



Energy management: Most consumers and businesses push for cleaner energy

Deloitte Resources 2018 Study

By Marlene Motyka, Suzanna Sanborn, Andrew Slaughter, and Scott Smith

GROWING consumer demand for environmentally responsible products and services, along with residential consumers' interest in managing their own energy consumption, is driving more businesses toward sustainable energy sources and prompting many to take a leadership role in implementing clean energy solutions. At the same time, residential consumers are seeing businesses act and beginning to learn from their example.

That's the overarching theme that emerges from the eighth annual *Deloitte Resources 2018 Study*,

which asked more than 1,500 US residential consumers and 600 US businesses about their attitudes and actions regarding energy management.

The findings suggest that residential consumers and businesses are engaged in a mutually reinforcing relationship where residential consumers' interest in reducing their carbon footprint—and in using digital technologies to help them do so—is leading many businesses to develop and deploy new tools for monitoring and reducing energy consumption, evolve their energy management policies and prac-

tices, explore expanding their use of renewable energy sources, and integrate their resource management programs more closely with their operations. And as businesses take these actions, residential consumers are watching and learning, and ultimately striving to do more to pursue greener energy practices.

That businesses are responding to consumer demand for cleaner energy is clear. Seven in ten businesses in the study said that their customers expect them to procure a certain percentage of their electricity from renewable sources. This demand for greener energy is having a ripple effect throughout the supply chain: 21 percent of surveyed businesses cited the need to meet supplier/business partner requirements as a primary motivation for their companies' resource management efforts. Many consider renewables to be a large part of the answer, with nearly half (48 percent) of business respondents saying that they are working to procure more electricity from renewable sources.

For their part, consumers continue to profess a growing concern about their impact on the environment. Residential consumers, particularly younger ones, seem increasingly keen on using clean energy sources in general, and on expanding the use of wind and solar power more specifically. Indeed, residential solar is increasingly being seen as a clean, affordable, and resilient source of energy; several negative perceptions about solar seem to be waning as consumers become more familiar with the technology.

While the desire to use cleaner energy sources and save costs on electricity bills was the main driver for their increased interest in renewable energy, consumers also link renewables to other benefits such as job creation and economic growth. Energy independence is also seen as an important potential benefit, with 76 percent responding that greater development of renewables can be extremely or very impactful in achieving energy independence. Perhaps based on this belief, the consumers surveyed overwhelmingly believed that the US government should shape the country's energy strategy.

Despite the groundswell of support for renewables, household participation in green energy programs remains low. Only 14 percent of surveyed consumers say that they've ever been offered green energy—and of those that have been offered green energy, only 6 percent have purchased it. Expense emerged as the top barrier among those who declined the offer. Yet consumer interest in green energy programs seems to outpace opportunities to participate in them. Among consumers who had not been offered green energy or were unsure if they had, nearly half (45 percent) claimed that they would like to have the chance to purchase it.

What does all this mean for electricity providers? For one thing, it seems to challenge utilities to get to know their customers to a much greater extent. For residential consumers, the consequences of their energy management decisions could be significant, since greener solutions such as solar PV, batteries, and home automation systems generally involve a greater upfront investment and longer-term commitments than conventional energy sources. But consumers may not know where to turn when seeking to learn more about new energy technologies. Utilities will need to find a way of addressing these insecurities in order to break through and meet consumer needs before potential competitors step in.

On the business side, the specter of utility disintermediation continues to rise as more and more companies take energy matters into their own hands. Fifty-nine percent of businesses surveyed this year say they generate some portion of their electricity supply onsite, citing price certainty, diversification of energy supply, cost savings, and resiliency as the top reasons for doing so. These motivations suggest that businesses want to have greater control over their energy supply in terms of price, quality, and reliability than would be possible if they were wholly dependent on external providers. Here, utilities would do well to understand their business customers' needs in detail to identify areas where they can add value. Making it easier for businesses to evaluate offerings, manage their energy supplies, and deploy batteries and renewables will likely be key to winning and retaining corporate customers.

Read the full report, *Deloitte Resources 2018 Study*, available at www.deloitte.com/insights/resources.

How can you leverage the Deloitte Resources 2018 Study?

Deloitte has designed this Study as a tool to assist companies with their business decision-making. The expansive database developed through the Study allows Deloitte to guide companies in examining the findings in much greater depth and from many vantage points. This Study can be used to help build the business case necessary to establish priorities and gain support for proposed initiatives, or it can provide solid data for new directions that are under evaluation. For more information please email us at DeloitteResourcesStudy@deloitte.com.

Additional resources

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The Deloitte Center for Energy Solutions (the “Center”) provides a forum for innovation, thought leadership, ground-breaking research and industry collaboration to help companies solve the most complex energy challenges.

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Deloitte Resources 2018 Study

Energy management: Businesses drive and households strive

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Executive summary

The findings of the 2018 Study indicate that the attitudes and actions of residential consumers and businesses are producing a virtuous circle of sustainability. Both groups generally expressed growing concern about climate change and reducing their carbon footprints, along with a willingness to act. On the one hand, residential consumers are calling for environmentally responsible products and services, along with more options for managing their energy consumption. On the other hand, businesses are answering this call, driving their resource management programs further into their operations, and taking a leadership role in implementing clean energy solutions.

CONSIDER these residential consumer results from the 2018 Study:

- Sixty-eight percent of residential consumers are very concerned about climate change and their personal carbon footprints, surpassing the previous high-water mark of 65 percent in 2016.
- Nearly half (47 percent) of respondents found time-of-use rates to be extremely/very motivating in making them want to change the way they use electricity, up from 33 percent in 2017.
- Up four points from last year, 49 percent of those who don't have solar panels on their primary residence said they would be more interested in rooftop solar if they could combine the panels with a home battery storage unit.

Consider these key business results from the 2018 Study:

- Seven in 10 businesses say their customers are demanding that they procure a certain percentage of their electricity from renewable sources, up nine points from the 2017 Study.
- Twenty-one percent of business respondents cited the need to meet supplier/business partner requirements as a primary motivation for their companies' resource management efforts, rising five points from last year's survey.
- Nearly half (48 percent) of business respondents say they are working to procure more electricity from renewable sources. Of those who are not working to procure more electricity from renewable sources, nearly two-thirds (61 percent) indicated the opportunity to combine battery storage with renewable sources would motivate them to do more.

As these findings suggest, businesses on the whole remain committed to reducing their energy consumption and to procuring electricity from renewable sources. They are generally thriving. They are feeling successful and are becoming more mature and effective in their energy management practices. And, to drive continuous improvement, they are expressing greater interest in emerging technologies, such as battery storage units, micro-grids, and alternative-fueled vehicles. Such advances could potentially help companies to optimize their current investments as well as to attain broader corporate goals such as reducing their carbon footprints, better managing fuel-price volatility, and improving resiliency.

The 2018 findings further imply that residential consumers are generally striving to do more. They are supportive of companies' efforts to become more sustainable, and they are looking to businesses to lead the way by demonstrating the efficacy of clean technologies and establishing leading practices in energy management. While residential consumers

expressed growing interest in renewables and clean technologies in this year's survey, they have yet to embrace them en masse. Millennials, who are largely greener and "techier" than previous generations, could soon tip this scale. The findings indicate they are more likely to adopt new solutions, such as electric vehicles, home automation systems, and time-of-use rates, and they are largely the impetus behind a virtuous circle of sustainability that has emerged among residential consumers and businesses. As millennials make up a larger proportion of the workforce and wield greater purchasing power, they are demanding environmentally responsible products and services from companies, and those demands are echoing throughout the supply chain. As a result, more and more businesses are finding that energy efficiency and expanded use of renewables are no longer optional; they have become essential to satisfying a wide range of stakeholders, including customers, suppliers, partners, employees, and investors.

ABOUT THE STUDY

Deloitte,¹ with strategy and market research firm Harrison Group, a YouGov company, has completed its eighth annual nationwide Resources Study (the "2018 Study" or "Study") to provide insights that can be useful in helping energy companies and businesses make energy-related investment and business decisions. The Study aims to answer questions such as:

- What are US residential consumers and businesses doing to manage their energy usage?
- How do they feel about carbon reduction and environmental responsibility?
- What motivates them to reduce their energy consumption and to implement clean technologies?
- How mature are their approaches to energy management?
- How can electricity suppliers and energy service providers better meet their needs?

The 2018 Study was conducted in March 2018, and thus, largely reflects attitudes and practices related to the year 2017. The Study captures two views: a residential consumer perspective and a business perspective. The residential consumer portion is based on more than 1,500 demographically balanced online interviews with household decision-makers for utility services. The business portion of the Study is based on 600 online interviews with business decision-makers responsible for energy management practices at companies with more than 250 employees across all industries. To facilitate in-depth analysis, business survey respondents are segmented by industry sector and company size. Please see figures 1 and 2 for definitions of these segments.

Figure 1. Sectors



Consumer and industrial products
includes companies within aerospace and defense; automotive; consumer products; manufacturing; retail and distribution; and travel, hospitality, leisure, and services



Financial services
includes businesses within banking and securities, insurance, investment management, and real estate



Health care
includes health care providers, health plans, and life sciences organizations



Technology, media, and telecommunications
includes technology, media and entertainment, and telecommunications companies

Figure 2. Company size



Small
Less than \$100 million in global revenue



Mid-cap
\$100–\$500 million in global revenue



Enterprise
More than \$500 million in global revenue

Figure 3. Generations



Millennials
Ages 21–34



Gen X
Ages 35–48



Baby boomers
Ages 49–67



Matures
Ages 68+

Source: Deloitte Resources 2018 Study survey results.

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Residential consumer views on energy management

THE 2018 findings indicate that many residential consumers, particularly younger ones, see renewables as the answer to their growing environmental concerns. In terms of top energy issues, respondents increasingly expressed their support for using clean energy sources in general and for expanding the use of wind and solar power more specifically. As in the 2017 Study, residential consumers widely believe that greater development of renewables can result in cleaner air and help address climate change. However, in this year's survey, residential consumers were also more likely to link renewables to other benefits, such as energy independence, job creation, and economic growth.

In addition to expressing broad support for renewables, residential consumers are generally striving to do more to become greener at a personal level. However, their tactics on a wide scale have yet to evolve beyond the basics (for example, replacing incandescent light bulbs with LEDs and adjusting their thermostats). The findings suggest this holding pattern may break before long. As in the broader

consumer sector, digital technologies are opening new doors for managing household energy usage—and residential electricity customers are ready to step through them. Interest in time-of-use rates and in combining battery storage systems with rooftop solar panels jumped noticeably in this year's survey. Simultaneously, perceived barriers to residential solar declined across the board, perhaps because residential consumers have become more familiar with the technology.

Among the age cohorts, millennials distinguished themselves as not only being the “greenest” but also the “techiest.” As in last year's findings, they continued to demonstrate a steadfast commitment to sustainability and a propensity for “all things digital.” Their influence will continue to grow as they become a larger part of the workforce. Simply put, millennials have momentum, which makes them impossible to ignore. Perhaps even more than policy or regulations, they are impelling businesses to take the lead in developing more sustainable solutions as they strive to do more themselves.

