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2017 outlook on renewable energy

My take: Marlene Motyka

Deloitte Center *for*
Energy Solutions

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In recent years, renewable energy resources such as solar and wind generation have outgrown the “alternative” label. Throughout 2016, renewables effectively competed against fossil fuel generation in power markets and for procurement contracts across the United States and around the world.

How would you describe the growth drivers that propelled renewables into the mainstream?

Due to the declining costs of solar and wind technologies as well as the anticipation of a more carbon-constrained future, today the global growth of renewable energy is increasingly driven by voluntary procurement by utilities and corporations. We’ve seen an especially rapid decline in the global levelized cost of electricity (LCOE) of solar photovoltaic (PV) generation—falling from \$315 per MWh in 2009¹ to just \$100 per MWh in 2016. The cost of onshore wind is also continuing to come down, reaching \$68 per MWh this past year. Perhaps most notably, the global LCOE of offshore wind drastically declined throughout 2016, falling 22 percent from the beginning of the year to around \$126 per MWh today.² These improving economics are empowering many customers to seek greater control over their energy choices. Fifty-six percent of residential consumers surveyed as part of the [Deloitte 2016 Resources Study](#) cited using clean energy sources as their most important energy issue.³ Furthermore, a movement toward localized energy procurement seems to be underway. We’re seeing many municipalities across the country take advantage of community choice aggregation (CCA) policies that enable governments to procure energy resources, typically renewables, on behalf of their constituents while retaining their existing electricity provider for transmission and distribution services.⁴ Three times the amount of installed solar PV was procured by CCAs in 2016 compared to 2015.⁵ There weren’t any solar contracts signed by CCAs the two years prior, so that’s a big jump. Community solar has taken off as well. As noted in the Deloitte report, [Unlocking the value of community solar](#), these programs allow customers who are unable to install solar at their homes or businesses to get their electricity from an offsite distributed solar system. Installed capacity of community solar systems is estimated to quadruple in 2016 compared to 2015.⁶ It is this strong demand from customers and communities that seems to have allowed renewables to shed the “alternative” label and transition into mainstream resources.

There was a lot of buzz around corporate renewable procurement in 2016. Why is this growing source of demand for renewable energy so significant and what are the drivers for companies in making these procurement decisions?

The energy industry views direct procurement by corporate buyers as a viable growth driver at a time when federal policies previously expected to stimulate growth, such as the Clean Power Plan, have been called into question. Low-priced power purchase agreements (PPAs) give companies price certainty that can have a positive impact on their bottom lines. Additionally, consumers are often demanding that companies be environmentally responsible; so, investing in sustainability has become more entrenched in business strategy. Relative to the landmark year of 2015, corporate PPA signing activity slowed in 2016, but forecasts for growth remain strong due to procurement targets. Seventy-one of Fortune 100 companies, which are among the most influential in the United States, have set renewable targets or sustainability goals while 22 Fortune 500 companies have committed to going 100 percent renewable.⁷ That’s a huge driver of demand, especially since many of those companies have expressed an interest in signing PPAs. It’s also significant to note that in this past year, some companies matured in their tactics by engaging with regulators to open up the market. Certain state-level policies prohibit private offtakers and developer contracts. We’re seeing many corporate buyers jointly ask state utility legislatures and commissions to address these barriers and foster a policy landscape that is favorable to corporate procurement.⁸ We’re also seeing some utilities get ahead of the game by offering green tariff programs that supply corporate customers directly with renewable energy. Just five of these programs existed in 2015, and today there are 10 programs nationwide.⁹



Green tariff programs are one example of how utilities are adapting to this growing consumer demand to choose their energy supply. What other types of programs are utilities rolling out to provide customers with the option to consume renewables?

Utilities are becoming more innovative and responsive to customer preferences by offering new products and services, many of which have a renewable energy component. Programs range from providing residential customers with utility-owned solar panels to allowing “self-consumption,”¹⁰ or “self-supply”¹¹ as they call it in Hawaii, through grid-tied, but customer-owned, solar and storage systems. They’re also responding to the previously mentioned localized energy trend by rolling out utility-led community solar programs and, as discussed in the Deloitte report [Reinventing Resilience](#), some utilities are also exploring how to deploy renewable microgrids at scale.¹² Furthermore, I’d like to acknowledge the growing belief that empowering customer choice will lead to more consumption of renewable energy. A key tenant to Google’s approach to achieving 100 percent renewable energy purchasing is promoting policies that empower consumers to choose their energy supply. The company considers this key to accelerating a global transition to a cleaner grid.¹³ So as customer choice gains momentum, it’s likely that demand for renewable energy will grow as well.

For years, electricity storage has been called the “holy grail” of the electric grid due to its potentially critical role in integrating renewable energy, reducing customer energy costs, and improving grid reliability and resilience. What is your take on the storage market in 2016 and its growth potential going forward?

