



Deloitte Resources 2016 Study
Energy Management: Navigating the headwinds

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About the study



Deloitte¹, with strategy and market research firm Harrison Group, a YouGov Company, has completed its sixth annual nationwide Resources study (the “2016 study” or “study”) to provide insights that can be useful in helping electricity providers and businesses make energy-related investment and business decisions. The study aims to answer questions such as:

- What actions are US residential consumers and businesses taking and expecting to take to manage their energy usage?
- What do they know about the energy marketplace?
- What motivates them to adopt new practices and invest in new technologies?
- How mature are their approaches to managing energy efficiency?

The 2016 study was conducted in March 2016, and thus, largely reflects attitudes and practices related to the year 2015. 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 more than 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 Figure 1 and Figure 2 for definitions of these segments. In addition, Deloitte interviewed several providers of energy-management products and services in order to obtain greater context and clarity around key findings.

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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
68+

Executive summary

The findings of the 2016 study indicate residential consumers and businesses remain strongly focused on reducing their energy consumption, even though record-low energy prices have “taken the heat off” their need to cut costs. These findings corroborate the conclusion reached last year based on the results of the 2015 study: that a tipping point had been passed. For both residential consumers and businesses, the concept of energy management had become engrained. Companies, by and large, considered energy management to be an essential aspect of corporate strategy, and residential consumers continued to be thoughtful and deliberate about their electricity usage. Today, neither group shows any sign of turning back. General trends in affordability, practicality, and environmental sensitivity appear to be driving energy management forward, despite strong headwinds in the form of record-low energy prices and a steeper hill to climb in terms of investment and effort.

Key residential consumer results from the 2016 study include:

- Nearly two-thirds (65 percent) now say they are “very concerned” about climate change and their personal carbon footprints, climbing four percentage points from 2015.
- Millennials are leading the charge on energy management: They are more concerned about shifting to cleaner sources of energy, more willing to pay for this shift through a surcharge in their electricity bills, and they’re more interested in incentives for saving electricity and purchasing related technologies.
- Residential consumer interest in sourcing at least one additional service from their electricity providers is growing across generations. About half (48 percent) of residential consumers indicated they are interested in purchasing energy efficiency services from their electricity providers; the same percentage indicated they are interested in purchasing Internet services from their electricity provider.



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As in 2015, the questions posed to businesses in the 2016 study were organized around eight key capability maturity categories. This year, mid-cap businesses progressed the farthest, showing greater levels of maturity in nearly every category explored by the study. Enterprises remained firmly committed to energy management, raising their reduction targets and investing more in developing their energy management capabilities. Nonetheless, both groups appear to be struggling to see the road ahead, partly due to shortfalls in the availability and application of advanced analytical tools.

Key business results from the 2016 study include:

- Seventy-four percent of business respondents say their customers are demanding that they offer more environmentally considerate solutions, up from 66 percent in 2015.
- More than half (52 percent) of businesses say they are working to procure more electricity from renewable sources. Of those that are procuring electricity from renewable sources, they are utilizing various options. Fifty-six percent say they are doing it through power purchase agreements (PPAs), 52 percent through green power programs, and 12 percent by directly purchasing a renewable project.
- Seventy-two percent of business respondents report that advanced analytical tools are not deployed across their companies, remaining virtually unchanged from 73 percent in 2015.

Residential consumer views on energy management

Introduction

The findings of the 2016 study reinforce the notion that residential consumer resourcefulness remains entrenched. Even though residential consumers are a little less worried about US energy resources as well as their own electric bill/consumption, they still do not expect to use more electricity in the future. This is a notable finding, considering that the economic context of the study has changed dramatically since its inception in 2011. No longer under intense financial pressure from rising energy prices and the Great Recession, residential consumers in the 2016 study appear to be broadening their motivations for continuing to contain their household energy consumption. While the affordability of electricity and of energy-related technologies and services remained important, environmental awareness took a strong upturn, with residential consumers showing greater concern about climate change and greater interest in reducing their own carbon footprints. Practicality also emerged as a driver of energy management behavior, with residential consumers beginning to perceive renewables as a familiar, more cost-effective part of the toolkit for facilitating intelligent energy consumption and cost savings.

Despite their ongoing commitment to energy management, residential consumers by and large still have not acted on their intentions to deploy tactics that require greater effort and investment (i.e., rooftop solar, smart thermostats, installing energy efficient doors and windows, etc.). Beyond the obvious barrier of cost, residential consumers fear biting off more than they can chew in terms of taking their energy management efforts to the next level. Their reluctance to deploy more intensive energy management tactics may also be linked to the belief that others are doing it for them as part of a broader clean energy movement. For instance, energy efficiency technologies are now automatically built into new appliances, vehicles, and homes (i.e, today's furnaces and air conditioners are many times more efficient than older models). They may also be feeling more confident that their electricity providers, communities, and some corporations are doing good things on their behalf, such as incorporating more clean energy into their offerings and/or operations.



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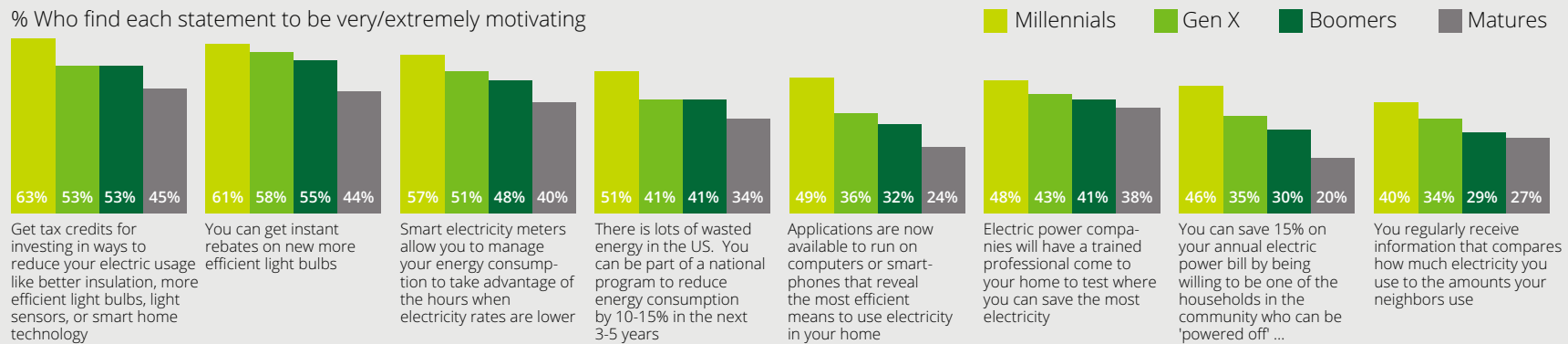
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Millennials wield considerable weight as electricity customers

The 2016 study interviewed electric-bill-paying Millennials (those ages 21-34, also known as Gen Y) regarding their views on energy, the environment, and their electricity consumption. Of those surveyed, more than half (53 percent) are homeowners, while 47 percent rent. The findings highlighted a growing dichotomy between the needs and concerns of this younger generation of electricity ratepayers compared to Baby Boomers and Mature generations. Overall, the findings suggest that Millennials are more concerned about shifting to cleaner sources of energy, more willing to pay for this shift through a surcharge in their electricity bills, and more interested in incentives for saving electricity and purchasing related technologies.

These findings help to dispel the common misperception that Millennials are reluctant to take on adult responsibilities such as managing their own finances and owning their homes. While the youngest of the Millennials have yet to mature fully into their roles as customers and employees of the future, it appears that many have already arrived. The importance of understanding their desires is relevant now and will increase by the minute for electricity providers, as Millennials continue to come into their own as the largest living generation in the US, having recently surpassed the Baby Boomers in size.ⁱ

Figure 4: Millennials are more receptive to incentives for improving energy efficiency



Detailed residential consumer findings

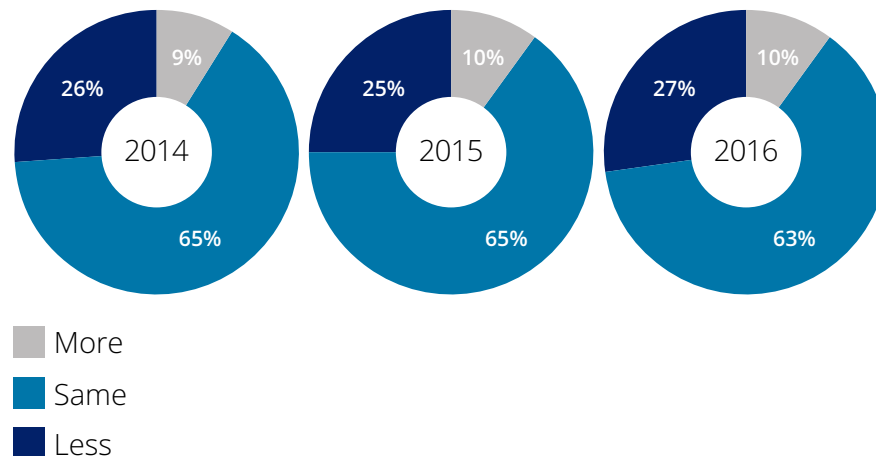
There is still no indication that residential consumers will relax their energy management practices and electricity demand will increase.

Eighty-two percent of residential consumers indicated their families took steps to reduce their electric bills over the past year, holding steady since 2013. This finding comes even as 47 percent of residential consumers say they are less worried about energy as the economy improves and the US discovers more domestic natural gas and oil reserves, a proportion that has risen steadily from 37 percent in 2014. Sixty-three percent say they plan to use about the same amount of electricity in 2015 as they did last year, and 27 percent believe they will use less. Consistent with 2015, only about 10 percent expect their households to increase their energy consumption over the next year. While residential consumers are continuing to take steps to reduce household electricity consumption, more than two-thirds (68 percent) believe they are doing all they can to reduce their bills even more. This proportion is up slightly from

64 percent in 2015. This implies that utilities and service providers may face challenges in motivating consumers to do more around energy management. As later study findings suggest, targeted communication and better alignment of incentives will likely be key to overcoming this perceptual barrier.

Figure 5: Consistent with 2014 and 2015, 90 percent of residential consumers in this year’s study expect their electricity consumption to remain the same or drop over the next year.

Expected future electricity use

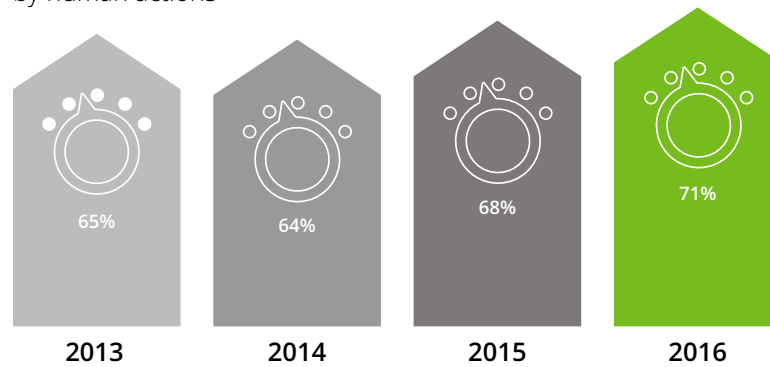


Residential consumers care about the environment and climate change.

General worries about the sustainability of the earth’s resources persist, with 70 percent of residential consumers saying they are very concerned about the earth running out of important resources. Seventy-one percent of residential consumers who responded to the study believe climate change is caused by human actions. This percentage has trended steadily upward from 64 percent in 2014. Nearly two-thirds (65 percent) now say they are “very concerned” about climate change and their personal carbon footprints, climbing four percentage points from 2015. While they identified “keeping my energy bills affordable” as the most important energy issue (59 percent), “utilizing clean energy sources” was almost as important, cited by 56 percent of respondents.

