



## Currents & Currencies

SCOUT  
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The Power of Change:  
Energy in an Age of Transition

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**T**he energy industry has long resisted change, for a number of reasons.

Power generation is one of the most heavily regulated and capital intensive industries there is—after all, a 1,000 megawatt power plant cannot simply be replaced by the latest app. Renewable energies from solar and wind sources depend on variable environmental conditions, storage technologies are in their infancy, and incremental change has been standard procedure for decades. Inertia is a powerful defender of the status quo, but once new currents build, the tidal wave of change is impossible to resist. Change is coming to the energy industry, and it's a change that has already impacted established industries such as consumer packaged goods and the beverage industry. What used to be considered mass commodities

are now lifestyle choices in which customers put their money where their values lie. Navigating through this period of adjustment will require companies and brands to have a broader view and deeper understanding of the currents and currencies of change that are upon them. 🌀



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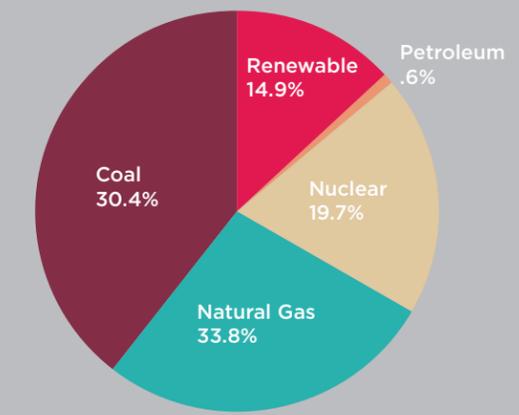
# The Energy Landscape Is Changing

Over the last twenty-five years, the mix of fuels used to generate electricity in the United States has changed. Coal, once the king of power generation, has become increasingly challenged. While coal currently still makes up 30% of electricity generation, natural gas and renewable energy sources are playing an increasing role in electricity supply. The U.S. Energy Information Administration (EIA) projects that coal's share of electricity production will continue to decline while natural gas and nonhydro renewable energy sources will grow through 2040.<sup>1</sup>

Even so, the EIA projects that coal plants will still remain the largest electricity generation fuel source until 2040, when production will be overtaken by natural gas, a cleaner and still abundant fossil fuel. Even the rollback of emissions regulations will not save coal from extinction, as market forces push toward cheap natural gas and renewables.

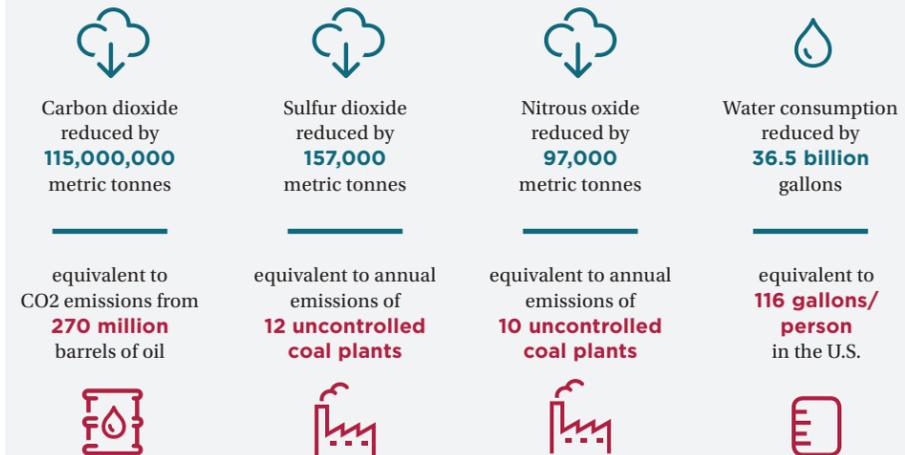
Infrastructure also impacts nuclear power, and as many old reactors are retired, its share of electricity generation will drop to 16% by 2040. As coal and nuclear infrastructure reach end-of-life, new fuel sources will need to be developed. For the near future, this means a heavier reliance on natural gas, but in the long term, renewable energy sources will play an increasingly larger role.

