U.S. Energy Storage Monitor: 2015 Year In Review Executive Summary," available at http://www.greentechmedia.com/research/subscription/u.s.-energy-storage-monitor (registration required).

9 "N.C. Clean Energy Technology Center Releases Q4 Solar Policy Update to The 50 States of Solar," North Carolina Clean Energy Technology Center press release, February 23, 2016, https://nccleantech.ncsu.edu/n-c-clean-energy-technology-center-releases-q4-solar-policy-update-to-the-50-states-of-solar/.

10 "Our 100% Renewable Energy Vision," MidAmerican Energy, accessed June 8, 2016, https://www.midamericanenergy.com/our-renewable-energy-vision.aspx.

lows, utilities are beginning to procure larger amounts of solar based simply on its economic merits.[11] (Utilities have procured cheap wind power for years.) Surging corporate demand for renewable energy—marked by a nearly three-fold increase in corporate renewable deals between 2014 and 2015—has also urged utilities in this direction.[12]

Company Rankings

This report compares utility holding companies on three key indicators of clean energy deployment:

1) **Renewable energy sales:** The total amount of renewable electricity sold to retail customers during the reporting year, including from owned power plants, power purchase agreements (PPAs), and retired Renewable Energy Certificates (RECs).[13]
2) **Incremental energy efficiency savings:** All reporting-year energy savings from i) new participants in existing programs, and ii) all participants in new programs.
3) **Life Cycle energy efficiency savings:** Estimated savings from all energy efficiency programs put in place during the reporting year, including reporting year savings and all future anticipated savings.[14]

All three indicators are provided as a percentage of annual retail sales to allow for comparison across utilities of different sizes. This report focuses on the amount of renewable energy delivered from electric utilities to their customers, and does not cover independent power producers. Since states have different approaches to defining and tracking renewable energy, the renewable energy sales findings in this report aren't intended to reflect utility compliance with state RPS targets. Nevertheless, the renewable energy sales data provided in this report are a useful indicator of the utilities' clean energy deployment.

Our analysis finds wide disparities in the extent to which the power providers are utilizing renewable energy and energy efficiency. For example, just four of the 30 companies included in the report accounted for more than half of total renewable energy sales.

Sempra Energy, PG&E, Edison International and Xcel Energy ranked the highest for renewable energy sales, with renewable resources accounting for more than 20 percent—and, in Sempra's case, nearly 36 percent—of their retail electricity sales in 2014. SCANA, PPL and FPL ranked at the bottom, with renewable energy sales accounting for less than two percent of their total retail electricity sales.[15]

Eversource Energy, PG&E, Portland General Electric, National Grid and Pinnacle West performed the best on incremental energy efficiency savings. Each achieved annual savings of at least 1.5 percent of their total retail electric sales. In doing so, they are helping their customers save on their energy bills while also helping avoid the need to build costly new power generation capacity. The weakest performers, with minimal or no energy efficiency savings, were **Southern Company, Entergy, Dominion Resources and FPL.** Similarly, leaders in life cycle energy savings include most of the same companies, but with Exelon bumping Portland General Electric out of the top five.

Top-performing utilities on renewable energy and energy efficiency are located almost entirely in states with more ambitious clean energy policy goals such as California, Illinois, Massachusetts, Minnesota, New York, and Oregon, while utilities with poor results are typically in states with weak policies, many of them being in the Southeast.

11 Colin Smith, "What Drives Utility Solar Growth in a Post-ITC-Extension World?," *GreentechMedia*, March 24, 2016, http://www.greentechmedia.com/articles/read/What-Drives-Utility-Solar-Growth-in-a-Post-ITC-Extension-World.

12 Rocky Mountain Institute, "Business Renewables Center Newsletter: January 2016," http://www.rmi.org/business_renewables_center_newsletter_002_jan_2016.

13 We've made a small change to our methodology for calculating renewable energy sales in the 2016 edition of this *Benchmarking* report. The denominator now includes only "bundled" retail electricity sales (where the utility is paid for both delivering and supplying power) and excludes "unbundled" sales (where the utility is paid for delivering power that the customer has purchased from another provider). This aligns better with utility obligations vis-à-vis state RPS targets. The denominator for both energy efficiency metrics remains bundled plus unbundled retail electricity sales, since utilities offer energy efficiency programs to customers who purchase power from other suppliers.

14 Since this *Benchmarking* report was first published in 2014, EIA has changed the energy efficiency information it gathers on Form 861. Rather than asking utilities for cumulative energy efficiency data (which captures all energy savings from all energy efficiency programs active in a given year), EIA now requests life cycle energy efficiency data as described above. We have updated our terminology to reflect this change.

15 This report's renewable energy sales ranking omits Southern Company because no publicly available data could be found and numerous data requests went unfulfilled. Note that this report only benchmarks performance by regulated utilities and not independent power producers (IPPs) or unregulated subsidiaries of utility holding companies.

Figure ES-1: Top Ranked U.S. Investor-Owned Electric Utilities on Clean Energy Deployment

Utility Rank	Renewable Energy Sales† (% of 2014 bundled retail electric sales)	Incremental Annual Energy Efficiency (% of 2014 retail electric sales)	Life Cycle Energy Efficiency (% of 2014 retail electric sales)
1	Sempra Energy (36.45)	Eversource Energy (1.87)	Eversource Energy (20.20)
2	PG&E (25.90)	PG&E (1.79)	National Grid (17.74)
3	Edison International (23.15)	Portland General Electric (1.67)	PG&E (17.49)
4	Xcel Energy (20.63)	National Grid (1.59)	Exelon (16.17)
5	PSEG (13.28)	Pinnacle West (1.50)	Pinnacle West (15.74)

Figure ES-2: Lowest Ranked U.S. Investor-Owned Electric Utilities on Clean Energy Deployment

Utility Rank	Renewable Energy Sales† (% of 2014 bundled retail electric sales)	Incremental Annual Energy Efficiency (% of 2014 retail electric sales)	Life Cycle Energy Efficiency (% of 2014 retail electric sales)
26	Entergy (2.06)	OGE Energy (0.36)	SCANA (4.30)
27	SCANA (1.81)	Southern Company (0.29)	Southern Company (3.47)
28	PPL Corp (1.02)	Entergy (0.24)	OGE Energy (2.95)
29	ConEdison (0.94)	FPL (0.20)	Entergy (2.66)
*30	FPL (0.17)	Dominion Resources (0.10)	Dominion Resources (1.50)

† Renewable Energy Sales is a % of bundled only sales
* Utility Rank of Renewable ranked to 29, as it does not contain one company: Southern Company
* Utility Rank of Life Cycle EE ranked to 29, as it does not contain one company: FPL

Source: Ceres analysis, based on data from EIA, company documents, PUC reports and other sources.

Overall, these 30 companies provided more than 136,000 GWH of renewable energy to their retail customers in 2014, and achieved incremental annual energy efficiency savings of more than 19,000 GWh. This represents year-on-year growth of 13 percent for renewable energy sales and 9 percent for energy efficiency savings as compared with 2013.

Full company rankings and underlying data are available for download at www.ceres.org/cleanenergyreport.

Other Key Findings

- **State policies remain a key driver in utility clean energy deployment.** The top-performing utilities on renewable energy sales are typically based in states and regions with more ambitious policy goals, while utilities delivering the lowest amounts of renewable energy to their customers are mostly located in the Southeast, which historically has had weak state-level support for clean energy.[16]
  - Similarly, all of the top-performing utilities on energy efficiency are located in states with policy support for utility energy efficiency programs, including Arizona, California, Connecticut, Illinois, Massachusetts, Oregon and Rhode Island.
  - Implementation of EPA's Clean Power Plan would provide further impetus for states to increase utility clean energy deployment.
- **Two of the Clean Power Plan's key approaches to compliance—energy efficiency and renewable energy—are increasingly economically feasible options for electric utilities.** Energy efficiency is often the lowest-cost energy resource, while the cost of renewable energy continues to decline dramatically and is often cost-competitive with fossil fuels.
- **Renewable energy will represent most new U.S. utility-scale electric capacity additions in both 2015 and 2016,** according to EIA—yet another indication that utility clean energy deployment will continue to grow.[17]

16 Georgia installed 209 MW of solar electric capacity in 2015, ranking it eighth nationally. But state law prohibits Georgia residents from signing power purchase agreements with solar developers, hobbling the growth of rooftop solar. See "State Solar Policy: Georgia Solar," Solar Energy Industries Association, accessed June 8, 2016, http://www.seia.org/state-solar-policy/georgia.

17 EIA, "Wind adds the most electric generation capacity in 2015, followed by natural gas and solar," March 23, 2016, http://www.eia.gov/todayinenergy/detail.cfm?id=25492; EIA, "Solar, natural gas, wind make up most 2016 generation additions," March 1, 2016, http://www.eia.gov/todayinenergy/detail.cfm?id=25172.

- Even among utilities in similar market and regulatory environments, however, there is a range of performance, suggesting that **strong state-level policies are not the only factor in utility deployment of clean energy.**
  - State RPS policies, which have accounted for about 60 percent of the growth in U.S. non-hydro renewables, will likely be less of a driver going forward as costs for renewables continue to fall.[18]
  - **Retrenchment can occur** in states despite demonstrated beneficial impacts of clean energy policy. While many states continue to encourage investment in energy efficiency, two states, Indiana and Ohio, froze their respective energy efficiency goals, likely leading to reduced energy savings by affected utilities and reduced bill savings for customers.
- **Performance in this *Benchmarking* report is not the only measure of clean energy leadership, which also includes such factors as a utility's level of support for clean energy policies.** For example, National Grid and PG&E have been vocal supporters of energy efficiency, while FirstEnergy has actively criticized and opposed Ohio's clean energy policies.
- **Better, more up-to-date data is paramount.** Data on utility clean energy deployment remains far too scattered among too many disparate sources. Forming a complete and uniform picture of how utilities compare on energy efficiency and renewable energy is critical, given the importance of carbon-free resources to the industry's future and to U.S. and global climate change mitigation efforts.

Clean energy deployment by profiled utilities grew by 13 percent for renewable energy sales and 9 percent for incremental energy efficiency in 2014 as compared with 2013.

18 Katherine Tweed, "Renewable Portfolio Standards Drive 60% of US Clean Energy Boom," *GreentechMedia.com*, April 18, 2016, http://www.greentechmedia.com/articles/read/renewable-portfolio-standards-drive-60-of-us-clean-energy-boom.