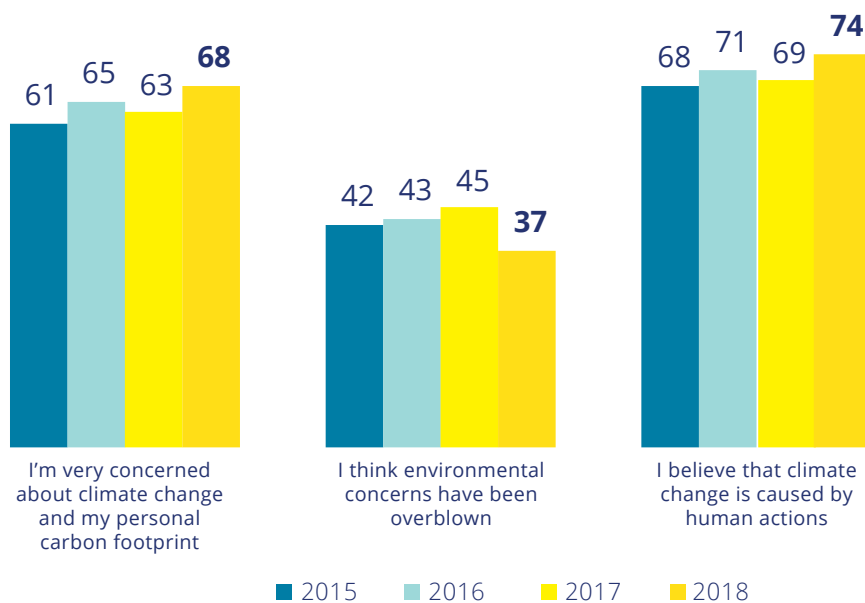
Detailed residential consumer findings

ENVIRONMENTAL CONCERNS INTENSIFY.

Sixty-eight percent of residential consumers are very concerned about climate change and their personal carbon footprints, surpassing the previous

high-water mark of 65 percent in 2016. Simultaneously, fewer respondents believe environmental concerns have been overblown, dropping from 45 percent in 2017 to 37 percent in this year's survey. Nearly three-fourths (74 percent) of respondents agree that climate change is caused by human action, up six points from 2017.

Figure 4. A triple threat? Concerns strengthen year over year across three environmental questions



Source: Deloitte Resources 2018 Study survey results.

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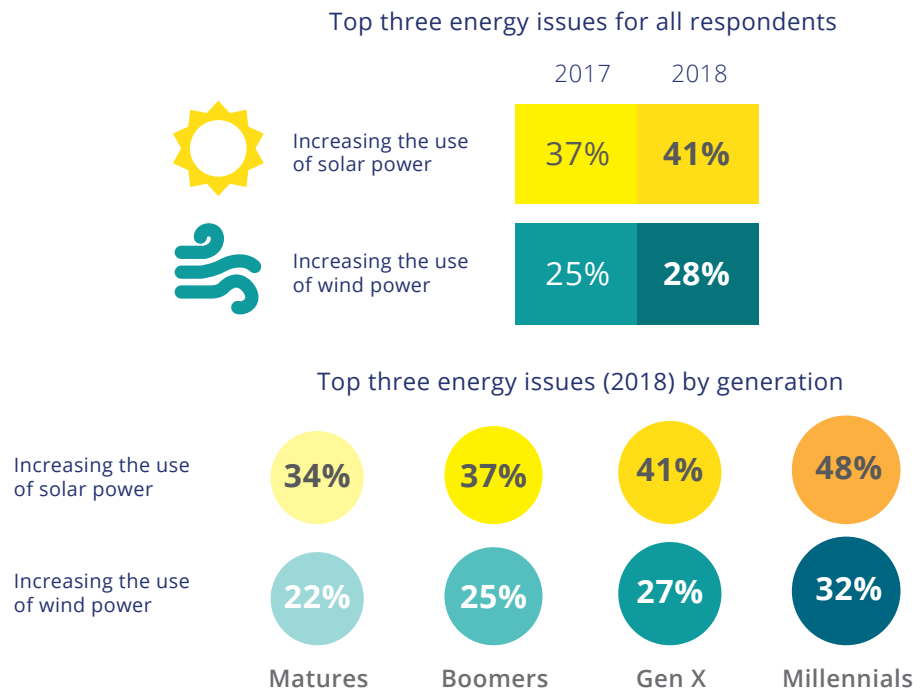
RENEWABLES ARE INCREASINGLY SEEN AS THE ANSWER, PARTICULARLY AMONG MILLENNIALS.

More than half of all respondents (53 percent) say that it is extremely or very important to them that part of their electricity supply comes from renewable sources, trending upward since 2013. As in 2017, keeping total energy bills affordable and using clean energy sources are the top two most important energy issues to residential consumers. In addition, more respondents ranked increasing the use of solar power, and, to a lesser extent, wind power, among their most important energy issues. The focus on renewable energy was particularly intense among young people—64 percent of millennials ranked utilizing clean energy sources among their top three most important energy-related issues, compared to 52 percent of overall respondents. Millennials also

voiced their support for solar and wind power more loudly than other age groups: nearly half (48 percent) ranked increasing the use of solar power, and nearly one-third (32 percent) placed increasing the use of wind power among their top three most important energy-related issues. This compares to 41 percent and 28 percent, respectively, on average.

The mounting emphasis on renewables, especially among millennials, may reflect greater familiarity with solar and wind as generation sources, since sustainability and climate change have been hot topics in the news. Businesses may also be helping to boost awareness as they expand their use of renewables and publicize their efforts. Plus, residential consumers may increasingly perceive rooftop solar to be a feasible solution, as installations become more visible in their neighborhoods.

Figure 5. Solar and wind still going strong



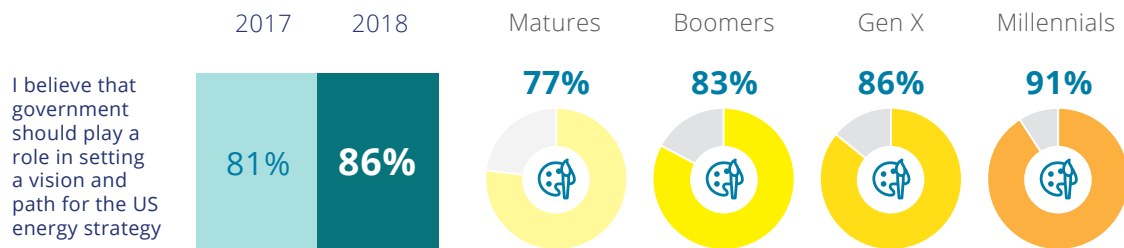
Source: Deloitte Resources 2018 Study survey results.

CITIZENS OVERWHELMINGLY
THINK THE GOVERNMENT SHOULD
SHAPE ENERGY STRATEGY.

Eighty-six percent of residential consumers believe the government should be active in setting a vision and path for energy strategy, a five-point increase over last year's survey. The call for a more

comprehensive energy solution gets even stronger among millennials, where 91 percent believe the government should play a role in shaping energy strategy. While still strong at 71 percent, matures were the least likely to support greater government involvement.

Figure 6. About 9 in 10 millennials want the government to paint a bigger energy picture



Source: Deloitte Resources 2018 Study survey results.

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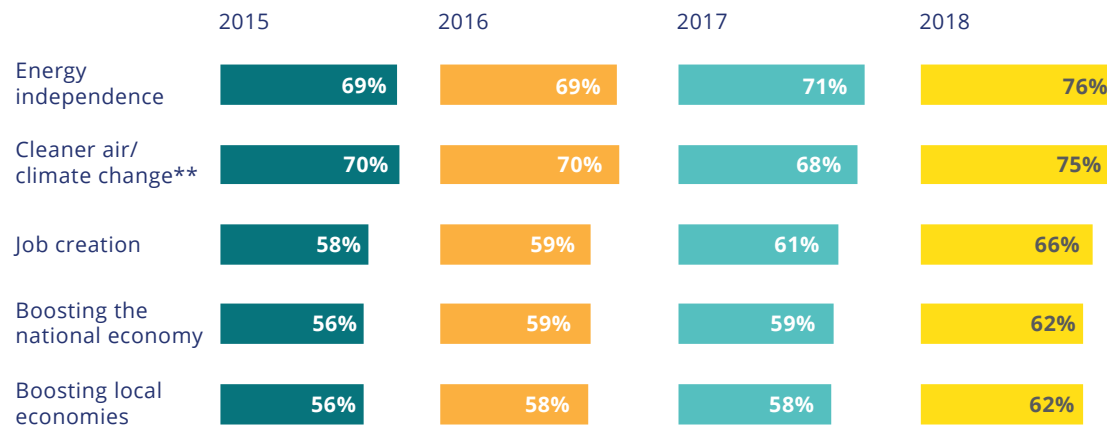
RENEWABLE DEVELOPMENT IS LINKED TO ENERGY INDEPENDENCE IN THE MINDS OF RESIDENTIAL CONSUMERS.

More than three-fourths (76 percent) of respondents think greater development of renewables can be extremely/very impactful for achieving energy independence, jumping five points year over year. The effect of renewables on climate change/cleaner air, job creation, and national and local economies all saw noticeable gains over last year's survey. The ability of renewable development to impact these factors, especially energy independence, was once widely thought to be implausible. This mindset ap-

pears to have changed, with many respondents now seeing the connection. This may be why they are feeling less urgency around increasing domestic oil and gas supplies, or it could be linked to the great expansion of US oil and gas production from shales and unconventionals in recent years. Or, perhaps it is both. Regardless, only 14 percent of respondents view drilling for more oil and natural gas as a top energy issue, dropping four points from last year's survey. Of the age cohorts, millennials were the least likely to see more drilling as the answer to America's energy challenges, with only 9 percent citing it as an important issue.

Figure 7. Renewables widely seen as a force for good

Impact of greater development of renewable energy sources*



*Extremely/very impactful

** Climate change added to cleaner air response in 2017

Source: Deloitte Resources 2018 Study survey results.

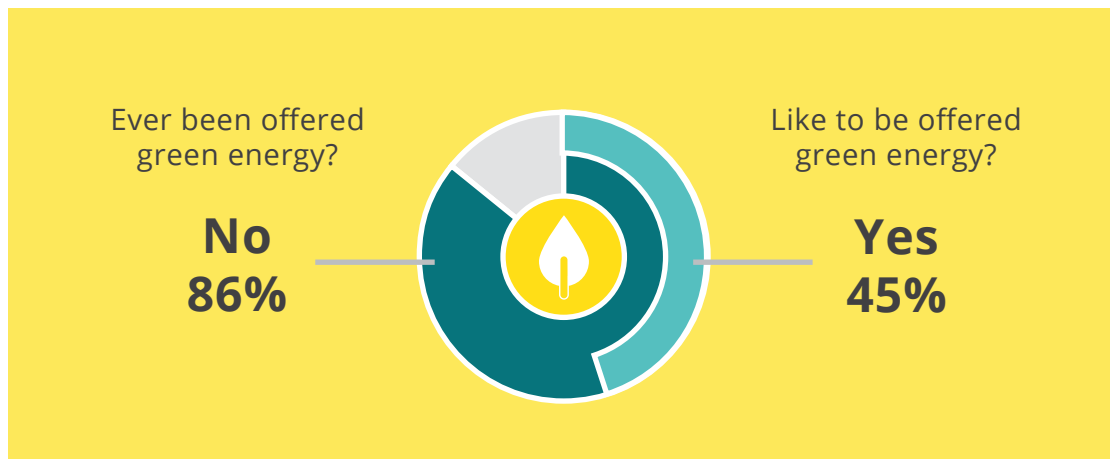
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GREEN ENERGY PROVIDERS MAY BE MISSING AN OPPORTUNITY TO GROW THEIR BUSINESSES.

Despite the groundswell of support for renewables, participation in green energy programs remains low. Only 14 percent of respondents say they've ever been offered green energy. Of those that have been offered green energy, only 6 percent have purchased it. Expense emerged as the top barrier among those who declined the offer. Why do so

few say they've been offered green energy? And, why has the response been lukewarm among those who have? Green energy providers may find these questions worth exploring. It seems that a big part of the challenge lies in reaching and communicating with residential consumers and not in their lack of interest: Of those who haven't been offered green energy or are unsure, nearly half (45 percent) say they would like to have the opportunity to purchase it.

Figure 8. Despite keen interest, green energy offerings aren't breaking through



Source: Deloitte Resources 2018 Study survey results.

