SMART ENERGY DECISIONS RESEARCH

STATE OF DISTRIBUTED ENERGY RESOURCES STUDY

SPONSORED BY nrg



A Note from NRG

It's becoming increasingly clear that businesses, institutions, and communities want to take control of their energy supply, and technology and regulation have evolved to allow them to do so. In competitive energy markets, customers can choose their own suppliers. And everywhere in the U.S. customers have the option to employ onsite energy in the form of distributed energy resources (DERs).

DERs improve power reliability and quality, while helping facilities meet their budgetary and sustainability goals. But managing DERs can be complex, so it's important to consider the best way to embark on this journey. We suggest that you begin by answering these five questions:

1. How large are your energy costs relative to the rest of your cost structure?
2. Does your operation have the flexibility to reduce energy during peak demand periods?
3. What might power outages cost your business, taking into account loss of sales, product, service, or processes?
4. Do you have dedicated resources that can respond to changes in the energy market and manage sustainable supply?
5. Are you working with multiple energy providers and have you determined what this costs you? Have you looked into the efficiency and cost savings of consolidating your effort with a single sophisticated provider?

After answering these questions, chances are you will conclude that DERs offer value, but they may be a lot for you to tackle alone. And working with a range of vendors also lacks appeal, given that each is apt to focus on their own narrow technology without a view into the interplay of DERs and their influence on the rest of your energy operation.

Partnering with a sophisticated provider can help. At NRG, we leverage our full range of capabilities and deep market experience to bring a single, cohesive, intelligence to your approach. We are experts in energy supply, demand management, sustainability, billing, and DERs. Taking all of these elements into account, we implement a DER strategy — from planning through operation and maintenance — tailored to your goals. We handle the complexity; you reap the benefits.



Introduction

Over the past several years there has been a transformational shift in how power is generated and delivered to commercial, industrial, institutional, and government/municipal customers. Distributed Energy Resources (DERs) have growing appeal in part because of the broad array of technologies available to generate power at or near the point of use, often with a significant cost savings. Smart Energy Decisions fielded its second annual Distributed Energy Resources Study to explore the usage, consideration, drivers, and barriers for DERs among these large electric power users.

Several themes became apparent as we examined the results of the study:

1. Customers are increasingly expressing interest in taking control of decisions regarding how and where they get their power. Additionally, they do not expect to spend capital to get it and are looking for real value in new deployments.

2. DER choices are plentiful and the technologies that enable them are complex. In many cases, how to select the best, most cost-effective option for onsite power to meet their specific needs is unclear to many and often requires guidance from experts.

3. Customers are considering a variety of models to deploy DERs, moving from owning and operating their own assets to partnering with outside suppliers, including more sophisticated energy providers such as DER product and service providers and ESCOs. These customers may benefit from a single partner for both supply and demand.

4. DERs are seen as a way to mitigate the effects of power outages. With resiliency and reliability as top concerns, having a back-up power source during a primary grid emergency has become a factor in power management decisions.

5. DERs can be an effective means to achieve renewable and sustainability goals, as meeting these targets are a driving force for more and more organizations.

Read on to understand the status of the industry today and where it could be headed tomorrow.



Executive Summary



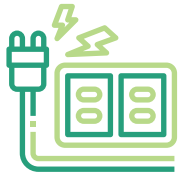
1.

Customers want the independence and control to choose their energy source. This requires a more holistic approach when planning a distributed generation future. Top challenges are cost and economics of implementation.



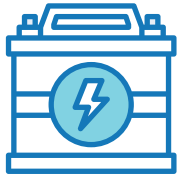
2.

A DER partnership model where products and services are provided by a single source is heavily favored. Successful relationships will be collaborative and have the multiple components of product knowledge, market savvy, and technical know-how.



3.

There is room for growth in the effective deployment of DERs. A majority of respondents report less than one-third of their load is currently offset by distributed energy.



4.

Even as resiliency concerns grow, few perform risk analysis, have not calculated the actual costs associated with outages, and do not know the true impact on their business.



5.

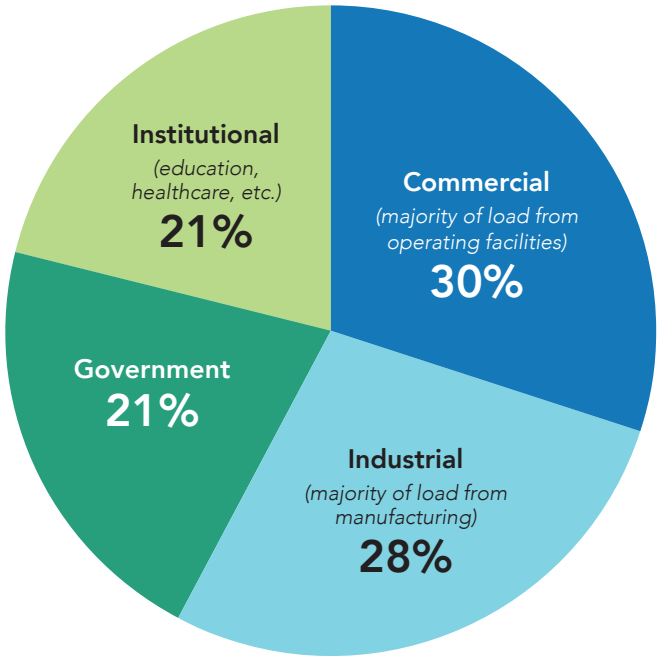
Emissions reduction and sustainability goals have emerged as a leading driver for DER adoption.

Methodology

An electronic survey was fielded to Smart Energy Decisions readers in June and July, 2020. A total of 102 responses, representing energy, sustainability, and facility executives at unique organizations indicating some level of interest in Distributed Energy Resources (DERs) were included in the final tabulation of results.

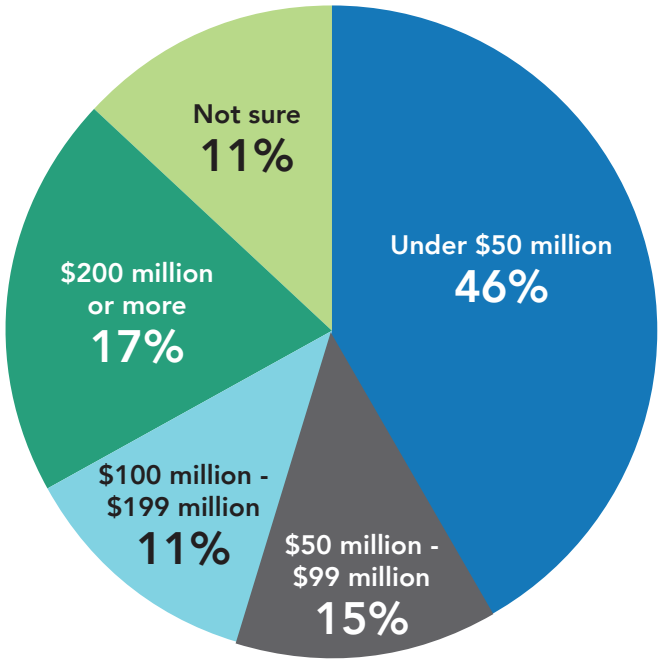
Among the distributed energy resources included in this study are: Onsite solar, EV charging infrastructure, Demand response, CHP/ cogeneration, Energy storage, Natural gas generators, Fuel cells, Microgrids, and Biomass.