Chapter 2

Context: Strong U.S. Clean Energy Growth Amid Intensifying Pressures on Electric Utilities

Renewable energy continues to be the largest source of new electricity generating capacity in the U.S., and investment in renewable energy and energy efficiency remains strong. Since this report was first published in 2014, ever-improving economics and strong policy and consumer support for clean energy have sparked conflict along the grid edge and intensified pressures on utilities and regulators to innovate. The challenges that clean energy can pose to traditionally regulated electric utilities must be addressed if clean energy investment is to reach the levels necessary to stabilize the earth's climate and avert the worst impacts of climate change.

Closing the Global Clean Energy Investment Gap: The "Clean Trillion"

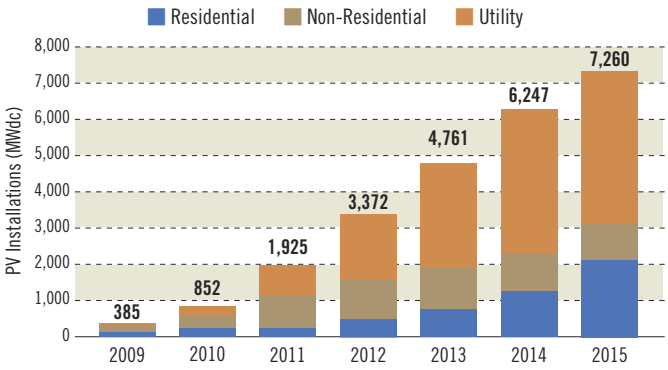
The Paris Climate Agreement, agreed upon by nearly every nation in the world in late 2015 and signed by the U.S., the European Union, China, India and a total of 175 countries, aims to reduce global carbon pollution to levels that will limit global temperature rise to well below 2 degrees Celsius. Most countries supporting the historic accord have made specific carbon-reducing commitments, including a U.S. pledge to reduce carbon pollution by 26-28 percent below 2005 levels by 2025. A key centerpiece of the U.S. commitment is the Clean Power Plan, which would reduce carbon emissions from power plants by nearly a third.

The incremental investment in clean energy that's needed to stabilize the earth's climate exceeds $1 trillion *per year* through 2050—a target known as the "Clean Trillion."[19] A significant portion of this investment will occur in the electric power sector. Recent analysis by Ceres and Bloomberg New Energy Finance finds a considerable gap between current and required clean energy investment levels.[20]

U.S. Clean Energy Growth

Renewable energy has grown dramatically in the U.S. in recent years. Solar photovoltaic (PV) capacity in the U.S. grew by a record-high 7.3 gigawatts (GW) in 2015 (**Figure 1**), eclipsing, for the first time, new natural gas.[21] Wind power also had a very strong year in 2015, with nearly 8.6 GW of new wind installed.[22] Overall, wind and solar accounted for more than 60 percent of new utility-scale capacity additions in 2015, according to the U.S. Energy Information Administration (EIA), and will constitute the majority of 2016 capacity additions as well.[23]

Figure 1: U.S. Solar Photovoltaic (PV) Installations—2009-2015



Source: GTM Research/Solar Energy Industries Association.

19 Ceres has launched the Clean Trillion initiative to encourage investors and businesses to increase clean energy investment commensurate with this challenge; see http://www.ceres.org/issues/clean-trillion/clean-trillion.

20 See Ethan Zindler and Ken Locklin, "Mapping the Gap: The Road from Paris; Finance Paths for a 2-Degree Future," January 27, 2016, available at http://www.ceres.org/resources/reports/mapping-the-gap-the-road-from-paris/view; and Alex Morales, "Paris Climate Deal Seen Costing $12.1 Trillion Over 25 Years," Bloomberg.com, January 29, 2016, http://www.bloomberg.com/news/articles/2016-01-29/paris-climate-deal-seen-costing-12-1-trillion-over-25-years.

21 GTM Research and Solar Energy Industries Association (SEIA), "U.S. Solar Market Insight Report: 2015 Year-In-Review," March 9, 2016; available at http://www.greentechmedia.com/research/subscription/u.s.-solar-market-insight (registration required).

22 American Wind Energy Association (AWEA), "U.S. Wind Industry Fourth Quarter 2015 Market Report," http://awea.files.cms-plus.com/FileDownloads/pdfs/4Q2015%20AWEA%20Market%20Report%20Public%20Version.pdf

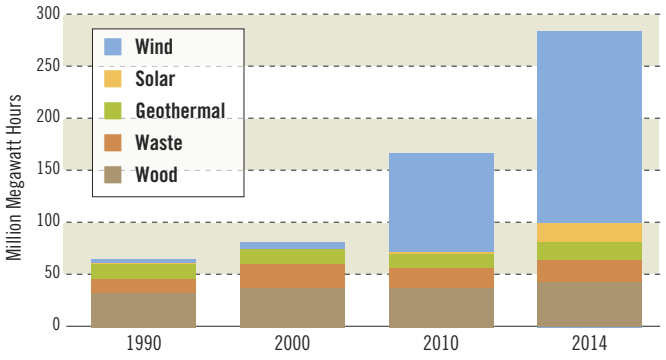
23 EIA, "Wind adds the most electric generation capacity in 2015, followed by natural gas and solar," March 23, 2016, http://www.eia.gov/todayinenergy/detail.cfm?id=25492; EIA, "Solar, natural gas, wind make up most 2016 generation additions," March 1, 2016, http://www.eia.gov/todayinenergy/detail.cfm?id=25172.

Not surprisingly, electric utilities have played a significant role in clean energy's growth. Utilities have installed about 60 percent of all U.S. solar capacity, and plan to install three times as much solar in 2016 as they did in 2015.[24] Further, utilities deliver virtually all of the wind, geothermal and hydropower energy in the country, according to Edison Electric Institute.[25] In recent months, two utilities, MidAmerican and Xcel Energy, have announced plans to build massive wind projects totaling $3.6 billion and $1 billion, respectively.

Steep cost reductions have helped to drive deployment of both solar and wind. The City of Palo Alto, California, has negotiated a solar power purchase agreement (PPA) at less than 3.7 cents per kilowatt-hour (kWh)—even cheaper than recent solar deals by Austin Energy and NV Energy at less than 4 cents per kWh.[26] Wind power, whose costs have fallen by two-thirds in the last six years, is now the lowest-cost source of new electricity in the U.S.[27] It's widely expected that costs for solar and wind will continue to fall, further encouraging development of these resources.[28]

While growth in renewable electric generating capacity is a useful indicator of U.S. clean energy progress, it's the growth in the amount of actual renewable *generation*—that is, the number of kilowatt-hours of electricity produced by renewable resources and sold to customers—that's essential to reducing power sector greenhouse gas emissions. This figure has also grown considerably in recent years; according to EIA, U.S. non-hydro renewable electricity generation more than quadrupled between 1990 and 2014 (**Figure 2**).[29]

Figure 2: Non-Hydropower Renewable Electricity Generation by Source—1990-2014

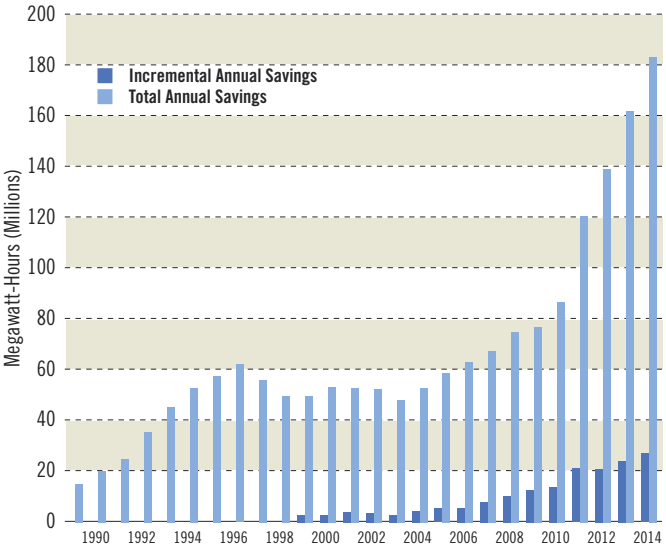


Source: U.S. Energy Information Administration, *Electricity Power Monthly* (February 2015)

Energy efficiency (EE) is widely recognized as a viable resource and a cheaper alternative to building new power plants. Utilities and program administrators have found that it's cheaper to reduce customers' demand for electricity—by offering rebates for better insulation and more efficient windows and appliances, for example—than to supply more electricity. A recent in-depth study of U.S. utility customer-funded energy efficiency programs calculated the average cost of saving electricity at 4.6 cents per kWh, placing EE among the lowest-cost resource options.[30]

Investment and savings from U.S. electric sector energy efficiency programs have reached all-time highs. The Consortium on Energy Efficiency reports that total expenditures on electric efficiency and demand response programs by U.S. administrators totaled $6.7 billion in 2014, up roughly $700 million from 2013.[31] Total electricity savings from U.S. utility sector energy efficiency programs grew to more than 180 billion kWh in 2014, according to the American Council for an Energy-Efficient Economy (**Figure 3**).[32]

Figure 3: Total Annual & Incremental Annual U.S. Electricity Savings—1989-2014



Source: American Council for an Energy-Efficient Economy

24 Tom Kuhn, "EEI: How investor-owned electric companies are delivering America's energy future," *UtilityDive*, May 2, 2016, http://www.utilitydive.com/news/eei-how-investor-owned-electric-companies-are-delivering-americas-energy/418442/.

25 Thomas R. Kuhn et al., "The Promise of Tomorrow: The Edison Electric Institute's 2016 Wall Street Briefing," February 10, 2016, http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/Documents/Wall_Street_Briefing.pdf.

26 Christian Roselund, "City of Palo Alto considers solar power contract at under $37/MWh," pv magazine, February 23, 2016, http://www.pv-magazine.com/news/details/beitrag/city-of-palo-alto-consider

27 "Wind energy top source for new electric capacity in 2015," American Wind Energy Association press release, February 16, 2016, http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8393.

28 Bloomberg New Energy Finance, "New Energy Outlook 2015: Executive Summary," June 2015, http://about.bnef.com/content/uploads/sites/4/2015/06/BNEF-NEO2015_Executive-summary.pdf.

29 EIA, "Energy in Brief: How much U.S. electricity is generated from renewable energy?," updated June 12, 2015, http://www.eia.gov/energy_in_brief/article/renewable_electricity.cfm.