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IT'S ABOUT TIME! RESIDENTIAL CONSUMERS ARE EMBRACING EXPANDED OPTIONS FOR MANAGING THEIR ENERGY CONSUMPTION, WITH INTEREST IN TIME-OF-USE RATES JUMPING 14 POINTS.

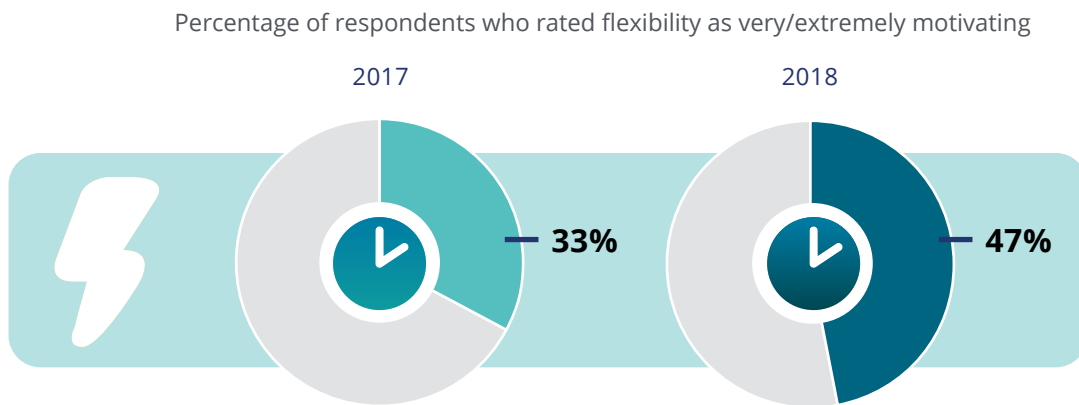
Beyond being offered green energy, residential consumers showed growing receptivity to other options for better managing their energy consumption. Up a couple of points from last year's Study, 57 percent of respondents indicated they found tax credits for investing in energy savings measures, such as better insulation, more efficient light bulbs, light sensors, or smart home technology, to be extremely or very motivating. However, while several categories held steady year over year, the prospect of utilizing time-of-use rates to reduce their electricity bills gained momentum among consumers. Nearly half (47 percent) of respondents found time-of-use rates to be extremely/very motivating, up from 33 percent in 2017. Millennials (52 percent) were the

most likely, and matures (37 percent) were the least likely, to be motivated by time-of-use rates.

Consumer interest in having more flexibility in managing their energy use may be linked to the expanded availability of time-of-use rates as well as greater access to information about their energy consumption, which is increasingly being provided by smart meters, energy apps, and utility websites. It may also be linked to perceptions that their electricity bills are going up due to utility rate increases. Almost half (46 percent) say they're paying more per month for electricity versus two years ago. Of those indicating they have higher bills, 61 percent primarily attribute them to utility rate increases, rather than higher usage. Industry data corroborates these perceptions, with the US Energy Information Administration reporting that electricity rates increased 2.7 percent on average in 2017 versus 2016.²

Figure 9. Flexibility is key in motivating consumers to change their ways

You can potentially save money on your electric power bill by utilizing time-of-use rates offered by your electricity provider since the cost of electricity will be cheaper during off-peak hours



Source: Deloitte Resources 2018 Study survey results.

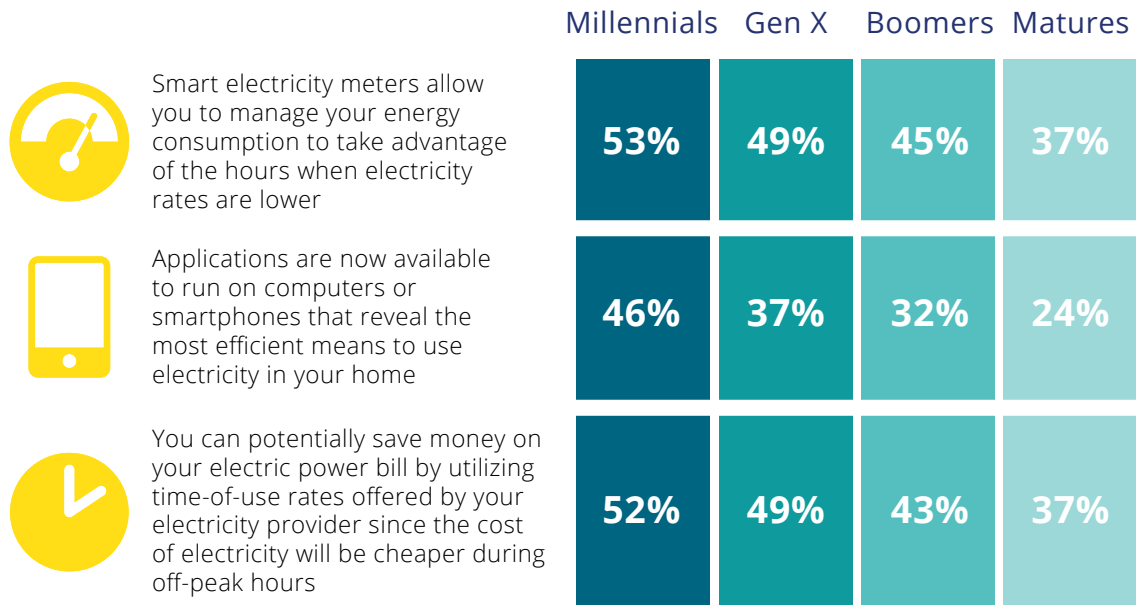
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DIGITAL NATIVES ARE MORE AT HOME WITH HIGH-TECH ENERGY MANAGEMENT THAN OLDER GENERATIONS.

Millennials, and to a lesser extent Gen Xers, are much more likely than baby boomers and matures

to be motivated by offerings that incorporate digital technologies for managing energy consumption, such as apps, smart meters, and time-of-use rates.

Figure 10. Energy management decisions are more data-driven among younger generations



Source: Deloitte Resources 2018 Study survey results.

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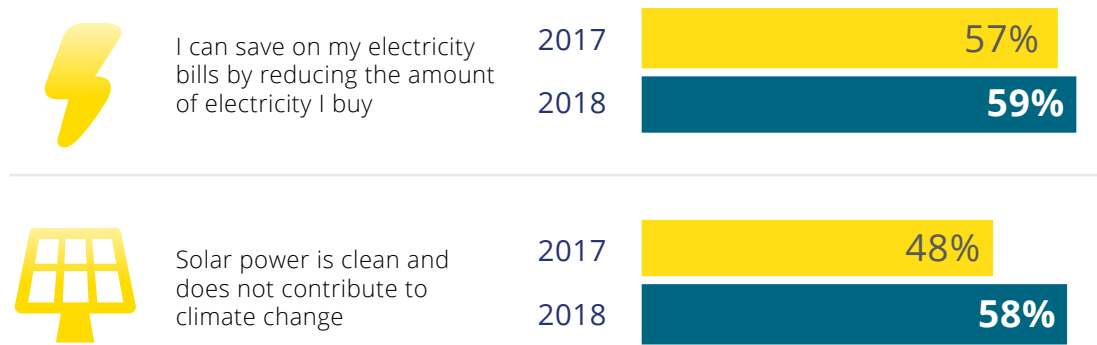
RESIDENTIAL SOLAR IS INCREASINGLY SEEN AS CLEAN AND AFFORDABLE.

Remaining flat year over year, residential solar penetration was reported to be 4 percent in 2018, versus 5 percent in 2017. Among those with solar panels, the ability to save on their electricity bills

(cited by 59 percent of respondents) and the fact that solar panels are clean and do not contribute to climate change were the primary motivations for installing panels. The latter, cited by 58 percent of those with panels, climbed 10 points from the 2017 Study.

Figure 11. “Clean” climbs in importance as a motivation for installing solar panels

The top two motivations for installing solar panels



Source: Deloitte Resources 2018 Study survey results.

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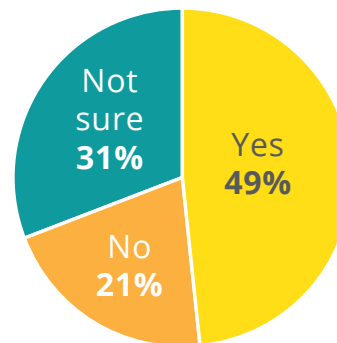
RESILIENCY SELLS, AS BATTERIES BOOST THE APPEAL OF RESIDENTIAL SOLAR.

Even though “clean” is climbing in importance as a motivation for installing solar panels, residential solar has yet to expand significantly across the United States. What could snap consumers out of this holding pattern? Resiliency may be the answer. Of those that do not have solar panels, 57 percent

cited ensuring they have electricity during a power outage as a motivation for considering solar. Up four points from last year, 49 percent of those who don't have solar panels on their primary residence said they would be more interested in rooftop solar if they could combine the panels with a home battery storage unit. Thirty-one percent said they weren't sure.

Figure 12. Battery-plus-solar possibilities intrigue residential consumers

Would you be more interested in installing solar panels if you could combine them with a home battery storage unit?
(Among those who don't have solar panels on their primary residence)



Source: Deloitte Resources 2018 Study survey results.

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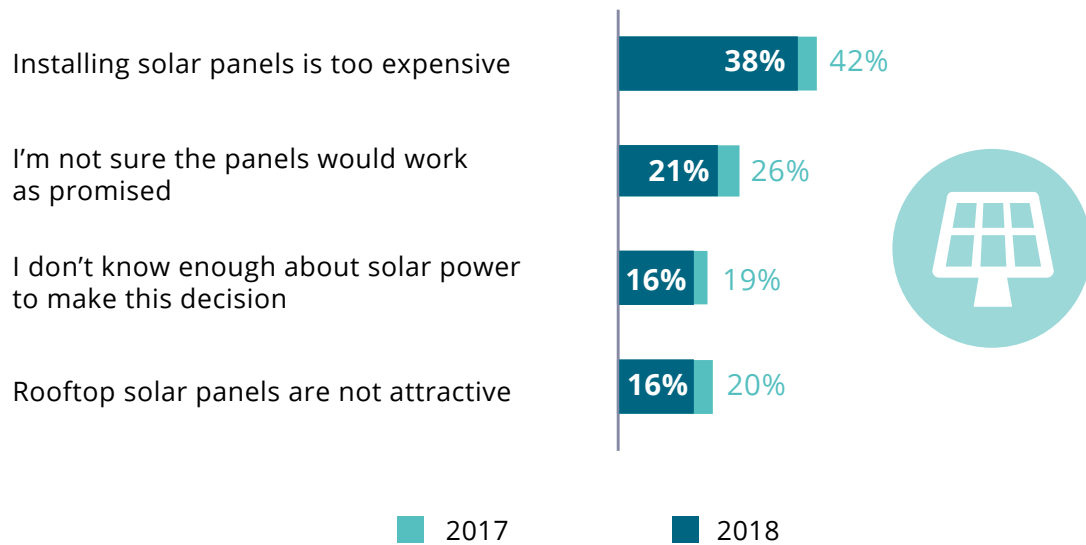
BARRIERS TO ROOFTOP SOLAR MELT AS CONSUMERS BECOME MORE ENLIGHTENED.

In this year’s Study, the top four barriers to residential solar remained the same: the perception of being too expensive, efficacy concerns, lack of familiarity, and unattractiveness of rooftop panels. How-

ever, the proportion of respondents citing these barriers declined across the board. This suggests that consumers are becoming more familiar with solar photovoltaic (PV) technology and more knowledgeable about the value proposition.

Figure 13. Resistance to residential solar going down

Proportion of respondents citing various barriers to interest in solar panels



Source: Deloitte analysis.