TYPE OF COMPANY



Q. Which of the following best describes your type of company?

ANNUAL ELECTRICITY SPEND



Q. What is your company's annual electricity spend?

SMART ENERGY DECISIONS RESEARCH

SmartEnergyDecisions.com

nrg

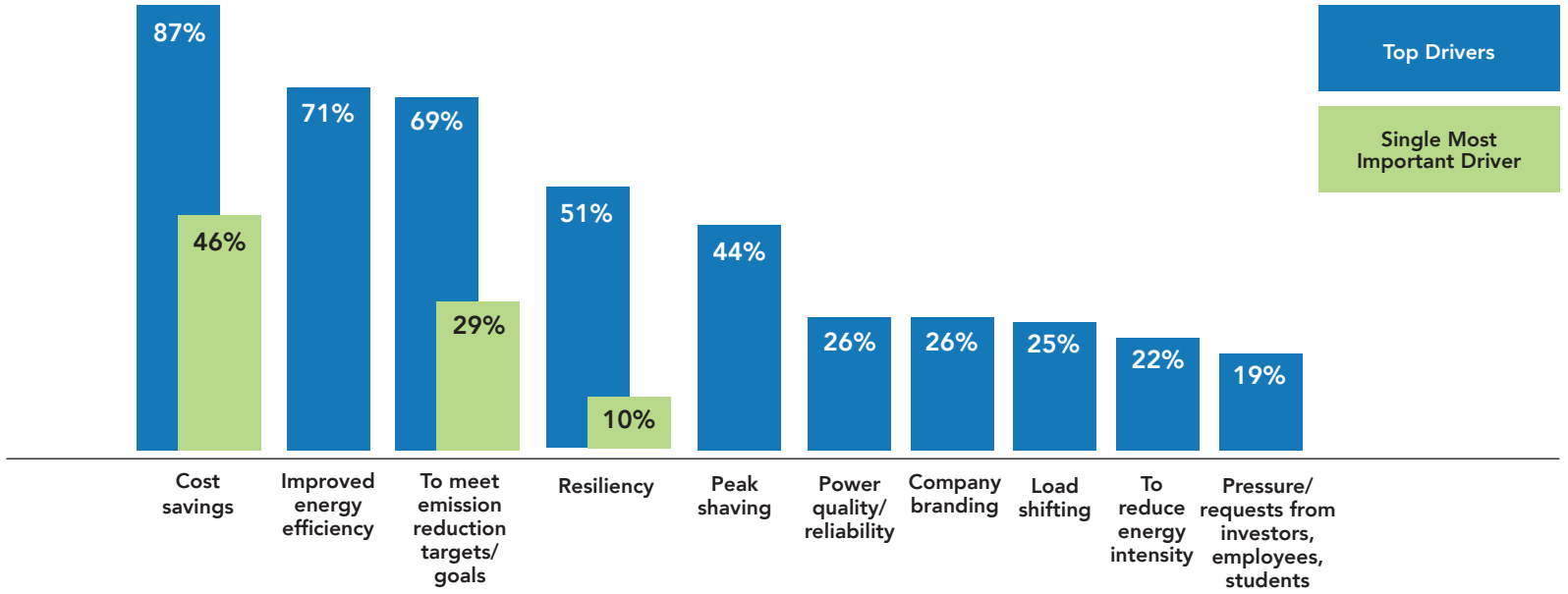
Responding Companies

2Life Communities
ACUA
Adobe, Inc.
Albertson Companies
Altria
Arizona State University
Arlington County
Aurora Public Schools
Baltimore City Public Schools
Bank of America
BASF Corp.
Becton, Dickinson & Co.
Bekaert nv
Bristol Byers Squibb
Bucknell University
CalPortland Company
CalTech
CBRE Limited
Chick-fil-A
Cinemark USA
Cisco Systems, Inc.
Citrix
City and County of Denver
City of Asheville
CIty of Barnstable
City of Boulder
City of Chula Vista
City of Columbus
City of Culver City
City of Cupertino
City of El Paso
City of Greenbelt
City of Hamden
City of Nashville
City of New Bedford
City of Orlando
Corning Inc.
Costco
Cumberland Farms Inc.
DaVita
Dillard's, Inc.
District of Columbia Housing Authority
Eastman Chemical Company
Equinix, Inc
Faurecia
FedEx
Ferrero
FoodService Partners, LLC
Fresno Pacific University
Fruit of the Loom
Goldman Sachs
Green Coast Enterprises
Grupo Bimbo
Harbec Plastics
Humber College
IBM
Illinois Tool Works
Intel
JLL
Johnson & Johnson
Kingman Healthcare Inc.
Kohler Co.
Kohl's Department Stores
Lake Forest
Lehigh University
Liberty University
Lockheed Martin
Los Angeles Unified School District
Louisiana State University
Massachusetts Water Resources Authority
McCormick & Company
Merck & Co., Inc.
Michigan State University
Mohawk Industries
MOM's Organic Market
Mortenson Construction
Nestle, Inc.
Newmark Knight Frank
Northwell Health
Novartis Americas
PepsiCo
PetSmart
Pharmaceutical Product Development, Inc.
Port of San Diego
Procter & Gamble
Radford University
Raytheon
Southwestern Illinois College
Sutter Health
Target Corporation
The Kroger Co.
Thermo Fisher Scientific
Thomas Jefferson University
TJX Companies
Toyota Motor Manufacturing
UC San Diego
Universal Health Services
University of Alabama at Birmingham
University of Cincinnati
Weis Markets
Whirlpool Corp.
Wichita State University

Customers Want Cost Savings Above All

SUMMARY:
When deploying DERs, large electric power users are most often looking for cost savings. A total of **87%** of respondents cited this factor as a top driver and **46%** called it THE top driver. Further, other drivers cited relate directly to lowering costs, including peak shaving and load shifting. Indirect lines can be drawn to other drivers as well; for example, improved energy efficiency initiatives often lead to lower costs.
Aside from cost savings, meeting targets, and resiliency, no other driver was the single top choice for more than **10%** of respondents - including improved energy efficiency, which was a top driver for **71%**.

TOP DRIVERS FOR CONSIDERING/CURRENTLY DEPLOYING DERs



Q. For your company, what are the top reasons or drivers for considering or currently deploying distributed energy resources? Which is the single most important?