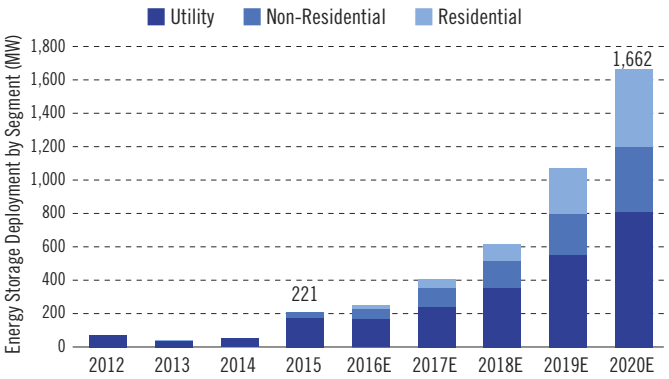
30 Ian Hoffman et al., *The Total Cost of Saving Electricity Through Utility Customer-Funded Energy Efficiency Programs: Estimates at the National, State, Sector and Program Level*, Lawrence Berkeley National Laboratory (Berkeley, CA: Lawrence Berkeley National Laboratory, 2015), http://emp.lbl.gov/sites/all/files/total-cost-of-saved-energy.pdf.

31 Consortium for Energy Efficiency, "2015 State of the Efficiency Program Industry," March 18, 2016, http://library.cee1.org/sites/default/files/library/12628/CEE_2015_Annual_Industry_Report.pdf.

32 Annie Gilleo, "Electricity savings keep rising, year after year," *ACEEE Blog: Data Points*, January 26, 2016, http://aceee.org/blog/2016/01/electricity-savings-keep-rising-year.

Grid scale and customer-owned battery storage units allow electricity to be stored when not required for immediate use, thereby enhancing the value of variable resources such as solar and wind. The prospects for energy storage in the U.S. have grown by leaps and bounds since the first edition of this *Benchmarking* report was published in 2014. Catalyzed in part by California's first-in-the-nation energy storage mandate, total deployments grew to 221 MW in 2015, roughly a 250 percent increase over 2014.[33] GTM predicts annual energy storage deployments will reach 1.7 GW in 2020, or about eight-fold growth in five years (**Figure 4**).[34]

Figure 4: U.S. Energy Storage Deployment—2012-2020



Source: GTM Research and Energy Storage Association

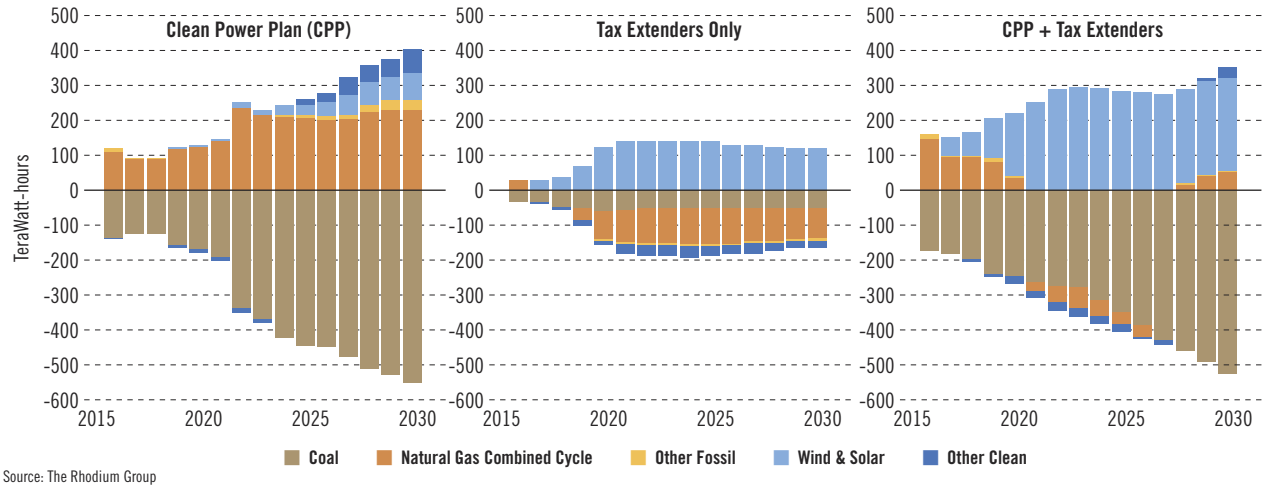
Federal and State Policies Driving Clean Energy Investment

The U.S. Environmental Protection Agency finalized the **Clean Power Plan**, the nation's first-ever federal standard aimed at reducing carbon pollution from power plants, in August 2015. The plan sets a specific carbon reduction target for each state and provides several compliance options that states must implement by 2022 to achieve compliance by 2030.[35] Overall, the plan aims to reduce 2030 power sector carbon emissions by 870 million tons, or 32 percent below 2005 levels. (Carbon emissions, at year-end 2015, were already 21 percent below 2005 levels.)[36]

While the U.S. Supreme Court has halted Clean Power Plan implementation until legal challenges are resolved, many observers feel the plan is likely to move forward following a ruling by the D.C. Circuit Court that's expected in fall 2016.[37] Further, the Edison Electric Institute (EEI), the industry association for U.S. investor-owned electric utilities, has acknowledged that the Clean Power Plan is only one of many drivers shifting electric utilities toward clean energy, and that carbon reductions will continue regardless.[38]

Federal tax policy has been instrumental in stimulating investment in U.S. solar and wind projects.[39] **The Investment Tax Credit** (ITC), which awards a tax credit equal to 30

Figure 5: Change in Generation from AEO 2015 Reference Case—2015-2030



Source: The Rhodium Group

33 GTM Research and Energy Storage Association, "U.S. Energy Storage Monitor: 2015 Year In Review Executive Summary," available at http://www.greentechmedia.com/research/subscription/u.s.-energy-storage-monitor (registration required).

34 Ibid.

35 While states may choose to operate independently, expert analysis and the real-life experience of regional carbon reduction schemes such as the Northeast's Regional Greenhouse Gas Initiative (RGGI) suggest that regional multi-state cooperation reduces costs to consumers while providing greater flexibility to states. See Paul Hibbard, Andrea Okie, and Susan Tierney, *EPA's Clean Power Plan: States' Tools for Reducing Costs and Increasing Benefits to Consumers*, Analysis Group (Boston, MA: Analysis Group, 2014), http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_epa_clean_power_plan_report.pdf.

36 EIA, "Carbon emissions from electricity generation in 2015 were lowest since 1993," May 13, 2016, http://www.eia.gov/todayinenergy/detail.cfm?id=26232.

37 Brad Plumer, "What Antonin Scalia's death means for Obama's climate plans," Vox.com, February 14, 2016, http://www.vox.com/2016/2/14/10989694/scalia-obama-climate-plan.

38 Rich Heidorn Jr., "EEI: Carbon Reductions to Continue Despite CPP Stay," *RTO Insider*, February 10, 2016, http://www.rtoinsider.com/eei-clean-power-plan-21981/.

39 State tax incentives often complement federal incentives to improve project economics and facilitate investment; see Warren Leon, *Clean Energy Champions: The Importance of State Programs and Policies*, (Montpelier, VT: Clean Energy States Alliance, 2015), http://www.cesa.org/assets/2015-Files/Clean-Energy-Champions-LR.pdf.

percent of total project investment, has helped to increase U.S. solar energy deployment by more than 1,600 percent since 2006.[40] The **Production Tax Credit** (PTC) awards a federal tax credit of 2.3 cents per kilowatt-hour (kWh) to developers of wind and other select renewable energy technologies for the first 10 years of a project's operation.

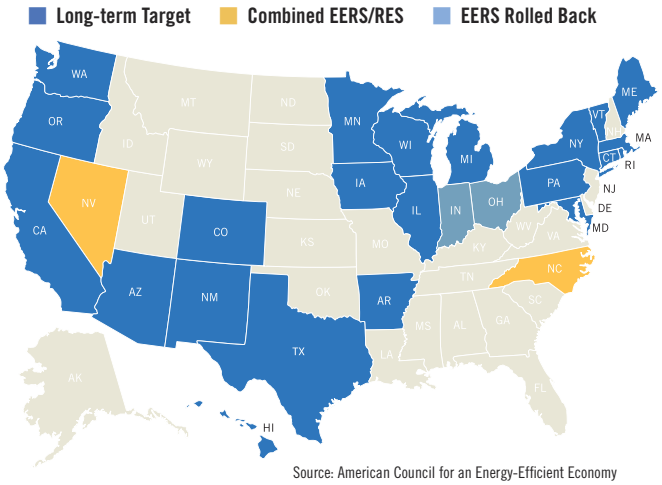
Recent multi-year extensions of both credits are projected to catalyze $73 billion in U.S. clean energy investment, resulting in 20 GW of new solar power and 19 GW of new wind.[41] The tax extenders will significantly affect U.S. electricity generation; wind and solar may displace almost completely the incremental natural gas generation that might have occurred in a non-extender scenario (**Figure 5**).[42]

State-level policy has been an essential driver of U.S. clean energy growth. **Energy Efficiency Resource Standards** (EERS)—which ACEEE describes as "clearly the most effective state policy driving energy efficiency program spending and savings in the U.S. utility sector today"—require utilities and/or third-party administrators to achieve a specified amount of energy savings.[43] Savings targets are typically in the range of one to two percent of annual electricity sales. As of this writing, 25 U.S. states have enacted some form of EERS, while two states, Indiana and Ohio, recently rolled back their EERS policies (**Figure 6**).[44] Continued growth in utility energy efficiency spending has helped to produce flat-to-declining demand growth in many states, a trend that is expected to continue.