Figure 6: Acceptance of climate change as a reality trends upward

% Agree strongly/somewhat that climate change is caused by human actions



Millennials are leading the charge toward a cleaner energy future.

Eighty-six percent of Millennial respondents believe the government should be active in setting a vision and path for driving US energy strategy. This compares to 80 percent of Gen X, 76 percent of Baby Boomers and 63 percent of Matures. Among all age cohorts, a willingness to pay a surcharge on their electric bills for developing sources of renewable energy trended upward in the 2016 study. Consistent with prior years, support for the surcharge was highest among Millennials and lowest among Matures.



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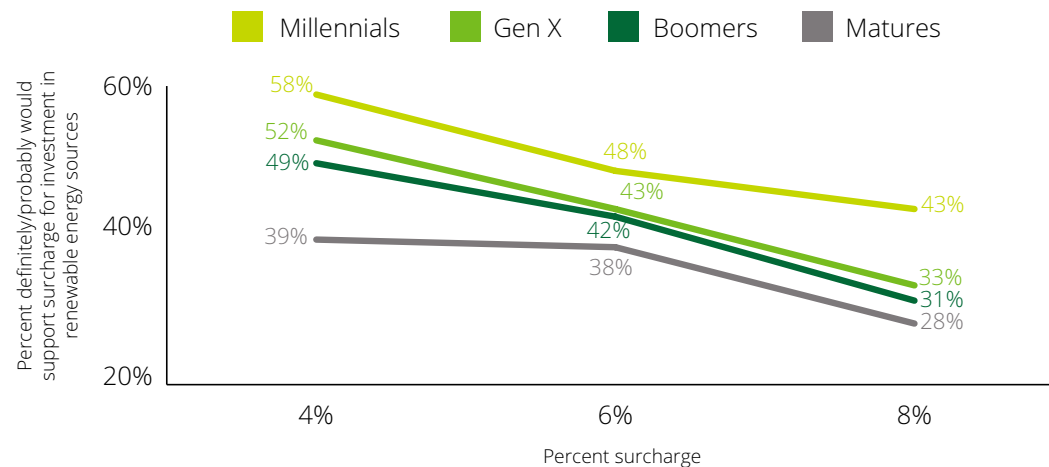
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This is could be an opportunity for utilities and electricity providers to either revisit or further explore the viability of offering green electricity programs, especially considering the increasing size of their Millennial customer base.

Instant rebates on new more efficient light bulbs (found to be very/extremely motivating by 56 percent of residential consumers) and tax credits for making energy efficiency improvements (54 percent) remain the top ways to incentivize people to be more resourceful. Millennials were more interested in these incentives than other age groups, with 63 percent finding tax incentives and 61 percent finding instant rebates to be extremely/very motivating.

While these types of automatic rewards appeal to Millennials, the allure of the traditional rebate model appears to be waning. In a recent interview conducted by Deloitte, Guy Champniss, vice president of consumer science at Enervee, explained that Millennials are frequently motivated by the social aspects of making better choices about energy use, and more broadly about sustainability. Once money is introduced into the equation, the desired behavior is often “crowded out” by the financial incentive and trails off, as they try to internally reconcile their motivations for taking action. He cautioned, “This could potentially be a big issue for utilities, and for the whole energy efficiency rebate model, if this starts to occur within a large portion of the customer base, and it’s the epitome of a completely unintended consequence.”

Figure 7: Support for a surcharge to promote renewable energy development remains highest among Millennials, lowest among Matures.





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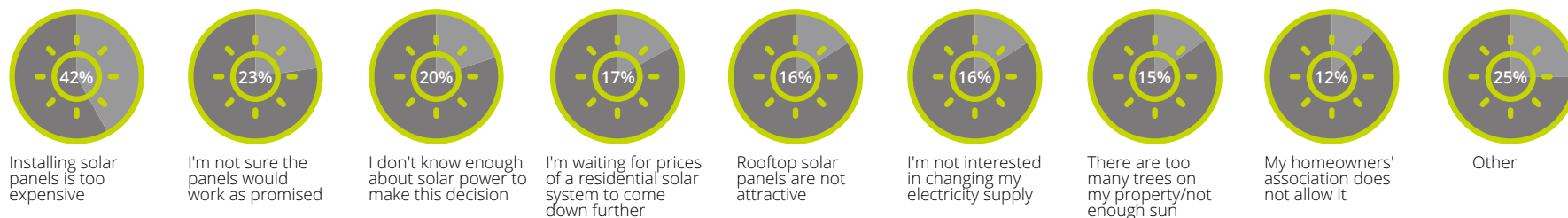
Millennials are keener than most for rooftop solar, although concerns about expense and efficacy linger as barriers to overall residential consumer interest in solar.

Among residential consumers who own their own homes and live in states with at least one MW of photovoltaic (PV) installations per quarter over the last year, solar penetration is at six percent, with interest in solar panels strongest in the West and South regions. As in other categories, Millennials are more receptive than most to solar, with 52 percent saying they are extremely/very interested. Gen X was next at 46 percent. Despite the strong interest in rooftop solar particularly among younger consumers, there are

still barriers to overcome. Top drivers of interest in solar panels are saving on electricity bills (76 percent), which fell off three points from last year, and “solar power is clean and does not contribute to climate change,” cited by 60 percent of respondents, down six points from 2015. Other drivers similarly declined. This suggests that residential consumers may not know what kind of investment is involved, what kind of benefits they could receive, or what to look for when choosing a provider. Indeed, for the third consecutive year, perceptions of being expensive (42 percent) and fears of the panels not working as promised (23 percent) remained the main barriers to residential consumer interest in solar.

Figure 8: Barriers to solar linger, but are they real or perceived?

Barriers to interest in solar panels in 2016*



*Among those not interested in installing solar panels on their primary residence



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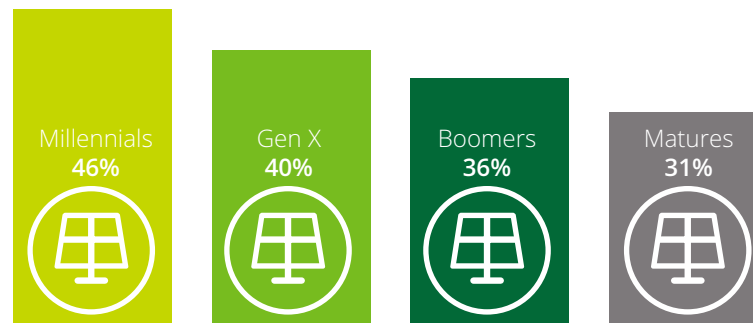
Will community solar blossom as a natural extension of the “sharing economy”?

A new question designed to gauge interest in community solar was added to the 2016 study. Nearly half (46 percent) of Millennial respondents indicated they were very/extremely interested in purchasing a share in a utility-scale solar installation that would allow them to meet some or all of their electricity needs with solar power generated in their community. This compares to 40 percent of Gen X, 36 percent of Baby Boomers, and 31 percent of Matures. Regionally, interest in community solar was strongest in the Northeast, cited by 46 percent of the respondents who reside there. Overall, residential consumer interest in community solar was lower (39 percent) than interest in installing solar panels on their primary residences (46 percent). Nonetheless, community solar may be poised for growth as overall interest in solar trends upward. As the recent Deloitte report, [Unlocking the value of community solar](#), points out, owning or leasing a home PV system may only be realistic for people who own their home, have a

creditworthy FICO score (typically over 680), and live in a state with net energy metering policies. These factors block a large portion of the US population from participating in the solar market. To provide more equitable access, policymakers are increasingly acting to spur development of community solar through state-level mandates and regulations.

Figure 9: As the driving force behind the sharing economy, Millennials accordingly show the greatest interest in community solar.

% Extremely/very interested in community solar





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The road to more advanced energy management tactics is paved with good intentions, but expense and concerns about “getting in over their heads” block follow-through.

Consistent with the 2015 study, residential consumers remain committed to doing the basics to save electricity, such as turning off the lights (cited by 83 percent of respondents); shutting down

electronics when they are not in use (67 percent); setting their thermostats a few degrees lower in the winter and higher in the summer (65 percent); and replacing older incandescent bulbs when they burn out with compact fluorescents and LEDs (63 percent). Residential consumers still have good intentions to go beyond the basics and invest in more capital-intensive tactics, but as in 2014

Figure 10: Could more education about what’s involved and potential payback break the holding pattern of inaction?

What may prevent implementation of actions to conserve electricity	Lack of time	Lack of money	Too big to tackle	Lack of expertise	Other
 Replace old appliances with new more energy efficient appliances	7	70	11	8	20
 Better insulate your home to keep heat or cool air from escaping out of the house	17	55	24	22	22
 Install energy efficient windows and doors	12	67	19	18	19
 Use a “smart” power strip that senses when appliances are off & cuts “phantom” energy use	9	45	9	16	31
 Use a timer on water heaters (that turns off during sleeping hours)	12	26	16	32	31
 Get a smart energy management application to control and reduce your energy consumption	21	42	16	30	21
 Install solar panels that provide electricity for your home	12	71	24	25	15

and 2015 they have not followed through. For instance, 46 percent of respondents in the 2015 study cited better insulating their homes; 45 percent replacing old appliances with energy-efficient ones; and 40 percent installing energy efficient windows and doors as being among the top five most important things they could see themselves doing to save even more electricity in the future. Nonetheless, the proportion of respondents who say they are currently doing those things dropped in this year's survey, indicating that residential consumers by and large have not acted on their intentions. And, the holding pattern of inaction continues: in the 2016 study, residential consumers still pointed to insulating their homes (45 percent); upgrading appliances (48 percent); and installing energy efficient windows and doors (38 percent) as among the top five things they could do to trim their electric bills in the future. Expense, lack of expertise, and concerns about projects being "too big to tackle" are mainly to blame for lack of residential consumer follow through on intentions to go beyond basic energy management tactics.

Part of the problem may also be human nature. As Matthias Kurwig, chief executive officer (CEO) of Enervee, indicated, people are chronically overly optimistic, often believing they have more time and money than they actually do. They also don't think they're average in terms of how much energy and money they'll save by deploying a given tactic. That's why the annual, average savings information, which is commonly posted on appliances means little to the consumer. The key, stressed Mr. Kurwig, is to make those energy savings personal by customizing them for individuals based on their actual usage patterns and electricity rates.



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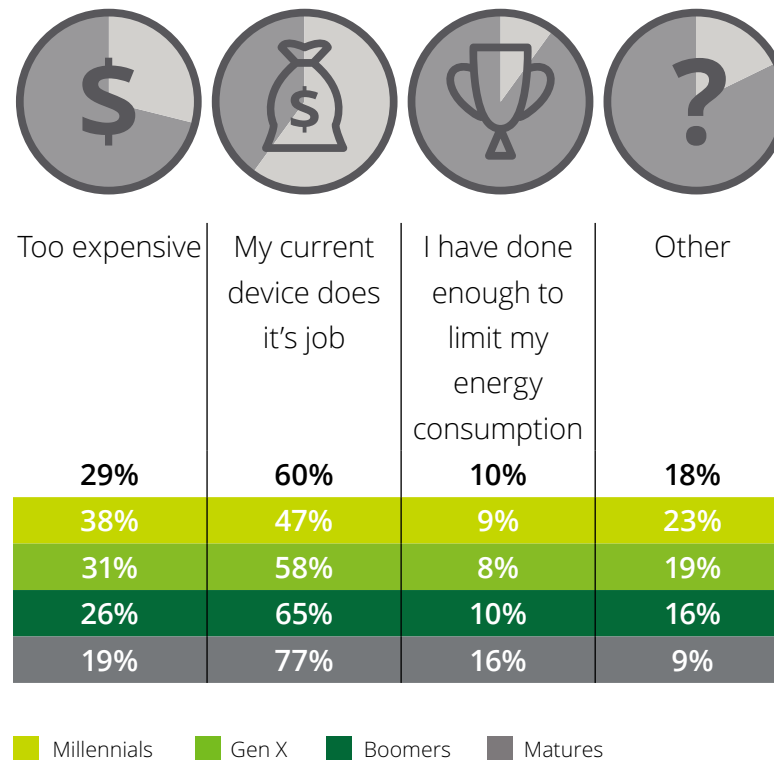
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Providers of smart technologies may need to get wiser about educating residential consumers on the value of their products.