Hydro and wind will make up the largest shares of renewables in 2040, although the share of wind power is projected to level off by 2018. The biggest growth is expected to come from solar and geothermal generation, capacity of which is expected to more than double by 2040. The rise of solar energy will bring with it a change in the way energy is delivered, as the big increases in solar are expected to come from small rooftop homeowner installations. Not only are the sources of electricity generation changing, so are entities that generate electricity and the grid that delivers it.<sup>2</sup>



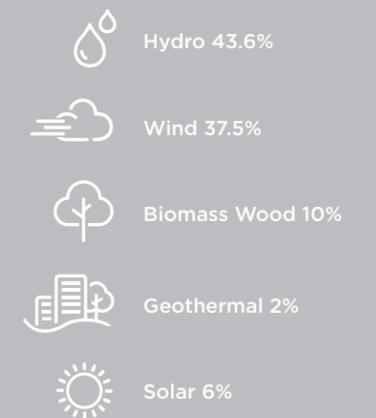
2016  
U.S. Electricity Generation

 Wind generation in 2013 provided a range of environmental benefits.

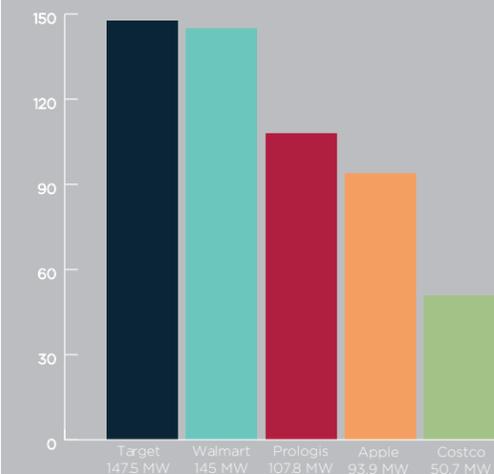


Note: Emissions and water savings calculated using EPA's Avoided Emissions and Generation Tool (AVERT). 'Uncontrolled coal plants' are those with no emissions control technology.

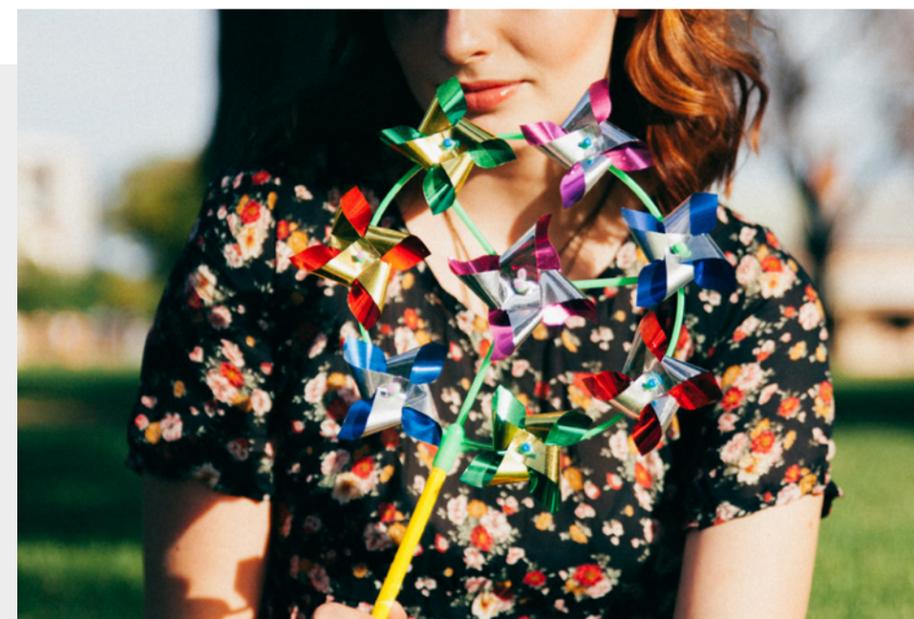
## Percentage of Renewable Energy



## 2016 Top Corporate Solar Users\*



\*SEIA.org/solarmeanbiz



# The Innovator's Dilemma in an Age of Transition



It is perhaps surprising that despite their advantages, renewables provided just 14.9% of electricity generation in 2016—including hydroelectric, biomass, geothermal, wind and solar. Wind energy supplied 5.5% of the total electricity generated in the U.S. in 2016, and solar energy, including utility-scale and distributed solar, generated 0.94% of all U.S. electricity in 2016.<sup>4</sup> Evidently, major change requires more than just the introduction of new technologies. In powerful established industries like electrical production, “conventional wisdom” can be a major barrier to change. The economist J.K. Galbraith warned that the biggest threat to an industry is avoiding “accommodation to circumstance until change is dramatically forced upon it.”<sup>5</sup> One can see this dynamic at work in the energy industry: the technologies are there, but the industry is not. It can often be difficult for companies to see beyond their immediate needs, even when short-term gains can lead to long-term disadvantage. However, it is important to take a broader perspective to place the current challenges in the narrative of long-term trends. One can look to theories developed by social scientists to identify and track the cyclical business

cycles and long waves of historical change in the global economic system. These social theorists observe that periods of innovation and growth are followed by decline and stagnation. The arc of these long-wave cycles often follows the fortunes of a global leader who sets the rules of the economic system for a few generations, or roughly 50-70 years, until conditions in the system change or no longer exist—and the ability to produce results begins to collapse. Social theorist Immanuel Wallerstein calls the current period,