The US energy storage market certainly matured throughout 2016, demonstrating more robust demand and more dynamic, customer-cited applications. Mandates for storage deployment in states such as California and Oregon seem to be propelling the market. Regulatory bodies across the nation are investigating the various value streams that storage can bring to the grid and how best to leverage storage to firm up intermittent renewables. Thus far, the PJM Interconnection region has enjoyed the most concentrated growth; however, this year deployments were down relative to last year due to an interim cap on the frequency regulation market.¹⁴ While central large-scale storage systems constitute the majority of today’s installed capacity in PJM and across the United States, customer-sited, distributed storage systems are projected to dominate over the next four years.¹⁵ It’s clear that the synergies achieved by coupling distributed storage with intermittent renewable resources will likely drive the market, as many of these behind-the-meter systems are expected to be tied to solar PV. Currently, demand charge management is the most common application for commercial and industrial (C&I) energy storage, but in the longer term, as more utilities adopt time-of-use (TOU) tariffs, rate arbitrage

opportunities will likely motivate both residential and C&I customers to invest in solar-plus-storage systems.¹⁶ Storage deployments in the United States are projected to nearly double in 2017 compared to 2016 and grow ninefold from 2015 to 2021;¹⁷ so, I'd say the prospect for growth is very strong.

Another strategy that renewable developers and utility holding companies are employing to increase return is global diversification. Why now?

It's widely recognized that renewables are leading a transformation of power markets on a global scale. In 2016, solar and wind power suppliers around the world demonstrated competitive pricing compared to other technologies. In countries with auction programs and tenders, prices fell significantly below \$100 per MWh. In a recent auction in Chile, a solar developer was awarded a contract just over \$29 per MWh, beating out incumbent energy suppliers.¹⁸ Success in these auctions makes global diversification attractive for renewable developers. Furthermore, many foreign power and utility companies are making investments in the United States to capture technological innovation and ride the growth of distributed energy resources (DER). We've seen several large European energy companies set up shop in innovation hubs around the United States to invest in the Internet of Things and data analytics technologies, especially those that enable more effective integration of distributed, renewable resources into the grid. They see the potential for those applications to disrupt their businesses. Instead of getting disrupted, they intend to be the disrupters.¹⁹

How are markets evolving to support or promote these developments?

Renewable energy markets matured this year on both a global and domestic scale, bringing more competition and resource diversity into the fold. The use of government-led auction mechanisms gained traction around the world in 2016, especially in countries with renewable generation targets. As was exemplified in Chile, these competitive auctions can serve to bring down the price of contracts. In addition, the Mexican government hosted two auctions in 2016. Participants in the most recent October tender received an average of \$33 per MWh, which was 30 percent lower than the auction that took place earlier in the year.²⁰

As for the United States, a notable market change came at the end of the year when the Federal Energy Regulatory Commission (FERC) proposed a rule that is expected to attract investment and open up the market for DER. The FERC is requiring²¹ each regional transmission organization and independent system operator to both define distributed energy resource aggregators as market participants and create rules for energy storage participation in wholesale markets. Lack of access to structured markets has likely been a barrier to growth for DER providers for some time now, so these new revenue opportunities coupled with increasingly stronger customer demand will likely foster considerable DER market growth.



What's next in 2017?

Despite ripples of uncertainty, whether related to US tax policy or commitments to fighting climate change, the positive momentum achieved by the renewable energy sector will likely not abate. Large corporations may keep flexing their buying power, and I expect that as the industry becomes increasingly comfortable with corporate renewable procurement, we'll see more contracts signed with small- to medium-size companies. The declining cost of energy storage should enable further penetration of variable, renewable resources, and what's really become evident is that the underlying driver for each of these market trends is customer demand for renewables. As in past years, in 2017, I expect that the marketplace will innovate in unexpected ways to give consumers what they want: clean, affordable renewable energy.

Save the date

November 13-15, 2017

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For more information, please contact
RenewableEnergy@deloitte.com