“Smart” technologies are making little progress in winning over residential consumers. Penetration of smart thermostats or home control/automation systems remains persistently low. Only five percent report having a programmable thermostat they can access and change via a smart-phone, up only one point from 2015, and only two percent say they have a home automation system that can be accessed by a mobile device. Just over one in 10 (12 percent) with basic thermostats plan to upgrade to one that can be accessed or changed via a mobile device or to purchase a home automation system in the next year. Why the lack of interest in smart thermostats and home automation systems? Residential consumers largely fail to see the merits of making a move: 60 percent of those who have basic thermostats indicated that they don’t plan to upgrade because their current device does its job, and 29 percent say it’s too expensive.

Figure 11: How can providers turn down the barriers to smart technology?

Barriers to upgrading basic thermostat





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Trust goes a long way: residential consumers continue to look to their electricity provider for good tips on saving energy, AND they are increasingly interested in sourcing additional services from their electricity providers.

Consistent with 2015, more than 8 in 10 residential consumers (82 percent) say they've received good tips on how to save energy. Among those who reported receiving good tips, 69 percent said they got some of them from their electricity provider. This proportion has trended steadily upward from 55 percent in 2013. The growing trust that residential consumers have in electricity providers could open the door for utilities to evolve their business models to offer other services, regulations permitting. Notably, residential consumer interest in sourcing at least one additional service from their electricity providers is growing across generations. About half (48 percent) of residential

consumers indicated they are interested in purchasing energy efficiency services from their electricity providers; the same percentage indicated they are interested in purchasing Internet services from their electricity provider. Thirty-eight percent expressed interest in purchasing cable services, 31 percent telephone services, 25 percent home security systems, and 18 percent home automation systems. Overall, there are a few perceptual barriers to electricity providers providing additional services to residential consumers, including those "behind the meter." Only one quarter of residential consumers said they would not consider sourcing another service from their electricity providers. Among those who are not interested in purchasing any additional service from their electricity providers, 48 percent gave "electricity companies shouldn't be in the business of providing these services" as a reason, down from 55 percent in 2015.



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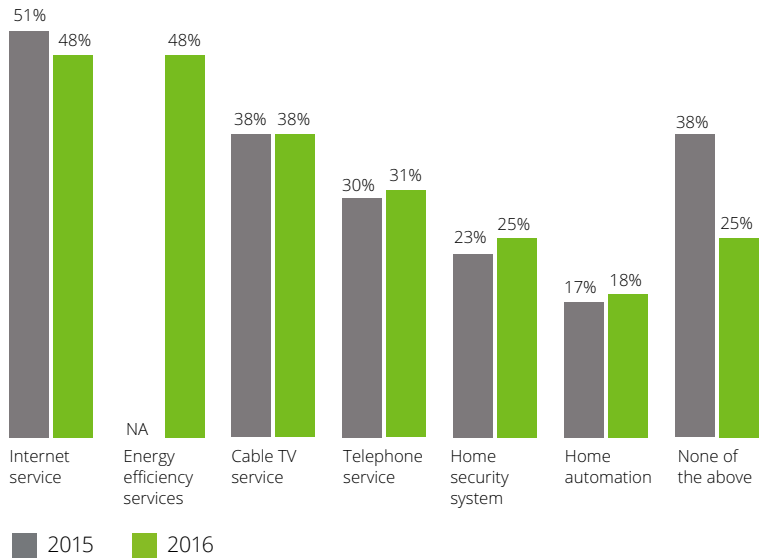
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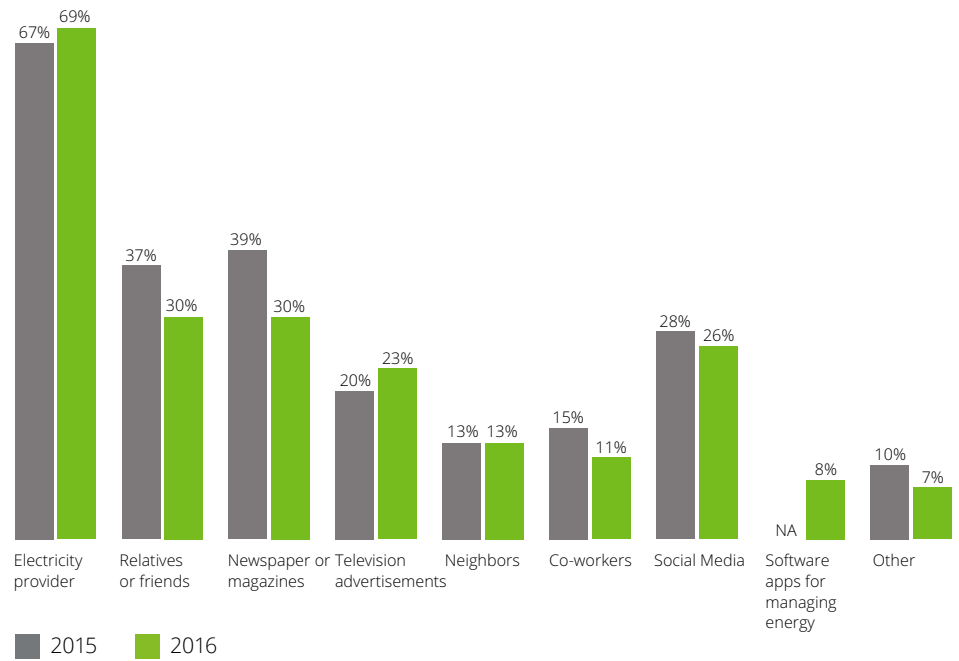
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Figure 12: As trust in their electric utilities grows among residential consumers, so does interest in purchasing additional services

Interest in services from electricity providers



Source of good energy savings tips





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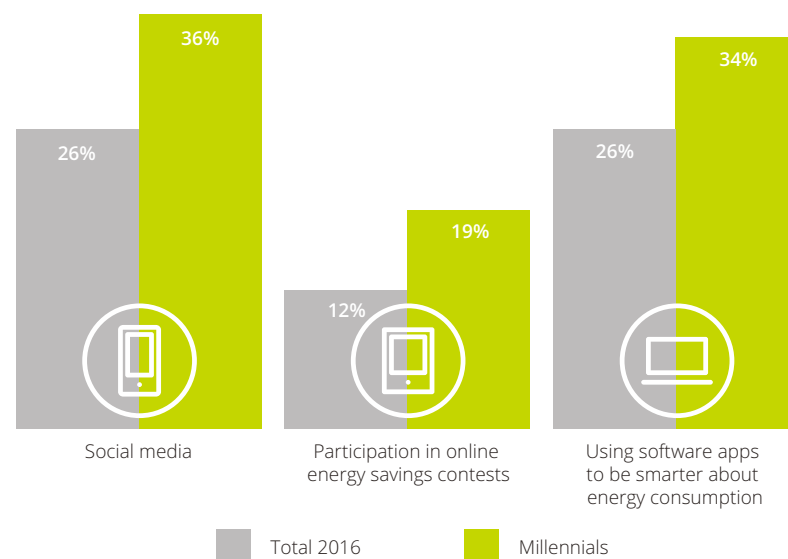
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Millennials are most likely to use social media and digital technology to learn how to manage their energy consumption.

Millennials are the most likely to get tips on saving energy through social media, with 36 percent saying they got some tips that way, compared to 26 percent of residential consumers in general. Participation in online energy savings contests remained on par with 2015 at 12 percent, although this percentage rose to 19 percent among Millennials. They are also leading the way in using energy apps, with more than a third of Millennials (34 percent) saying they use software apps to be smarter about energy consumption. This compares to 26 percent of the general population. As electricity providers contemplate new service offerings, it will also be important to consider the new tools and methods that will be required to connect with their customers. Matthias Kurwig, CEO of Enervee, observed that utilities are just beginning to target their offerings and tailor their approaches to reach different age groups. Figuring out how to engage Millennials will be particularly important for utilities and electricity providers since they represent a large and growing proportion of their customer base.

Figure 13: Tap the app to engage Millennials

Source of tips on saving energy



Enervee is an energy smart-data and commerce platform that connects utilities, retailers, manufacturers, and governments through integrated product rankings and recommendations—distributed via online, in-store, mobile, and social channels. The Enervee Score provides a data-driven and objective way of comparing a product's eco-value including energy consumption, product popularity, and price worthiness, based on industry standards, against all models available on the market. In a recent interview conducted by Deloitte, Matthias Kurwig, CEO of Enervee, noted that his company's experience corroborates the study's findings that residential consumers trust their utilities and this trust is growing. Mr. Kurwig observed that Enervee's utility-branded marketplaces generally show higher rates of engagement than comparable government-branded platforms. He further noted that it takes time to generate awareness about programs among residential consumers within a defined territory.

Business views on energy management



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Introduction

The findings of the 2016 study continued to signal that energy management has become a core business discipline, and businesses showed few indications of backing off their commitments. On the whole, the focus on managing electricity consumption remained front and center, driven largely by the practical need to stay competitive and the growing importance of environmental stewardship. Regarding the latter, environmental motivations trended upward among business respondents as they did with residential consumers in this year's study. Consider the following:

- Eighty percent of businesses view reducing electricity costs as essential to staying competitive from an image perspective, consistent with 79 percent in 2015.

- Seventy-four percent of business respondents say their customers are demanding that they offer more environmentally considerate solutions, up from 66 percent in 2015. After falling to 59 percent in 2014, customer pressure concerning sustainability appears to be rising back toward its peak of 81 percent in 2013.
- Seventy-eight percent of businesses, the highest proportion thus far, now say that they actively promote their environmental efforts to their clients and customers, up a couple of points from 2015.

Competitiveness in terms of financial efficacy also remained a top driver of energy management. Here, 83 percent of business respondents say they view reducing electricity consumption as essential to staying competitive from a financial perspective, up four points from 2015.



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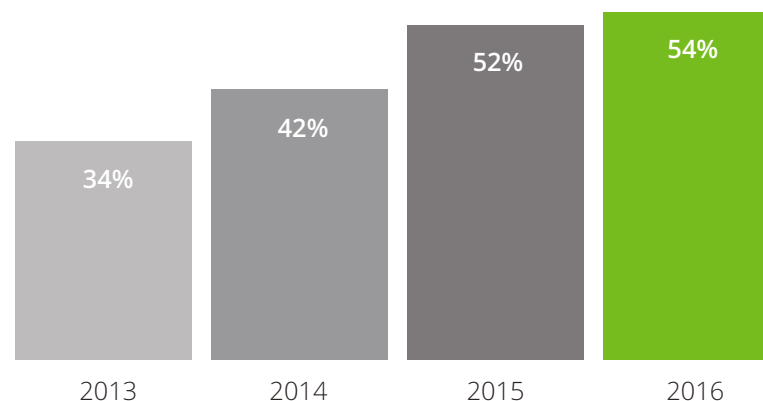
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Businesses not only remain committed to energy management but they are generally feeling good about their accomplishments to date, with more than half (54 percent) characterizing their efforts as extremely/very successful, compared to 52 percent in 2015. However, despite this positive momentum, companies appear to be encountering more challenges in taking their practices to the next level. For example:

- Seventy percent believe that “cutting electricity costs/usage in the future is going to be much harder for their businesses,” steadily rising from 66 percent in 2015, and 62 percent in 2014.
- Even more companies (76 percent) indicated they encountered lots of ‘hiccups’ that were not expected in rolling out new energy management practices to their companies—representing a 10 point increase from 2015.
- As in 2014 and 2015, businesses cited length of payback period as the primary barrier to achieving their resource management goals, with fewer citing staffing or strategic barriers.

