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Trends to watch in
alternative energy
Firmly entrenched in the
mainstream, alternative
energy's momentum
accelerates

Deloitte Center
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In recent years, there has been much discussion of alternative energy moving into the mainstream. While it hasn't yet shed the "alternative" label, alternative energy's shift to the mainstream is largely complete and likely irreversible. Despite continuing uncertainty over policy incentives and competition from historically low natural gas prices, alternative energy's momentum continues to accelerate. In the case of wind and solar power, growth is regularly outpacing projections. Alternative energy sources still face the aforementioned roadblocks and perhaps a few emerging ones, but the industry continues to move forward and the overall outlook for growth is strong due to both longstanding and new trends.

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As we detail in the following pages, new sources of support are broad-based. Innovative business models like community solar are widening the addressable market and attracting potential new customers and providers. New state and utility imperatives to ensure electric grid resiliency are encouraging adoption of distributed renewable generation. Corporations are increasingly doing their part by pledging to generate as much as 100 percent of their power from renewable sources in the coming years. And federal and state governments are introducing policies—such as the Clean Power Plan and New York's "Reforming the Energy Vision"—that pave the way for further growth.



Of course, as the share of power generated by intermittent sources like wind and solar grows, concerns about utilities' ability to maintain power quality and reliability on the electric grid increase, but technological advances are easing this transition. For alternative energy companies themselves, rapid growth may prompt questions such as whether they are prepared for the organizational implications around learning and development, culture, performance management, and workforce readiness that result from rapid growth. Their success is also bringing another kind of attention, with wind and solar power asset acquisitions steadily growing and more potential purchasers waiting in the wings.

1. Renewable acquisition activity gaining steam

In 2015, renewable energy assets continued to attract attention from Wall Street and other influential buyers, driving deal count up 42 percent from the prior year, to 163 deals. Total capacity acquired rose 17 percent, to nearly 19.7 gigawatts (GW). Renewable assets established a greater presence in publicly traded financial markets through YieldCo-related activity. Furthermore, large corporations eager to lock in future electricity rates entered into long-term contracts with solar and wind developers, boosting investor confidence in the sector.

Solar emerged as the most active subsector in 2015 with 115 deals, nearly doubling deal count compared to 2014. This compared to 48 wind transactions. However, given the typically larger size of wind plants, the amount of wind capacity acquired still beat solar, at 11.3 GW versus 8.3 GW for solar. Developers sought opportunities to monetize the federal Investment Tax Credit (ITC) prior to its scheduled 2016 stepdown, which was postponed at yearend with multi-year extensions of both the solar ITC and the Production Tax Credit for wind. Additionally, the declining cost of solar gave both utilities and independent power producers (IPP) with historically wind-dominated renewable portfolios the opportunity to add solar capacity.

One of the top drivers of IPP renewable acquisitions early in 2015 was the need to feed YieldCos. However, stock market volatility impacted YieldCo values toward the end of the third quarter, driving them to sell off assets. As a result, financial institutions and utilities saw an opportunity to acquire 7.6 GW of solar and wind capacity in the second half of 2015.

The renewables sector ended the year on a very high note, primarily due to the extension of federal tax credits and a heightened global interest in low carbon energy sources following the December 2015 United Nations conference on climate change (COP21). Utilities will likely continue to demonstrate a strong appetite for solar and wind assets due to regulatory directives and attractive economics. These drivers coupled with developers' robust project pipelines will continue to propel merger and acquisition activity through 2017.



2. Community solar broadens market for solar power

Community solar programs allow customers who do not own their homes or have strong credit scores, available capital, or adequate roof space to invest in solar power by sharing the resource with others in their vicinity. Each installation typically generates one to two megawatts (MW), making them large enough to tap project financing and other efficient sources of capital. These funding sources can reduce the cost by as much as 50 percent compared with individual rooftop solar installations.¹



Community solar programs—which include a wide range of offerings from utility-owned projects to rate-based programs and “virtual net-metered installations”—can reduce costs for consumers and help states meet Renewable Portfolio Standards (RPS) goals. Such programs typically provide credits on customers’ bills equal to their subscription rate or ownership stakes in the project. In addition, the federal government has supported using these programs to bring solar power to low-income communities and areas in which households and businesses either rent or do not have adequate roof space.

Backed by such support, community solar has gained a foothold in the US market during the past five years and its growth shows no signs of slowing. In 2010, only two shared solar projects existed. By 2015, there were more than 50 projects across 19 states, with a combined capacity of more than 170 MW. That capacity could grow to as much as 11 GW by 2020 depending on how many states adopt community solar and net-metering legislation, according to the National Renewable Energy Laboratory.² Thirteen states and the District of Columbia have adopted various shared renewables policies.³

In some states, utilities and regulators have expressed concern that large industrial customers may use the program to offset their electricity costs, which would socialize their higher bills among residential customers and undermine the cost savings of shared solar programs.⁴ How states manage and support the development of community solar projects through legislation will be critical to future growth.