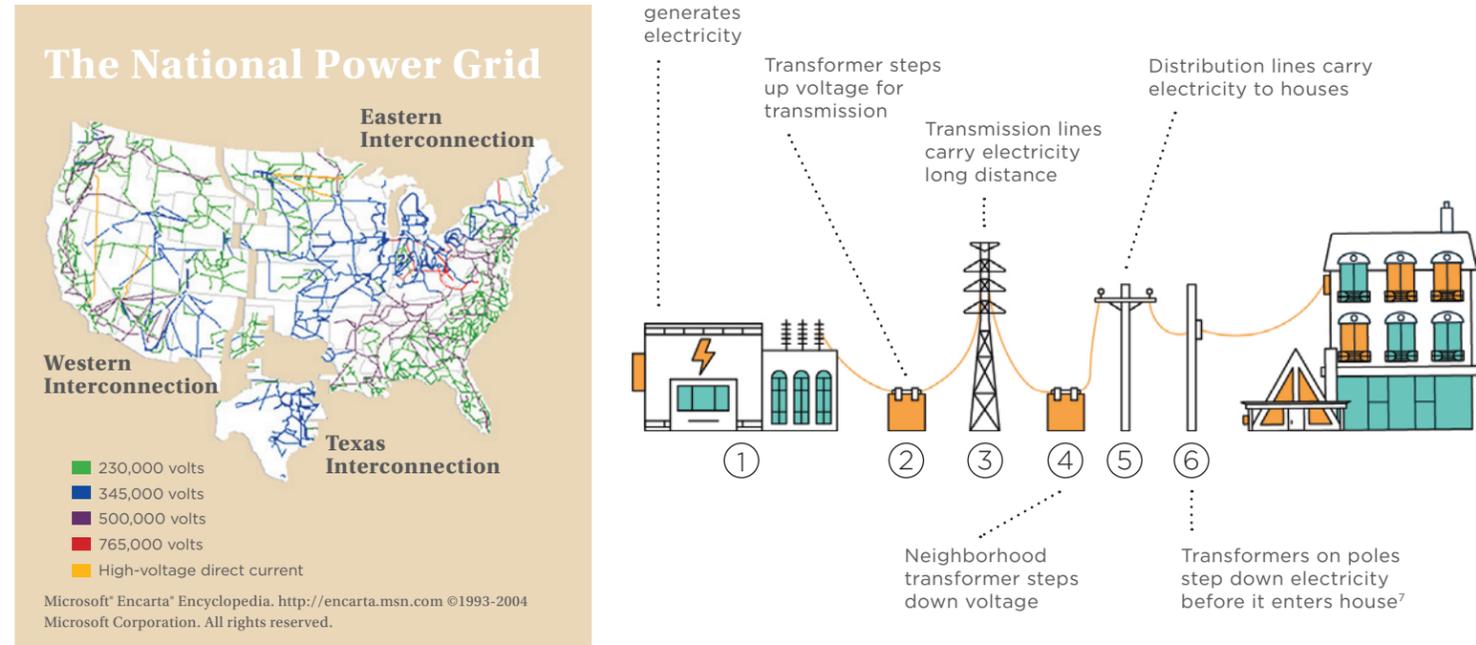
*These periods of transition happen only once a century or so, meaning very few people alive have experienced such changes. Those who do must successfully navigate the breakdown of the current order, and embrace the privilege and responsibility of creating a new order.*

in which the United States has been the leader of the world-system since World War II, an “age of transition.”<sup>6</sup> Periods of transition are often fraught with turmoil and uncertainty, as the old system is challenged by the new, unestablished, emerging paradigm. What one group views as a breakdown of the established order, the other sees as a clearing away of rules that were created to solve problems that no longer exist. These periods of transition happen only once a century or so, meaning that very few people alive have experienced such changes. When people experience systemic transformation, they must successfully navigate the breakdown of the current order, and embrace the privilege and responsibility of creating a new order.