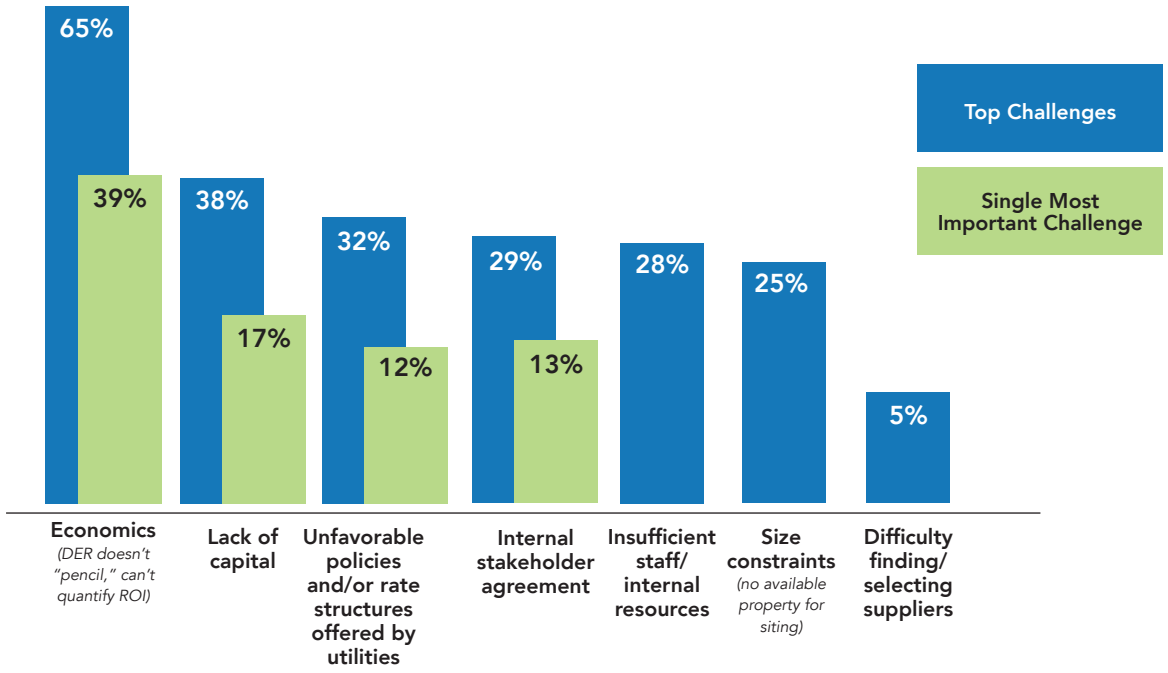
SMART ENERGY DECISIONS RESEARCH

Making the Business Case and Funding are Top Pain Points

SUMMARY:
Economics associated with onsite generation, including ROI justification, was called a top challenge by **65%** and named the #1 single most important challenge by **39%**. Lack of capital to fund DER deployment was the single top choice for **17%**, followed by internal stakeholder agreement (which may relate, in part, to proving the business case for DERs) at **13%** and unfavorable policies of utilities at **12%**. No other challenge was cited as a single top obstacle by more than **10%** of respondents.

BY COMPANY TYPE: Economics is the single top challenge for commercial and industrial companies. For institutions and government, the top pain point is lack of capital. Internal stakeholder agreement is ranked higher by C&Is than other entities.

TOP CHALLENGES FOR CONSIDERING/CURRENTLY DEPLOYING DERs



Q. For your company, what are the top challenges or obstacles to deploying distributed energy resources? Which is the single most important?

INSIGHTS: Is it time to re-examine current pathways to DER implementation? A fragmented power management strategy where supply and DER silos operate independently without integration may not optimize energy use and no longer provide the cost savings companies require. With flexible DERs that conserve energy, modify consumption, and manage load at crucial times, cost savings can be realized.

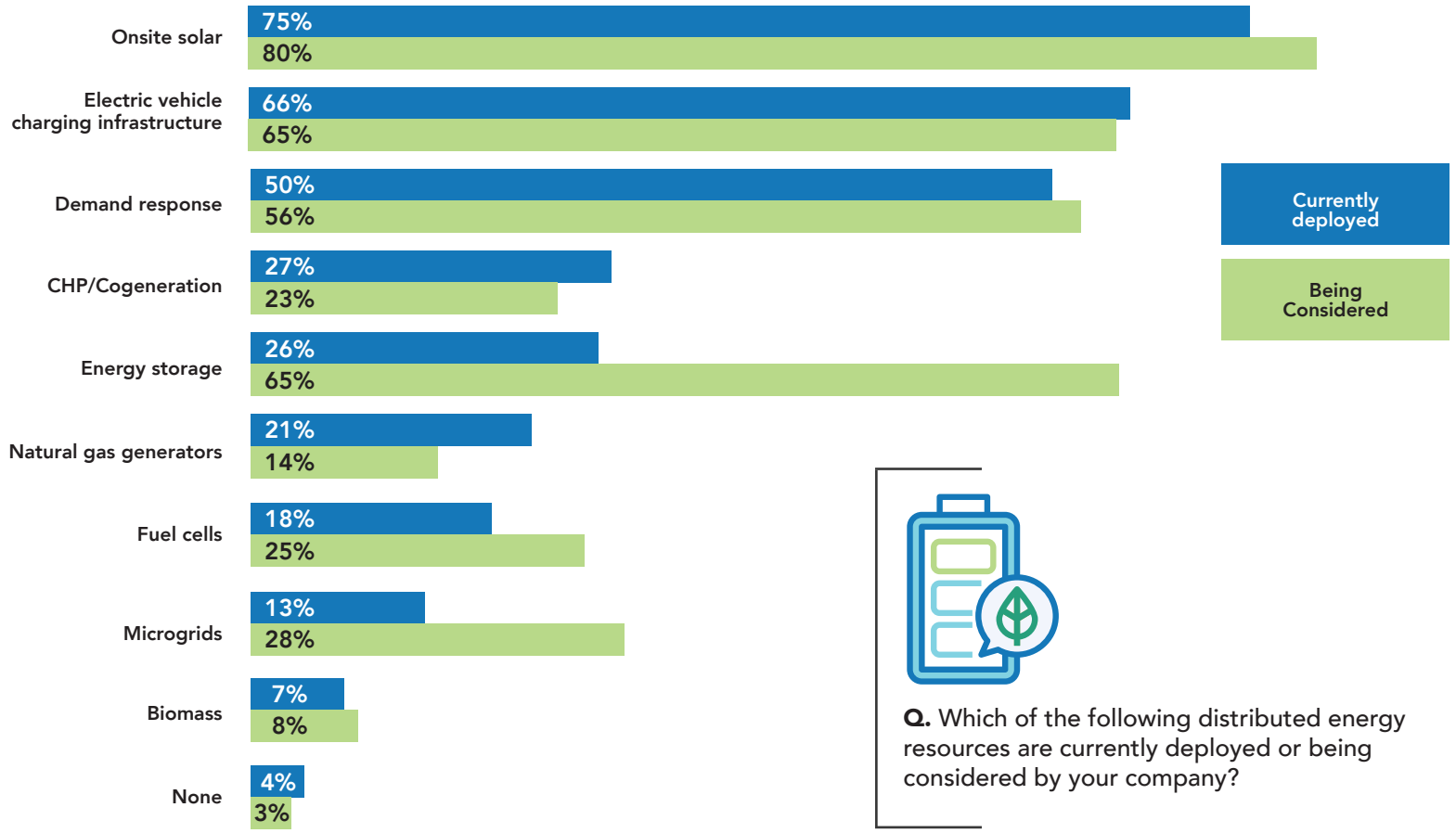
Power Choices Abound

SUMMARY:
When companies consider options for onsite power, there are a bewildering number of choices and uses to meet their needs. The most-often deployed type of DER is onsite solar with three-quarters of respondents currently using this technology. Among the **80%** who are considering onsite solar, a majority have already deployed it to some extent and are looking at expansion. EV charging infrastructure is used by two-thirds, while demand response is employed by one-half. In 2020, respondents deployed an average of three DER types each.

CHP/Cogeneration is used by **27%** of total respondents – a result that jumps to **52%** among industrial companies.