Figure 14: Majority of businesses still feel successful in achieving resource management goals

Extremely/very successful



Part of the problem may be that companies are finding it harder to engage the broader organization as they move beyond the low-hanging fruit. For instance, 69 percent agreed/strongly agreed with the statement, “Only a few of us are having a major impact on reducing electricity consumption in our company.” This is up from 65 percent in 2015. Sixty-nine percent also say they have difficulty in gaining acceptance and participation from their employees regarding energy management. This proportion too has steadily trended upward from 56 percent in 2014.



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Many of the questions posed to businesses from the 2014 study onward have been organized around a Capability Maturity Model, which encompasses eight key categories of energy management capabilities. After dramatic growth in the 2015 study, this year's findings indicated that energy management maturity had generally leveled off among businesses, although there were variations according to company size. Enterprise companies advanced their capabilities very little in 2016, while mid-caps showed the greatest gains in maturity, particularly around tying energy management to overall strategy. Smaller companies continue to be the most challenged.

Figure 15: Seven out of ten business respondents believe the climb is getting steeper.

Agree/strongly agree with the statement: Cutting electricity consumption in the future is going to be much harder for my business



FirstFuel is a company focused on information-enabled energy services. Headquartered in Lexington, Massachusetts, the company combines data science, building science, and software expertise, to deliver energy intelligence to utilities and their business customers about how energy is used behind the meter. In a recent interview with Deloitte, Swapnil Shah, CEO of FirstFuel, corroborated the study's findings regarding company size and the maturation of energy management capabilities. Mr. Shah noted that enterprises have become very sophisticated in their energy management capabilities, since many executives must report their progress to a board of directors against predefined metrics, scores, and other criteria. He further noted that mid-caps are getting very active in the energy management space, driven by a combination of three factors: 1) heightened awareness of their energy consumption, as utilities provide them with more-specific and actionable information; 2) their customers are demanding it; and 3) city and state mandates are increasingly forcing businesses to track and report their energy usage. Small companies remain the most challenged because they generally don't think about energy and they are often focused on survival. "Energy management isn't a sexy thing, especially for small businesses," observed Shah. "To reach them, utilities and other providers must translate the benefits into their language." What does this mean? Mr. Shah further explained that reducing the energy consumption of a small business by 10 percent might equate to selling 30 more pizzas per month or 40 more hotel nights. Expressing the value of energy management in these terms is something they'll understand.



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Across the board, companies remain committed to energy management, but they are struggling to see the road ahead. This is particularly the case with enterprises, which had grown in sophistication over the past couple of years and are now employing more focused tactics.

In considering the reasons for the slower rate of maturation among enterprises in 2016, two factors may come into play. The first is persistently low electricity prices, which may be giving companies more breathing room regarding the rate at which they reduce their consumption. Second, companies may be hitting a temporary ceiling, particularly for those that have been in the energy-management game for a few years. As the number of “easy wins” diminishes, getting to the next level will require increasingly focused efforts, greater capital investment, and more time. It will also require increasingly robust tools, such as tracking software and analytics applications, the evolution and deployment of which may not be keeping pace with companies’ commitment to managing their energy consumption. The detailed business findings presented throughout the remainder of this report delve into each of the capability categories as well as discuss the potential implications for companies at differing levels of maturity.

Figure 16: Deloitte Energy Management Capability Maturity Model



Detailed business findings



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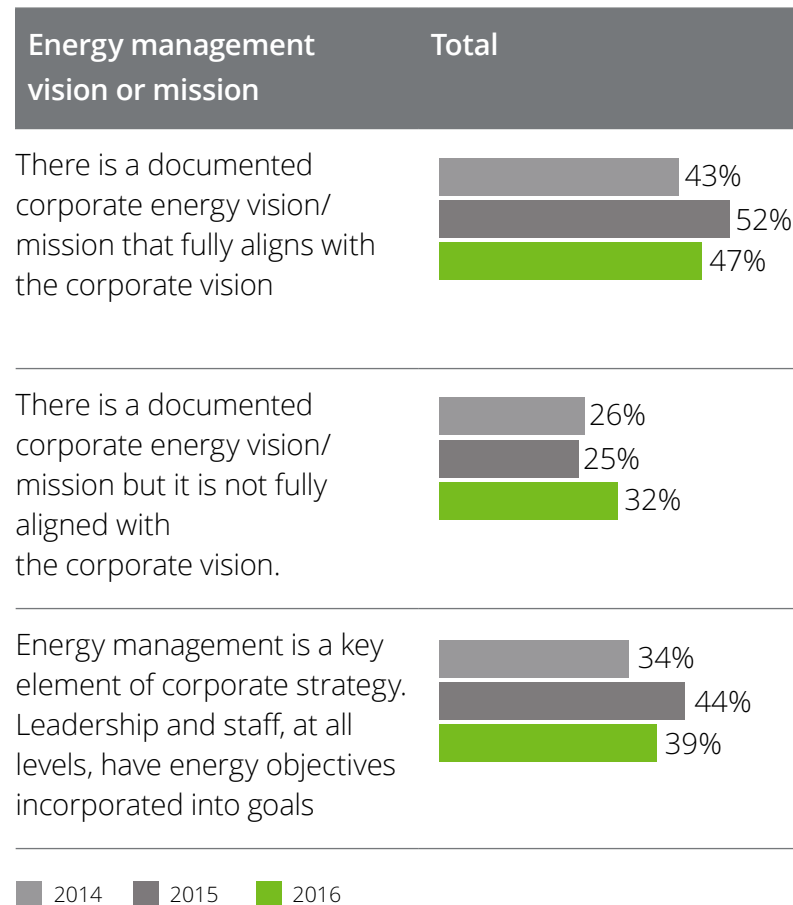
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Vision and strategy

Most businesses have documented energy strategies, but fewer report full alignment with corporate vision.

As in 2015, nearly eight in 10 business respondents (79 percent) said they have a documented energy strategy, but more say this strategy is not fully aligned with the corporate vision. Less than half (47 percent) of businesses in this year's study report having a documented corporate energy vision/mission that fully aligns with the corporate vision, down from 52 percent in 2015. Meanwhile, 39 percent report that energy management is a key element of corporate strategy, down from 44 percent in 2015. This lack of alignment between the energy vision and corporate strategy could be a factor in the difficulties businesses are having in advancing their energy management agendas, particularly in light of the reduced pressure to curb energy consumption mainly as a means to cut costs. In the 2016 study, mid-caps reported greater success in aligning their energy management visions with their corporate strategies. In contrast, enterprises led in 2015.

Figure 17: More businesses say energy vision and corporate vision not fully aligned





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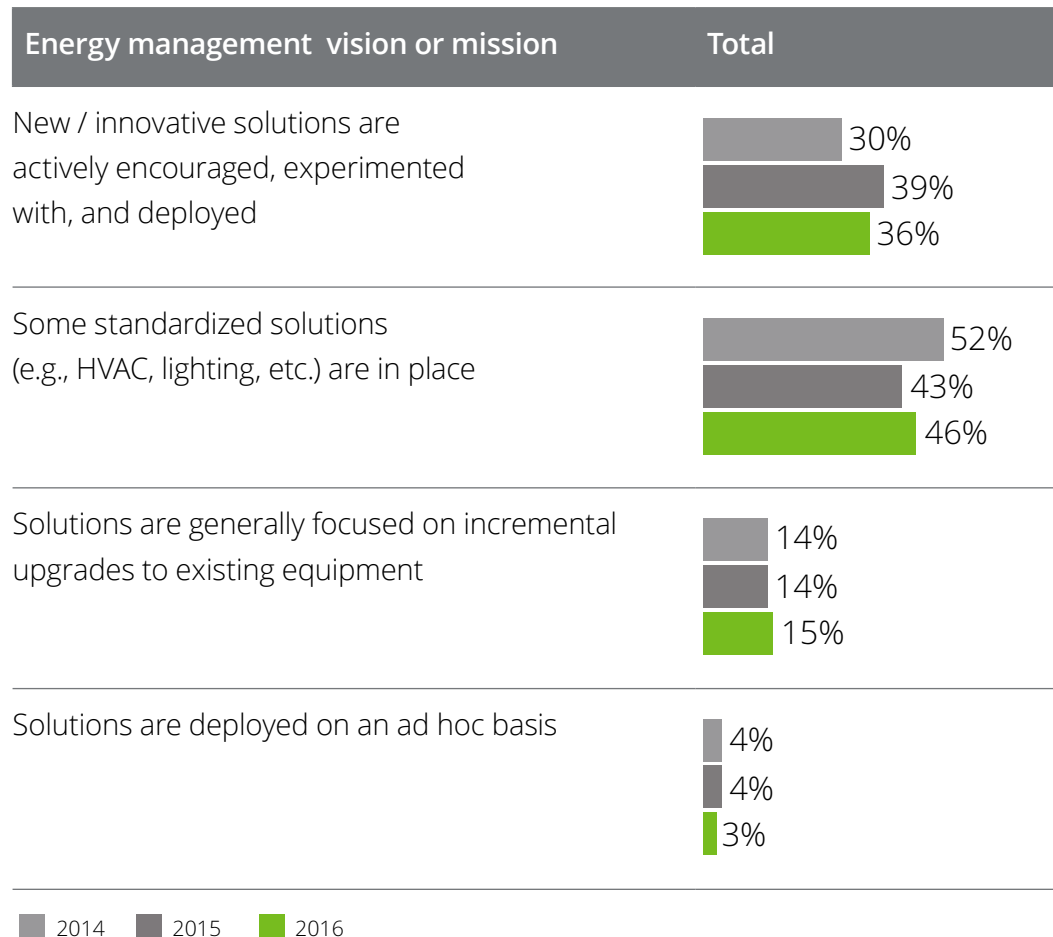
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More companies see their energy management solutions as tried and true, not novel and new.

More companies in this year's survey describe their energy management solutions as standardized, while fewer characterize them as new or innovative. In this year's study, 36 percent of businesses say new/innovative solutions are actively encouraged, experimented with, and deployed, down from 39 percent in 2015. In parallel, 46 percent say they have some standardized solutions in place, up from 43 percent in 2015. As the discipline of energy management continues to mature, perhaps solutions once thought to be novel are now becoming more widely adopted across the business.