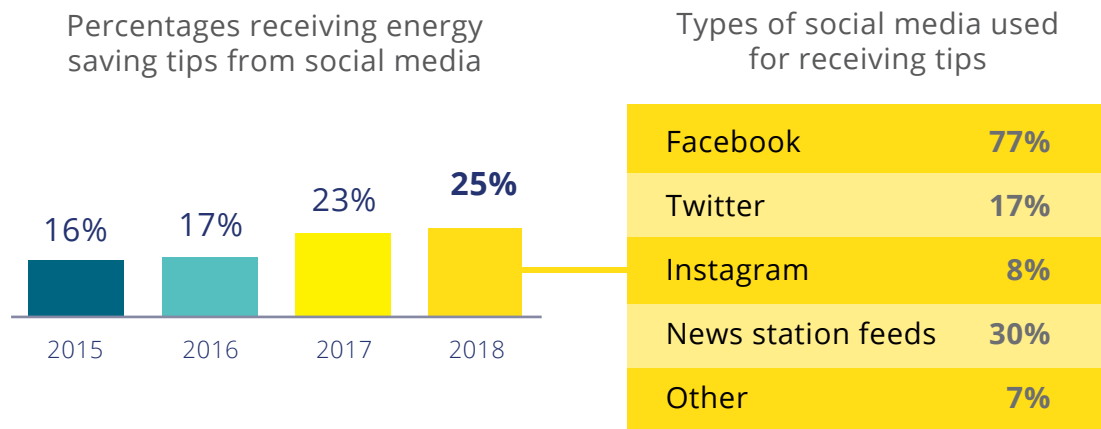
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SOCIAL MEDIA RISES IN IMPORTANCE AS A SOURCE OF ENERGY SAVING TIPS; MILLENNIALS GIVE IT THE MOST LIKES.

Electricity providers continue to be the primary source of tips on saving energy (66 percent), followed far behind by family and friends (37 percent). However, social media continues to rise in importance, with one-quarter of residential consumers indicating they have received energy saving tips

that way. Millennials are the most likely to get tips through social media (34 percent). In contrast, older generations are the least likely, instead preferring to rely on their energy providers (80 percent). New in this year's Study, respondents were queried about which social media sites they use to get energy-saving tips. Facebook was the most liked, followed by news station feeds.

Figure 14. Social media mentions moving up



Source: Deloitte Resources 2018 Study survey results.

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PRIVACY PLEASE! SECURITY CONCERNS MAY BE DIALING DOWN ENTHUSIASM FOR SMART THERMOSTATS AND HOME AUTOMATION SYSTEMS.

Twenty percent of residential consumers report having automated home functions. Most often, this involves heating/cooling systems and/or lighting. Of those who have automated functions, six in 10 (61 percent) say they have increasing concerns about privacy and security as they use more smart technologies. Millennials (69 percent) were slightly more concerned about privacy and security than other age cohorts.

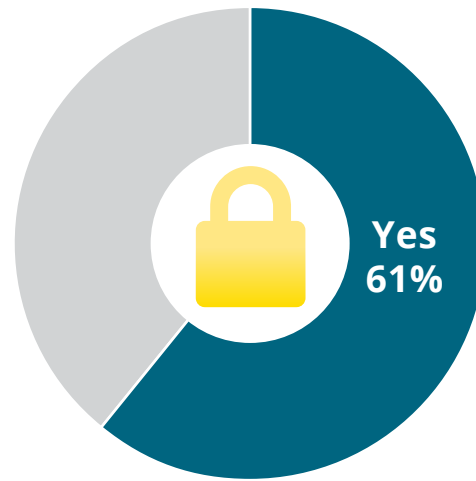
Growing privacy and security concerns were also reflected in the reasons given for not purchasing a smart thermostat or home automation system. Like last year, most (50 percent) simply say, “my current device does its job,” while 28 percent say it’s too expensive. But, amid increasing awareness of the vulnerability of home devices to cyberattacks, 21 percent cited privacy and security concerns as a barrier to upgrading their thermostats, compared to 15 percent last year. Despite these concerns, penetration of smart thermostats or home control/automation systems continues to inch up, increasing from 7 percent in 2016 to 12 percent in 2018. This increase may be partially due to turnover in the housing stock, since new homes often come with automated thermostats and home control systems built in.

Could cyber-wariness be impeding the growth of smart technologies? The answer may be yes, especially considering that millennials, who are often perceived to be the most tech-savvy consumer group, are not embracing home automation technology to the degree one might expect. Just 12 percent indicate they plan to upgrade their thermostats or purchase a home automation system in the next year.

Figure 15. Cyber-wariness is increasing among those with automated home functions

As your home becomes more automated and you use more smart technologies do you have increasing concerns about privacy and security?

(Among those who report having automated home functions)



Source: Deloitte Resources 2018 Study survey results.

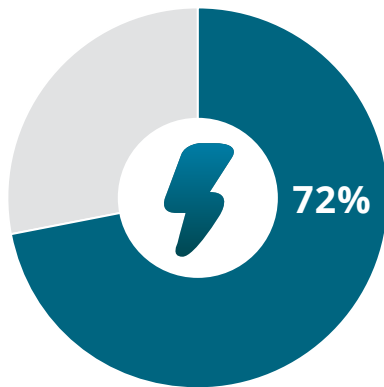
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RENEWABLE ENERGY SUPPLIERS ARE THE REAL DEAL FOR ELECTRICITY SHOPPERS; PROVIDER WEBSITES ARE THE TOP CHOICE FOR DATA GATHERING.

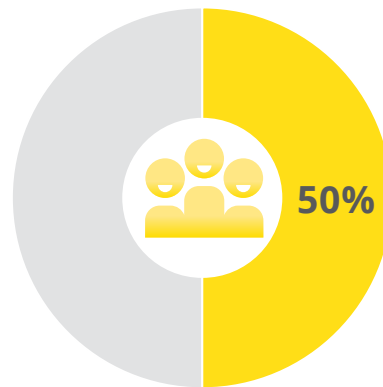
Cited by 63 percent of respondents, renewable energy suppliers are overwhelmingly the top alternative to current electricity suppliers. “Other independent suppliers,” cited by 45 percent of re-

spondents, came in a distant second. If they had the option of changing providers, how would consumers decide whether or not to make a switch? Three-quarters of residential respondents indicated they would turn to electricity provider websites or information included in their monthly bills to learn more. Half said they would ask family and friends.

Figure 16. If they could switch providers, residential consumers would turn to electricity suppliers and friends or family for guidance



Electricity suppliers
(websites and bill inserts)



Friends or family

Source: Deloitte Resources 2018 Study survey results.

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ELECTRIC VEHICLES AND HYBRIDS MAKING INROADS WITH BUSINESSES AND RESIDENTIAL CONSUMERS

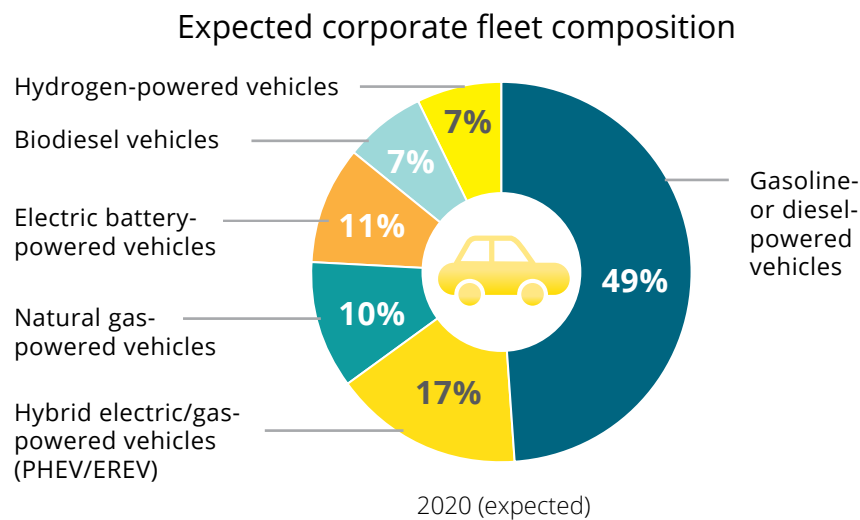
Business respondents on average expect that gasoline or diesel vehicles will make up less than half (49 percent) of their companies' transportation fleets by 2020. If this aspiration comes to pass, it would mark the first time that vehicles powered by alternative means, including electric/gas hybrids, electric batteries, natural gas, biodiesel, and hydrogen, would constitute a majority among corporate fleets. While sustainability goals and the desire to reduce greenhouse gas emissions are likely pushing fleet composition in this direction, fuel costs are also contributing to the movement. Sixty-three percent of business respondents indicated that the price of gasoline affects their decisions about the future mix of vehicles in their fleets.

In addition to deploying alternative-fueled vehicles within their operations, businesses are accelerating their efforts to support employees who drive electric vehicles (EVs). Well over half (56 percent) of business respondents in this year's Study say they provide EV charging stations to their employees, up seven points from 2017. Fifty-two percent of these businesses own the charging stations themselves, while 41 percent belong to the building owner. Regardless of who owns the chargers, most companies (83 percent) offer them as a perk to employees and not to the general public.

With businesses paving the way, residential consumers are also embracing alternative-fueled vehicles to a greater extent. Gasoline vehicles remain the top choice when looking for a replacement vehicle, but hybrids and EV preferences are getting stronger. More than one quarter (26 percent) of consumers say they plan to replace their existing vehicle with a hybrid, while 9 percent plan to purchase an EV. Consumers cited "better for the environment" and cost as the top two factors influencing their decisions. Millennials, followed by Gen Xers, are more likely to be planning to replace their current vehicle with a hybrid or an EV.

Intentions to replace their current vehicle specifically with an EV are highest in the West and lowest in the Northeast. Supportive EV policies in states such as California and Oregon, along with the most developed charging infrastructure, could be possible reasons behind the keener receptivity to EVs in the West. Conversely, an abundance of public transportation options and a less visible charging infrastructure may be factors in the lower receptivity to EVs in the Northeast. So may be the abundance of high-rise apartments and multifamily housing, where lack of garage ownership and access to a personal charger can discourage EV purchases. With almost half (46 percent) of respondents planning to replace their vehicles within the next three years, EV and hybrid sales seem ready to rev up.

Figure 17. Clean preferences reflected in changing composition of corporate fleets



Source: Deloitte Resources 2018 Study survey results.

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Business views on energy management

THE findings of the 2018 Study indicated companies are driving the adoption of clean technologies and sustainable practices throughout society. Businesses continue to be successful in reducing their energy consumption while expanding their use of electricity generated from renewable sources. Notably, they remain committed to investing in their energy management programs, even as they focus on enterprise growth. This suggests a proactive stance, as opposed to a reactive one. Businesses are pursuing energy management goals for reasons that go well beyond cost-savings. They are becoming greener in order to enhance their image, attract and retain employees, reduce financial risk, and to meet the changing expectations

of their customers and suppliers. And because they generally have more resources than individuals or not-for-profit organizations, they are able to lead the way, shaping the world with their actions and demonstrating that “renewable” is not only doable but also effective.

Building upon previous wins, companies showed even greater confidence and maturity in this year’s survey. They are focused on continuous improvement and are starting to reap the rewards of driving their energy management programs into the business units and operational sites. Largely viewed as being essential to long-term viability, energy management is permeating more areas of the business.