**How do companies navigate through these times of change?** It can be helpful to examine previous periods of massive change for guidance. In times of transition and disruption, those that resist change often follow the same fate as those companies that thought they were in the horse business instead of the transportation business when the mode of transportation for thousands of years was replaced

by the automobile in a few short years. Clayton Christensen, author of *The Innovator's Dilemma*, explained that large established companies focus too much on their customers' current needs and find it difficult to transition or adapt to new technologies or customer demands. Established companies do not want to cannibalize their current products and thus avoid innovation, allowing new entrants and innovators to disrupt. Companies that resist change also tend to not see that the returns on investment for innovation are far greater than the return on protecting a dying industry. Thus, avoiding innovation in the short term can lead to long-term ruin. 🌀

# A Major Barrier: An Infrastructure Gridlock



**Large centralized generating plants.** *The United States does not have a national power grid—instead, it is made up of three independently operating power grids in the lower 48 states.<sup>8</sup>*

**A**mong many barriers to change, the energy grid infrastructure is perhaps the most complex. The United States does not have a national power grid—instead, it is made up of three independently operating power grids in the lower 48 states. Most of the electrical transmission facilities are decades old and were built to serve large centralized generating plants. They facilitate a one-way flow of energy from power plant to consumer and are designed to provide a stable and reliable energy source. But centralized power generation also leads to electricity loss in transmission. While electricity transmission is more efficient at high-voltage, it must be stepped down to lower voltage before it can be used safely. Due to line resistance, step-up transformers and step-down transformers, the total loss from electricity generation to residential usage can be as high as

14%.<sup>9</sup> Therefore, a rooftop solar installation can be considered as immediately being 14% more efficient, since it is used at its source.

To further complicate things, since electrical power cannot be stored effectively at large scale, power must be produced at the time it is used in order to ensure the stability of the entire grid. This creates further inefficiencies, as power plants create more power than is needed and some must ramp up to full power before getting online, losing much of the energy created in the process. Additional challenges facing the grid include landowner resistance to new construction of transmission lines, and regulatory uncertainty around who should pay for them, especially those that cross state lines to reach renewable energy generation sites that may be located far from highly populated areas.<sup>10</sup>

# Tides of Change: Toward Energy As A Lifestyle

The main drivers of the transformation in the energy industry are changes in the regulatory landscape, the emergence of new technologies, and a shift in customer preferences. These drivers are inextricably linked to the broader macro trends of climate change, increasing scarcity of resources, and environmental degradation.

Feeling helpless in the face of a multitude of global crises, individuals increasingly seek to be in control of their personal choices. They sense that mass production and consumption are at the source of many of these crises, and so they are not seeking answers in business as usual. Consequently, every purchase they make becomes an opportunity to make an impact within their locus of control. Products and services that used to be considered commodities are now becoming lifestyle currencies. The sustainable lifestyle has evolved from being

the sole purview of “tree huggers” and hippies, to a sizable segment of early adopters such as the LOHAS (Lifestyles of Health and Sustainability) consumers, and is now on the verge of going mainstream. As more and more people value quality, sustainability, and making an impact locally, these attributes have become table stakes in the new economy. Millennials, a large demographic with increasing purchase power, are accustomed to making purchase decisions that “feel good.”

These fundamental shifts in purchasing preferences make even the selection of a utility a lifestyle choice. In an age where a simple appliance such as a thermostat is transformed into a smart gadget, leading energy providers will be those who can match the sexiness of the Nest and the smart connected home with equally attractive clean and locally produced energy.



## *Climate Change and More Engaged Customers*

In some administrations, federal regulations push established utilities and power generators to shift business practices to lower emissions. Then (and now), a large and increasing segment of energy consumers are demanding more renewable energy options from suppliers, and are even willing to pay more for it. An international study conducted by IBM found that two-thirds of consumers say they are willing to pay more for power that could be definitively shown to have lower CO2 emissions. Surprisingly, Americans were willing to pay the highest premium of all countries surveyed, up to an additional 20% or more.<sup>11</sup> Another global study conducted by Swiss Re showed that more customers would rather buy renewable energy provided by utilities than install equipment to generate their own power.<sup>12</sup>

## *Decentralization, Microgrids and Democratization of the Energy Grid*

One of the biggest changes in the energy industry is in how energy will be delivered. Most of the electrical transmission facilities are decades old and built to serve large centralized plants to provide a steady and reliable energy source. However, as energy preferences change and new distributive technologies emerge, customers are increasingly keen to make their energy choices more democratic and their communities more resilient through decentralized, smart microgrids and extensive use of



renewables. An additional advantage of a decentralized grid is that the economic benefits of power generation will become as dispersed as the ownership of the sources.<sup>13</sup> The emergence of the microgrid—a small-scale system connecting diverse power sources, transmission lines and local users—can empower local energy decision-making and improve resilience, proving that cost alone is not the only factor involved in decision-making. The continued operation of micro-grids at Princeton University during the Polar Vortex and Hurricane Sandy demonstrated their potential.<sup>14</sup> Environmental concerns, local reliability, and consumer lifestyle choices are challenging the notion of energy as a commodity, allowing customers to elect the power that represents their needs, including generation and distribution.

