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## **Connected customers**

The transformation imperative for Utilities in a digitally disrupted world

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# Introduction

The Internet of Things (IoT) is beginning to transform the Power and Utilities industry, with customers, employees, and assets all becoming increasingly connected.<sup>1</sup> In the first of our series, we look into how the connected customer will drive change in the industry and what energy companies should do to respond.

The traditional energy company is facing potential threat from its own customers. Connected technology, micro-generation, and advances in energy storage are helping empower a customer base, which traditionally has been quick to complain, but slow to take control of their energy use and supply. In the short term, these developments present opportunities for selling additional products and services to that customer base but longer-term success will depend on energy companies adapting to this new world and making themselves relevant to the customer – disrupt or be disrupted!



<sup>1</sup> For more on how IoT is transforming the Power & Utilities industry see “The power is on: How IoT technology is driving energy innovation.”

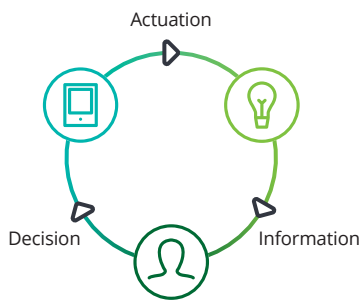
# Delivering the value of the Connected Home

The connected home has started to take off in both consumers' minds and their living rooms. The *Deloitte Consumer Review: Switch on to the connected home* report suggests that 52 percent of people own some form of connected device and 66 percent agree that connected technology has the potential to transform their lives. Energy companies should be well placed to take advantage of this interest, given their central role in the home, and user-friendly smart thermostats have helped provide customers with an early, tangible example of how they could benefit from having connected devices in their home.

This interest, however, is yet to translate into serious market penetration. When you break down what technology people actually have in their home, the majority is entertainment devices, such as smart TVs and gaming consoles. Our report *Deloitte Consumer Review: Switch on to the connected home* shows that connected thermostats, lighting, and security, which have the potential to genuinely transform the way we live our lives, have a much lower penetration, at two-to-three percent.

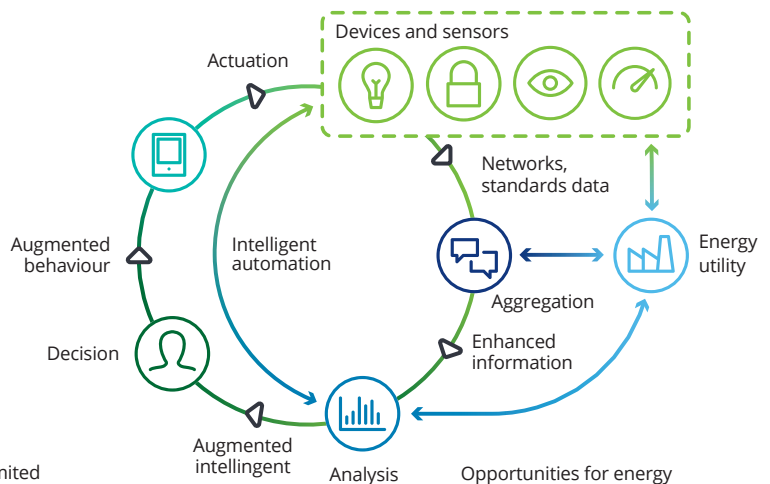
So what's holding customers back? Cost is certainly a factor, but as is often the case, what's more important is the consumer's perception of value. Providers have yet to make a compelling case for consumers to invest in connected devices. This is evidenced by survey data collected in the Deloitte study *Utility 2.0: Winning over the next generation of utility customers*. Survey results reveal that a participation gap exists between residential consumers who are interested in, but who do not yet participate in connected home products. For example, 52 percent of residential customers surveyed are at least "very interested" in rebates for energy-efficient appliances, but only 13 percent participate in a rebate program. The same is true for solar micro-generation and home energy management systems, with 40 percent very interested but only three percent participating in solar, and 33 percent very interested, but only four percent participating in home energy management systems.

## From basic remote control ...



The opportunity within this value chain is limited to connected homes customer management.

## ... to intelligent automation



Opportunities for energy utilities exist at every stage within this value chain

Source: Deloitte analysis

Beyond being able to control lights or a thermostat from a phone, consumers aren't yet seeing the bigger picture: the promise of not just a connected home but an interconnected one that delivers genuine value by giving customers a single point of control and liberating them from that control by using the insight from multiple devices to drive intelligent automation.

In practice, this will mean different things to different people – from combining energy consumption and time-of-use data to generate savings for the cost-conscious, to using motion sensors, connected lighting and alarm systems to provide security for a senior citizen and peace of mind for their relatives.