3. Grid integration advances help accommodate more renewables

Many wind, solar, and other variable alternative energy resources are not owned or controlled by utilities. As these intermittent resources are connected to the electric grid, utilities and system operators must integrate power output while balancing supply and demand in real time and avoiding unanticipated voltage fluctuations or circuit overloads that could trigger blackouts or other service disruptions. To address these issues, utilities are developing more accurate forecasting tools and planning processes, and adopting new technologies and applications such as grid automation, smart inverters, sensors, advanced analytics, forecasting, and electricity storage.

With these improvements, utilities and grid operators can accept higher levels of renewable generation. Five years ago, they were reluctant to allow renewables on the grid to exceed 10 percent of overall capacity. Now, the level is 20 percent or more, and the National Renewable Energy Laboratory predicts it could exceed 50 percent by using more supply and demand flexibility options. Germany, Australia, and Hawaii can already handle variable loads of 25 percent or more.

Hawaii has passed legislation requiring the state to get 100 percent of its power from renewable energy sources by 2040. After it worked with solar installers to upgrade the software for inverters, Hawaiian Electric was able to increase circuit thresholds from 120 percent of the daytime minimum load to 250 percent, more than doubling the hosting capacity of circuits for integrating rooftop solar.⁵



4. Renewable energy sees expanded role in resiliency

Renewables have changed ways of thinking about resiliency. While resiliency efforts used to focus on preventing outages, states and utilities are realizing that alternative energy sources can speed recovery times after an outage occurs. Consumers and commercial users are recognizing that with renewables and other distributed generation facilities combined with electricity storage and linked through micro grids, they can more effectively protect themselves from outages.

Increasing outages from severe weather have brought reliability and resiliency to the forefront for many states and utilities, which are deploying clean, resilient power technologies that can keep the power on at critical facilities during grid outages caused by extreme weather events.

Many are incorporating wind, solar, and other alternative energy sources into their resiliency plans because these technologies, combined with energy storage, can provide electricity during outages as well as valuable grid services year-round.

Following the Fukushima nuclear disaster in 2011, Japan initiated a sweeping redesign of its energy policy to improve resiliency in the wake of natural disasters such as earthquakes. An assessment of the feasibility of a 100 percent renewable energy electricity system by the year 2030 showed it could achieve greater resiliency than Japan's current system. It would employ wind and solar coupled with batteries, pumped hydro, or compressed air storage to smooth supply and demand fluctuations.⁶ Deployment of storage technologies is advancing fastest in Asia and Europe, where electricity costs tend to be higher than in the US, making storage a more viable option for stabilizing the grid.

Meanwhile, in the US, states hammered by "Superstorm Sandy" in 2012 are turning to microgrids—a combination of a generator and storage devices linked by a control system that is isolated from the main grid. Microgrids, which tend to serve a small geographic area such as a college campus, hospital, or downtown area, can be separated from the main grid if a disruption occurs. This independence improves both grid resilience and local ability to deal with an emergency. Connecticut leads the nation in developing microgrids, with projects underway in several cities, in part thanks to its use of innovative financing mechanisms.



5. EPA's Clean Power Plan supports renewable growth

The Environmental Protection Agency's (EPA) Clean Power Plan (CPP), finalized in October 2015, calls for reducing greenhouse gas emissions in the US electricity sector from their 2005 level by 32 percent by 2030. The expansion of renewables is one of the plan's three key pillars. The plan targets carbon reductions in electricity generation by improving the efficiency of existing coal plants, and shifting from coal generation to existing natural gas plants and new renewable sources like wind and solar.⁷ The US Energy Information Administration estimates that under the CPP, renewables will account for as much as 400 GW of generation by 2040, a projection some analysts in the industry see as conservative.

The ruling requires that states develop their own plans to cut carbon pollution, allowing them to customize procedures for achieving the goals. These plans must be submitted by September 2016 and enacted by 2022. While the CPP is likely to be litigated in the courts, it will nonetheless move the industry toward renewable energy, energy efficiency, and other low- or no-carbon emission alternatives. This ruling and other environmental legislation is already affecting some corporations' decisions about energy use by encouraging them to address carbon reduction sooner than they otherwise might because they believe a price on carbon is increasingly inevitable.