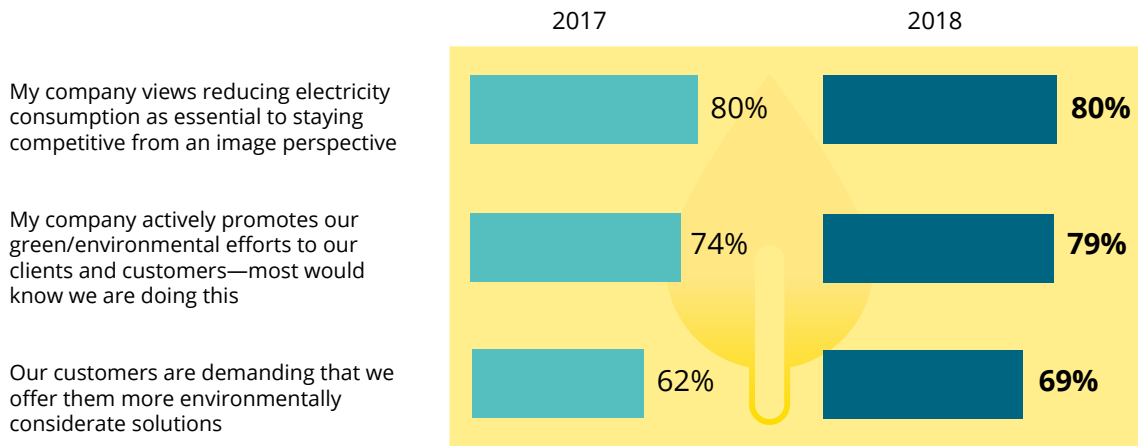
Detailed business findings

BUSINESSES ARE ANSWERING THE CALL FOR ENVIRONMENTAL RESPONSIBILITY AND CLIMATE-CHANGE ACTION.

Nearly seven in 10 businesses (69 percent) said their customers are demanding more environmentally considerate solutions, up seven points from the 2017 Study. This finding parallels the results of the residential consumer survey, which indicated that

environmental concerns are intensifying among residential electricity customers. This could explain why nearly eight in 10 (79 percent) businesses say they actively promote their green/environmental efforts to their clients and customers, up five points from last year's survey. And, holding steady from last year, 80 percent of business respondents view reducing electricity consumption as essential to staying competitive from an image perspective.

Figure 18. Customers driving companies to become greener



Source: Deloitte Resources 2018 Study survey results.

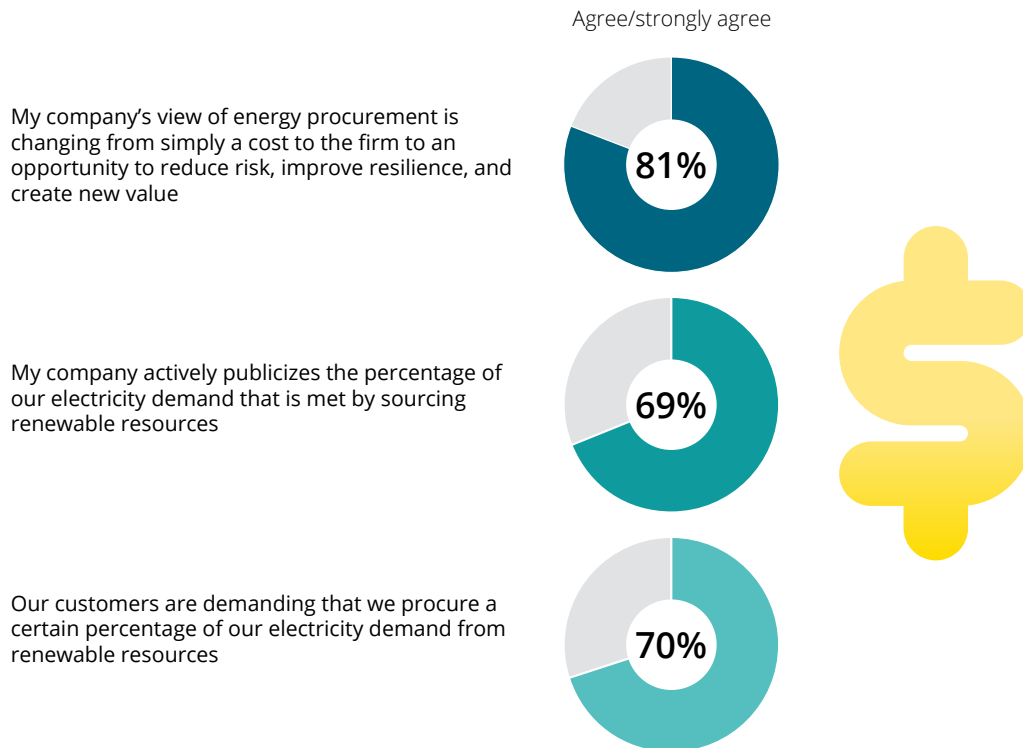
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BEYOND COST, COMPANIES INCREASINGLY VIEW PROCURING RENEWABLE ENERGY AS “GOOD BUSINESS.”

More than eight in 10 businesses continue to agree that their company’s view of energy procurement is shifting from merely a cost to an opportunity for reducing risk, improving resiliency and creating new value. Once again, companies appear to be responding to their customers’ calls for sustainability.

Seven in 10 businesses said that their customers are demanding that they procure a certain percentage of their electricity from renewable sources, up nine points from the 2017 Study. And, 69 percent said that their companies actively publicize the percentage of their electricity demand that is met by sourcing renewable resources, a four-point increase over last year’s survey.

Figure 19. Companies procuring renewables to create value



Source: Deloitte Resources 2018 Study survey results.

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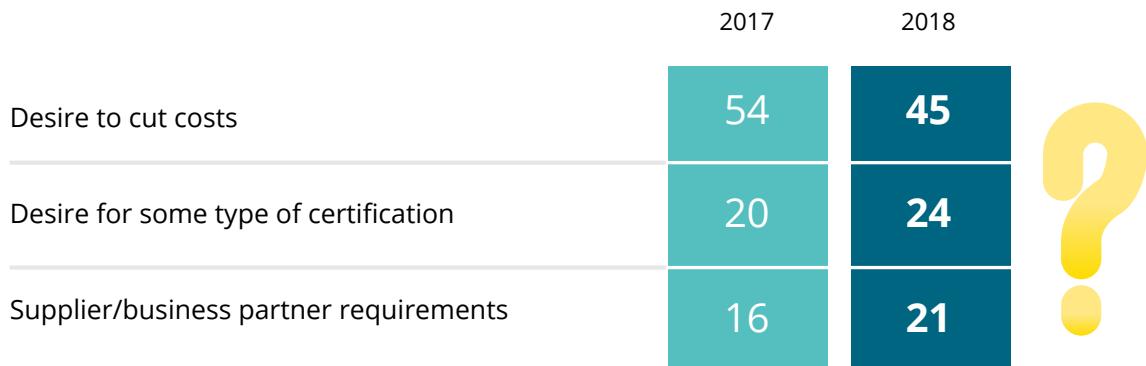
WE HEAR YOU! COST-CUTTING IS STILL THE TOP DRIVER FOR RESOURCE MANAGEMENT PROGRAMS, BUT BUSINESSES ARE RESPONDING TO CHANGING EXPECTATIONS.

While declining in importance, the desire to cut costs is still the main motivation behind energy management programs. Forty-five percent of business respondents cited cost-cutting as a driver in this year's survey, down nine points from 2017. Meanwhile, the need to meet supplier/business

partner requirements rose five points year over year, reaching 21 percent in the 2018 Study. Similarly, nearly one quarter (24 percent) of respondents cited the desire to achieve some type of certification (for example, LEED and Energy Star) as a motivation, up four points from 2017. This suggests that companies are responding to changing expectations about sustainability, which are permeating the broader business environment.

Figure 20. Insistence on sustainable practices reverberating through the supply chain

Which of the following business drivers are primarily responsible for (or facilitated) your company's decision to implement its resource management programs?



Source: Deloitte Resources 2018 Study survey results.

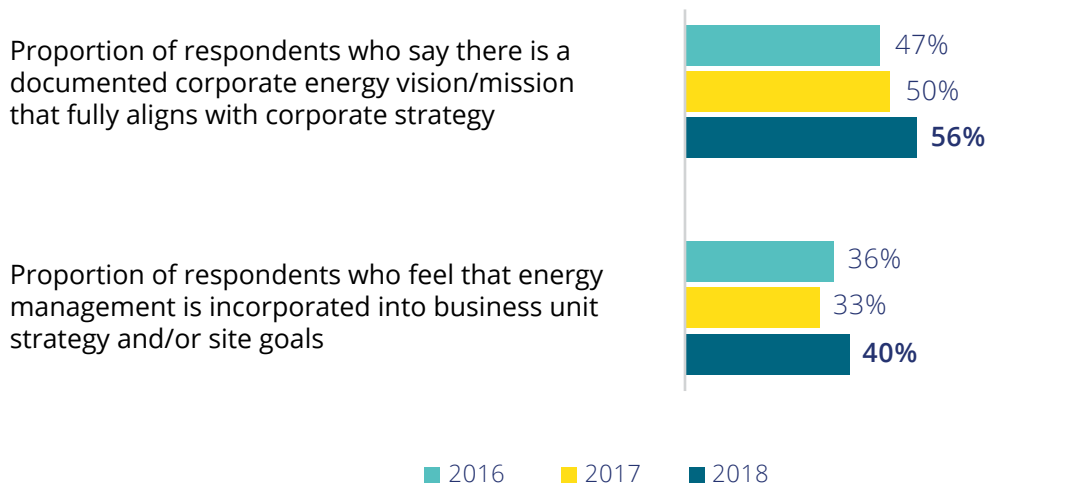
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**SUCCESS DRIVES SUCCESS:
BUSINESSES ARE TAKING ENERGY
MANAGEMENT TO THE NEXT LEVEL.**

Consistent with the prior two surveys, over half (56 percent) still feel extremely/very successful at achieving their resource management goals. Capital funding challenges were most often cited as a primary barrier to achieving their goals. However, in this year’s Study, fewer respondents cited strategic challenges and internal bureaucracy as barriers versus 2017. Perhaps this reflects more support from the C-suite, with leaders promoting a cohesive en-

ergy management vision from the top down. Other findings back up this assertion. In the 2018 Study, 85 percent of businesses indicated they have a documented corporate energy vision/mission, compared to 78 percent in last year’s survey. Also, noticeably more respondents in 2018 indicated that their energy management strategies were incorporated into the business unit strategies and site goals. This suggests that companies are extending their energy management strategies further into their business operations, deploying more tactics at the local and regional levels where they can make a bigger impact.

Figure 21. Energy management reaches further into the business



Source: Deloitte Resources 2018 Study survey results.

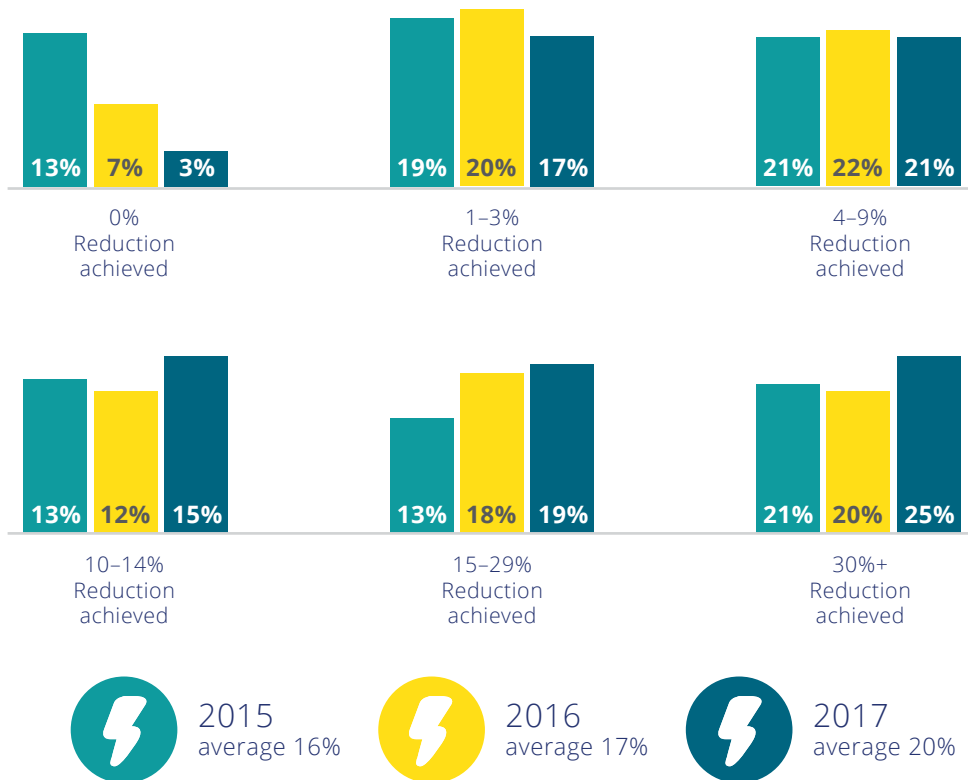
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CONTINUOUS IMPROVEMENT PAYS OFF, AS COMPANIES BECOME MORE EFFECTIVE AT MANAGING THEIR ENERGY USAGE.