Energy companies are well placed to realize the true promise of the connected home and help move customers beyond basic remote control but they need to be clear about where to play. Opportunities exist across the value chain and each has different organizational implications. The most obvious opportunities relate to providing the technology itself and from helping customers get the most out of it:

- **Customer management** – At the most basic level, selling, installing, and supporting smart technology, such as thermostats and lighting, providing an incremental revenue stream to energy organizations increasingly under pressure on commodity margins. This is likely to be a relatively short-term strategy, however.
- **Home service management** – Delivering value to the customer depends on using smart technology to its full potential. There are two things that energy companies could do to help realize this:

- **Acting as the integrator** – The connected home ecosystem is still very fragmented, with multiple organizations using divergent platforms for different technologies. Providing the software and apps to integrate devices and provide a single view helps energy companies start to “managing the home.” There is likely to be competition in this space as home virtual assistants are starting to provide this point of integration.

- **Providing insight and intelligent automation** – Combining information from connected devices with usage information gained through smart meters and billing systems could provide energy companies with a unique market advantage. Energy companies could provide value-driven consumers with the insight they need to manage down their usage and automate key parts of their lives, whether it's turning off the lights or locking the door.

Organizations across multiple sectors are vying to deliver home service management. For many energy companies, a connected home strategy is about building a broader, more lasting relationship with the customer; one that goes beyond that of commodity supplier.

Consumers aren't yet seeing the bigger picture: the promise of not just a connected home but an interconnected one that delivers genuine value.

# Distributed energy management – staying relevant in a changing world

If the connected home helps energy organizations remain relevant in today's world, what about the future?

Two developments already underway – micro-generation and storage – could turn the energy industry on its head. Plus, the two have the potential to deliver a third and possibly more exciting opportunity for energy companies – distributed energy management.

Improvements in rooftop solar and other renewable technologies are bringing the dream of consumer self-supply ever closer. The cost of solar PV has fallen by 19 percent over the last year, and by 63 percent over the last five years. California is the national leader in residential (rooftop) solar installations, with over 2.5 GW installed in 2016 alone.<sup>2</sup> As costs and capabilities continue to improve, more customers are likely to seek these new energy-generation options. Utilities will need to have a plan in place to take advantage of this trend.

One of the main hurdles to deploying even more distributed solar is being able to store the generated energy and use it at the right time. The sun generally shines in mid- to late afternoon when a homeowner has lower demand for energy, meaning that the generated energy gets exported, while the energy a homeowner uses in the morning and evening has to be purchased at higher, peak-time prices.

## The Connected Home Value Chain

However, advances in battery storage have the potential to mitigate some of the supply-and-demand mismatches inherent with variable renewable resources. Companies are now starting to sell batteries

into the home; these batteries can store energy during the day for the homeowner to use during peak time, presenting an opportunity for significant savings and, for some households, the potential to be off-grid for regular energy consumption. The attractiveness of a solar + storage system depends on several factors, including system cost, solar irradiance, electric utility rates, and state policy.

The cost of storage, even if it is beginning to drop, remains high. An installed residential battery could cost the consumer in excess of \$6,000, a significant upfront investment for the average household.<sup>3</sup> Still, for customers located in regions with high electricity prices, the economics of storage may become increasingly compelling.<sup>4</sup>

Another factor that could help make the case for micro-generation investment is the potential benefit of aggregating domestic batteries. As the intermittent renewables' share of the installed capacity increases, grids face significant challenges to balance supply and demand second-by-second, producing a rapidly growing need for faster responses to more and increasingly unpredictable deviations from target frequency.

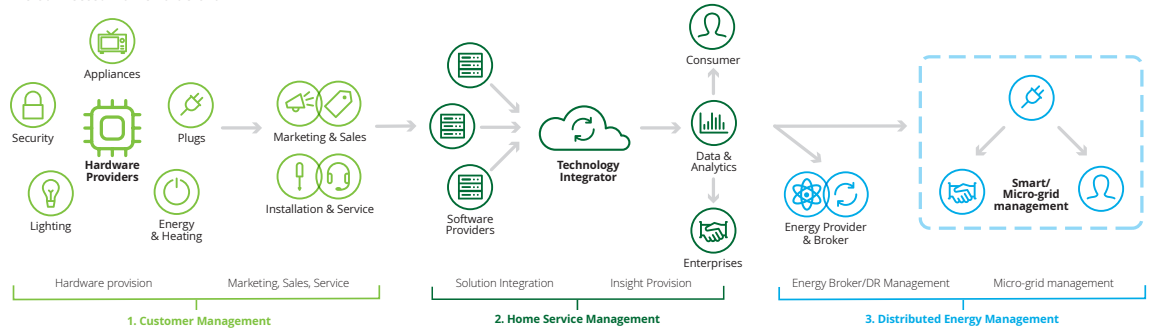
Since batteries can respond in under a second, there is potential for households to take advantage of the energy they generate and store. An energy company can potentially help by aggregating networks of batteries within people's homes to provide a service to the grid and generate returns that would justify a homeowner's upfront investment in solar PV, batteries and associated smart technologies.

<sup>2</sup> 583 MWdc installed in 2016. <http://www.seia.org/research-resources/solar-market-insight-report-2016-year-review>

<sup>3</sup> One 14 kWh residential battery (with supporting hardware) costs \$6,200. <https://www.tesla.com/powerwall>

<sup>4</sup> Increasingly cost competitive battery storage could also help increase residential solar penetration as evidenced by the Deloitte 2017 Resources Study finding that 45% of residential consumers who don't have solar panels on primary residence said they would be more interested in installing panels if they could combine them with a home battery storage unit.