Figure 18: Businesses are implementing more standardized solutions





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Goal setting and capital allocation

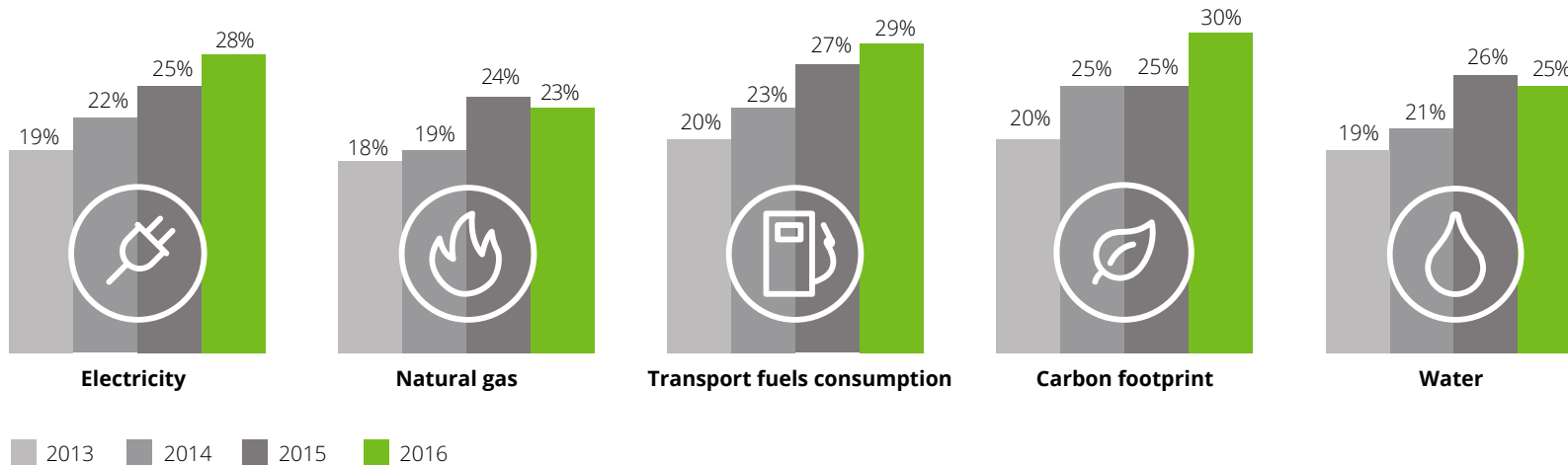
Companies turn up the dial on their resource reduction goals, yet again.

After increasing their targets considerably in 2015, companies raised their resource reduction goals yet again in 2016, but they continued to “keep it real” by giving themselves a little more time to reach their targets. In this

year’s study, companies report giving themselves about 4.7 years on average to accomplish their goals, up slightly from 4.5 years in 2015. In addition, their targeted reduction goals in all areas other than natural gas and water were more aggressive compared to the 2015 study.

Figure 19: Carbon goals are back on the radar; companies raise the bar in most resource categories

Average targeted % reduction



COP 21 captures attention; could breathe new life into carbon goals.

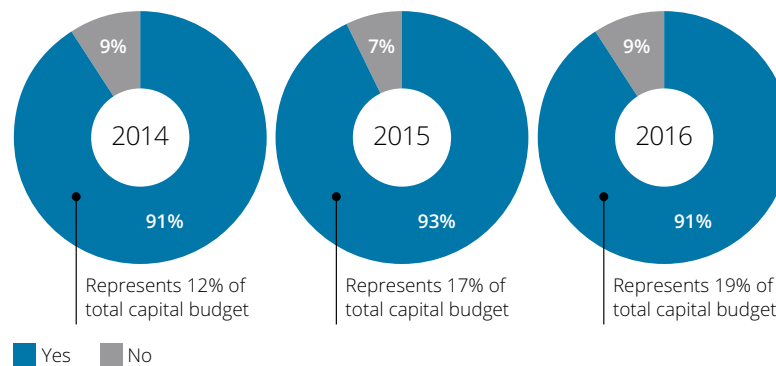
On par with last year, nearly six in 10 report having carbon footprint goals. However, this proportion may be poised to rise. About 60 percent of companies said they were familiar with the United Nations Conference on Climate Change (COP21), and of those familiar, nearly two-thirds (63 percent) said they are planning to review or change their energy management initiatives in response. The financial and health care sectors are more likely to have carbon footprint goals, while health care outranks other sectors on water goals, and technology, media, and telecommunications companies have the highest goals pertaining to transport fuels consumption.

Companies show little sign of easing up on the funding throttle; acknowledge need for more capital-intensive tactics

In the 2016 study, businesses invested an even greater proportion of their total capital budgets in pursuit of their resource management goals. Ninety-one percent

of companies say they have invested funds in energy management programs over the last three years, with these funds representing about 19 percent of their total capital budgets. This may reflect growing recognition among businesses that greater investment in more advanced projects and solutions will be needed to achieve their reduction goals moving ahead. For instance, companies continued to employ more capital-intensive energy management tactics alongside the basics in this year’s study.

Figure 20: Invested funds in energy management over past four years





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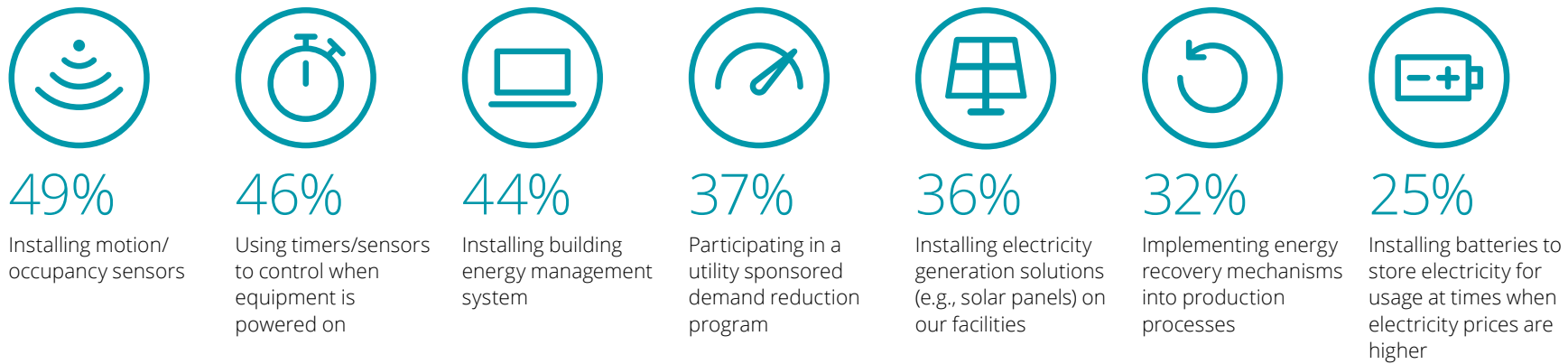
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As in 2015, business said the most popular tactics for reaching their energy management goals are using timers/sensors to control when equipment is powered on (cited by 27 percent of companies), installing building energy management systems (29 percent), and installing motion occupancy sensors (30 percent). Businesses also remained committed to deploying more capital-intensive measures at levels similar to 2015. For example, installing electricity

generation solutions (e.g., solar panels) on facilities was cited by 36 percent of respondents, compared to 39 percent in 2015. Thirty-two percent of businesses reported implementing energy recovery mechanisms into production processes, compared to 34 percent in 2015, and a quarter (25 percent) said they installed batteries to store electricity for usage at times when electricity prices are higher, consistent with 26 percent in 2015.

Figure 21: Businesses deploy capital-intensive tactics alongside the basics in 2016





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Well over half of businesses now have on-site generation, citing multiple reasons for “doing it themselves.”

A solid majority (56 percent) of business respondents say they generate some portion of their electricity supply on-site, consistent with 55 percent in 2015. Of those with on-site generation, 43 percent of their total energy supply is sourced from electricity providers, with the remainder split between on-site cogeneration (15 percent), on-site renewable generation (16 percent), fuel cells (16 percent), and other sources (9 percent). The most commonly cited motivations for doing it themselves include price certainty (37 percent), cost savings (37 percent) and diversity of energy supply (36 percent). As in the 2015 study some sectors are pursuing self-generation goals more aggressively than others. Health care organizations (78 percent) and technology, media, and telecommunications companies (61 percent) are the most likely to generate on-site, perhaps due to the critical nature of their operations.

Figure 22: Businesses have many motivations for on-site generation

Reasons for on-site generation	Total
Price certainty	37%
Cost savings	37%
Diversification of energy supply	36%
Resiliency	29%
To meet sustainability goals	18%
Other	6%



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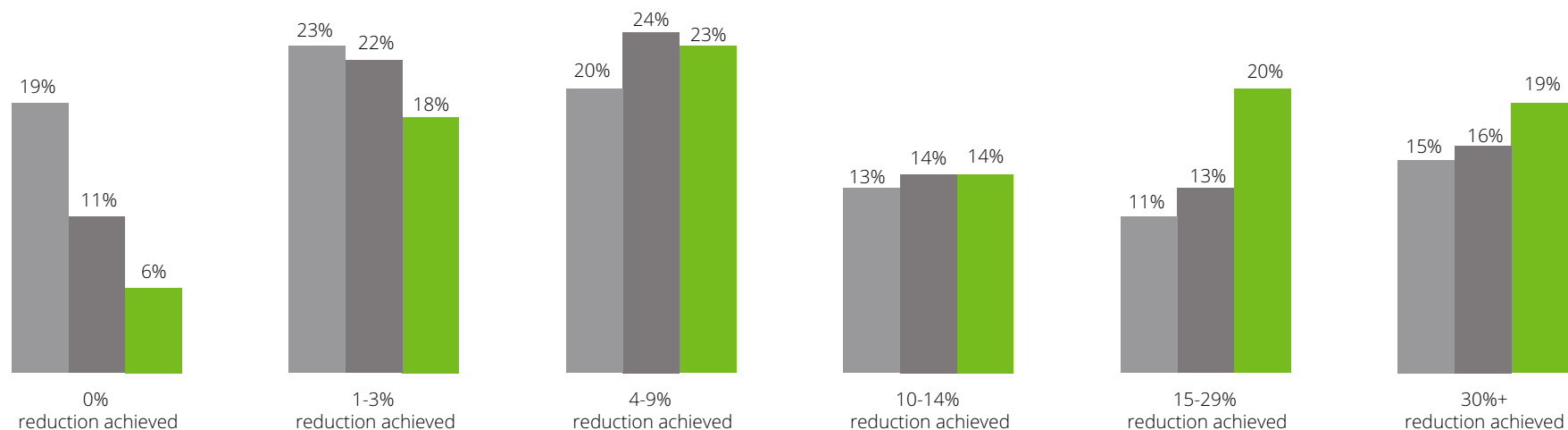
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Year after year, businesses report using less and less electricity, highlighting the success of their ongoing efforts.

In this year's study, businesses reported reducing their electricity consumption by 19 percent on average in calendar year 2015. This compares to 16 percent in calendar year 2014 and 15 percent in calendar year 2013.

Figure 23: Businesses are steadily reducing electricity consumption year over year

Percent electricity reduction achieved



2013
average 15%



2014
average 16%



2015
average 19%



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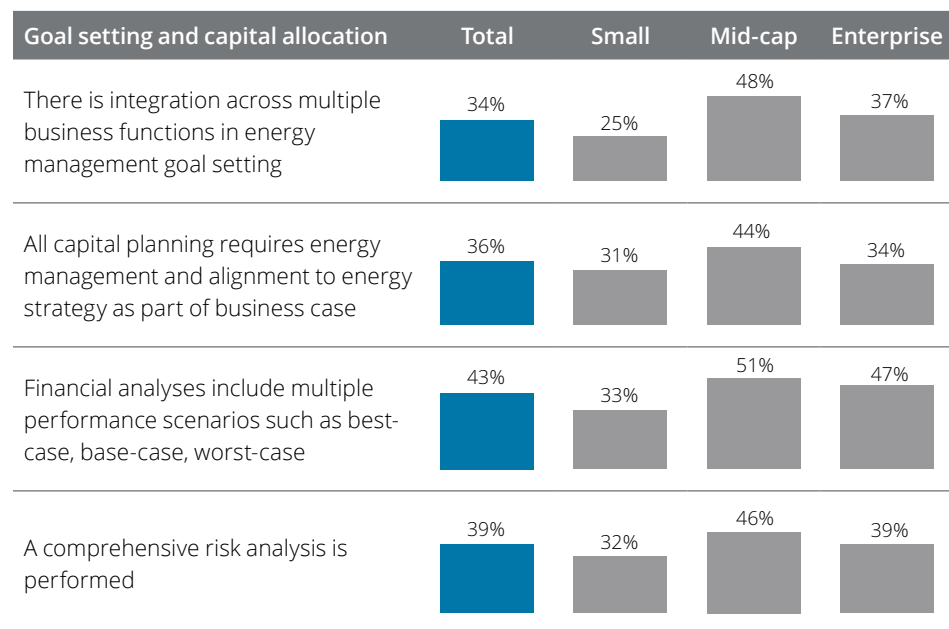
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Consistent with the 2015 study, companies continue to align their investments in energy management with corporate strategy.