Similarly, 29 states and the District of Columbia have enacted some form of **Renewable Portfolio Standard** (RPS) or **Renewable Electricity Standard** (RES).[45] RPSs require retail electric suppliers to provide a minimum percentage or amount of their retail load with eligible sources of renewable energy. In recent months, three states with existing RPSs have substantially increased them: California (50 percent by 2030), Hawaii (100 percent by 2045), and Oregon (50 percent by 2040). In June 2015, Vermont scrapped its renewable energy goal in favor of a RPS that calls for 75 percent by 2032. Eight states have non-binding renewable energy goals. Nationwide, RPS compliance costs are minimal, amounting to only 1.3 percent of retail electricity bills in 2014.[46]

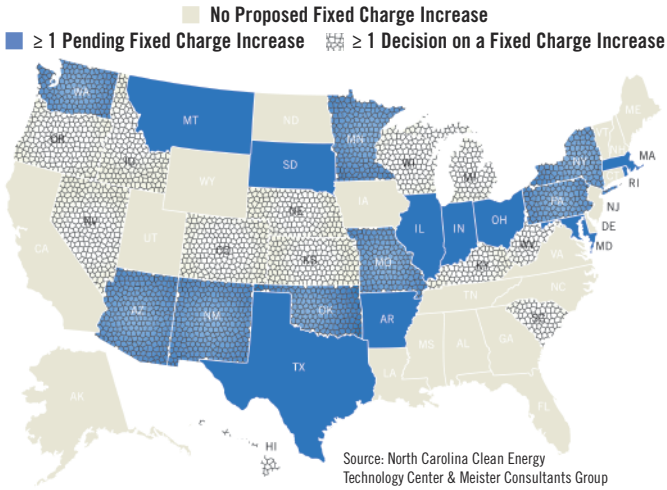
Net metering, a key policy driver for distributed solar PV, has become one of the most active and contested issues before state commissions. Net metering allows customers with rooftop PV and other approved types of on-site generation to be paid for the electricity they feed into the grid, often equal to the full retail price of electricity. Currently, 41 states and Washington D.C. have net metering rules in place.[47] Facing revenue losses, many utilities have petitioned utility regulators to modify net metering rules and increase customer fixed charges. Twenty-seven states considered or enacted changes to net metering policies in 2015, while 61 utilities in 30 states requested increases in monthly fixed charges for residential customers (**Figure**

Figure 6: States with Electric EERS Policies in Place (as of April 2015)



Source: American Council for an Energy-Efficient Economy

Figure 7: Pending & Decided Utility Residential Fixed Charge Increases in 2015



Source: North Carolina Clean Energy Technology Center & Meister Consultants Group

40 Solar Energy Industries Association (SEIA), "Issues & Policies: Solar Investment Tax Credit (ITC)," http://www.seia.org/policy/finance-tax/solar-investment-tax-credit. Accessed March 17, 2016.

41 Tom Randall, "What Just Happened in Solar is a Bigger Deal Than Oil Exports," Bloomberg.com, December 17, 2015, http://www.bloomberg.com/news/articles/2015-12-17/what-just-happened-to-solar-and-wind-is-a-really-big-deal.

42 John Larsen, Whitney Herndon, and Kate Larsen, "What Happens to Renewable Energy Without the Clean Power Plan?," *Rhodium Group Note*, February 25, 2016, http://rhg.com/notes/renewable-energy-without-the-clean-power-plan.

43 Martin Kushler, "IRP vs. EERS: There's one clear winner among state energy efficiency policies," *ACEEE.org*, December 16, 2014, http://aceee.org/blog/2014/12/irp-vs-eers-there%E2%80%99s-one-clear-winner-.

44 ACEEE, "Policy Brief: State Energy Efficiency Resource Standards (EERS)," April 2015, http://aceee.org/sites/default/files/eers-04072015.pdf.

45 Database of State Incentives for Renewable Energy (DSIRE), "Renewable Portfolio Standard Policies: June 2015," http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/Renewable-Portfolio-Standards.pdf.

46 Galen Barbose, "U.S. Renewables Portfolio Standards: 2016 Annual Status Report," Lawrence Berkeley National Laboratory, April 2016, https://emp.lbl.gov/sites/all/files/lbnl-1005057.pdf.

47 DSIRE, "Net Metering: March 2015," http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/04/Net-Metering-Policies.pdf.

7).[48] Net metering continues to be a hotly contested issue across the U.S.; see the text box, "Net Energy Metering: Recent State-Level Developments."

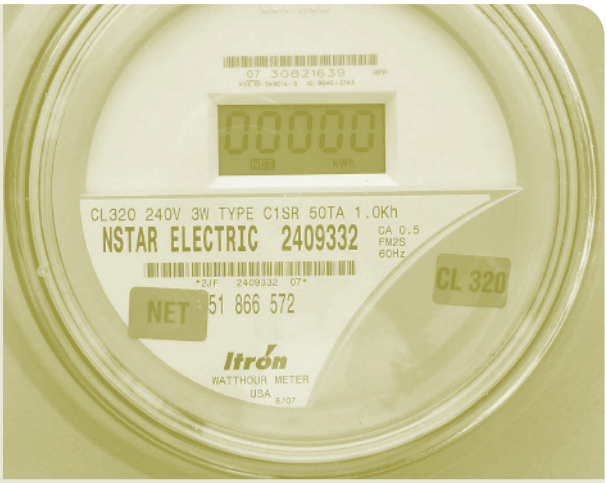
A related policy that's helped to stimulate U.S. solar energy growth, **community solar**, allows multiple customers to purchase shares of capacity or output from a solar facility. These customers may receive bill credits for their portion of the solar energy that's delivered to the grid, an arrangement known as **virtual net metering**. Compared to net metering, community solar (or "shared renewables") policies are less prevalent in the U.S.—as of this writing, 15 states and the District of Columbia have them—but substantial growth is expected in the community solar market by 2020.[49]

The Evolving Business and Regulation of U.S. Electric Utilities

The trends outlined in this section—namely, strong policy and consumer support for ever-cheaper clean energy in an electricity marketplace characterized by stagnant sales, advancing technologies and greater consumer choice—continue to pressure the traditional electric utility business model. The crux of the challenge facing utilities is the need to recoup tremendous long-term capital investments at a time of historic uncertainty and risk.[50] In 2015, with disruptive challenges to utilities as clear as ever, total U.S. electricity industry capital expenditures reached an all-

Net Energy Metering: Recent State-Level Developments

With each state at a different stage in solar market development, each has approached this issue differently. In the first quarter of 2016 alone, 22 states considered changes to net metering policies. Recent discussions have mostly focused on customer compensation rates and caps on aggregate net metering capacity. Here's a brief overview of recent net metering developments in key states around the U.S.:



California: In January 2016, the California Public Utilities Commission voted to preserve net metering, but will require new net metering customers to pay a one-time interconnection fee, pay approximately $0.02 per kWh for all energy consumed from the grid, and use time-of-use rates when they become available.

Hawaii: In October 2015, the Hawaii Public Utilities Commission issued an order that ended net metering but grandfathered existing customers into current net metering terms. New residential customer-generators must now choose either a self-supply or grid-supply option.

Nevada: In December 2015, the Nevada Public Utilities Commission issued successor tariffs to net metering that simultaneously tripled the fixed charges solar customers will pay and reduced the credit those customers will receive. Unlike Hawaii, Nevada denied grandfathering requests for current customers.

Pennsylvania: In February 2016, the Pennsylvania Public Utility Commission amended both its Alternative Energy Portfolio Standard and its net metering rules by i) maintaining compensation for all excess generation at the retail rate; ii) increasing the capacity limit for distributed resources (from 2 MW to 5 MW); and iii) increasing customers' onsite generation limit (from 110% to 200% of their annual electricity consumption).

New York: In October 2015, the New York Public Service Commission decided to lift all net metering caps for rooftop solar until the state's Reforming the Energy Vision (REV) proceedings set values for distributed energy resources (DERs). Therefore, owners of distributed generation will continue to receive the retail rate for exporting electricity to the grid. The NYPSC is currently exploring proposals for an interim successor to net metering.

Source: E9 Insight

48 "N.C. Clean Energy Technology Center Releases Q4 Solar Policy Update to The 50 States of Solar," North Carolina Clean Energy Technology Center press release, February 23, 2016, https://nccleantech.ncsu.edu/n-c-clean-energy-technology-center-releases-q4-solar-policy-update-to-the-50-states-of-solar/.

49 See, for example, Clean Edge, 2016 U.S. Clean Tech Leadership Index with data from EQ Research, http://cleanedge.com/reports/2016-US-Clean-Tech-Leadership-Index; David Feldman, Anna M. Brockway, Elaine Ulrich, and Robert Margolis, *Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation*, National Renewable Energy Laboratory (Golden, CO: National Renewable Energy Laboratory, 2015), http://www.nrel.gov/docs/fy15osti/63892.pdf; Mike Munsell, "US Community Solar Market to Grow Fivefold in 2015, Top 500 MW in 2020," *GreentechMedia.com*, June 23, 2015, http://www.greentechmedia.com/articles/read/us-community-solar-market-to-grow-fivefold-in-2015-top-500-mw-in-2020.

50 See, for example, Marc Chupka et al., *Transforming America's Power Industry: The Investment Challenge 2010-2030*, The Brattle Group (Washington DC: The Edison Foundation, 2008), http://www.brattle.com/_documents/UploadLibrary/Upload725.pdf; Ron Binz et al., *Practicing Risk-Aware Electricity Regulation: What Every State Regulator Needs to Know*, Ceres (Boston, MA: Ceres, 2012), http://www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation/view; and Edison Electric Institute, "Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business," January 2013, http://www.eei.org/ourissues/finance/documents/disruptivechallenges.pdf.

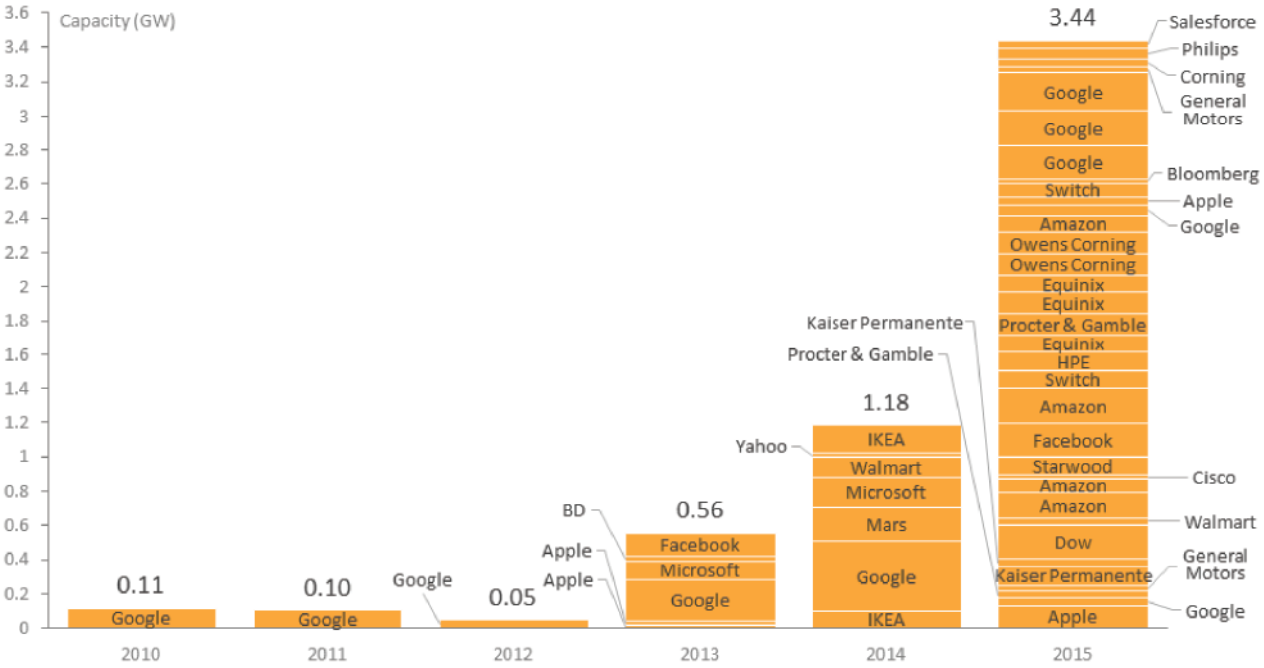
time high of $108.6 billion, more than double 2005 investment levels.[51]