Business respondents in this year’s survey reported reducing their electricity consumption in calendar year 2017 by 20 percent on average, compared to 17 percent in calendar year 2016 and 16 percent in calendar year 2015. Similar patterns emerged in other energy/resource management areas. These increases may be related to the adoption

of new tactics that can optimize technologies that have already been deployed. For instance, the use of battery storage systems and time-of-use rates trended upward in the 2018 Study. These tactics can help companies to get more value from their self-generation facilities and building energy management systems. Companies may also be reaping the rewards of extending their energy management programs further into the business units.

Figure 22. Businesses report larger reductions in electricity usage; one-quarter lowered their consumption by 30 percent or more

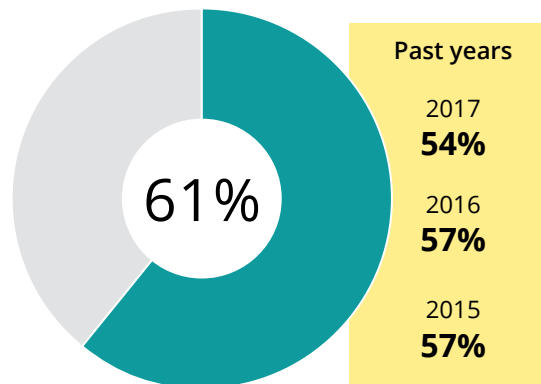


Source: Deloitte Resources 2018 Study survey results.

BUSINESSES ARE DOUBLING DOWN ON THEIR EFFORTS TO CURB CARBON EMISSIONS IN THE WAKE OF US POLICY CHANGE.

Like residential consumers, businesses are more concerned about their carbon footprints in this year's survey. Sixty-one percent report having carbon footprint goals, up from the previous high point of 57 percent in 2015 and 2016. Respondents were also queried about how they are reacting to the United States' decision to pull out of the Paris Climate Accord. Of the 87 percent who were familiar with the decision, approximately four in 10 said they are reviewing or changing their energy management policies in response. Notably, three-quarters of those who are adjusting their policies say they are increasing their commitment and/or investment in energy management as a result.

Figure 23. Companies have carbon on their minds



The number of companies with carbon footprint goals is higher in 2018 vs. past years

Source: Deloitte Resources 2018 Study survey results.

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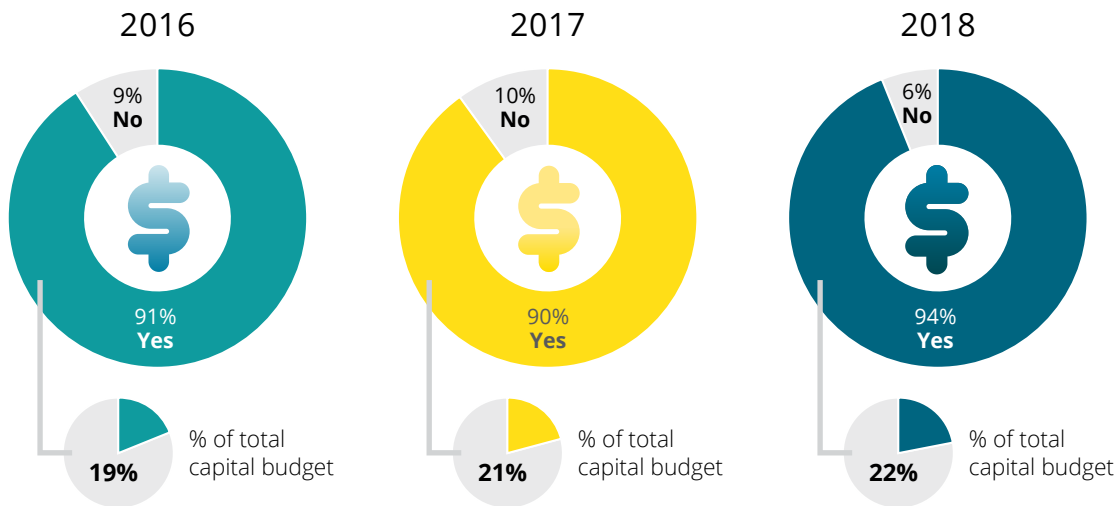
COMPANIES SEE ENERGY MANAGEMENT AS A WAY TO THRIVE, NOT JUST SURVIVE.

Nearly four in 10 businesses (38 percent) say they factor expected company growth into their energy management goals, while more than half (55 percent) assume a steady state. Only 6 percent are anticipating a decline. Forty-five percent of businesses are planning to invest in additional US locations as a result of the lower corporate tax rate that went into effect in 2018. Another 36 percent are planning to invest in additional US locations, but the tax-rate change wasn't a primary factor in their decisions. Even as companies focus on growth,

energy management is holding its own in the competition for capital. Most business respondents (94 percent) continue to have a pool of funds for investing in energy management in 2018. These funds represent about 22 percent of their total capital budgets, which is consistent with the numbers in the 2016 and 2017 studies. Despite continued access to funding, 24 percent of respondents still cited lack of capital as a primary barrier to achieving their goals. Why? Perhaps some would like to do more than their current budgets allow.

Figure 24. Energy management funding remains robust amid renewed competition for capital

Invested funds in energy management over past three years



Source: Deloitte Resources 2018 Study survey results.

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MORE BUSINESSES ARE TAKING ENERGY MATTERS INTO THEIR OWN HANDS.

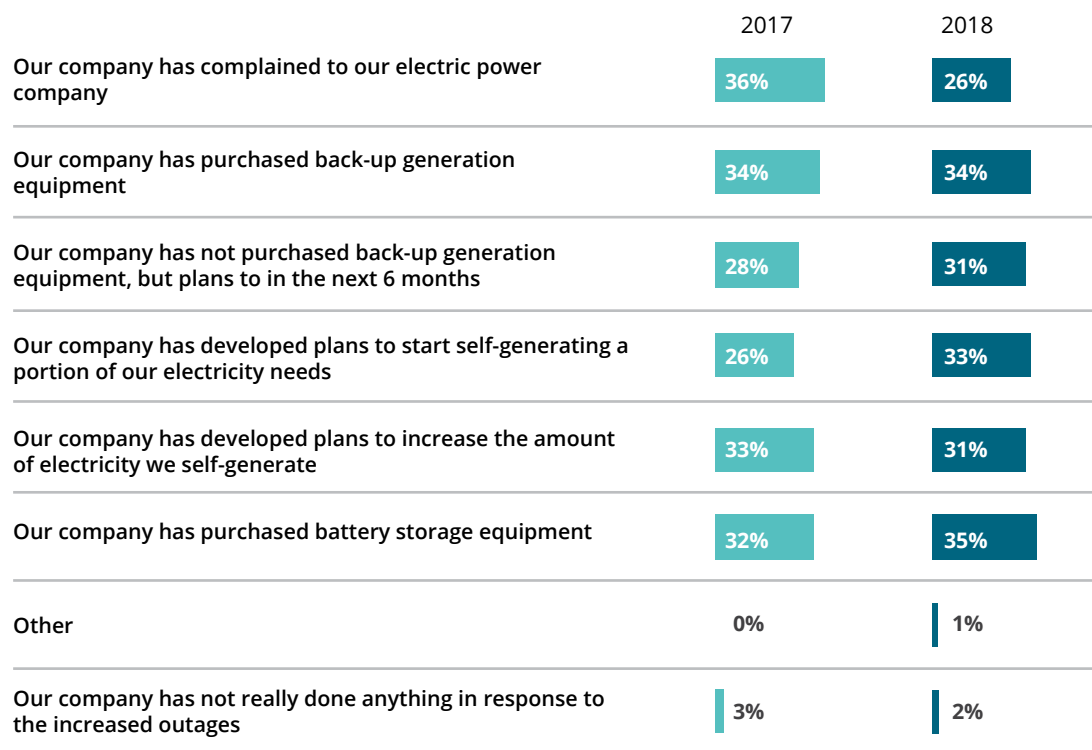
The number of businesses with some sort of onsite generation continues to trend upward. Fifty-nine percent of businesses say they generate some portion of their electricity supply onsite, inching up from 2017. Of those that self-generate, 13 percent of their electricity supply came from onsite renewables in 2017, 13 percent from onsite cogeneration and 10 percent from onsite battery storage. Price certainty (53 percent) was the No. 1 reason given for having onsite generation, up from 44 percent in 2017. It was followed by diversification of energy supply (45 percent), cost savings (35 percent), and

resiliency (34 percent). These motivations suggest that businesses want to have greater control over their energy supplies in terms of price, quality, and reliability. They also imply that renewables, batteries, fuel cells, and other distributed resources are increasingly viewed as being realistic, cost-effective options for attaining these objectives.

The trend toward greater self-sufficiency is unlikely to abate soon, since many companies are open to doing even more to control their own energy destinies. About half (48 percent) of the respondents are working to procure more electricity from renewable sources. Of the 36 percent that are not trying to do so, nearly two-thirds (61 percent) said the oppor-

Figure 25. Businesses empower themselves to better manage electricity outages

Steps taken due to increased outages
(Among those that have experienced more outages)



Source: Deloitte Resources 2018 Study survey results.

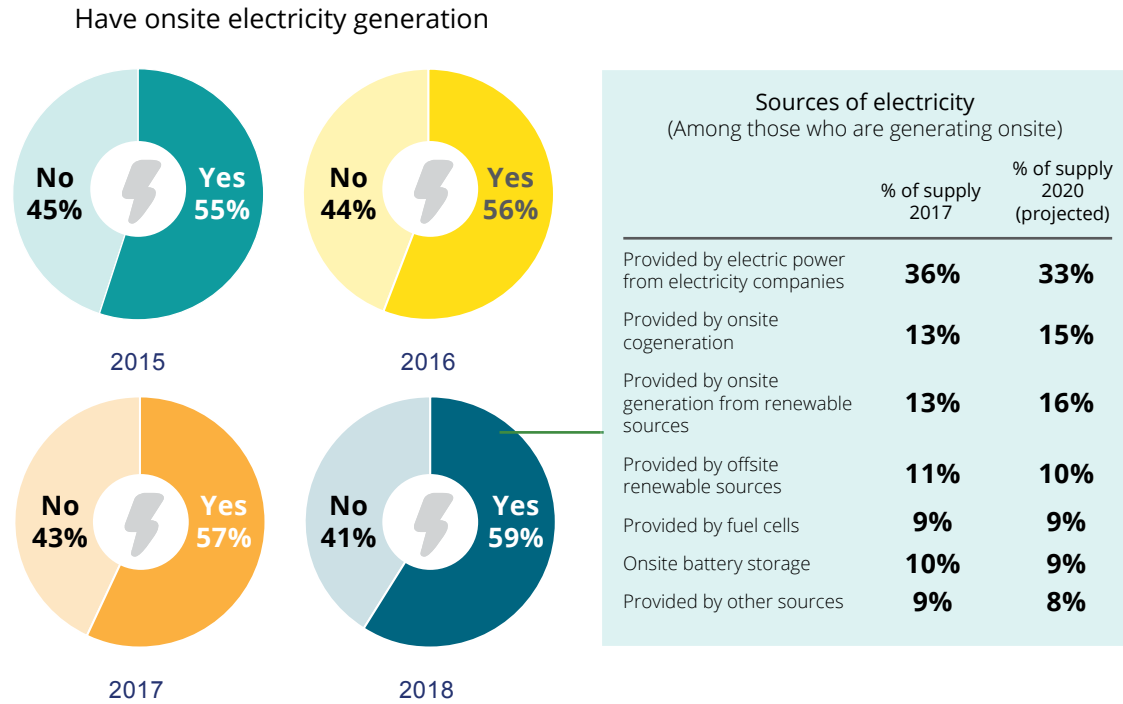
tunity to combine battery storage with renewable sources would motivate them to do more. And, 38 percent of respondents are open to implementing or participating in a micro-grid, up from 35 percent in 2017.