SMART ENERGY DECISIONS RESEARCH

DERs CURRENTLY DEPLOYED/BEING CONSIDERED



Q. Which of the following distributed energy resources are currently deployed or being considered by your company?

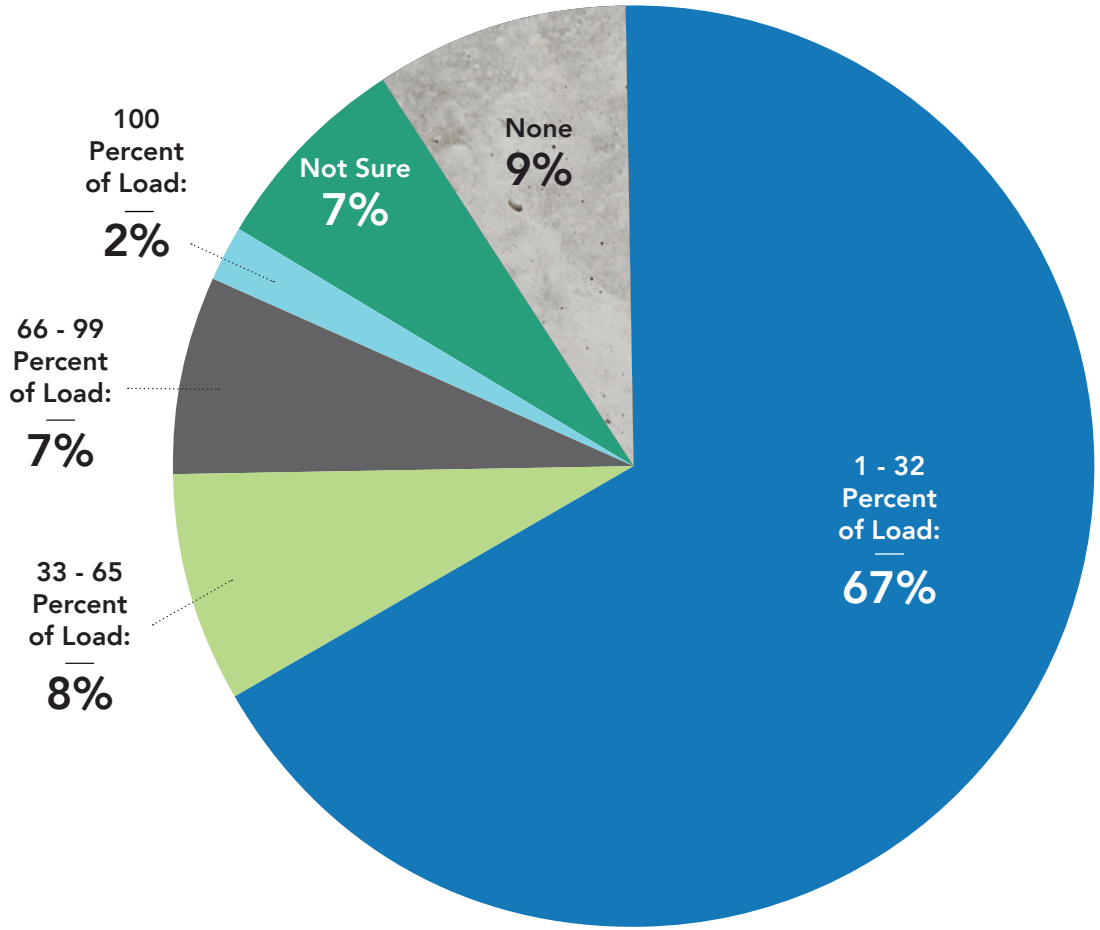
nrg

DER Opportunities Await

HOT SPOTS:
While energy storage is currently deployed by **26%**, **65%** are considering this resource. Microgrids could also be poised for growth: while only **13%** are currently using these systems, **28%** are considering their deployment. *(See page 8 for chart).*

ROOM TO GROW:
Among those currently deploying DERs, a majority say less than one-third of their load is offset by distributed energy, leaving significant opportunities for savings on the table.

PERCENT OF LOAD CURRENTLY OFFSET BY DERS



INSIGHTS: Technologies and systems for distributed energy resources are complex; partners with deep experience with DERs and electricity markets are in demand, according to comments from survey respondents. Further, with economics and lack of capital as top challenges, customers need help in educating their internal stakeholders to better understand the value of onsite energy.