Despite efforts by some utilities to slow the pace of change, numerous industry surveys show a clear awareness that change is both afoot and necessary. Two common themes that emerge are the necessity of developing new utility business models—affirmed overwhelmingly in one recent survey by 97 percent of respondents—and, simultaneously, the recognition that the existing regulatory model may be the single biggest obstacle to such change.[52]

The acute pressures facing utilities, in particular the rapid growth of rooftop PV and conflicts around net metering, have led utility regulators in some states to begin exploring new regulatory models. The best known of these, New York's Reforming the Energy Vision (REV) initiative, has taken a ground-up approach to reinventing the state's electricity marketplace, with utilities serving as "distribution system platform providers" that increasingly rely on demand-side management, efficiency improvements, and distributed energy resources to meet consumer needs. There also has been renewed interest in performance-based regulation (PBR) to reward utilities for the socially beneficial, quantifiable outcomes they achieve rather than simply the capital they invest.[53]

Large corporate energy users have emerged as a key driver urging utilities and regulators toward clean energy solutions. Demand from these companies has so far led to the development of innovative purchasing mechanisms (e.g., "green tariffs") in a handful of states, and more extensive changes may soon follow: a consortium of major companies just pledged not only to promote 60GW of new renewables development, but also to help overcome the barriers that complicate clean energy procurement in all but 13 states.[54] Meanwhile, companies continue to source ever-greater amounts of clean energy; Rocky Mountain Institute reports that corporate renewable deals surged to 3.44 GW in 2015, a year-on-year increase of nearly 300 percent (**Figure 8**).[55]

Figure 8: Corporate Renewable Deals—2010-2015



Source: Rocky Mountain Institute

51 Kuhn et al., "The Promise of Tomorrow."

52 UtilityDive, "2016 State of the Electric Utility Survey," available for download at http://app.assetdl.com/landingpage/state-of-the-utility-survey-2016/.

53 See, for example, Mark Newton Lowry and Tim Woolf, Performance-Based Regulation in a High Distributed Energy Resources Future, Lawrence Berkeley National Laboratory (Berkeley, CA: Lawrence Berkeley National Laboratory, 2016), https://emp.lbl.gov/sites/all/files/lbnl-1004130_0.pdf; Ron Lehr and Michael O'Boyle, "Why utilities should push for performance-based regulation," UtilityDive, May 18, 2015, http://www.utilitydive.com/news/why-utilities-should-push-for-performance-based-regulation/398851/; and Ron Binz and Dan Mullen, "For better outcomes, let's reward utilities for performance," EnergyBiz, Spring 2016, http://community.energycentral.com/community/energy-biz/better-outcomes-let%E2%80%99s-reward-utilities-performance.

54 Krysti Schallenberger, "Major US companies launch Renewable Energy Buyers Alliance," UtilityDive, May 13, 2016, See http://rebuyers.org/.

55 Rocky Mountain Institute, "Business Renewables Center Newsletter: January 2016," http://www.rmi.org/business_renewables_center_newsletter_002_jan_2016.

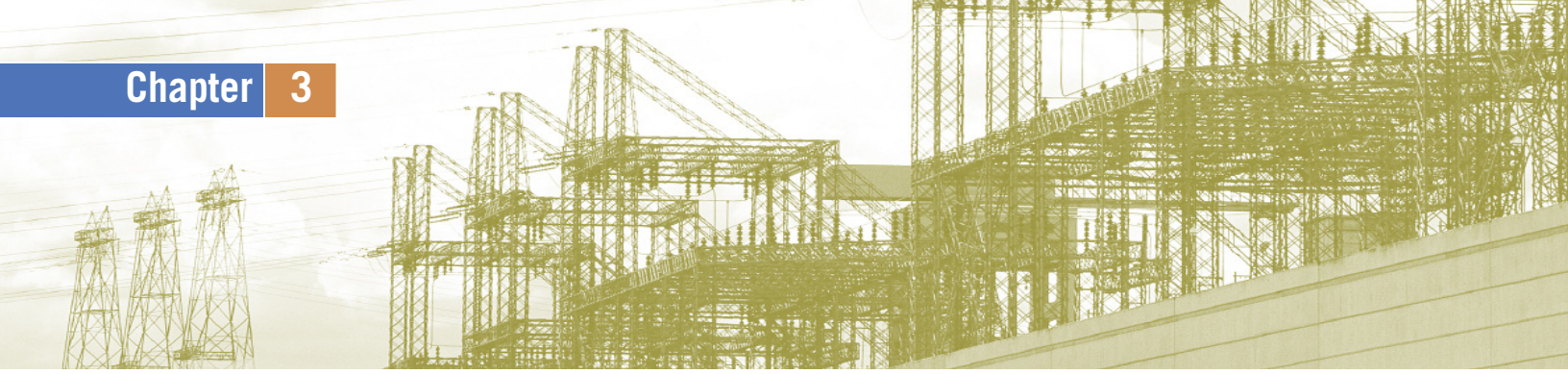
Institutional investors have announced plans to step up engagement with electric utilities over the business risks that utilities may face in a carbon-constrained world. A recent report, expressed as a set of expectations, identified investor priorities for utility management and boards. These include stress testing the utility's business model for a "2° scenario," incorporating greater amounts of distributed energy resources and diversifying utility revenue streams.[56] More than 270 institutional investors around the world, representing assets of more than $22 trillion, have endorsed this agenda.

The imperative for clean energy is clear. The vast majority of global utility executives believe the electricity system could host 70 percent renewable energy by 2050, a recent poll found, and about half think it's possible by 2030.[57] What remains to be seen is how utilities will exert their leadership to meet society's evolving needs; how regulators will facilitate or impede this transition; and how the actions of this relatively small group of decision makers will impact utility shareholders and customers, the climate and the overall economy.

The imperative for clean energy is clear. What remains to be seen is how the actions of a relatively small group of decision-makers will affect utilities and customers, the climate and the overall economy.

56 "Global investors launch guide to drive engagement with the electric utilities sector," Ceres press release, April 28, 2016, http://www.ceres.org/press/press-releases/global-investors-launch-guide-to-drive-engagement-on-climate-risk-with-the-electric-utilities-sector.

57 "DNV GL survey: 82 percent of global industry respondents say electricity system can be 70 percent renewable by 2050," DNV GL press release, March 18, 2015, https://www.dnvgl.com/news/dnv-gl-survey-82-percent-of-global-industry-respondents-say-electricity-system-can-be-70-percent-renewable-by-2050-18716.



Chapter 3

Benchmarking Clean Energy Deployment by U.S. Electric Utilities

The U.S. electric power sector is the largest source of U.S. greenhouse gas emissions, responsible for roughly one-third of the country's global warming pollution. It is widely expected that U.S. electric utilities, through a mix of regulations and incentives, will be directed to mostly decarbonize their electricity supply portfolios in the coming decades.

This report provides a "moment in time" snapshot of how 30 of the largest U.S. investor-owned electric utilities are deploying renewable energy and energy efficiency on behalf of their customers. **Figure 9** lists the companies and their retail sales in 2014.[58] Wherever possible, this report utilizes data from 2014, the most recent year for which data is widely available.

Figure 9: Selected U.S. Investor-Owned Electric Utility Holding Companies Ranked by 2014 Retail Electric Sales

Holding Company	Rank	Retail Sales (MWh)	States
Duke	1	211,832,267	FL, IN, KY, NC, OH, SC
Southern Company	2	161,630,362	AL, FL, GA, MS
Exelon	3	156,825,789	IL, MD, PA
FirstEnergy	4	149,585,266	MD, NJ, NY, OH, PA, WV
American Electric Power	5	140,413,272	AR, IN, KY, LA, MI, OH, OK, TN, TX, VA, WV
Entergy	6	110,912,762	AR, LA, MS, TN, TX
Berkshire Hathaway	7	110,375,921	CA, DC, DE, IA, ID, IL, MD, MI, NV, OH, OR, PA, SD, TX, UT, WA, WY
FPL	8	104,431,096	FL
Xcel Energy	9	89,639,519	CO, MI, MN, ND, NM, SD, TX, WI
Edison International	10	87,417,483	CA
PG&E	11	86,871,508	CA
Dominion Resources	12	80,009,735	NC, VA
Ameren	13	73,919,930	IL, MO
PPL Corp	14	68,560,444	KY, PA, TN, VA
National Grid	15	63,864,527	MA, NH, NY, RI
ConEdison	16	61,972,431	NJ, NY, PA
Eversource Energy	17	54,802,376	CT, MA, NH
Pepco Holdings	18	47,221,126	DC, DE, MD, NJ
DTE Energy	19	46,956,390	MI
PSEG	20	40,746,702	NJ
CMS Energy	21	37,233,269	MI
AES Corporation	22	28,000,188	IN, OH
Pinnacle West	23	27,584,533	AZ
OGE Energy	24	27,000,756	AR, OK
We Energies	25	26,733,379	MI, WI
Alliant Energy	26	26,122,279	IA, MN, WI
Puget Sound Energy	27	22,668,167	WA
SCANA	28	22,374,515	SC
Sempra Energy	29	20,115,867	CA
Portland General Electric	30	19,266,161	OR
Total		**2,205,088,020**	

Source: EIA Form 861 including both bundled and unbundled sales.