More than one-third (36 percent) of businesses require all capital planning to consider energy management implications and alignment to energy strategy as part of the business case, consistent with 2015. The average payback period required for investments in energy management programs is on par with 2015 at about four years. Over the last year, mid-caps had the most success in tying investments in energy management to the overall corporate strategy/business case. Forty-four percent of mid-caps say they require all capital planning to consider energy management implications and alignment to energy strategy as part of the business case, compared to 31 percent of small caps and 34 percent of enterprises.

Figure 24: Mid-cap companies make the most progress in tying investments in energy management to overall corporate strategy/business case

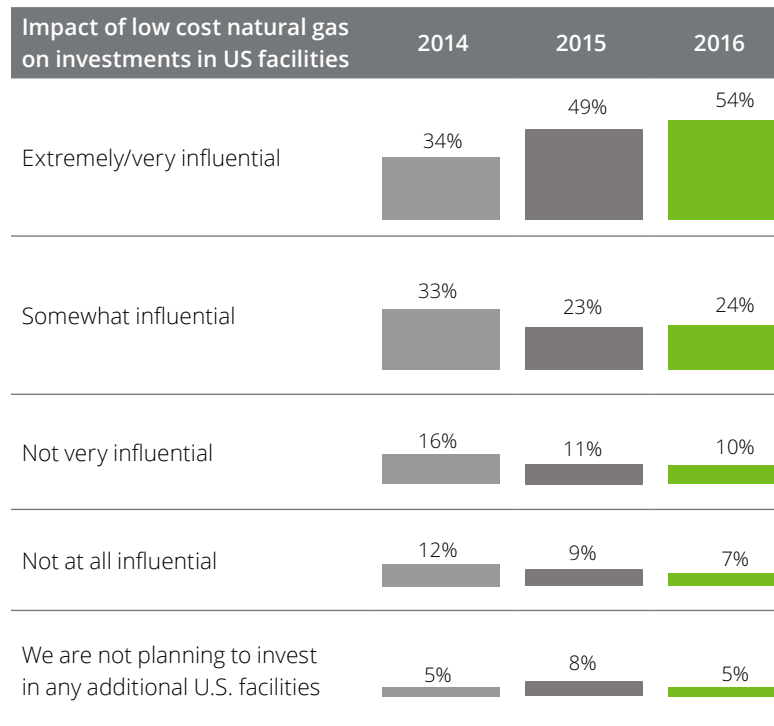


Low natural gas prices offer an example of how energy prices can affect corporate energy management strategy.

More than half (54 percent) of businesses rate the low cost of natural gas as being an extremely/very influential factor in their decisions to invest in additional facilities in the US. This proportion has steadily risen upward from 49 percent in 2015, and 34 percent in 2014. According to a recent report by IHS, manufacturing sector production in the US has increased significantly across several sub-sectors from 2013-2015. This increase, the report suggests, is largely due to a surge in domestic natural gas production, spawned by advances in accessing unconventional shale-gas deposits. This abundance of shale gas has led to lower natural gas prices and, subsequently, electricity prices that are significantly lower than they otherwise would have been. The effect of this “low cost of energy” has been especially positive not only in natural gas intensive sectors of the US economy but also in those that use large amounts of electricity. Interestingly, business respondents in the 2016 study believe these favorable pricing conditions will last. Twenty-seven percent of respondents expect electricity prices to increase three to five percent cumulatively over the

next 24 months, while 43 percent expect them to increase even less than that, to remain stable, or to even decline—up 10 points from 2015.

Figure 25: Lower cost of natural gas has growing influence on decisions to invest in additional US facilities



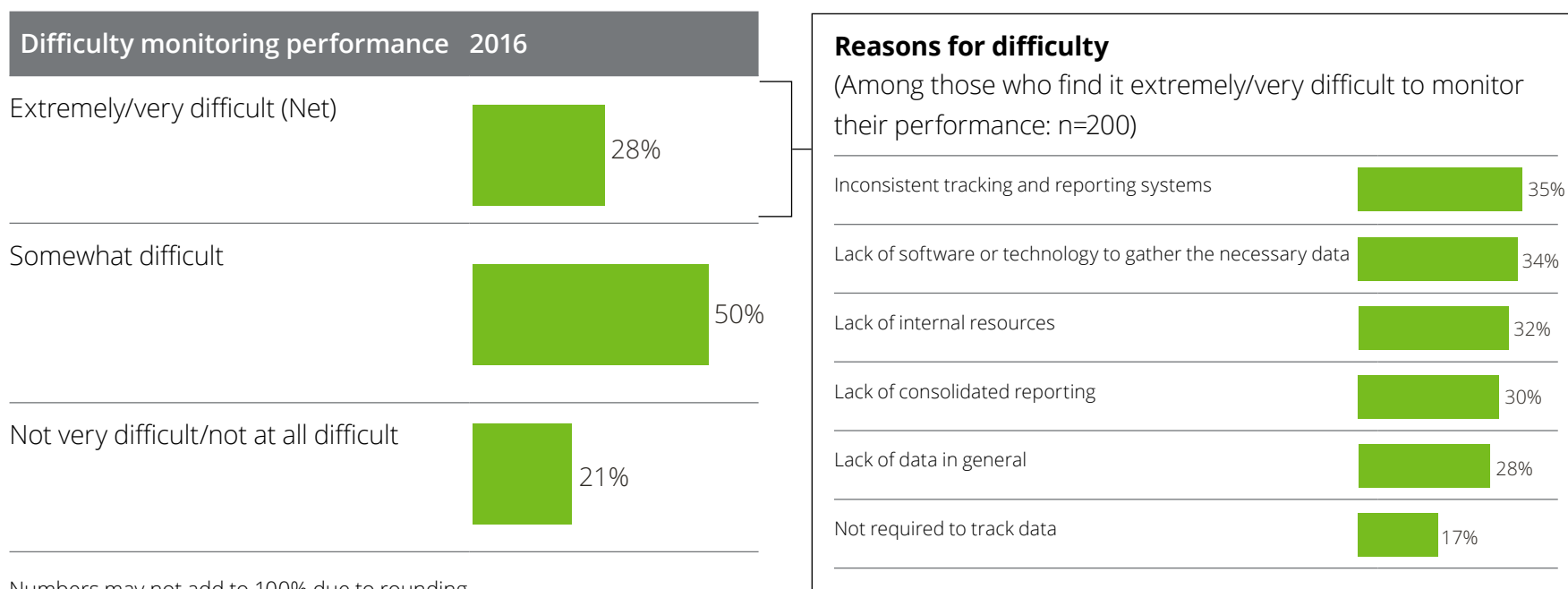
Program measurement and management

Are we there yet? Businesses still say it's hard to tell.

With respect to energy performance measurement, companies displayed similar maturity levels as in 2015, with a slight shift toward more standardized processes. As their initiatives become more complex, companies of all

sizes continue to find it difficult to monitor performance against goals, with 28 percent indicating it is extremely/very difficult to do so. This compares to 27 percent in 2015 and 20 percent in 2014. Inconsistent tracking and reporting systems, lack of software or technology to gather data, and lack of internal resources emerged as top barriers to further maturity in monitoring performance against goals.

Figure 26: Companies still face barriers in measuring performance of their energy management initiatives



Numbers may not add to 100% due to rounding.



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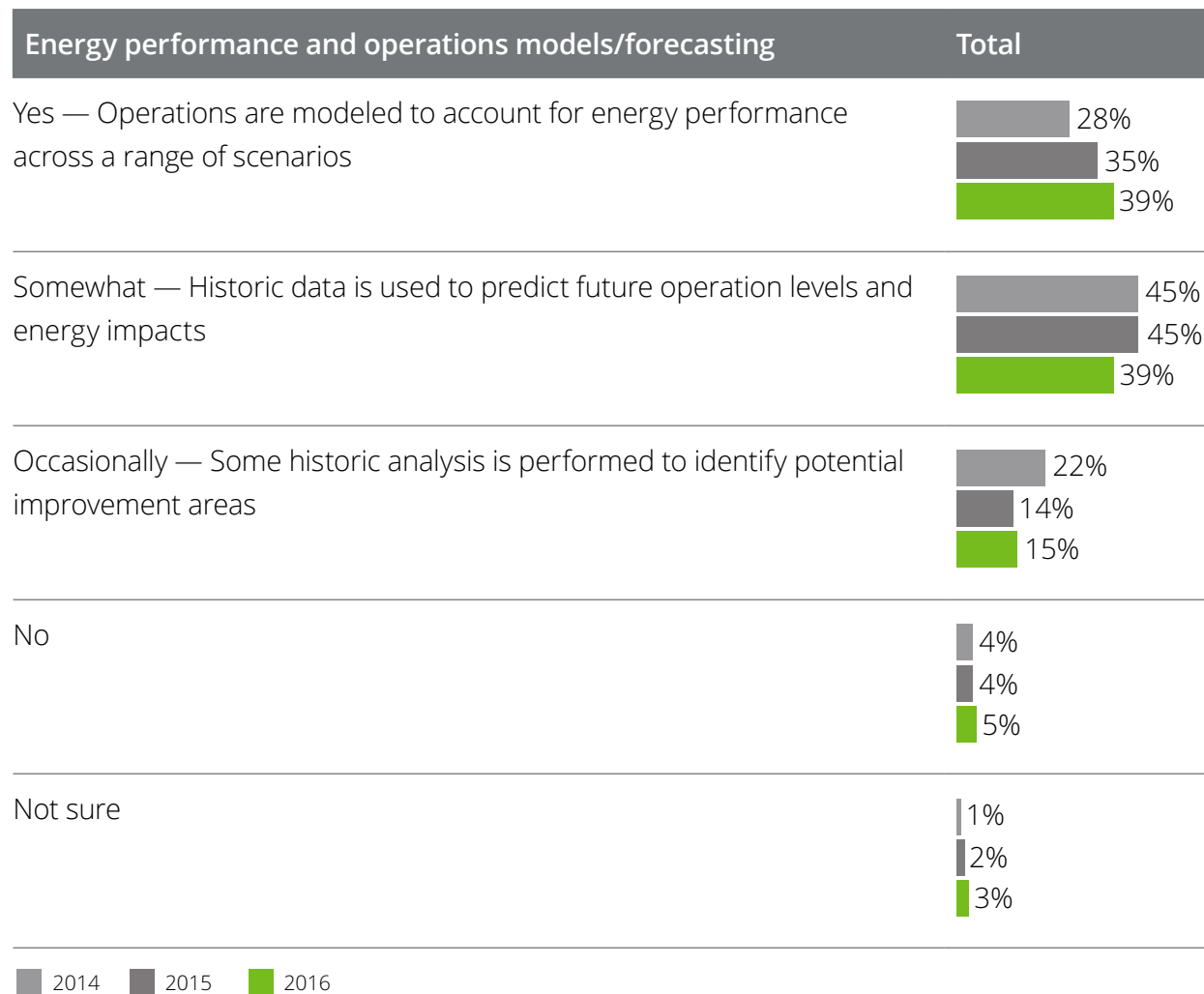
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Demand and operations management

Companies have become more mature in incorporating energy management into the different aspects of their businesses.