## *Electricity Demand Slows*

Years of energy efficiency efforts are beginning to pay off, reducing the consumption of energy dramatically. Global demand is expected to grow by only 1.8% a year and actually decline in advanced economies over the next 25 years. This will give an advantage to smaller, smarter, and more responsive power providers. Legacy energy infrastructure such as centralized fossil fuel plants will continue to be needed for some time, but they will become less viable, profitable, and unable to cope with a changing energy landscape.<sup>15</sup> The ability of combined-cycle natural gas plants and renewable energy



sources to add smaller incremental generation capacity to meet demand will accelerate diversification and innovation in the industry.

## *Natural Gas Is a Short-Term Solution*

Declining natural gas prices will have a major short-term impact on the energy industry. The fracking revolution in the United States has destabilized global energy prices, forcing producers to take measures to protect their market share and attempt to drive out higher-cost competitors. In combination with increased air pollution emissions regulations, the lower cost of gas will accelerate the replacement of coal plants, with cleaner burning and more responsive combined-cycle natural gas plants.<sup>16</sup> However, the fracking boom will be mostly confined to the United States, while the cost of renewable energy continues to rapidly decrease globally. Wind power will be less costly than gas plants by 2023 and utility-scale solar will reach that point by 2036.<sup>17</sup>

## *Solar Is the Future*

Bloomberg’s New Energy Outlook expects \$3.7 trillion to be invested in solar between now and 2040, of which \$2.2 trillion will go to rooftop solar. Over the next 25 years the cost of a photovoltaic solar power plant will drop by nearly half, eventually becoming cheaper and capable of outcompeting fossil fuels as their prices gradually increase.<sup>18</sup> Cheap, abundant, decentralized, and renewable, solar power’s future looks extremely bright.



*How Does This Impact Me?*

## For the Incumbents:

**Remember that you are in the energy business.** Utility companies are not in the coal, natural gas, or nuclear power business. Fossil fuels will play a large role for a while, but companies looking for continued growth will have to look elsewhere.

**For many customers, energy has become a lifestyle choice.** They are empowered customers who are voting with their dollars to influence their environmental impact. By resisting change, established companies incentivize competitors and customers to move forward without them.

**Listen to your customers.** Studies have shown that many customers are willing to pay more for renewable energy. Many of these customers don't really want to be off the grid—they want utilities to offer them renewable energy. Connecting with what your customers truly want is more important than ever.

### How to Begin:

**Declare your intentions.** You may not be ready, but giving employees a pole star to work toward can unleash their creativity and help large companies begin to move toward an established goal.

**Think big, start small, and adjust the goals as you go.**

**Make reaching your goals fun.** Focus on doing more good, not less bad. Going net-zero and reducing emissions does not hold the same attraction as aiming for a net-positive impact, making more renewable energy, or making more customers happy.<sup>19</sup>

Walmart has declared its intention to be 100% renewably powered. It is the largest corporate user of solar collectors in the United States and has started to work with local food growers to reduce shipping cost and emissions.

Office furniture-maker Steelcase invested in the Texas Panhandle window farm to offset carbon release. Their efforts brought power to almost 3,000 homes and businesses and provided carbon offsets for the company.<sup>20</sup>



Walmart 

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How Does This Impact Me?



## For Newcomers:

**Know your industry.** The electricity generation industry is very conservative; few entities want to take risks and none want to be the first to try something new. The incumbents' sluggishness is a newcomer's biggest advantage.

**Be first or be friends.** Being first means higher returns, more time to adjust, and greater visibility. If resources don't allow, consider cooperating with the established players instead of working against them.

**There is plenty of room.** If investments in electric cars—by companies like Tesla, Google, and Apple—come to fruition, electricity generation and transportation industries could soon merge into a single industry. Such a market would be far too big to be controlled by a handful of companies. Furthermore, with the continued reduction in renewable energy costs and a more decentralized

grid, even with slowing energy demands, there will be more than enough opportunity to go around.