58 Retail sales data was calculated from EIA's 2014 Annual Electric Power Industry Report, Survey Form EIA 861, available at https://www.eia.gov/electricity/data/eia861/zip/f8612014.zip. We excluded from this report two large electric utility holding companies, Energy Future Holdings and Reliant Energy, because little if any data about their clean energy performance could be found.

Scope and Methodology

This report focuses solely on investor-owned utilities for several reasons. Data quality and availability for these companies, while in need of improvement and difficult to assemble, is generally superior to that of publicly owned utilities. More investment in renewable energy and energy efficiency has generally occurred in the investor-owned segment of the U.S. utility industry, with prominent exceptions (e.g., Austin Energy, Sacramento Municipal Utility District). Finally, as a convener of institutional shareholders of U.S. electric utilities for more than two decades, Ceres has an established interest in the long-term financial, environmental and social performance of U.S. investor-owned utilities.

Benchmarking was done at the parent holding company level. To do this, we aggregated data for all subsidiary companies into one overall metric for the parent company, and then compared the parent companies with each other. Because we focus on regulated retail distribution utilities with an obligation to serve the public, this report excludes activity by independent power producers (IPPs; e.g., NRG Energy) and by unregulated subsidiaries of utility holding companies (e.g. Con Edison Solutions, NextEra Energy Resources). For example, while NextEra Energy is the largest developer of renewable energy in the U.S., its utility subsidiary, FPL, provides very little renewable energy to its customers in Florida.

Three Clean Energy Indicators

1. Renewable Energy Sales
2. Incremental Energy Efficiency
3. Life Cycle Energy Efficiency

This report compiles data for **three clean energy indicators:**

1. **Renewable energy sales:** The total amount of renewable electricity sold to retail customers during the reporting year;
2. **Incremental energy efficiency savings:** All reporting-year energy savings from i) new participants in existing programs, and ii) all participants in new programs;
3. **Life Cycle energy efficiency savings:** Estimated savings from all energy efficiency programs put in place during the reporting year, including reporting year savings and all future anticipated savings.[59]

To evaluate utilities in comparable terms, benchmarking was done using normalized data, with renewable energy sales and energy efficiency savings expressed as a percentage of annual retail sales. For completeness we also present absolute data, but did not rank utilities in absolute terms (since this would have unfairly advantaged larger utilities).

The **renewable energy sales** benchmarked in this report include wind, solar PV, solar thermal (concentrating solar power, or CSP), geothermal and biomass, because deployment of many of these resources is expected to increase significantly in the coming decades.[60] While utility-scale hydroelectric and nuclear power are important energy resources that contribute about a quarter of U.S. electricity generation, we don't include them in this report because neither resource is widely expected to constitute a large portion of the nation's newly built carbon-free energy portfolio going forward.

We've made a small change to our methodology for calculating renewable energy sales in the 2016 edition of this *Benchmarking* report. The denominator now includes only "bundled" retail electricity sales (where the utility is paid for both delivering and supplying power) and excludes "unbundled" sales (where the utility is paid for delivering power that the customer has purchased elsewhere). This aligns better with utility obligations vis-à-vis state RPS targets. The denominator for both energy efficiency metrics remains bundled plus unbundled retail electricity sales, since utilities offer energy efficiency programs to customers who purchase power from other suppliers.

The Value of Benchmarking

Benchmarking clean energy deployment by U.S. utilities provides an opportunity for transparent reporting and analysis of important industry trends. It also fills a knowledge gap by offering utilities, regulators, investors, policy makers and other stakeholders consistent and comparable information on which to base their decisions.

- **The financial community**, including investors in the electric utility industry, is continually searching for new and better ways to evaluate the financial, environmental and social performance of electric utility companies. Investors are becoming increasingly attuned to how investor-owned electric utilities are adapting to disruptive challenges facing the sector and the extent to which utilities are modernizing their business models to enhance profitability and minimize risk of financial loss.
- **Electric utility companies** can benefit from clean energy benchmarking by understanding how their peers are performing, and specifically whether and how advanced technologies, wide-ranging state policies and innovative rate mechanisms are helping to create shareholder value, especially for companies in similar market and regulatory environments.

59 Since this *Benchmarking* report was first published in 2014, EIA has changed the energy efficiency information it gathers on Form 861. Rather than asking utilities for cumulative energy efficiency data (which captures all energy savings from all energy efficiency programs active in a given year), EIA now requests life cycle energy efficiency data as described above. We have updated our terminology to reflect this change.

60 For consistency with state renewable energy standards, this report includes landfill gas and waste-to-energy in its definition of biomass energy. Future reports may revisit this definition.

- **Consumers** can benefit from learning how much clean energy the utility has deployed, how the utility is tracking toward state renewable energy and energy efficiency requirements (if applicable), and how well-positioned the utility is for a lower-carbon future (which could impact reliability, service quality and customer bills).
- **Policymakers** can benefit from benchmarking by understanding which clean energy policies have been most effective in driving investment and creating value for customers, utilities, shareholders and non-utility businesses.

Important Considerations

Given the challenges associated with benchmarking utility clean energy deployment, a few considerations should be taken into account:

- U.S. investor-owned electric utilities are a disparate, heterogeneous group, making direct apples-to-apples comparison among them difficult. For our purposes, one of the most relevant differences among electric utilities is the extent to which they retain control over resource selection. Utilities like National Grid and ConEdison, for example, have very limited say in electric generation resource choice due to the extent to which their local electricity markets have been "restructured," with generation largely severed from distribution. In contrast, utilities like Southern Company and We Energies have far more control over their electric supply resource portfolios.
- Similarly, some states have taken responsibility for clean energy deployment away from electric utilities and created third-party administrators that oversee energy efficiency and/or renewable energy programs. This affects several utilities included in this report, including those operating in New York (ConEd and National Grid), Oregon (Portland General Electric) and Wisconsin (We Energies). In this context, the utility collects funds from ratepayers and turns them over to the state's third-party administrator. In order not to penalize these utilities, we have attributed energy efficiency and/or renewable energy outcomes in these states in proportion to i) the funding that the utility provided or ii) its share of in-state retail electricity sales.

Finally, while the utilities that rank highly in this report could be described as "leading the way to a clean energy future," it is important not to consider a utility's benchmarking score as a proxy for its industry leadership. Policy advocacy, one of the most important leadership qualities that utilities can exhibit on clean energy, falls outside the scope of this report, for example.

Customer Engagement: A New Priority for Utilities

Utilities haven't historically had to spend resources to acquire or educate customers, simply because utilities were the only game in town: if customers wanted electricity, they had no other choice but their local utility.

That's starting to change. As aspects of the retail electric business have gradually deregulated, as distributed resources become more prevalent, and as policymakers look for ways to encourage greater energy savings, customer engagement has become increasingly important for utilities.

According to a 2015 Utility Dive survey, 71% of utility executives expect funding for residential customer education programs to increase over the next five years. Yet only 2% of utilities think they are currently doing a great job at educating their customers.

As utilities move toward a more customer-centric business model, they must rethink the characteristics of successful customer engagement in order to more effectively and efficiently market their products and communicate their message. With new data sources and improved access to information—for example, through channels such as My Green Button, mobile apps, social media, and online services—utilities can effectively inform and engage customers on a more personal level.

Nowhere is the transition to a customer-centric model more evident than in New York's Reforming the Energy Vision (REV) proceeding. In 2014, New York State launched the REV proceeding to establish a market for customer-sited distributed energy resources such as rooftop solar, batteries, and smart thermostats. This distributed system platform places the customer at the center of resource planning and grid operations.

Ultimately, customer-owned distributed energy resources will introduce new participants into New York's market, and improved communications tools will allow customers to better manage their energy use and bills. As distributed resources reach higher levels of market penetration, communication between the utility and customers will become increasingly important.

Source: E9 Insight

Indicator 1: Renewable Energy Sales

Renewable energy sales are the total amount of renewable electricity sold to retail customers, or the total amount of Renewable Energy Credits (RECs) acquired or retired by the utility, during the reporting year.[61] This ranking omits one large holding company, Southern Company, because little data about their renewable energy sales could be found and multiple data requests to each company went unanswered.

Figure 10: Renewable Energy Sales as a Percentage of Retail Sales (2014)

Holding Company	Rank	Percentage	Mean: [10.31%]	MWh	Mean: [4,902,738]
Sempra Energy	1	36.45%		6,002,000	
PG&E	2	25.90%		19,456,767	
Edison International	3	23.15%		17,558,000	
Xcel Energy	4	20.63%		18,495,000	
PSEG	5	13.28%		2,599,898	
National Grid	6	13.19%		3,881,856	
Eversource Energy	7	13.08%		3,058,302	
Berkshire Hathaway	8	12.99%		14,114,750	
OGE Energy	9	11.59%		3,129,474	
Exelon	10	11.49%		4,793,000	
Ameren	11	11.22%		5,179,826	
FirstEnergy	12	10.31%		5,810,517	
Puget Sound Energy	13	10.29%		2,116,470	
Pinnacle West	14	10.22%		2,819,880	
Alliant Energy	15	10.11%		2,642,000	
Pepco Holdings	16	9.79%		1,888,311	
CMS Energy	17	9.36%		3,114,000	
We Energies	18	9.03%		2,194,000	
DTE Energy	19	8.74%		3,662,195	
Portland General Electric	20	8.46%		1,489,000	
American Electric Power	21	6.00%		6,738,000	
AES Corporation	22	3.82%		688,722	
Duke	23	2.79%		5,477,000	
Dominion Resources	24	2.18%		1,741,787	
Entergy	25	2.06%		2,285,411	
SCANA	26	1.81%		404,525	
PPL Corp	27	1.02%		413,000	
ConEdison	28	0.94%		208,714	
FPL	29	0.17%		177,000	
Southern Company	No Data				

Mean: 10.31%

61 Again, the renewable energy sales benchmarked in this report include wind, solar PV (both utility-scale and distributed), solar thermal (concentrating solar power, or CSP), geothermal and biomass.

Findings: Renewable Energy Sales:

Many companies have shown significant progress in providing more renewable energy to their customers. For example:

- **PG&E's** renewable sales grew from 14.6 million to 19.5 million MWh from 2012 to 2014, with more than 25 percent of its total sales coming from renewable resources in 2014 (up from about 17 percent in 2012). PG&E is well on track to achieve California's interim renewables goal of 33 percent by 2020.
- **Xcel Energy's** renewable sales grew from 16.1 million to 18.5 million MWh from 2012 to 2014, a 15 percent increase.
- **Pinnacle West**, which owns Arizona Public Service, has nearly doubled its renewable energy sales in just two years. APS's renewable energy sales jumped from 1.5 million MWh in 2012 to 2.8 million MWh in 2014, accounting for more than 10 percent of its total electricity sales.