More than one-third (39 percent) of business respondents say they model their operations to account for energy performance across a range of scenarios, up from 35 percent in 2014. Twenty-nine percent said they incorporate energy as a key planning parameter in operations and inventory planning, on par with 30 percent in 2015. Consistent with other maturity metrics, mid-caps posted the greatest maturity gains in demand and operations management, with more than half (52 percent) now reporting they model their operations to account for energy performance across a range of scenarios.

Figure 27: More companies are incorporating energy into operational modeling



Businesses give the green light to procuring more electricity from renewable sources.

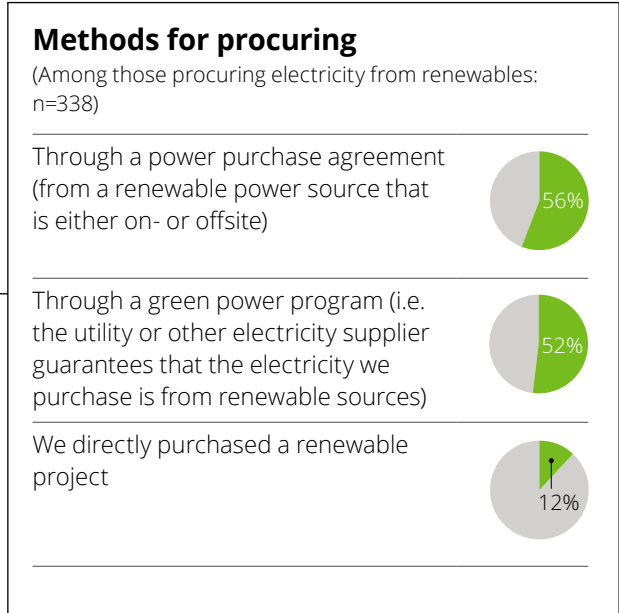
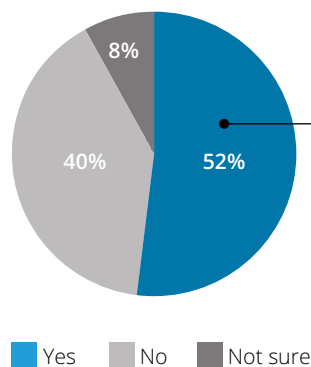
More than half (52 percent) of businesses say they are working to obtain more electricity from renewable sources, and their efforts go beyond increasing self-generation. Of those that are procuring electricity from renewable sources, 56 percent say they are doing it through PPAs, 52 percent through green power programs, and 12 percent by directly purchasing a renewable project. These findings align with those outlined in Deloitte’s recent report, [Trends to watch in alternative energy](#). As noted in the report, corporations are “going all-in” on renewable energy, whereby companies such as Apple Inc., Intel, and Kohl’s are leading a movement among major corporations to generate all of their energy from renewables in the next two decades.ⁱⁱⁱ This movement is driving record-breaking PPA activity, and creating big opportunities for renewable developers. In 2015, corporations signed PPAs for large-scale, off-site renewables covering 3.44 GW of power, up from 1.2 GW for all of 2014.^{iv} As companies become more focused in their energy management efforts, procuring electricity directly from suppliers increasingly makes sense, particularly to enterprises that have considerable experience and buying clout. For instance, in one of the biggest renewable energy deals outside of the utility sector so far, Google plans to buy

electricity from wind and solar farms worldwide that have a combined capacity of 842 MW.^v

In a recent interview conducted by Deloitte, Suvi Sharma, CEO of Solaria, commented on the remarkable growth of renewables in the commercial and industrial space. “Adopting renewables isn’t political; it’s practical,” stressed Mr. Sharma. He further explained that the reason corporations are developing and/or purchasing so much renewable generation capacity today is because they can kill two birds with one stone: cost reduction and being green.

Figure 28: Businesses look to purchase more renewable power

Working to procure more electricity from renewables





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Based in Fremont, California, the Solaria Corporation produces technological innovations through a product portfolio which includes building glass that allows visibility while simultaneously generating solar power and reducing solar gain, and greenhouse glass that promotes plant growth while at the same time creating solar power. In a recent interview conducted by Deloitte, Suvi Sharma, CEO of Solaria, spoke to the small, but growing, movement toward net-zero-energy buildings, whereby a structure produces as much energy as it consumes over the course of a year. While only a handful of net-zero energy buildings presently exist in the US, this market is starting to expand due to advances in construction materials, energy efficiency technologies, and renewable energy systems, such as Building-integrated Photovoltaic systems. Whether attempting to attain net-zero-energy status or simply to heighten the overall energy performance of a new structure, Mr. Sharma noted that two types of organizations are leading the way in this space: high-tech companies, which are primarily motivated by progressive social values and aggressive sustainability goals; and government organizations, which are increasingly motivated by state and federal energy mandates.



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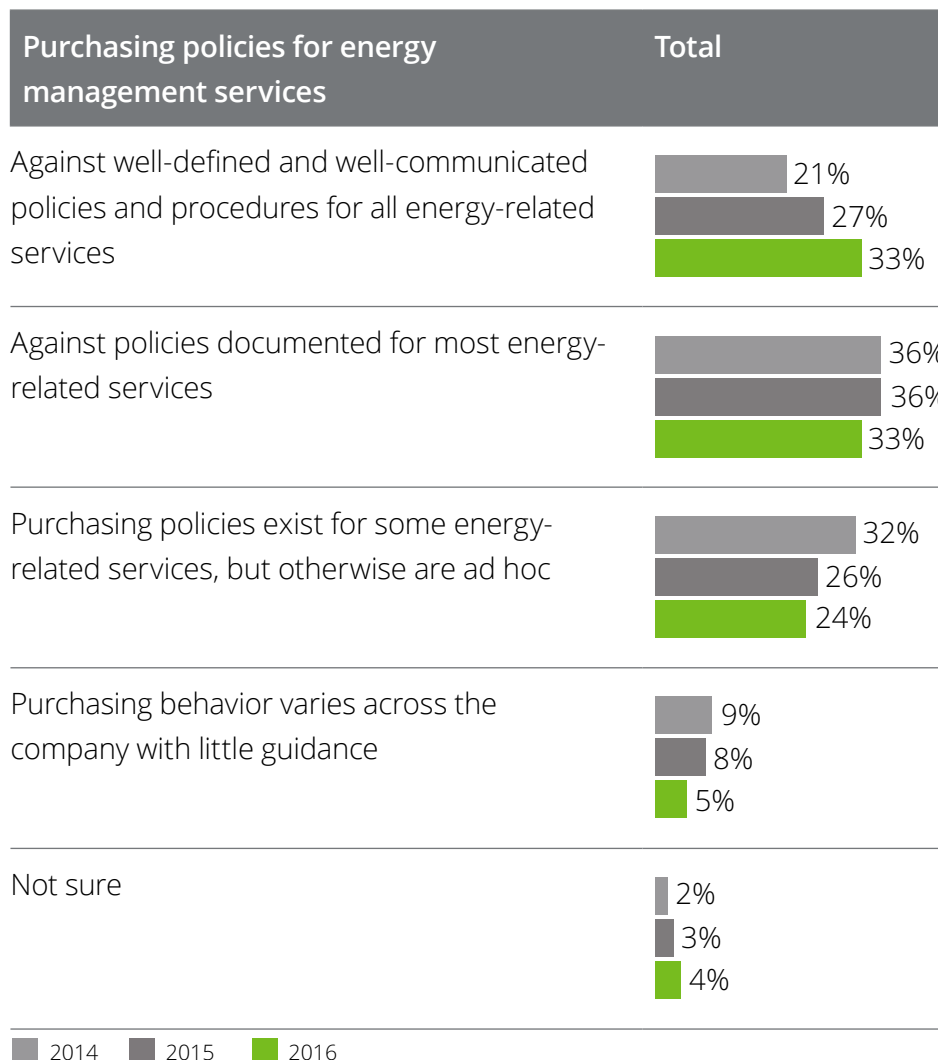
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Supplier and contract management

Companies continue to tighten up their procedures for procuring energy management services and tracking supplier performance.

Up five percentage points from 2015, 33 percent of respondents indicated they evaluate all of their purchases of energy supply and related services against well-defined and well-communicated policies and procedures. Sophistication in tracking supplier performance remained on par with 2015, with one-third saying they have KPIs in place for all energy-related suppliers enterprise-wide.

Figure 29: Companies are staying on top of energy-related procurement



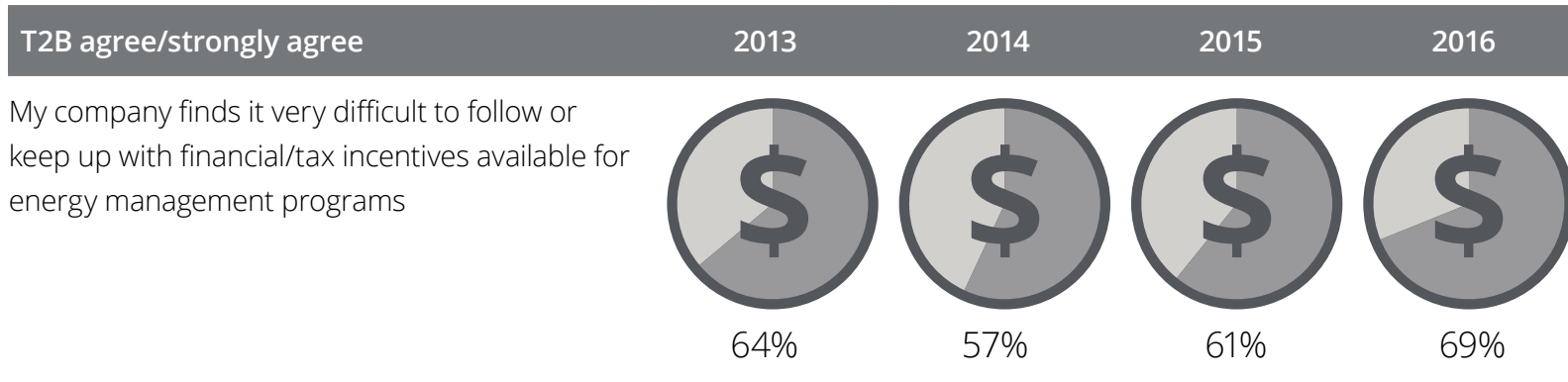
Cost and risk management

Companies continue to monitor energy spend closely, but may be leaving more money on the table than ever before.

Forty percent of respondents indicated they track energy spending for all corporate entities and energy types on a monthly basis, compared to 38 percent in 2015. Consistent with the previous point, businesses find it hard to measure

actual performance versus efficiency goals, and despite the attention paid to managing their energy spend, companies may be leaving more money on the table than ever before. Additionally, 69 percent say they have difficulty in following or keeping up with financial/tax incentives available for energy management programs, up from 61 percent in 2015. Why such a big increase? Complexity may be the culprit, as companies expand the scope of their initiatives and integrate more capital-intensive tactics.

Figure 30: Companies are likely missing opportunities to claim tax incentives and improve ROI





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Governance and culture

Companies increasingly face challenges in gaining employee buy-in.

Although more have formal programs in place to engage employees across the organization in energy management, 69 percent of companies in this year's study indicated they have difficulty gaining acceptance and participation from their employees regarding resources management, compared to 60 percent in 2015. Companies are countering this resistance with more formal efforts: 40 percent report their companies have corporate programs for employees at all levels (i.e., all employees are engaged and are capable of identifying opportunities), up from 34 percent in 2015. Three in 10 link energy management goals to performance metrics and compensation, consistent with 2015.

Reporting, systems, and tools

See the problem? Despite better access to energy data, companies lack advanced analytics capabilities and insight into how to improve.