The findings also revealed that businesses are increasingly trying to handle electricity outages on their own. Of the 38 percent of respondents who have experienced increased power outages in the last 24 months, fewer are blaming them on their electric companies for not maintaining their systems. Nonetheless, more are responding by pursu-

ing tactics that enhance resiliency and self-sufficiency, such as purchasing backup generators, adding battery storage units, and expanding the amount of electricity they self-generate.

Amid increasing self-sufficiency, where do utilities fit in? Among those businesses that self-generate, 36 percent of their electricity supply came from utilities in 2017. By 2020, they expect that proportion to decline to 33 percent, challenging utilities to find ways of offsetting this anticipated drop in demand.

Figure 26. Businesses are becoming more self-sufficient



Source: Deloitte Resources 2018 Study survey results.

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COMPANIES ARE MOVING UP THE MATURITY CURVE, COLLABORATING ACROSS FUNCTIONS AND EXPANDING THE REACH OF THEIR ENERGY MANAGEMENT PROGRAMS.

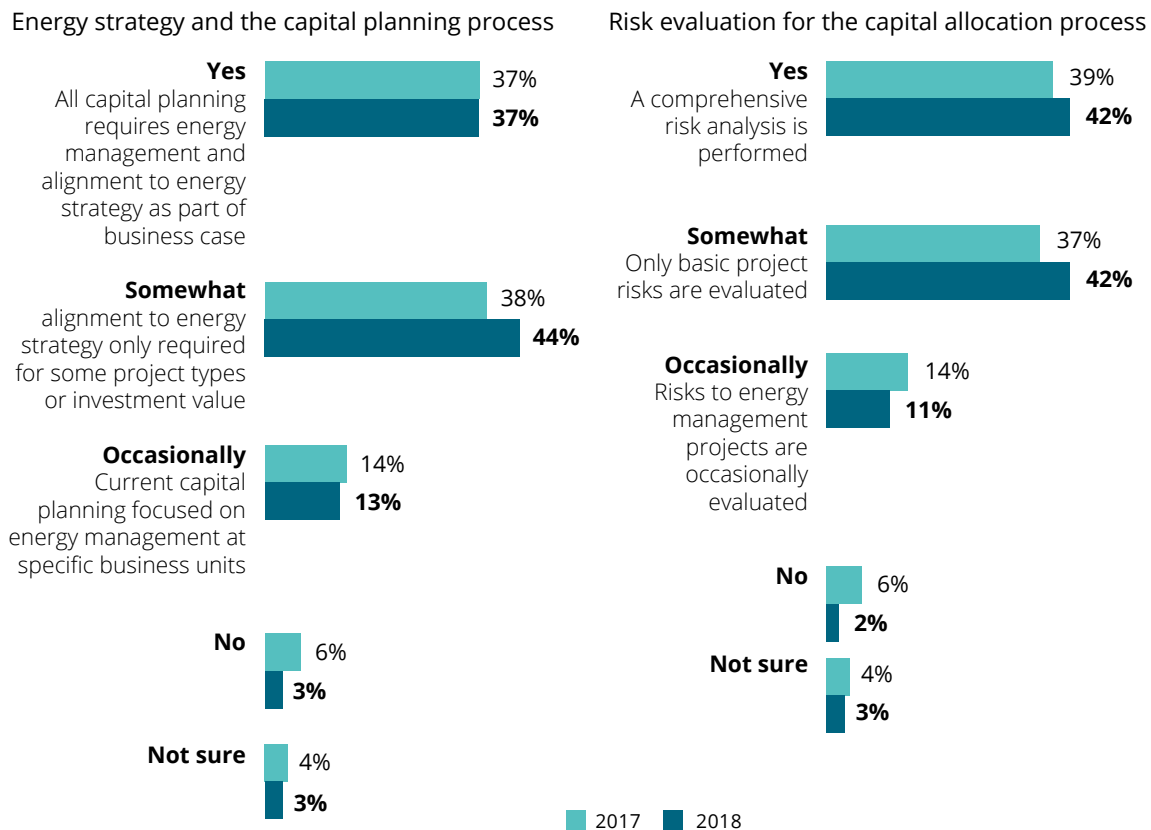
Consistent with 2017, 40 percent of companies integrate energy management goal-setting across business functions. Over one-third require all capital planning to consider energy management implications. This too is consistent with last year's survey. However, in the 2018 Study, more businesses say they consider alignment to energy strategy somewhat during the capital planning process, with fewer respondents reporting they consider it occasionally or not at all.

A similar pattern emerged with risk analysis. Forty-two percent of business respondents report-

ed that their companies perform a comprehensive analysis of risks to energy management projects as part of the capital allocation process. This proportion was up slightly from 39 percent in the 2017 Study. Once again, more businesses say they evaluate risks to energy management projects somewhat, while fewer report doing it occasionally or not at all.

This movement up the ladder into greater levels of maturity emerged as a consistent theme across many categories in this year's Study. It seems the vast majority of companies have not only developed at least a basic level of capability in nearly every survey category but they are extending the reach of their energy management efforts into more areas of the business.

Figure 27. Businesses are moving up the capabilities ladder



Source: Deloitte Resources 2018 Study survey results.

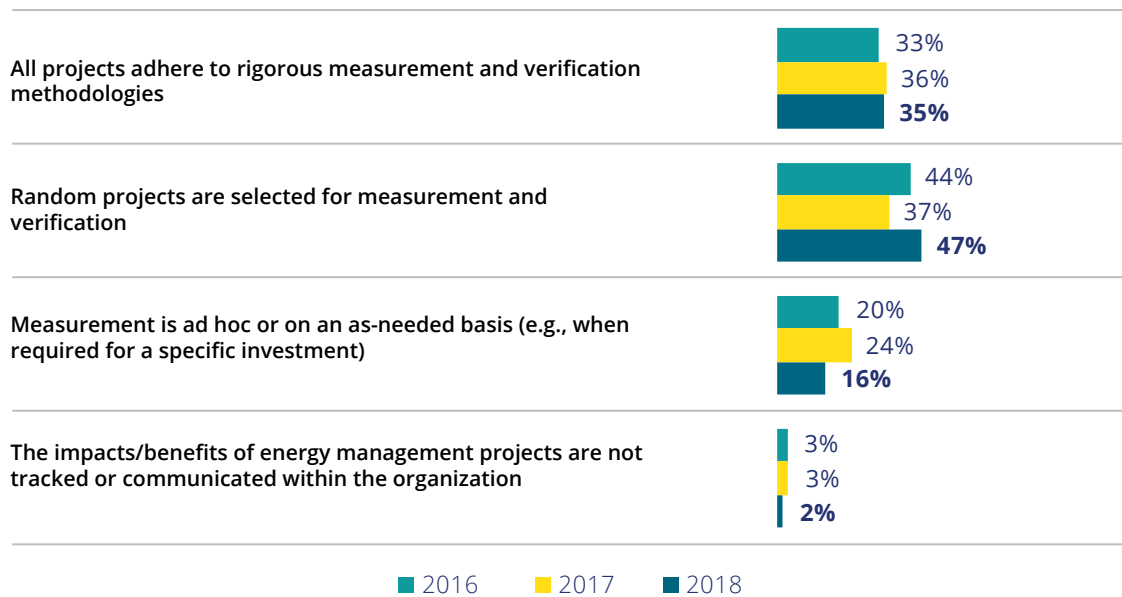
BENEFITS TRACKING PROLIFERATES AS COMPANIES EVOLVE THEIR ENERGY MANAGEMENT PRACTICES.

Consistent with previous years, more than one-third (35 percent) of companies in this year’s Study require all energy management projects to adhere to rigorous measurement and verification methodologies. Up 10 points from last year’s survey, 47 percent of businesses indicate they somewhat track and communicate the benefits of energy management projects, randomly selecting projects for

measurement and verification. Sixteen percent say measurement is occasional or ad hoc, down eight points from the 2017 Study. And, only 2 percent of respondents in this year’s Study say they don’t track or communicate the benefits of their energy management projects at all. Despite the big jumps in maturity when it comes to performance measurement and benefits tracking, more than a quarter (27 percent) continue to find it extremely or very difficult to monitor performance against goals.

Figure 28. Measurement and verification capabilities are maturing

Tracking impact/benefits of energy management projects



Source: Deloitte Resources 2018 Study survey results.

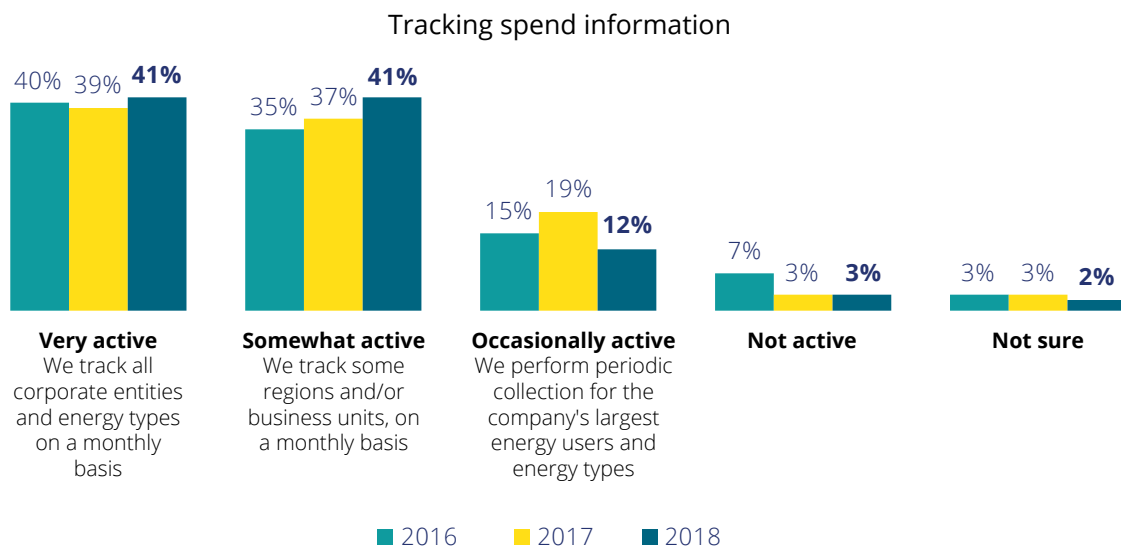
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PERFORMANCE TRACKING RIPPLES THROUGHOUT THE SUPPLY CHAIN.

About seven in 10 businesses have key performance indicators (KPIs) in place for most, if not all, of their energy-related suppliers. In reporting energy spend information across the business, more respondents (41 percent) track all corporate enti-

ties and energy types on a monthly basis, up slightly from the 2017 Study. The proportion that are “somewhat active,” meaning they track some regions or business units on a monthly basis, also increased in the 2018 Study, rising four points to 41 percent.

Figure 29. Companies shining a brighter light on energy spend



Source: Deloitte Resources 2018 Study survey results.