Creative financing is required. Low energy prices mean diminished interest by established investors. Expect short-term investments to favor natural gas projects. Energy investors are accustomed to spending very large sums on massive projects and have developed institutional knowledge surrounding fossil fuels investments. It will take time for investors to adjust to smaller-scale investments and new technologies. In the meantime, look locally, take advantage of all incentives possible, and don't forget the power of the crowd. Focus on the customers who want your services and are willing to pay more to have their choices reflect their lifestyle.

**Connecting with the right customers is essential.** Tell your story. It matters as much as the rest of your branding and messaging to reach your established goal.

## For Individuals:

**You don't have to go off the grid to make a big impact.** You can lease or buy renewable energy without having to install it at your house. For example, SolarCity, a California-based company, helps customers avoid the headaches of designing, installing, permitting, dealing with the tax incentives, and the high upfront costs of buying a rooftop solar system. It offers a no-money-down, 20-year lease or loan and, best of all, guarantees that customers will save money.<sup>21</sup> In Minnesota, Mortenson Construction, SunShare and Real Capital Solutions are partnering to build 11 megawatts of solar gardens to serve more than 6,000 customers in 2017.<sup>22</sup> Minnesota citizens have had access to locally produced solar energy since 2013, when the Minnesota State legislature passed the Solar Energy Jobs Act, which allows customers to choose their energy source, regardless if their homes are suitable for rooftop solar.<sup>23</sup> Solar gardens will be an integral piece of the energy picture allowing large utility companies to reach clean energy targets and react to customer demands for renewable energy sources.

**Focusing on energy efficiency is the best and easiest place to start.** Reduce first and generate second. Make sure to take advantage of energy-saving programs and incentives: Renovate America's Hero Program focuses on expanding residential energy efficiency products and information, connecting customers with approved contractors, and providing financing.<sup>24</sup> DSIRE is a comprehensive source for information and renewables and energy efficiency incentives from government and business by state.<sup>25</sup> These sites help homeowners capture the payback that intelligent energy planning can afford.

**Keep a pulse on new home technologies,** so that when it's time to make big changes around your home, you are already well informed. The Nest thermostat is just the beginning. The home of the near future will have numerous devices generating and using energy simultaneously. This complex environment will require intelligence software, such as GridPoint energy management solutions, that monitors real-time data and conducts analytics to increase energy savings and efficiently provide reliable energy supply.<sup>26</sup>

**Watch the prices of renewable energy drop due to new technology innovation** to a point where they become viable alternatives for your home. Especially for solar, reducing the cost is critical to increased adoption. For example, Enphase Energy's "inverter" technology is cutting the cost of one of the most expensive parts of a solar system that switches direct current (DC) to alternating current (AC) for use in households. The technology boosts output, manages maintenance problems, and improves reliability.<sup>27</sup>

**Put your money where your heart is.** You can fund renewable energy by using crowdfunding marketplaces, such as Gridshare, that connect renewable energy investors and energy borrowers.<sup>28</sup> You can invest in a multitude of renewable energy projects from floating solar panels to community wind projects. 

# How to Innovate— A Case Study:

*You cannot discuss innovation in the energy industry without mentioning Elon Musk.*

**POWERWALL**  
TESLA HOME BATTERY



**E**lon Musk is most well-known for his effort to change the auto industry by introducing Tesla's electric cars. However, the same battery technology needed to power cars has the possibility to completely change the energy industry. At the unveiling of the Tesla Powerwall, a lithium ion energy storage system for home, business, and utilities, a sign hung over a sleek white box that read, "THE MISSING PIECE." The cost starts at \$5,500 (excluding installation and inverter costs) for a wall-mounted system that could, in combination with solar panels, take a home off the grid. The Powerwall is a clear indication that, as the company states, "Tesla is not just an automotive company, it's an energy innovation company."<sup>29</sup>

## What does it mean for the energy industry?

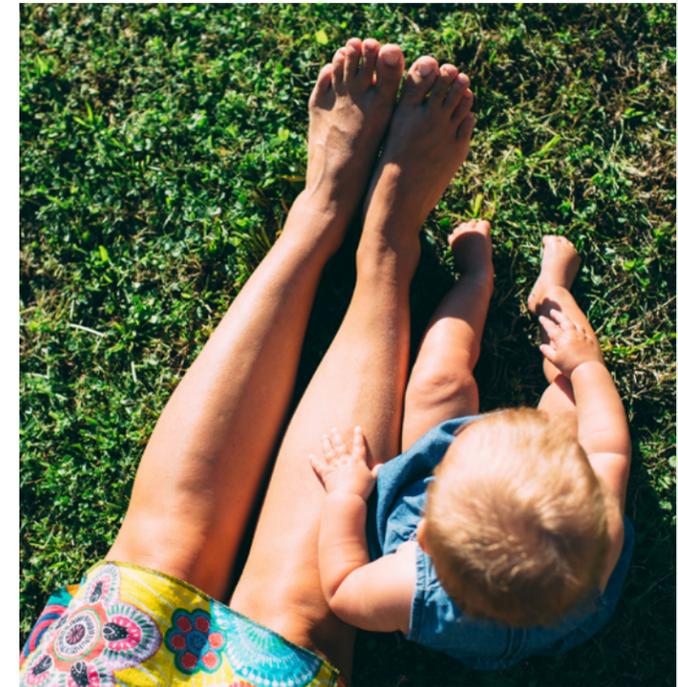
Powerwall and Powerwall 2 home energy storage systems enable effective storage of renewable energy that can be used to smooth out peak and off-peak consumption. This solves multiple problems at once.