Businesses made some gains in improving visibility of energy data across the organization, but lack of fit-for-purpose tracking software, advanced analytical tools,

and effective technology to support managing electricity consumption remains a challenge. Thirty-one percent of business respondents indicated that high-quality energy data and data management exists across the company, compared to 28 percent in 2015. More executives in this year's study (39 percent) report that they have online access to energy management data across the enterprise with drill-down capability, compared to 34 percent in 2015. In spite of these gains, the question remains: what can they accomplish with this data? Seventy-two percent report that advanced analytical tools are not deployed across the company, remaining virtually unchanged from 73 percent in 2015. While data from sensor and meter data infrastructure have improved, executives are not yet taking full advantage of the insight provided by these data to unlock business value. Vladi Shunturov, president and founder of Lucid, corroborated this point. He explained that the market is dominated by point solutions, which are particularly the case within corporate real estate and owner occupied buildings. Amid a fragmented application landscape, building owners are challenged to obtain practical information from multiple, disintegrated data streams. And, many are forced to work with several different software vendors in an effort to make sense of all of the data that are available to them.



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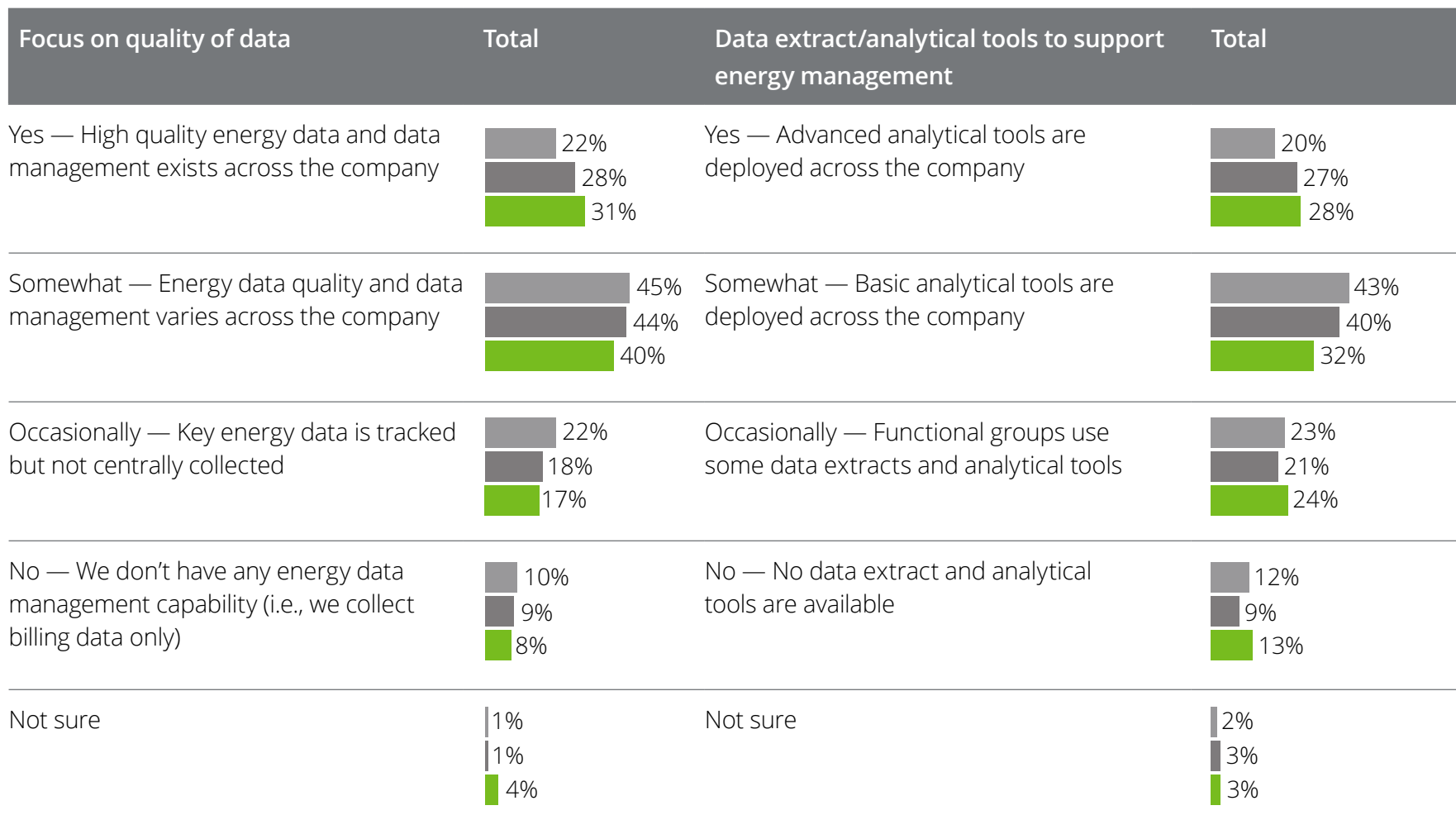
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Figure 31: Analyze this: more have access to high quality energy data, but most still do not have access to advanced analytical tools



■ 2014 ■ 2015 ■ 2016



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Of note, satisfaction with existing software solutions has declined since last year (2015). Two-thirds of companies still report using spreadsheets (at least in part) to track their energy management efforts, while about one-third said they have a custom-developed system. Meanwhile, only two percent reported using a third-party tool, dropping from five percent in 2015. Of those that use custom-developed software or a third-party tool, fewer companies are satisfied with them. Sixty-one percent report that their software has served them extremely/very well, falling from 66 percent last year (2015).

The dissatisfaction with current tools extends to technologies designed to support managing electricity consumption. Nearly three-fourths (72 percent) said the “smart technology” designed to help reduce electricity consumption is not that effective for their companies’

circumstances, up from 64 percent last year. Seventy percent indicated the technology available today is inadequate to be very helpful in managing their companies’ electricity consumption, up 13 percentage points from 2015. This sentiment about available energy management technology was consistent across sectors.

Collectively these results suggest that companies are either not keeping pace with leveraging available technology or the technology itself is not keeping pace with the growing sophistication and complexity of companies’ energy management efforts. For many companies, “off the shelf” software is not likely to be the answer to their growing need for the collection and analysis of data. Organizations aspiring to drive to the highest levels of energy efficiency must strive to meet this need with a combination of in-house or third party analytic skills and technology.

Headquartered in Oakland, California, Lucid uses data, analytics, and insights to support portfolio-wide energy management programs. Vladi Shunturov, founder and president, shared his thoughts on the state of reporting, data systems, and tools in a recent interview conducted by Deloitte. “Building owners are still running their buildings and their businesses on spreadsheets–this is the biggest challenge and opportunity of this industry,” observed Mr. Shunturov. The reason being, today’s highly sophisticated buildings, many of which are equipped with smart technologies, are producing data streams at an incredible pace. Most organizations lack the tools or capabilities to derive practical and actionable insight from these data to improve their building and operational efficiency. Mr. Shunturov believes the answer resides in modern software-as-a-service (SaaS) offerings, which combine multiple data streams and present actionable insights to business users in finance, sustainability, and energy management, as well as owners and investors.

Concluding thoughts

In the 2016 study, both residential consumers and businesses remained steadfast in their commitments to energy management and continued to progress toward their goals, even as persistently low electricity prices gave them less motivation to do so from a financial perspective. This reinforces the notion that the impetus for energy management continues to extend well beyond cost. Environmental concerns trended upward in this year's study as a motivation for remaining committed to energy management. And, as solar and wind power enter the mainstream as a practical and increasingly cost-effective option for generating electricity, both residential consumers and businesses have little reason not to explore procuring electricity generated from renewable resources in some way, either by purchasing it through a provider or through self-generation. The same holds true for energy efficiency technologies, which are increasingly becoming more affordable and seamless, often being built into new products such as electronics, appliances, home heating and cooling systems, and vehicles—all of which routinely consume much less fuel or electricity than older models.

On the residential consumer side, a motivational trifecta of environmental sensitivity, practicality, and affordability is inspiring continued resourcefulness when it comes managing energy consumption. Millennials are leading the way in most aspects of energy management. They are more concerned about shifting to cleaner sources of energy, more willing to pay for this shift through a surcharge in their electricity bills, and they're more responsive to incentives for saving electricity and purchasing related technologies. This points to growing opportunities for utilities and providers of energy-related technologies and services as this age group increasingly purchases homes, vehicles, appliances, and more. It also suggests that ignoring Millennials could be perilous, as they more fully embrace their newfound purchasing power as the largest living generation in the US.



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On the business side, lower energy prices, both for natural gas and subsequently electricity, are giving companies more breathing room. The pressure to manage their energy consumption simply as a way to cut costs has diminished. Today, however, the impetus to be resourceful is coming from a different direction: their customers are demanding greater environmental stewardship, and containing electricity consumption remains an essential aspect of staying competitive from an image standpoint. Companies generally believe they are on course to meet these demands and they are feeling successful about their energy management efforts to date. However, as they employ more focused tactics and increase the scope of their initiatives, businesses are struggling to see the road ahead. This is likely due to less low-hanging fruit, more complexity, and greater capital-intensity, which have collectively exposed a deficit in companies' capabilities. Either they still do not understand how available software solutions can help them set energy management goals and track their performance towards them, or the tools they require do not exist. Furthermore, while they have matured in their ability to access energy data, businesses largely do not have the advanced analytical tools and skills needed to capitalize upon it.

What does this mean for electricity providers?

Residential consumers continue to trust their electricity providers, and this trust appears to be growing. They also showed greater receptivity to electricity providers providing services behind the meter. This may represent opportunities for electricity providers to expand their offerings in an effort to offset declining traditional electricity demand. Moving forward, appealing directly to Millennials will become increasingly important. Electricity providers will need to "speak their language" and understand the distinct motivations and buying behavior of this powerful generation, the members of which represent their future customers.



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What does this mean for businesses?

Businesses that have been in the energy management game for a while are acknowledging that much of the low-hanging fruit has been picked. Thus, they are becoming more focused in their energy management tactics, allocating more capital toward deploying them, and giving themselves more time to achieve their goals. It seems that the road ahead is not only getting tougher but also less obvious. Experienced companies need to obtain a more data-driven, robust picture of what's happening across the operation in order to target their next investments and continuously improve. However, many do not have suitable tools for tracking and analyzing energy data, nor do they have the skills within the business or the data science capabilities needed to leverage the tools and interpret the analyses. This means that businesses will need to further develop their data analytics capabilities if they are to take their energy management efforts to the next level. It also highlights an opportunity for solution providers who can help businesses to fill this "insight gap."

What's next?

The 2016 Resources study indicated that energy management continues to move forward, carefully navigating headwinds in the form of low energy prices, which lessen the immediate need to curb consumption as a means to cut costs, and a steeper hill to climb in terms of investment and effort. What's next if these headwinds continue or if they abate?

How can you leverage the Deloitte Resources 2016 study?

Deloitte has designed this study to be a living tool to assist companies with their business decision-making. The expansive database developed through the study allows Deloitte to guide companies in examining the study's findings in much greater depth and from many vantage points. For electricity providers, the data can be used to develop a deeper understanding of customer motivations and priorities. For businesses in all sectors, the Capability Maturity Model 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.

Endnotes

- i United States Census Bureau, “Millennials Outnumber Baby Boomers and are Far More Diverse, Census Bureau Reports,” April 25, 2016, <https://www.census.gov/newsroom/press-releases/2015/cb15-113>
- ii IHS Economics, “The Economic Benefits of Natural Gas Pipeline Development on the Manufacturing Sector,” Prepared for the National Association of Manufacturers, May 2016, pgs 35 & 35.
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Suvi Sharma, CEO, Solaria

Vladi Shunturov, President and Founder, Lucid



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