Q. What percent of your load is currently offset by distributed energy resources?

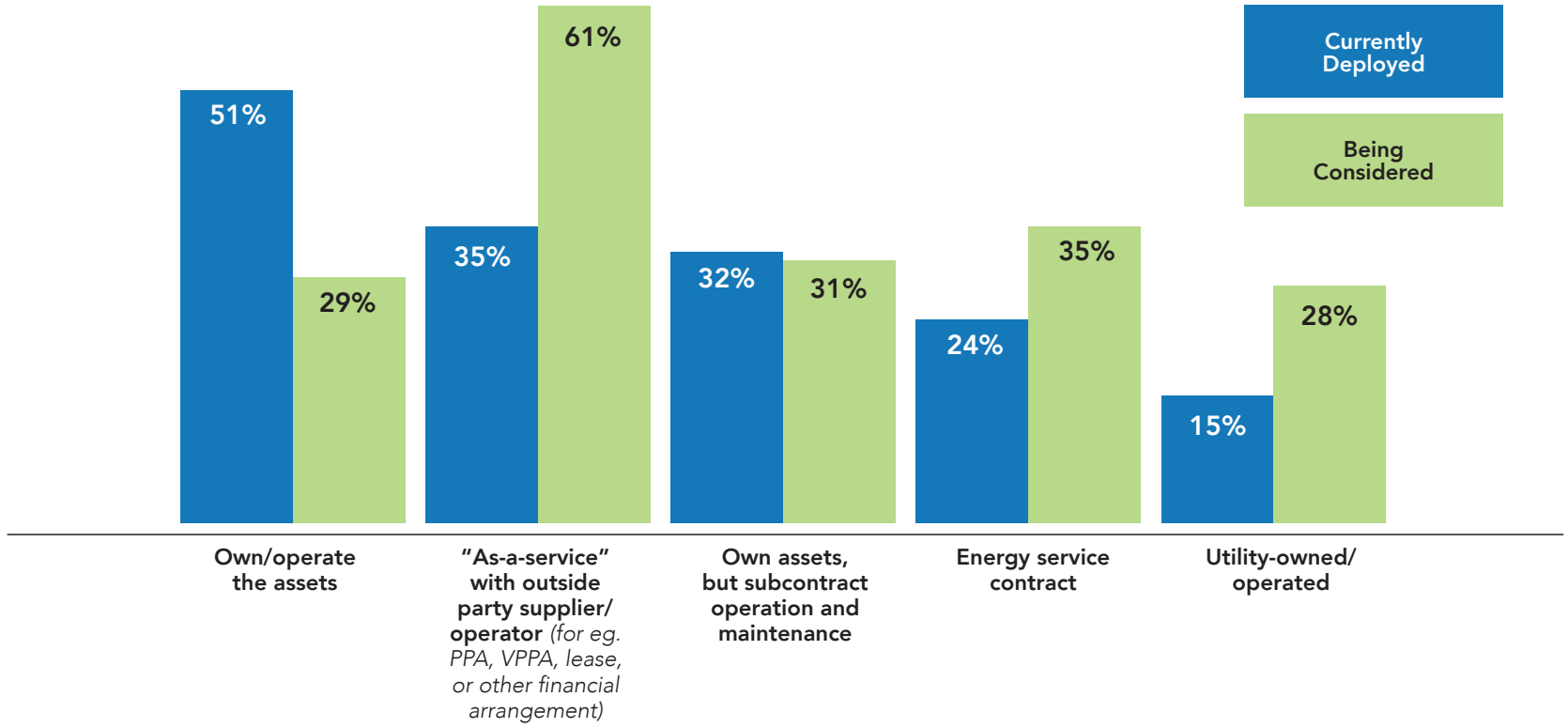
SMART ENERGY DECISIONS RESEARCH

nrg

Looking Outside to Deploy DERs

SUMMARY:
About half **(51%)** of respondents report currently owning and operating their own DER assets. While this has historically been the model most often used among all company and budget segments, the industry is undergoing a shift: as-a-service programs, which use outside suppliers, are currently used by **35%** but are being considered by **61%**. That result indicates stronger potential growth compared to all other models and holds true across all respondent company type and budget segments. Energy service contracts, and utility involvement are also rising in consideration.

MODELS BEING USED/CONSIDERED TO DEPLOY DERS



Q. Which of the following models are being considered and/or currently utilized to deploy distributed energy resources?

SMART ENERGY DECISIONS RESEARCH

nrg

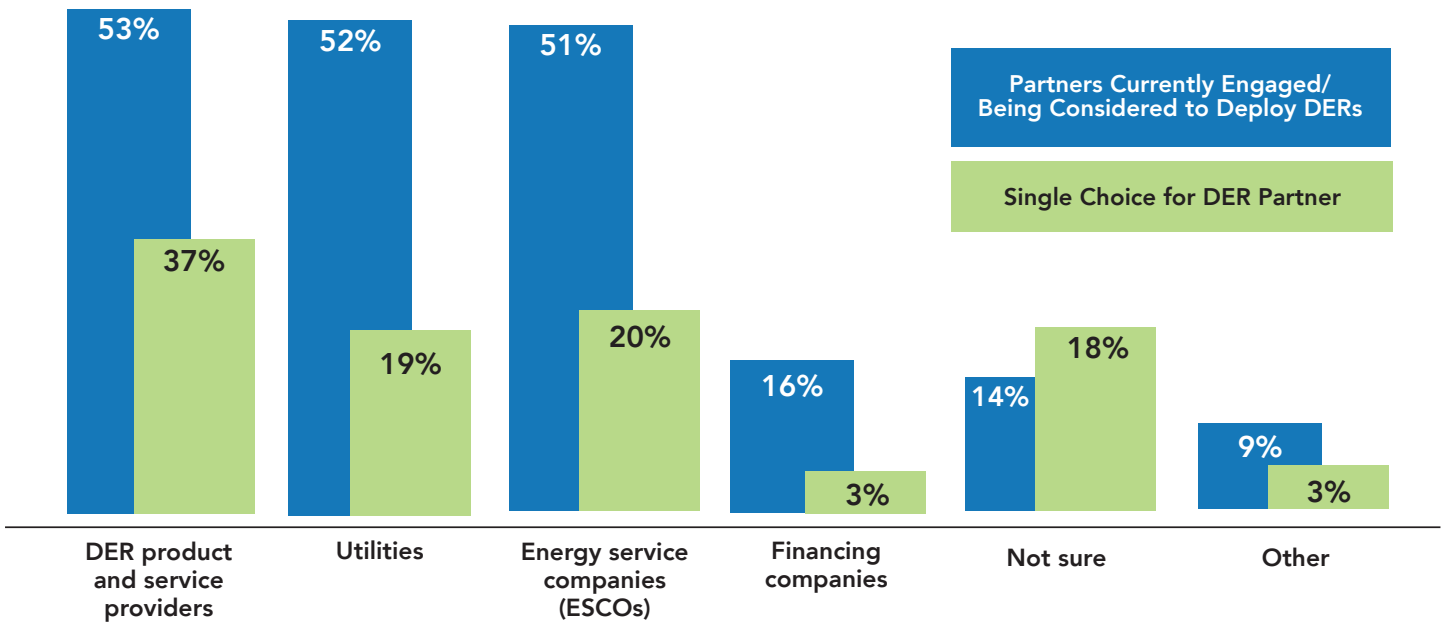
Understanding the Value of Partnerships

CHOOSE YOUR PARTNER:
Partnering with DER product and service providers is currently in use or is being considered by **53%** of those surveyed. These partners are heavily favored by commercial companies **(68%)** and those with budgets of **$50 million** or more **(66%)**.

Utilities are the partner of choice for **52%** of total respondents and are the top choice within the government sector. ESCOs follow close behind at **51%** and are the top choice for industrial operators.

DER product and service providers were selected as the single favored partner for collaboration – cited by **37%** - and were even more heavily favored by commercial customers (**52%**).

PARTNERS ENGAGED WITH/BEING CONSIDERED TO DEPLOY DERS



Q. What types of partners is your company considering/currently engaging with to deploy distributed energy resources? If you could choose only one, which would you choose?

SMART ENERGY DECISIONS RESEARCH

nrg

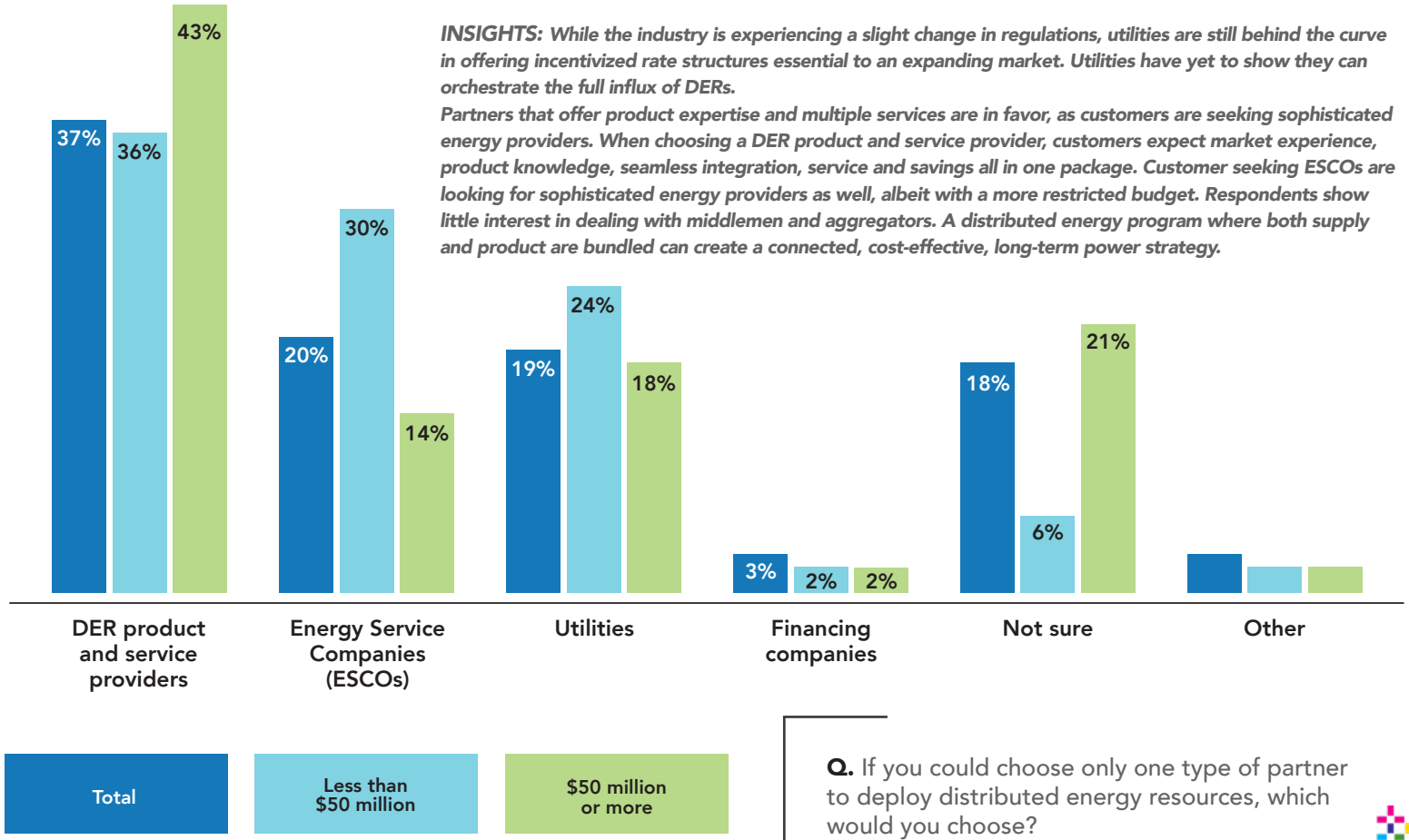
A Variety of Choices Regardless of Budget