1. Solar power that is generated during the day can be stored and used at night.
2. Homeowners with electric cars could potentially, with a large number of renewable

- sources, power their homes and fuel their cars independent of the grid, breaking dependence on fossil fuel completely.
3. Tesla doesn't even need renewables to sell the battery. The ability to buy grid power at its least expensive point and sell it back to the grid at its most expensive point provides benefits to homeowners and utilities alike. Homeowners will pay less to the utility. And power companies will have the capability of storing energy during low demand, shutting down underperforming legacy plants and deferring large new investments.
4. Reliable power storage means that power companies can add renewable and nonrenewable generation capacity incrementally. This means they can be more reactive to supply and demand, reduce capital costs for added capacity, and reduce financial exposure and time associated with building massive power plants. At present, utilities must build power plants to exceed peak demand, a practice that inefficiently uses and wastes energy at off-peak demand. This means that, as Musk said, "you can basically, in principle, shut down half of the world's power plants," because stored energy could be used in off-peak times."<sup>30</sup>

## The Economics Are Secondary

Musk readily admits that the economics in the United States will not be in his favor immediately, because for some time it will still be less expensive to get power from the grid. Will customers be interested? Tesla sold 168.5 MWh of batteries in 2016.<sup>31</sup> Energy is not just a numbers game. People have other reasons than just the cheapest energy: climate change, environmental concerns, or they just want to be energy independent."<sup>32</sup>



## Will customers be interested?

*Tesla already has more than 100,000 battery reservations equaling more than \$1 billion in sales for home and utility scale use.<sup>33</sup>*



# How to Build Resilience— A Case Study:

## *Renewable Energy and Microgrids on Native American Lands*

**M**icrogrids are energy generation and transmission networks that connect to the grid, but can offer local communities the ability to seamlessly switch to operating off the grid—the best of both worlds. Microgrids allow the possibility of flexible, local control over power generation decisions and increased community resilience against grid disruption. Microgrids are not only for communities that want to achieve energy independence, but also for those with limited or no access at all. It is estimated that only 14% of Native American households on reservations have access to electricity.<sup>33</sup> Reservations are often located in isolated areas with households spread out over large distances. This makes it extremely expensive to connect to sources of power, but it also makes microgrids, in combination with renewable energy, the most cost-effective and sustainable power choice. Native American tribes across the country are turning to renewable energy sources and microgrids to provide reliable energy and create jobs.

**The Navajo Tribal Utility Authority (NTUA)** offers solar photovoltaic systems to households without grid access. It also offers payment plans toward the purchase of solar-wind hybrid systems. These solutions are cheaper than the estimated \$60,000 per mile it would cost to connect remote locations to the grid.

**The Hopi Nation of Arizona formed NativeSUN** to sell and install small solar systems on its lands through monthly payments plans.

**The Moapa Band of Paiutes tribe** created a 250 MW hybrid microgrid project made up of PV trackers, generators and a battery bank. It has been so successful, they are adding another 100 MW of solar power in 2017.

**The town of Tuntutuliak in western Alaska** may not have much sun for portions of the year, so it is turning to wind power to save money. Wind turbines connected to a microgrid are saving them almost half a million dollars a year and reduce the need to burn 70,000 gallons of dirty diesel fuel annually.<sup>34</sup>

**Blue Lake Rancheria**, a Native American reservation in California, has built a microgrid consisting of a 0.5 MW solar installation, 950 kWh battery storage systems, diesel generators and a biomass fuel cell system to power government buildings, local businesses, and health care facilities. The microgrid will allow the 100-acre reservation to operate independently of the grid, generate, store and manage energy for the community while reducing 150 tons of carbon per year.<sup>35</sup>

Native American reservations are serving as proving grounds for the development of microgrids while drastically improving quality of life in communities with little to no access to power. They also demonstrate the power of local resilience and can showcase the sustainable economy of the future. 