6. Regulatory reform driven by states

While the CPP will likely promote renewable growth, overall federal support for renewables has been inconsistent in recent years, and states have increasingly stepped in to fill the void. In 2014 and 2015, many states continued to expand their programs to encourage renewable energy development, and in some cases, states are developing new regulatory frameworks to accommodate changes in the traditional utility business model.

The most extensive of these new regulatory frameworks is New York's "Reforming the Energy Vision." Adopted in 2014, it proposes overhauling the state's energy grid and utility regulatory system to achieve system-wide efficiency, reliability, resiliency, fuel diversity, affordability, carbon reduction, and increased customer choice and value. At the same time, it would promote greater use of wind and solar power and reshape the utility business model to deploy more distributed energy resources.

While state responses to the growing use of renewable energy vary, there is little doubt that their efforts, combined with federal and local incentives and policies, have helped trigger dramatic cost declines that have encouraged more people to invest in solar and wind. As many states approach RPS targets, a few have increased their goals in an effort to encourage further renewable development. California, for instance, upped its RPS from 33 percent by 2020 to 50 percent by 2030.⁸ Vermont raised its target from a nonbinding goal of 20 percent by 2017 to 75 percent by 2032, and Hawaii boosted its goal from 40 percent by 2030 to 100 percent by 2045.⁹ Electricity storage mandates, like California's 2013 rule requiring the state's three largest electric utilities to deploy 1.3 GW of electricity storage by 2024,¹⁰ are also promoting renewable growth because storage mitigates wind and solar intermittency.

State and regional cap-and-trade systems like California's, implemented in 2012, and the Northeast's Regional Greenhouse Gas Initiative also support the growth of renewables. And state tax credits for renewables, such as the 35 percent solar tax credit in North Carolina, have also been critical to growth.



7. Corporations go all-in on renewable energy

According to [Deloitte's annual Resources Study](#), in 2014, companies favored conventional solutions to energy management, such as switches that automatically power off equipment when it is not in use. However, in 2015, companies began embracing more capital-intensive measures. Thirty-nine percent reported installing solar panels or other electricity-generating assets at their facilities and 26 percent said they had installed batteries to store electricity as a hedge against peak demand times, when prices are higher.¹¹

Companies such as Apple Inc., Intel, and Kohl's are leading a movement among major corporations to generate all of their energy from renewables in the next two decades.¹² Meanwhile, Amazon, General Motors, and Facebook have made commitments to step up purchases of renewable power. In one of the biggest renewable energy deals outside of the utility sector so far, Google recently unveiled an ambitious plan to power all of its operations with renewable energy. The company plans to buy electricity from wind and solar farms worldwide that have a combined capacity of 842 MW.¹³

As of November 2015, corporations had signed power purchase agreements for large-scale, off-site renewables covering 2 GW of power, up from 1.2 GW for all of 2014.¹⁴ Others were studying ambitious programs to increase on-site generation.

Increasingly stringent environmental rulings and proposals have convinced some companies that carbon pricing is imminent and encouraged them to develop plans for reducing carbon rather than waiting for government mandates. Meanwhile, corporate renewable energy goals are becoming intertwined with other policies, such as sustainability programs. Despite the advances, many companies continue to struggle with renewable energy initiatives.¹⁵ For every successful corporate deal to source energy from large-scale off-site renewables projects, 5-10 deals fail or experience significant delays, according to estimates from the Rocky Mountain Institute.¹⁶



8. Fast growing companies focus on people to sustain growth

The days are dwindling when alternative energy companies were confined to startups. As the industry makes way for large, scalable enterprises, companies are starting to grapple with organizational questions tied to their exponential growth.



The [Deloitte Global Human Capital Trends 2015 Report](#) has identified the preeminent people-related issues that keep energy executives up at night: learning and development, organizational structure, culture, performance management, and workforce readiness.¹⁷ Alternative energy companies looking to sustain their forward momentum should be asking the following critical questions:

“Do the right people have the right skills for the right jobs?” Alternative energy companies that are anticipating growth or change must assess their competency structures and needs as well as their current learning offerings and create a strategy that supports and engages all employees at the right levels both now and for the future.

“Do we have the right structure in place to scale and accommodate our vision?” An organizational design needs a clear business strategy to guide specific decisions. Effective design requires an understanding of the potential impact and significance of proposed organizational changes on your people, their ways of working, and your customers.

“How can we consciously retain or create our organizational culture through all this change?” Creating a sustainable culture that incentivizes the right behaviors and dis-incentivizes the wrong ones is really, really tough. But it can be done with solid data and active engagement.

“Is the talent model and performance management process the right one to support growth, and does the current talent pipeline meet the future needs?” Leaders of alternative energy companies need to define the capability framework for talent selection, assessment, development, and succession that meets the leadership needs of today and tomorrow.

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