SUMMARY:
DER product and service providers are the single top choice for partners regardless of energy budgets and are especially favored by organizations with energy budges of **$50 million** or more (**43%**). ESCOs were a strong second-place choice among organizations with smaller budgets. Among organizations with larger budgets, ESCOs and utilities are equally preferred (by **20%** and **19%**, respectively).

PARTNER CHECKLIST:
WHY CUSTOMERS PREFER DER PROVIDERS (based on their comments):

- Benefits of a wide array of products and services
- Technical expertise
- Market expertise and experience
- Cost savings
- Better integration and customized support with a vested interest in success

SINGLE TOP CHOICE FOR DER PARTNER BY ENERGY BUDGET



INSIGHTS: ***While the industry is experiencing a slight change in regulations, utilities are still behind the curve in offering incentivized rate structures essential to an expanding market. Utilities have yet to show they can orchestrate the full influx of DERs.***
Partners that offer product expertise and multiple services are in favor, as customers are seeking sophisticated energy providers. When choosing a DER product and service provider, customers expect market experience, product knowledge, seamless integration, service and savings all in one package. Customer seeking ESCOs are looking for sophisticated energy providers as well, albeit with a more restricted budget. Respondents show little interest in dealing with middlemen and aggregators. A distributed energy program where both supply and product are bundled can create a connected, cost-effective, long-term power strategy.

Q. If you could choose only one type of partner to deploy distributed energy resources, which would you choose?

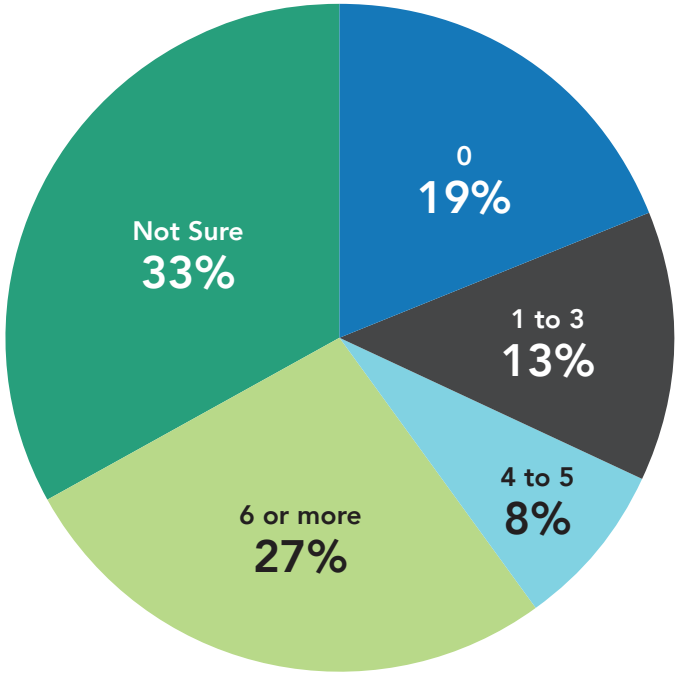
SMART ENERGY DECISIONS RESEARCH

Assessing Outages and Risk

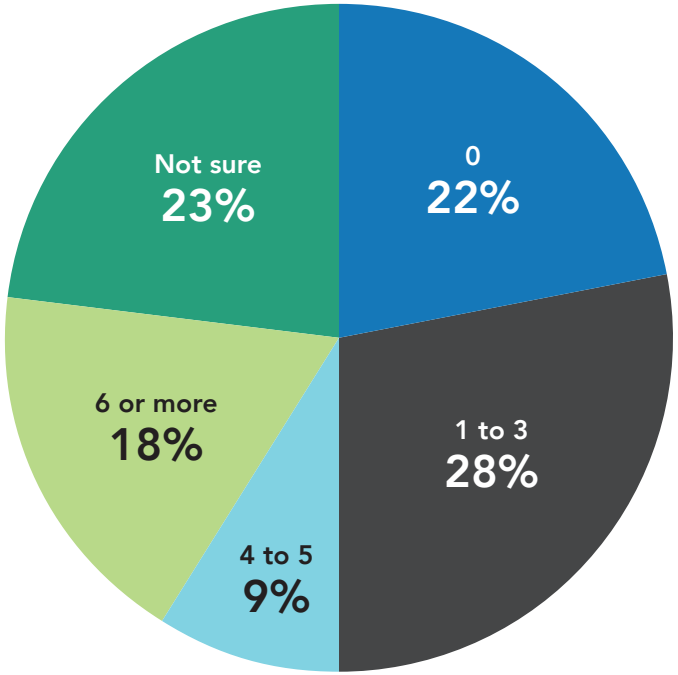
SUMMARY:
Resiliency was cited by half of respondents **(51%)** as one of their drivers for deploying DERs, while power quality and reliability was chosen by **26%** (see page 6). Yet even as resiliency concerns grow in the face of natural disasters, more extreme weather patterns, the aging primary grid, and the potential of external attacks, survey data points to lack of attention to tracking and monitoring outages. More than half **(56%)** perform no risk analysis and half **(50%)** have not calculated costs associated with power outages at their company.

Among respondents reporting micro outages (encompassing durations of less than five minutes) in the past year, **27%** cited six or more of these outages. For longer-term outages (five minutes or more), **18%** reported having six or more.