Many companies have shown significant progress in providing more renewable energy to their customers.

Voltage Optimization: Benefitting the Modern Grid

New technologies are enabling much greater control of the voltage on a utility's distribution system. This can yield important benefits for modernizing the electric grid.

First, distribution system operators can "flatten" the voltage across their system, improving power quality by reducing the risk of either too much or too little voltage. As a result, utilities can then reduce the overall voltage on the system. Since total power consumed is a function of both voltage and current, this reduction can lead to system-wide energy savings of 3% or more.

Second, as more distributed energy resources interconnect with the distribution grid, risks of localized voltage fluctuations increase. Using advanced voltage technologies, distribution system operators can reduce these fluctuations and increase the overall "carrying capacity" of distributed energy systems.

Many utilities are testing and deploying voltage optimization systems to reduce energy losses and improve reliability and power quality. According to data reported to EIA, the 12 utility holding companies with the greatest share of "Volt/VAR Optimization" (VVO) on their systems are:

Holding Company	Percent	Total Circuits
FirstEnergy	93%	6,306
ConEd	92%	2,395
FPL	86%	3,171
Sempra	58%	1,015
Idacorp	56%	639
PNM Resources	55%	533
PHI	53%	974
SCANA	52%	718
Southern Company	47%	5,216
National Grid	42%	3,666
HEI	39%	699
Duke	33%	7,071

Source: E9 Insight

Indicator 2: Incremental Energy Efficiency

Incremental energy efficiency savings are all reporting-year energy savings from i) new participants in existing programs, and ii) all participants in new programs.

Figure 11: Incremental Energy Efficiency as a Percentage of Retail Sales (2014)

Holding Company	Rank	Percentage	Mean: [0.97%]	MWh	Mean: [645,732]
Eversource Energy	1	1.87%		1,024,653	
PG&E	2	1.79%		1,557,012	
Portland General Electric	3	1.67%		321,492	
National Grid	4	1.59%		1,016,001	
Pinnacle West	5	1.50%		414,824	
DTE Energy	6	1.45%		681,639	
Exelon	7	1.42%		2,227,508	
Puget Sound Energy	8	1.32%		300,027	
Alliant Energy	9	1.30%		338,369	
AES Corporation	10	1.23%		344,941	
CMS Energy	11	1.21%		449,304	
Sempra Energy	12	1.14%		228,541	
Edison International	13	1.09%		955,060	
Xcel Energy	14	1.03%		925,432	
Ameren	15	0.97%		716,018	
Pepco Holdings	16	0.95%		449,694	
We Energies	17	0.93%		248,277	
Berkshire Hathaway	18	0.92%		1,012,629	
FirstEnergy	19	0.91%		1,365,723	
Duke	20	0.76%		1,613,886	
American Electric Power	21	0.75%		1,051,397	
PSEG	22	0.71%		289,314	
PPL Corp	23	0.58%		396,335	
ConEdison	24	0.38%		237,631	
SCANA	25	0.38%		84,627	
OGE Energy	26	0.36%		95,885	
Southern Company	27	0.29%		470,429	
Entergy	28	0.24%		263,125	
FPL	29	0.20%		209,166	
Dominion Resources	30	0.10%		83,034	

Mean: 0.97%

Findings: Incremental Energy Efficiency:

- In 2014, 14 electric utility holding companies achieved incremental energy savings of more than 1 percent of their annual sales, up from 12 companies in 2012.
- Five companies—**Eversource, PG&E, Portland General Electric, National Grid**, and **Pinnacle West**—achieved savings of more than 1.5 percent of annual sales, up from just two companies in 2012.
- One of the largest companies, **Exelon**, showed a dramatic jump in incremental energy efficiency savings, from 0.9 percent in 2012 to 1.4 percent in 2014.

Significant energy savings are achievable in states that make a sustained commitment to energy efficiency investment.

Electric Vehicles: Emerging Opportunities for Utilities

While electric vehicles currently represent less than 1% of all vehicles sold in the U.S., their market share has jumped 128% since 2012 and continues to rise. Electric vehicles can provide significant new revenue streams for utilities, especially in a time of reduced electricity demand. Utilities have several opportunities to support this rapidly expanding market—for starters, by offering rebates on vehicles and charging stations, providing rate incentives, and deploying related infrastructure.

Most states have been slow to investigate this opportunity, but utilities in a few states have proposed pilot programs that await Commission approval:

California: California's IOUs, including SDG&E, SCE, and PG&E, have all proposed separate electric vehicle pilot programs. In 2015, PG&E proposed to deploy over 25,000 EV charging stations, offer outreach and education, and implement time-variant pricing. But the Commission scaled back PG&E's proposal, allowing only 2,500 EV charging stations amid concerns about unfair competition and potential cross-subsidy issues. The Commission is currently reviewing PG&E's revised proposal.

Oregon: In April 2016, in response to state legislation requiring the Oregon Public Utility Commission to commission Transportation Electrification proposals from the state's two large IOUs, Staff initiated a docket to guide the utilities' proposals. The proposals, expected in December 2016, will contain plans for rate-based EV charging infrastructure.

Missouri: In November 2015, the Missouri Public Service Commission opened a docket to address the unresolved legal and long-term policy issues related to whether and how utilities can recover the costs of installing and operating EV charging stations in their rate base. Commission Staff is expected to file a report of its findings and recommendations by mid-2016.

Source: E9 Insight

Indicator 3: Life Cycle Energy Efficiency

Life cycle energy efficiency savings are estimated savings from all energy efficiency programs put in place during the reporting year, including reporting year savings and all future anticipated savings.

Figure 12: Life Cycle Energy Efficiency as a Percentage of Retail Sales (2014)

Holding Company	Rank	Percentage	Mean: [9.93%]	MWh	Mean: [6,595,619]
Eversource Energy	1	20.20%		11,069,251	
National Grid	2	17.74%		11,328,353	
PG&E	3	17.49%		15,194,647	
Exelon	4	16.17%		25,353,979	
Pinnacle West	5	15.74%		4,340,798	
Alliant Energy	6	15.32%		4,002,532	
Puget Sound Energy	7	15.27%		3,462,221	
CMS Energy	8	14.79%		5,506,298	
Xcel Energy	9	14.43%		12,930,997	
Portland General Electric	10	14.15%		2,726,199	
Edison International	11	12.11%		10,583,265	
Sempra Energy	12	11.96%		2,405,240	
AES Corporation	13	10.94%		3,062,904	
Berkshire Hathaway	14	10.05%		11,094,170	
Pepco Holdings	15	10.05%		4,745,571	
We Energies	16	9.87%		2,637,683	
Ameren	17	9.85%		7,281,846	
FirstEnergy	18	8.81%		13,181,238	
American Electric Power	19	7.53%		10,567,421	
PSEG	20	7.16%		2,919,044	
ConEdison	21	6.30%		3,906,221	
PPL Corp	22	5.83%		3,994,476	
DTE Energy	23	5.81%		2,726,001	
Duke	24	5.34%		11,321,776	
SCANA	25	4.30%		961,522	
Southern Company	26	3.47%		5,613,310	
OGE Energy	27	2.95%		796,078	
Entergy	28	2.66%		2,953,655	
Dominion Resources	29	1.50%		1,201,879	
FPL	30	No Data			

Mean: 9.93%

Findings: Life Cycle Energy Efficiency:

- In 2014, seven companies achieved life cycle energy savings greater than 15 percent of their annual electricity sales, up from four in 2013. Two companies, **Exelon** and **PG&E**, saved their customers more than 40 million MWh combined in 2014.
- Lagging companies such as **Southern Company, Dominion Resources, Entergy,** and **OGE Energy** achieved life cycle savings of less than four percent of their annual electricity sales.

Harnessing the Power of Distributed Energy Resources

Distributed energy resources (DER) are smaller, often customer-sited power sources that can be aggregated to help utilities meet demand. The rapid evolution of these resources—spurred by policy support, improving economics, advances in technology and demand from consumers—is forcing utilities and regulators to reconsider rate structures, compensation mechanisms, and even the structure of the grid itself.

Greater utilization of DERs has resulted in a strong focus on grid planning at the distribution level. States such as New York and California have moved toward distribution-level integrated resource plans that factor in both avoided costs and distribution-level benefits. As part of the Reforming the Energy Vision (REV) initiative, the New York Public Service Commission is currently evaluating DER compensation methods to replace net metering. One such approach, "LMP+D" (locational marginal price plus distribution value), values DERs differently at different points on the grid.

The most widely deployed DER technologies include demand response, solar PV, and battery storage. With 46 of the 50 states engaged in solar policy debates in 2015, solar PV has been the most contentious and potentially disruptive DER.

While no standard methodology has emerged, several states have initiated proceedings to determine the appropriate value of distributed generation:

Arizona: In 2013, the Arizona Corporation Commission opened a docket to evaluate net metering issues and the benefits of distributed solar. In February 2016, the Alliance for Solar Choice filed a study concluding that the average benefits of residential distributed solar in Arizona are worth up to 28 cents per kWh.

New York: As part of the REV Initiative, the New York Public Service Commission approved a Benefit Cost Analysis (BCA) framework to evaluate utility expenditures in investments in a Distributed System Platform and DERs as well as energy efficiency programs. The Order also requires utilities to develop handbooks to guide DER providers and submit them, along with Distributed System Implementation Plan filings, in June 2016.

Oregon: In January 2015, the Public Utility Commission of Oregon opened a docket to i) determine the resource value of solar; ii) investigate cost shifts associated with net metering; and iii) evaluate the reliability impacts of DER. In 2016, the Commission closed the reliability inquiry and instead opened a docket investigating a smart inverter standard.