- <sup>1</sup>[http://www.eia.gov/energy\\_in\\_brief/article/fuel\\_mix\\_for\\_elect\\_generation.cfm](http://www.eia.gov/energy_in_brief/article/fuel_mix_for_elect_generation.cfm)
- <sup>2</sup>[http://www.eia.gov/energy\\_in\\_brief/article/fuel\\_mix\\_for\\_elect\\_generation.cfm](http://www.eia.gov/energy_in_brief/article/fuel_mix_for_elect_generation.cfm)
- <sup>3</sup><http://www.eia.gov/conference/2015/pdf/presentations/schoff.pdf>
- <sup>4</sup><http://www.eia.gov/tools/faqs>
- <sup>5</sup>Galbraith, John Kenneth, *The Affluent Society* (London: Pelican, 1962) 16-27.
- <sup>6</sup>Hopkins, Terence K. and Immanuel Wallerstein, *The Age of Transition*. (London: Zed Books, 1996).
- <sup>7</sup>[http://www.eia.gov/energyexplained/index.cfm?page=electricity\\_delivery](http://www.eia.gov/energyexplained/index.cfm?page=electricity_delivery)
- <sup>8</sup>[http://www.eia.gov/energy\\_in\\_brief/article/power\\_grid.cfm](http://www.eia.gov/energy_in_brief/article/power_grid.cfm)
- <sup>9</sup>McDonough, William and Michael Braungart, *The Upcycle: Beyond Sustainability-Designing for Abundance* (North Point Press, 2013) 114.
- <sup>10</sup>[http://www.eia.gov/energy\\_in\\_brief/article/power\\_grid.cfm](http://www.eia.gov/energy_in_brief/article/power_grid.cfm)
- <sup>11</sup><http://www.sustainablebusiness.com/index.cfm/go/news.display/id/14884>
- <sup>12</sup><http://www.greentechmedia.com/articles/read/Consumers-Want-Green-Energy-From-the-Utility-If-the-Price-is-Right>
- <sup>13</sup><http://www.bostonpacific.com/the-second-democratization-of-electricity/>
- <sup>14</sup><http://ilsr.org/democratizing-electricity-system-vision-21st-century-grid/>
- <sup>15</sup><http://www.bloomberg.com/news/articles/2015-06-23/the-way-humans-get-electricity-is-about-to-change-forever>
- <sup>16</sup>[http://www.eia.gov/energy\\_in\\_brief/article/fuel\\_mix\\_for\\_elect\\_generation.cfm](http://www.eia.gov/energy_in_brief/article/fuel_mix_for_elect_generation.cfm)
- <sup>17</sup><http://www.bloomberg.com/news/articles/2015-06-23/the-way-humans-get-electricity-is-about-to-change-forever>
- <sup>18</sup><http://www.bloomberg.com/news/articles/2015-06-23/the-way-humans-get-electricity-is-about-to-change-forever>
- <sup>19</sup>McDonough, William and Michael Braungart, *The Upcycle: Beyond Sustainability-Designing for Abundance* (North Point Press, 2013) 70.
- <sup>20</sup><http://www.steelcase.com/press-releases/steelcase-inc-becomes-first-renewable-energy-credit-buyer-to-sponsor-commercial-scale-wind-farm/>
- <sup>21</sup><http://www.solarcity.com/>
- <sup>22</sup><http://mysunshare.com/>
- <sup>23</sup><http://www.mprnews.org/story/2015/07/13/community-solar-for-xcel-customers>
- <sup>24</sup><http://www.heroprogram.com/>
- <sup>25</sup><http://www.dsireusa.org/>
- <sup>26</sup><http://www.gridpoint.com/>
- <sup>27</sup><http://enphase.com/en-us>
- <sup>28</sup><http://joinmosaic.com/>
- <sup>29</sup><http://www.scientificamerican.com/article/tesla-s-elon-musk-unveils-solar-batteries-for-homes-and-small-businesses/>
- <sup>30</sup><http://www.forbes.com/sites/jeffmcmahon/2015/08/05/elon-musk-tesla-powerpack-doesnt-need-renewables-battery-market-staggeringly-gigantic/>
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- <sup>33</sup><http://www.geni.org/globalenergy/research/renewable-energy-on-tribal-lands/Renewable-Energy-on-Tribal-Lands.pdf>
- <sup>34</sup><http://cleantechnica.com/2014/06/30/native-american-reservations-embracing-renewable-energy-technologies/>
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