NUMBER OF MICRO OUTAGES
(LESS THAN 5 MINUTES)



NUMBER OF LONGER-DURATION OUTAGES
(5 MINUTES OR MORE)



Q. How many of the following types of power outages have you experienced in the last 12 months: micro, longer duration?

SMART ENERGY DECISIONS RESEARCH

nrg

Few are Calculating the Cost of Outages

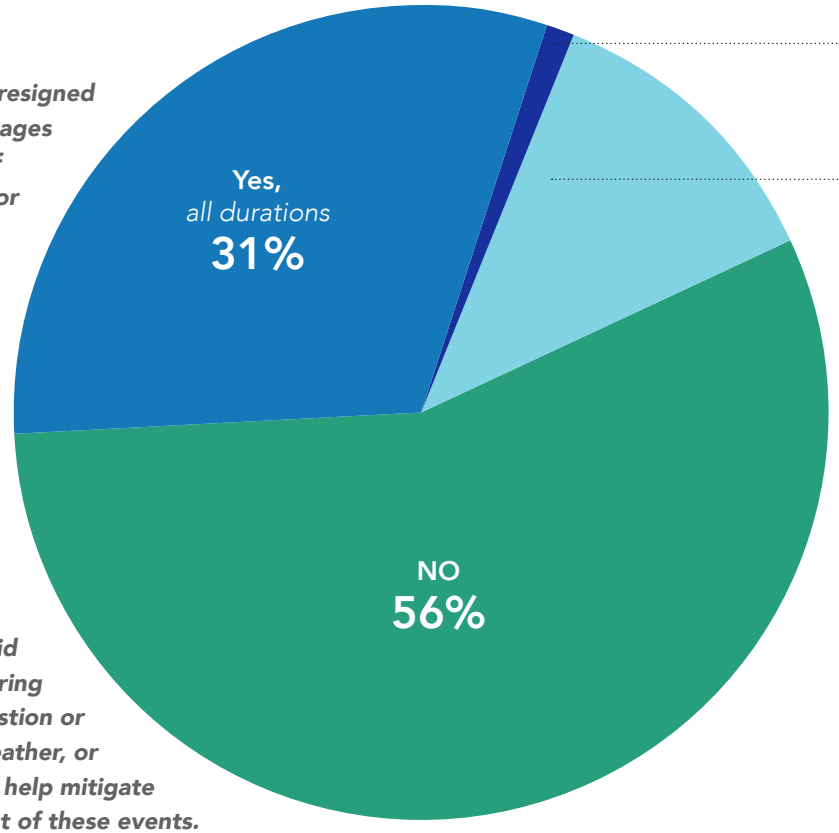
SUMMARY:
Given the high number of outages, it is striking to note that **56%** of respondents have not performed a risk analysis to evaluate the impact of these outages on their business. Among the **44%** of organizations that have performed this type of risk analysis, **31%** included all durations, while **12%** focused only on longer durations.

Only **25%** have calculated the cost of power outages, while **50%** have not done so and **25%** are not sure. Respondents who have recorded outages report calculating costs at only a slightly higher rate: **27%** for those with micro outages and **28%** for those with longer-duration outages.

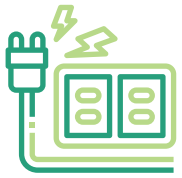
Among respondents who did calculate costs, **25%** report the cost of outages during the past 12 months at $1 million or more, **60%** put the price at less than $1 million, and **15%** are not sure of the cost.

SMART ENERGY DECISIONS RESEARCH

HAVE YOU PERFORMED A RISK ANALYSIS OF THE IMPACT OF A UTILITY OUTAGE AT YOUR COMPANY?



INSIGHTS:
Are respondents resigned to the cost of outages as just the cost of doing business – or are they unaware of the actual cost of an outage to their operations? Customers need to be more informed of options that could defray costs. For example, having a power source such as a microgrid to fall back on during larger grid congestion or failure, severe weather, or cyber-attacks will help mitigate the long-term cost of these events.



Q: Have you performed a risk analysis of the impact of a utility outage at your company?

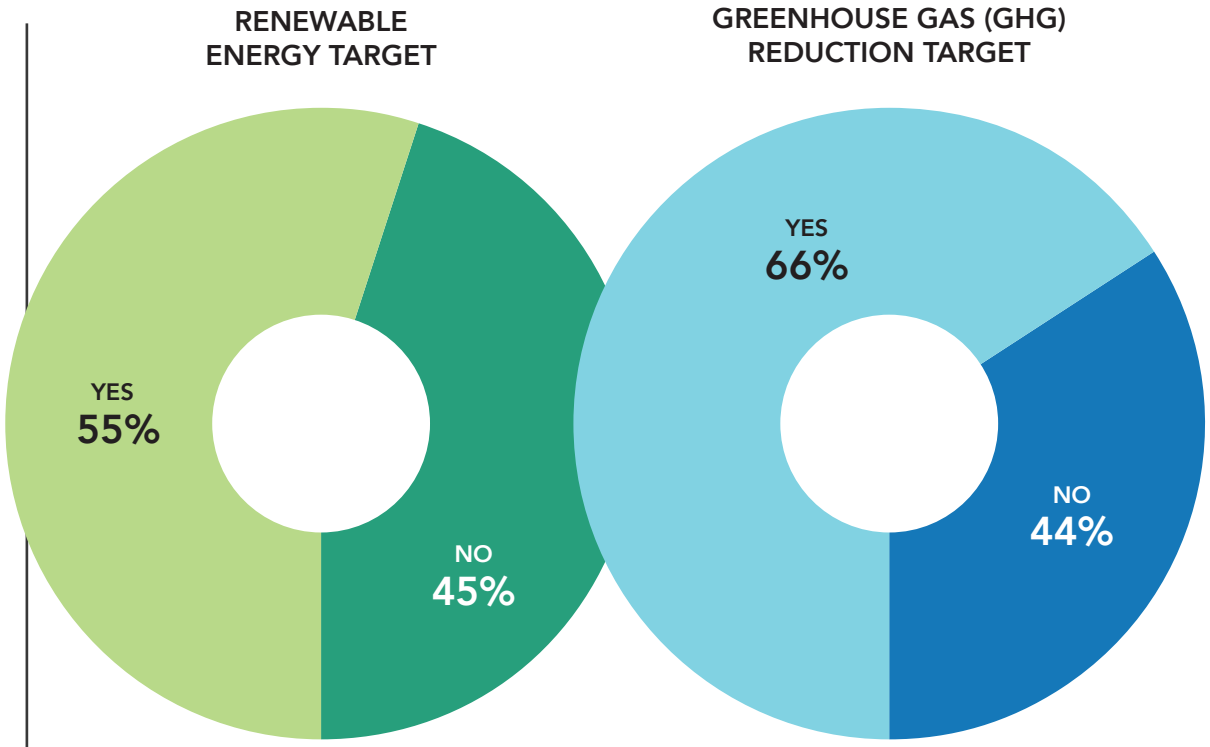
nrg

The Growing Importance of GHG Reduction and RE Targets

SUMMARY:
Achieving renewable and sustainability targets ranked among the top three drivers for developing distributed energy plans regardless of company type or budget segment (with the exception of institutions, which ranked this factor in fourth place.). Overall, more than one-half **(55%)** have renewable energy targets, while two-thirds **(66%)** set GHG reduction goals.

Meeting emission reduction targets/goals increased as a driver of deploying DERs from 52% in 2019 to 69% in 2020.