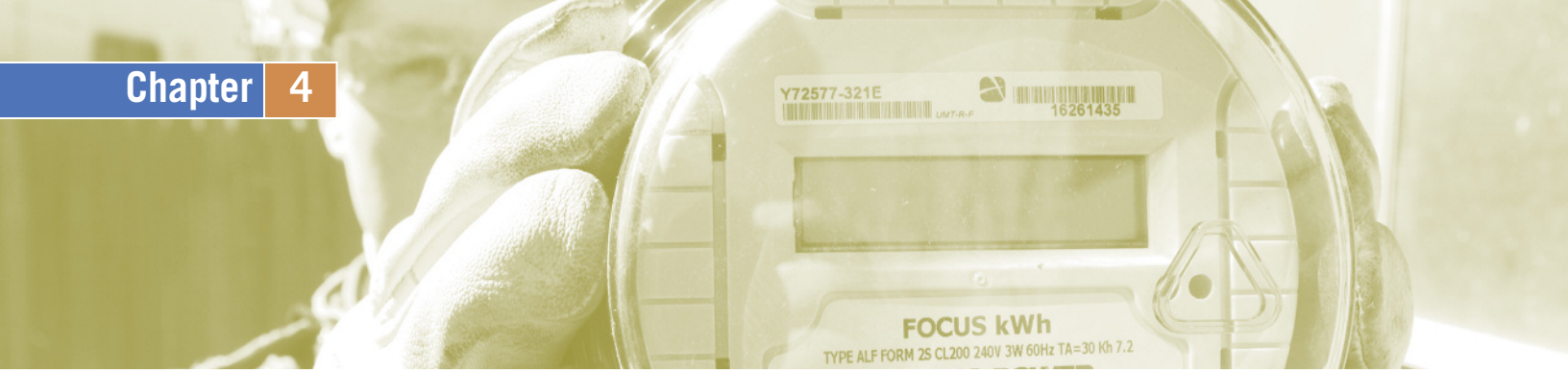
Utah: In November 2015, the Utah Public Service Commission adopted a framework for assessing the costs and benefits of Rocky Mountain Power's net metering program. The framework will compare two cost-of-service studies (one that assumes net metering customers and one that doesn't) that will be submitted before the utility's next rate case.

The growth of solar PV creates opportunities for new energy storage technologies. While the value of electricity storage has been long recognized, the price tag has always been too high; as a result, investments have primarily been limited to small demonstration projects. Nevertheless, some states, such as California and Texas, have promoted innovative applications of cost-effective electricity storage:

California: In 2013, the California Public Utilities Commission issued a groundbreaking order requiring the three major IOUs to procure 1,325 MW of cost-effective energy storage by 2020. The decision requires each utility to file separate procurement applications, which are currently pending before the Commission.

Texas: On the heels of California's energy storage mandate, in November 2014, Texas utility Oncor announced that it would seek regulatory approval to spend $5.2 billion on 5 GW of energy storage to improve reliability and reduce customer bills. However, a Brattle Group study found that "30-40% of the total system-wide benefits of storage investments… cannot be captured by merchant storage investors."

Source: E9 Insight



Chapter 4

Data Sources, Issues and Quality

Renewable Energy Data

Gathering utility-specific data on renewable energy sales was the most challenging task in developing this report. Data sources were many and varied, and included the following:

- Renewable Portfolio Standard (RPS) annual reports
- Company Securities and Exchange Commission (SEC) Form 10-K filings
- Company press releases
- Company websites
- Public utility commission (PUC) compliance reports
- Personal communications with Company and PUC staff
- Company integrated resource plans
- Company Sustainability and Corporate Social Responsibility (CSR) reports
- Company public presentations
- Company investor fact sheets
- U.S. Department of Energy (DOE) Form EIA 861

Every effort was made to source accurate data. But unlike energy efficiency data, which is comparatively easier to find, data on utility renewable energy deployment and generation is not regularly reported by any of the reporting agencies; as a result, validating and fact-checking data is very difficult.[62] Renewable energy data for New York utilities was calculated based on each utility's respective system benefit charge contribution to the New York State Energy Research and Development Authority (NYSERDA).

Energy Efficiency Data

Nearly all energy efficiency data was drawn from 2013 and 2014 EIA Form 861. For utilities operating in Delaware, New Jersey, New York, Oregon and Wisconsin, energy efficiency results were attributed to each utility in proportion to its respective share of funding provided to the state's third-party energy efficiency administrator.

Form EIA 861

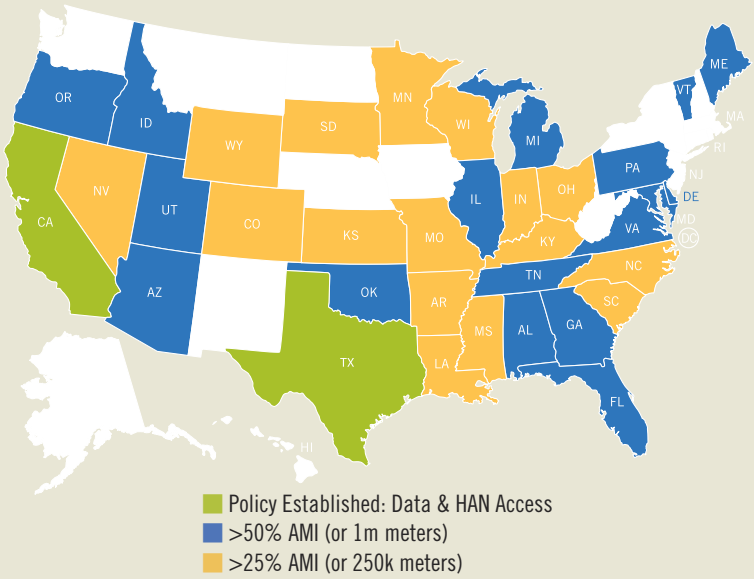
Form EIA 861 collects data on the electric power industry and is typically published every October for the previous calendar year. We utilized Form EIA 861 to gather information on retail sales, energy efficiency, renewable and conventional generation, customer counts, and net metering programs.

62 In addition to possible errors in utility-reported data, there may be differences in how data is reported to different entities (e.g., EIA, public utility commissions, trade associations, etc.). State RPS reports vary greatly in terms of information quality and quantity, and also timeliness. Some states have not issued RPS annual reports in several years, while others take several years beyond the compliance year to issue reports. In some cases, RPS reports didn't agree with renewable energy sales that companies reported in their annual 10-K forms. When there was a discrepancy, data from the 10-K was used. Data obtained directly from utilities were used over any other source. Some data requests to utilities went unfulfilled.

Advanced Metering Infrastructure: Improving Data Access to Realize Consumer Benefits

Over the past decade, U.S. electric utilities have deployed nearly 60 million advanced meters. Expected AMI benefits depend on the utility's operating profile and on the specific business case that is presented to support its proposed AMI investment. But a consistent theme and expected benefit has been better consumer visibility into energy use, both retrospectively and in real time to support better energy management.

Data Policy & Advanced Metering



"A key objective is to provide mass-market customers with convenient access to their energy usage information, and facilitate their ability to share that information with vendors they select. Open and widely adopted industry standard tools are designed for that purpose…." The NYPSC is also considering the best ways to achieve "advanced meter functionality," establishing a centralized data exchange and fostering a consumer "digital marketplace."

Those direct consumer benefits have often been delayed and deferred from original proposals. At the same time, new consumer solutions and in-home devices have emerged to help consumers take advantage of the detailed information that smart meters offer.

Utility commissioners in several states are seeking to establish a consistent regulatory framework for accessing smart meter information:

Illinois: In August 2014, the Illinois Commerce Commission (ICC) began a proceeding to consider establishing an "Open Data Access Framework" under which consumers would be given a right to have access to their own information and the ability to share it with service providers. The Commission is also examining methods for consumers to grant data access to third-parties. The proceedings are ongoing.

New York: As part of the Reforming the Energy Vision (REV) Initiative, the New York Public Service Commission has considered questions related to data access at many points. In 2015, the PSC initiated Track Two of the proceeding to consider, primarily, ratemaking details. The Staff Report presented to the Commission notes that,

California: California, through a series of orders and rulings dating back to at least 2009, has established that consumers should have the right to access and share information, both historical and real-time information. Home area network capabilities have been enabled for a very limited number of consumers. In 2015, utilities implemented the Green Button Connect standard, allowing consumers consistent, ongoing access to their usage information.

Texas: In order to support its competitive market, Texas established a central clearinghouse for smart meter information. In August 2014, the Commission initiated an inquiry to review this system. An expected outcome is that the regional transmission operator (ERCOT) will assume responsibility to ensure consumers and retail electric providers consistent, ongoing access to information. The review is ongoing.

At present, two states, California and Texas, have established affirmative policies that allow consumers to access their smart meter information in an electronic format suitable for sharing with other service providers and technology companies.

Source: E9 Insight

Chapter 5

Data Recommendations

Energy efficiency and renewable energy, which have grown dramatically in the U.S., will become increasingly important resources for U.S. electric utilities going forward. Forming a complete and uniform picture of how utilities deploy these resources is critical. Following are specific recommendations on how federal and state agencies, utilities, regulators and other stakeholders can improve the quality and availability of utility clean energy data.

- **Better, more up-to-date data is paramount.** Data from important sources such as EIA and state RPS reports are not only incomplete but are often dated.
- EIA, in its annual information request from electric utilities, should **create a new Form 861 file focused entirely on renewable energy** that is populated, at a minimum, by renewable energy sales and capacity data broken out by holding company and all subsidiaries; by renewable energy type (including distributed assets); and by ownership type (utility-owned, contracted, or customer-owned).
- As part of this new form, EIA should **clarify the definition of renewable energy** to include only sources such as wind, solar PV, solar thermal, geothermal, biomass, and small hydro (up to 10 MW), and explicitly exclude problematic energy sources that are considered renewable in some states, such as waste coal, "black liquor," large hydro (greater than 10 MW) and fuel cells (unless powered by renewable fuels). These two improvements alone would greatly aid data collection and transparency.
- Additionally, EIA, FERC, or another federal agency should **begin tracking distributed and centralized grid intelligence infrastructure** such as energy storage and demand response, in addition to tracking smart meter deployment.
- **Federal guidance on state RPS and EERS reporting requirements** could ensure comparable, verifiable and timely data about utility clean energy deployment throughout the U.S.
- **The financial community**, including investors in the electric utility industry, should use this data to better evaluate the financial, environmental and social performance of electric utility companies. The data in this report should help investors identify how IOUs are adapting to disruptive challenges facing the sector and the extent to which utilities earn revenues from deploying clean energy.
- **Electric utility companies** should use this report to compare themselves to their peers, especially companies in similar market and regulatory environments, and to evaluate their positioning and strategies.
- **Policymakers** would benefit from determining which clean energy policies have been most effective in driving investment and creating value for customers, utilities, and the wider economy.
- **Consumers** can assess how much clean energy their utility has deployed, how the utility is progressing toward state renewable energy and energy efficiency requirements (if applicable), and how well positioned the utility is for a lower-carbon future.