Endnotes

1. Angus McCrone and Ulf Moslener, *Global trends in renewable energy investment 2015*, Frankfurt School FS-UNEP; Collaborating Centre for Climate & Sustainable Energy Finance, http://fs-unep-centre.org/sites/default/files/attachments/key_findings.pdf, accessed November 18, 2016.
2. "H2 2016 LCOE: Giant fall in generating costs from offshore wind," Bloomberg New Energy Finance, November 1, 2016, <https://about.bnef.com/blog/h2-2016-lcoe-giant-fall-generating-costs-offshore-wind/>, accessed December 9, 2016.
3. Deloitte 2016 Resources Study, Deloitte, <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/resources.html>, accessed December 8, 2016.
4. "Community Choice Aggregation" webpage, US Department of Energy website, http://apps3.eere.energy.gov/greenpower/markets/community_choice.shtml, accessed December 8, 2016.
5. Eric Wesoff, "Slideshow: Why 2016 Is the Weirdest Year for US Solar," Greentech Media, October 25, 2016, <https://www.greentechmedia.com/articles/read/the-weirdest-year-for-us-solar>, accessed November 18, 2016.
6. Ibid
7. *2016 Corporate Advanced Energy Commitments*, Advanced Energy Economy, December 2016, <http://info.aee.net/growth-in-corporate-advanced-energy-demand-market-benefits-report>, accessed January 4, 2017.
8. Michael Copley, "Corporates keep up pressure to loosen utility regulations," SNL, November 15, 2016, <https://www.snl.com/web/client?auth=inherit#news/article?id=38388575&KeyProductLinkType=2>, accessed November 18, 2016.
9. Letha Tawney, Celina Bonugli and Daniel Melling, "Green Tariffs Take Off in the US, Expand Access to Renewable Energy," World Resources Institute, October 27, 2016, <http://www.wri.org/blog/2016/10/green-tariffs-take-us-expand-access-renewable-energy>, accessed December 8, 2016.
10. Andy Stone, "More Utilities Are Offering Services That Allow Customers to Self-Consume Their Solar Power," Greentech Media, August 3, 2016, <https://www.greentechmedia.com/articles/read/more-utilities-are-offering-self-consumption-packages>, accessed November 18, 2016.
11. Tam Hunt, "The Outlook for Hawaii's Solar Market After the End of Net Metering" Greentech Media, March 23, 2016, <https://www.greentechmedia.com/squared/read/hawaii-solar-market-after-the-end-of-net-metering>, accessed December 6, 2016.
12. *Reinventing resilience: Defining the model for utility-led renewable microgrids*, Deloitte, <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/microgrids-enchange-grid-resilience.html>, accessed January 4, 2017.
13. *Achieving our 100% renewable energy purchasing goal and going beyond*, published by Google, December 2016, <https://environment.google/resources/>, accessed December 11, 2016.
14. Brett Simon and Daniel Finn-Foley, "An Industry in Flux: Energy Storage Transitions to New Markets and New Applications in the US," Greentech Media, September 21, 2016, <https://www.greentechmedia.com/articles/read/Energy-Storage-Transitions-in-the-US>, accessed November 18, 2016.
15. Stephen Lacey, "How Distributed Battery Storage Will Surpass Grid-Scale Storage in the US by 2020," Greentech Media, March 10, 2016, <https://www.greentechmedia.com/articles/read/how-distributed-battery-storage-will-surpass-grid-scale-storage-in-the-us-b>, accessed November 18, 2016.
16. Mike Munsell, "Corporate Investments in Energy Storage Reach \$660 Million in Q3 2016," Greentech Media, December 6, 2016, <https://www.greentechmedia.com/articles/read/corporate-investments-in-energy-storage-at-660-million-in-q3-2016>, accessed November 18, 2016.
17. "GTM Research U.S. Energy Storage Monitor" splash page, Greentech Media, <https://www.greentechmedia.com/research/subscription/u.s.-energy-storage-monitor>, accessed November 18, 2016.
18. Philip Sanders, "Chile Energy Auction Gives Bachelet a Success to Boast About," Bloomberg LP, August 18, 2016, <https://www.bloomberg.com/news/articles/2016-08-18/chile-s-energy-industry-a-spot-of-light-in-a-darkening-economy>, accessed December 6, 2016.
19. Interview with Florian Kolb & Chris McLachlan of RWE at Bloomberg New Energy Finance's The Future of Energy Summit 2015, <https://vimeo.com/125544982>, accessed December 6, 2016.
20. "As renewable power overtakes coal, here's how Mexico has been doing its part" Mexico Now, October 26, 2016, <http://www.mexico-now.com/main/index.php/9-news/1008-renewable-power-overtakes-coal-here-s-how-mexico-has-been-doing-its-part>, accessed December 6, 2016.
21. "FERC Proposes to Integrate Electricity Storage into Organized Markets," News Release: November 17, 2016 Docket No. RM16-23-000, <https://www.ferc.gov/media/news-releases/2016/2016-4/11-17-16-E-1.asp#.WE2kro-cFpz>, accessed December 7, 2016.



Marlene Motyka

US Renewable Energy Leader
Deloitte Transactions and
Business Analytics LLP
mmotyka@deloitte.com
+1 973 602 5691
[@MarleneMMotyka](https://www.linkedin.com/in/MarleneMMotyka)

Marlene serves as the US Renewable Energy Leader for Deloitte and is a principal in Deloitte Transactions and Business Analytics LLP. In her role as US Renewable Energy leader, she steers Deloitte's overall delivery of a broad range of cross-spectrum professional services to renewable energy companies and those who invest in renewable energy. In addition, for over twenty years, Marlene has supervised and performed financial analyses and valuations in the power and utilities and renewables sectors.



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