The challenge of size constraints (no available property to site DERs) was named by **25%;** understandably higher for commercial operations **(32%)**, which tend to have smaller site footprints than industrial companies **(17%)**.



Q. Does your company have a specific renewable energy target? A greenhouse gas (GHG) reduction target?

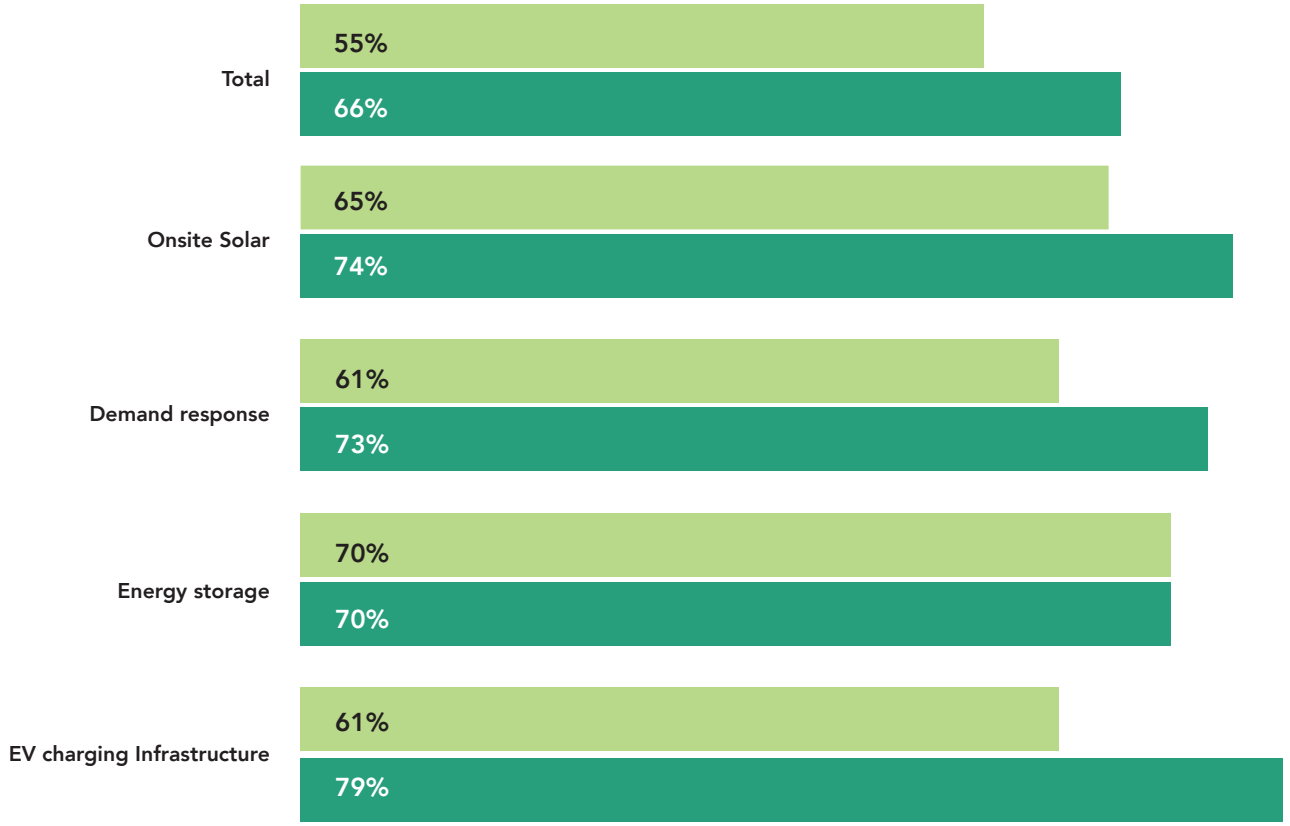
INSIGHTS:
While commercial and industrial companies clearly view DERs as a realistic path towards better energy efficiency and meeting emissions reduction targets, survey results point to government entities as even stronger champions of DERs to meet goals. This could be due in part to well-defined mandates and targets set by cities and municipalities over the past several years.

Deploying DERs to Meet Targets

SUMMARY:
Respondents who have deployed a variety of DERs also reported having definite renewable energy and GHG emissions reduction targets to a larger degree than the average respondent. For example, those with onsite solar exceed the average in having renewable energy goals by 10 points and GHG reduction goals by 8 points.

It is interesting to note that respondents who are currently considering the deployment of energy storage and microgrids - two technologies poised for growth - also have higher-than-average rates in setting goals.

GOALS BY TYPES OF DERS CURRENTLY DEPLOYED



Q. Does your company have a specific renewable energy target? A greenhouse gas (GHG) reduction target?

SMART ENERGY DECISIONS RESEARCH

nrg

Acknowledgements



At NRG, we're bringing the power of energy to people and organizations by putting customers at the center of everything we do. We generate electricity and provide energy solutions and natural gas to more than 3.7 million residential, small business, and commercial and industrial customers through our diverse portfolio of retail brands. A Fortune 500 company, operating in the United States and Canada, we deliver innovative solutions while advocating for competitive energy markets and customer choice, and working towards a sustainable energy future. More information is available at www.nrg.com. Connect with NRG on Facebook, LinkedIn and follow us on Twitter @nrgenergy.



We're committed to your success. Smart Energy Decisions is the leading information resource and research platform dedicated to addressing the information needs of large electric power customers. We deliver news, analysis, and research in addition to producing events designed to help our readers make better decisions. We are a catalyst for change in support of the dramatic energy transformation taking place in the electric power markets impacting customers, utilities, and suppliers. Our mission is to help large electric power users improve their profitability and reduce their carbon emissions by adopting best practices in energy efficiency and renewable energy sourcing. For more information contact: John Failla, Founder & Editorial Director, john@smartenergydecisions.com



NRG.COM

FOR OUR CUSTOMERS, DISTRIBUTED ENERGY CAN BE BETTER ENERGY.

EFFICIENCY

An integrated system for optimal results

RELIABILITY

Backup generation onsite and seamless

PREDICTABILITY

Price stability in an ever-volatile market

REASSURANCE

A solution installed and managed by our team

As the energy world evolves and new technologies and possibilities emerge, we're guiding our customers to the right blend of components and strategies for their business. With a distributed energy solution, it's no longer a question of what's the right thing. Instead, it's the best mix of things for their situation.

Finding what's right, starts with what's present. That means a sound understanding of each customer's business, their current energy usage, plans for growth, and goals for the future. From here, the right solution will come together from a spectrum of products — the right energy plan, a tailored demand response program, onsite generation, renewables, an energy management system — all of the above, or some of the above.

The possibilities, and the benefits, are many.

We're ready when you are.
nrg.com/DERpossibilities

NRG and the plus signs are registered servicemarks of NRG Energy, Inc. NRG is a registered trademark of NRG Energy, Inc. © 2021 NRG Energy, Inc. All rights reserved. 578244483

SMART ENERGY DECISIONS

YOUR SUCCESS IS OUR BUSINESS

DIRECTOR OF RESEARCH & CONTENT

DEBRA CHANIL
debra@smartenergydecisions.com

MANAGER OF CUSTOMER SOLUTIONS

TIM GAGHAN
267.212.4983
tim@smartenergydecisions.com