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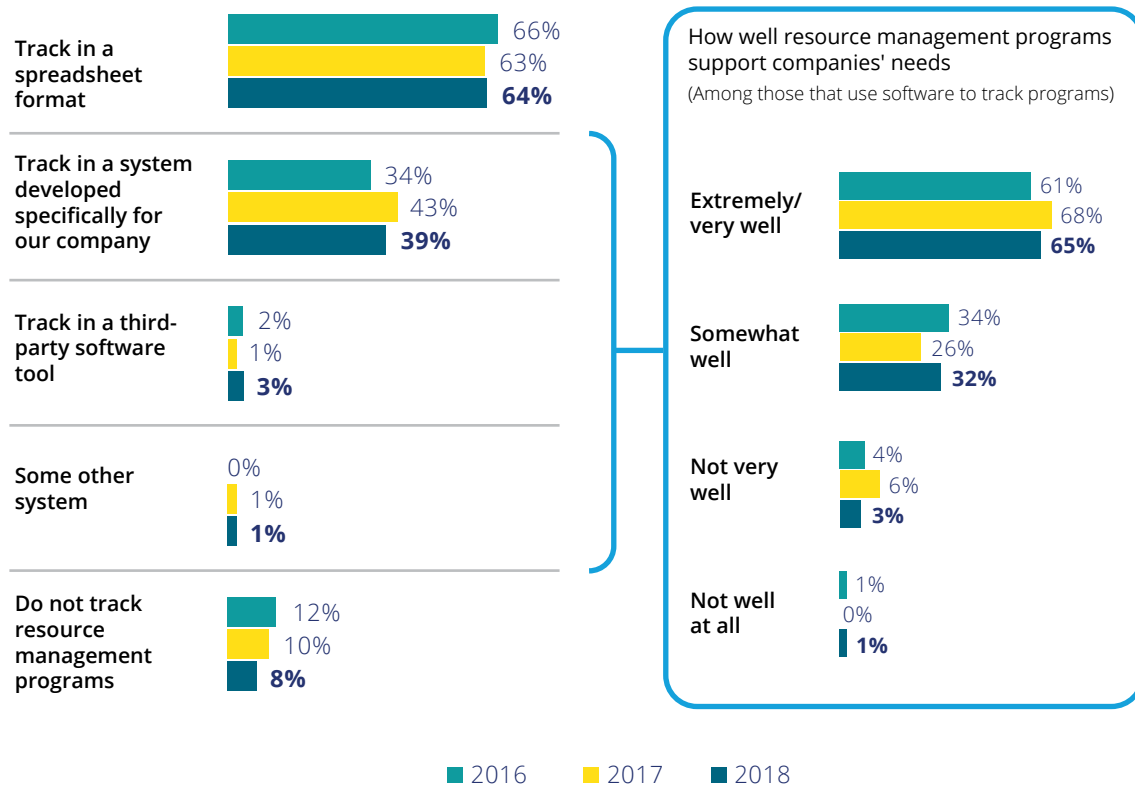
**AN INTRACTABLE CHALLENGE?
DIFFICULTIES IN MONITORING AND
REPORTING CAN BE TRACED TO
INADEQUATE SYSTEMS AND TOOLS.**

Availability of good technology to support managing electricity consumption remains a challenge, showing little progress since 2017. Sixty-eight percent agree that the technology available today is inadequate to be very helpful in managing their companies' energy consumption. After improving in the 2017 Study, this measure of dissatisfaction has

reverted to 2016 levels. Nearly two-thirds of respondents (64 percent) use spreadsheets to track their resource management programs versus systems developed specifically for their company: This proportion has remained relatively unchanged since 2015. As reported last year, there appears to be a dearth of adequate third-party software tools, with a negligible 3 percent saying they use off-the-shelf software to support their resource management programs.

Figure 30. Systems and tools still falling short, leaving companies' needs unmet

Software to support resource management programs



Source: Deloitte Resources 2018 Study survey results.

STRONGER TOGETHER: BATTERY STORAGE AND TIME-OF-USE RATES

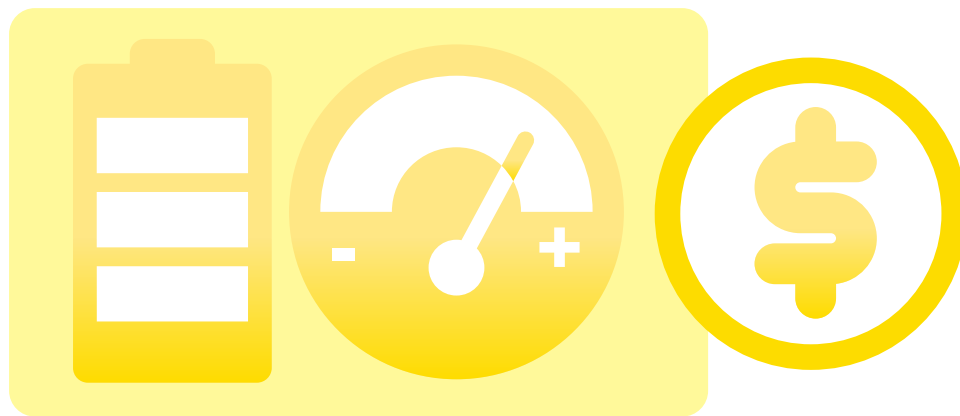
One-quarter of business respondents indicated they have installed batteries to store electricity for usage at times when electricity prices are higher. Just over one-fifth (21 percent) of companies rank installing battery storage units among their top three most important energy management tactics. Storing electricity for later use also appeals to residential consumers. Among those without solar panels, nearly half (49 percent) said they would be more interested in installing solar panels if they could combine them with a home battery storage unit.

While deployment has yet to become widespread, battery storage units have clearly captured the attention of both businesses and residential consumers. This may be partly due to increased availability of time-of-use, also known as time-varying rates (TVRs), particularly on the consumer side. According to the US Energy Information Administration, 7.95 million residential customers were enrolled in TVRs within the United States as of the end of 2016.³ Based on an analysis of this data performed by Advanced Energy Economy, Maryland continues to lead the nation, with over 75 percent of its residential customers on TVRs, followed by Delaware (59 percent), Oklahoma (37 percent), Arizona (32 percent), and Ohio (15 percent).⁴ Several new states are moving in this direction, including California, Arizona, Rhode Island, and Minnesota.⁵ California is particularly notable, because of its size as well as its ambitious plans to implement default time-of-use rates for residential customers in 2019.⁶

As time-of-use rates become more prevalent in the United States, electricity customers gain more flexibility to store energy from the grid or self-generating assets when electricity rates are lower and to consume this stored energy or feed it back into the grid when rates are higher. This, in turn, allows them to extract more value from battery storage units, especially if they are coupled with self-generating assets. The findings offer evidence that both businesses and consumers are intrigued by this value proposition. Like interest in battery storage, the appeal of time-of-use pricing also increased in this year's Study. Up 14 points from 2017, 47 percent of residential consumer respondents find the ability to save money through time-of-use rates to be extremely/very motivating. This percentage rises to 52 percent among millennials. Similarly, nearly one-third of businesses report participating in utility time-of-use plans, up four points from last year's survey. And, one-quarter of companies rank participating in time-of-use plans among their top three most important energy management tactics, inching up slightly from 2017.

Overall, the findings suggest that greater interest in time-of-use plans may be driving interest in battery-plus-renewable installations and vice versa. This mutual exchange underscores the inter-relationships among the many drivers behind the growing adoption of battery storage solutions and the transformation of the US electricity sector. These drivers are explored in greater detail in the 2018 Deloitte report, *Supercharged: Challenges and opportunities in global battery storage markets*.

Figure 31. Battery storage and time-varying rates offer a compelling value proposition



Source: Deloitte Resources 2018 Study survey results.

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Concluding insights

THE findings of the 2018 Study reflect a confluence of desires among businesses and residential consumers. They also suggest that reciprocity is at play in fulfilling them. As businesses drive their energy management efforts forward, residential consumers are watching and learning, and ultimately striving to do more. At the same time, residential consumers, especially millennials, are finding their voice and flexing their purchasing muscles, increasingly demanding that businesses offer environmentally responsible solutions. These mutually reinforcing mechanisms are changing societal norms concerning sustainability. In turn, this is creating opportunities for deploying new technologies, evolving energy management practices and propagating them across the enterprise. Together, residential consumers and businesses are building momentum in taking energy management to the next level.

What does this mean for electricity providers?

Utilities are being challenged to get to know their customers to a much greater extent. For residential consumers, the consequences of their decisions are more significant since high-tech energy management solutions, such as solar PV, batteries, and home automation systems, involve increased investment and longer-term commitments. Yet they may be unsure about whom to trust for guidance on these products—that is, will something work and is it secure? Utilities will need to find a way of addressing these insecurities in order to break through.

On the business side, the potential for utility disintermediation continues to rise as more and more companies take energy matters into their own hands. Here, utilities are also being challenged to get to know their customers so they can identify areas where they can add value and distinguish themselves from other types of providers. Making it easier for business customers to evaluate offerings, manage their energy supplies (not just electricity), and to deploy batteries and renewables, including connecting to the grid, will likely be key to winning and retaining corporate customers.

What does this mean for businesses?

The pressure for businesses to reduce their carbon footprints and to become more sustainable is unlikely to ease up. The growing influence of millennials is changing societal expectations and norms across the board. Possessing both knowledge and capital, businesses not only have the ability to take the lead in implementing clean technologies but are also increasingly being forced to do so. They are being pushed by their customers and their supply chains, which means their goals and growth are at stake. This ups the ante on being proactive. Those that wait and see may forfeit their opportunity to build goodwill and brand share among millennials, and soon among Generation Z (that is, those born between 1998 and 2016).⁷ This could affect business performance not only in terms of revenue but also in terms of attracting and retaining talent.

What's next?

Overall, the survey findings provide further evidence that transformation of the electricity sector should continue to move forward in the direction of three macro trends that suppliers have been broadly pursuing for some time: decentralization, digitalization, and decarbonization. These trends have emerged due to the confluence of technology advances and increasingly strong business and residential consumer demands for a cleaner, more resilient, and secure—but still affordable—energy supply.

Simply put, businesses and residential consumers increasingly want clean, reliable assets, preferably close to them, that they can control to optimize reliability, flexibility, and affordability. However, this year's Study findings also emphasize that electricity customers are increasingly aware of the privacy and security concerns inherent in some of the smart technologies that are required to enable this vision. This needs to be addressed by providers soon if collective progress toward a clean, secure energy future is to continue.

How can you leverage the Deloitte Resources 2018 Study?

Deloitte has designed this Study as a tool to assist companies with their business decision-making. The expansive database developed through the Study allows Deloitte to guide companies in examining the findings in much greater depth and from many vantage points. This Study can be used to help build the business case necessary to establish priorities and gain support for proposed initiatives, or it can provide solid data for new directions that are under evaluation. For more information please email us at DeloitteResourcesStudy@deloitte.com.

Additional resources

Read *Supercharged: Challenges and opportunities in global battery storage markets*



Register now for the 2018 Deloitte Renewable Energy Seminar to be held in Denver, Colorado, during August 15-17, 2018.



ENDNOTES

1. As used in this document, “Deloitte” means Deloitte LLP and its subsidiaries. Please see www.deloitte.com/us/ about for a detailed description of the legal structure of Deloitte LLP and its subsidiaries. Certain services may not be available to attest clients under the rules and regulations of public accounting.
2. US Energy Information Administration, “Average price of electricity to ultimate customers,” *Electric Power Monthly*, April 24, 2018.
3. US Energy Information Administration, *Electric power sales, revenue, and energy efficiency Form EIA-861 detailed data files*, April 24, 2018.
4. Coley Girouard, “The state of advanced metering infrastructure and time-varying rates, in three maps and one graph. The leaders—and laggards—may surprise you,” *Advanced Energy Economy*, November 22, 2017.
5. Ibid.
6. Ibid.
7. Libby Kane, “Meet Generation Z, ‘the millennials on steroids’ who could lead the charge for change in the US,” *Business Insider*, September 15, 2017.

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