**The Connected Home Value Chain**



Source: Deloitte analysis

Utilities looking to enter the distributed energy services market are operating from a position of strength. Deloitte’s Utility 2.0 customer survey indicates that over half of residential customers say they would consider utility companies as a potential provider of distributed solar or battery storage. In fact, utilities rank highest of any group measured, including independent energy services companies and local HVAC companies. Additionally, almost half of residential survey respondents say they are at least “very interested” in solar + storage power capabilities at their residence.

If the future is one where customers become micro-generators who sell excess energy back into the grid, the traditional energy retail business model is very likely to change. Today’s energy retailer’s core business is to buy energy from generation companies, sell it to customers and bill them for it. In the future, it might be the customers selling energy to other customers who consume more than they generate - a business, for example.

While the traditional retail role might be under threat, given energy companies’ trading experience, they are well-placed to start acting as an energy broker on customers’ behalf, helping them buy and sell in a dynamic and changing market. Few, if any, consumers want to concern themselves with tariff options and forward price curves, and fewer still would relish exposure to trading risk.

Given that two-thirds of surveyed residential customers report they have no interest in receiving additional services beyond what their utility company currently provides, there may be an opportunity for utilities to redeploy their trading and hedging expertise to serve the underlying customer ambition to “set and forget” their utility provision.

Already, customers are becoming more conscious of the energy they use, with environmental concerns and technology improvements such as smart meters driving better energy efficiency. In fact, 51 percent of surveyed residential customers indicate that “preserving the environment” is their first or second reason for participating in energy efficiency programs. Micro-generation and trading take this to the next level: Customers are conscious of the energy resources existing within their homes from saving money through energy efficiency to making money through distributed generation. The connected home will play a central role in helping them to manage that resource efficiently.

# Developing the organization to win in the new world

What capabilities will energy companies need to operate efficiently and effectively in an increasingly connected environment? Depending what role(s) they choose to play, here are four important capabilities to consider:

## Using service design to define a company's value proposition

As noted earlier, the connected home's value proposition isn't yet clear to the consumer. This may be due, in part, to the technology developing ahead of the customer's perceived need. Energy providers, therefore, should consider taking a step back from the technology and refocus attention on wants, needs and challenges along the customer journey. Service design methods can help companies build a service around customer needs rather than creating the technology and looking for someone to sell it to.

## Mining data insights through analytics

The opportunity to gain real value from connected technology lies in mining impactful insights from the data that the technology delivers. Being able to do this requires robust analytics capabilities and approaches, such as Reveal, Enrich, Model: Reveal energy usage data to both the organization and its customers using visualization techniques, Enrich it with other sources of data, such as comparative benchmarks or external factors such as the weather. Model scenarios using the insight gained during the process – for example, would this customer want the heating and lights adjusted based on the expected weather?

## Employing cognitive computing

Moving beyond providing usage information and the ability to 'remote control' devices requires cognitive computing capabilities. Machine learning will likely make it easier for the connected home to make better decisions, taking into account customer actions and their direct feedback.

## Enabling energy trading through blockchain

Buying and selling energy across a wide network of micro-providers presents major process and security hurdles. Blockchain technology provides a distributed platform through which digital tokens can be used to represent, transfer, and exchange underlying assets securely by using the strength of the shared network itself to validate the transaction and maintain a record of it. Where the traditional energy purchase model requires a central organization for receiving and processing customer payments, providers in a blockchain-enabled micro-grid can trade with each other efficiently and securely. Energy companies could help to build that network and provide the technology to support it.





Building these capabilities can help position energy companies to capitalize on connected home developments; however, they also need to build the right organization and culture to operate under the new paradigm, and this can be quite challenging. Energy companies aren't often thought of as innovators, but this is precisely what they need to become as they look to incorporate retail, trading, wholesale, and generation elements into daily operations.

Fundamental to achieving the desired results will be a culture, which for some in the sector will mean moving from being a risk-averse commodity supplier with a centralized, command-and-control structure to an agile, cross-functional innovation leader.



# Where next for energy companies?

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The connected home provides a stepping-stone into this new world, and can help energy companies forge a more value-driven relationship with their customers.

# Contacts

Deloitte Digital's Energy and Resources team has worked with most of the US and UK's major energy and water companies. We understand the challenges these organizations face and are helping our clients address the changes they need to make, whether they are strategic, operational, cultural or technical. We can help you think through what the future may look like for your organization and implement the people, process and technology changes needed to thrive in that future.

**Ian Wright**

Principal, Energy & Resources  
Deloitte Consulting LLP  
iwright@deloitte.com

**Rick McLaughlin, PMP**

Managing Director, Power and Utilities  
Deloitte Consulting LLP  
rmclaughlin@deloitte.com

**Mark Lillie**

Partner – Head of UK Power & Utilities  
mlillie@deloitte.co.uk

**Duncan Barnes**

Partner – Deloitte Digital  
dbarnes@deloitte.co.uk



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