THE LATEST EVOLUTION OF DISTRIBUTED ENERGY RESOURCES

OPPORTUNITY FOR BUSINESSES WITHIN PJM

Out of competition has come innovation, allowing businesses within the PJM footprint to leverage new and sophisticated distributed energy resources

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CONTENTS

Introduction: Welcome to the era of energy innovation 3

What exactly are distributed energy resources? 4

Commonly employed distributed energy resources 4

History: From open access and competition came innovation 5

Growth and service to business and society 6

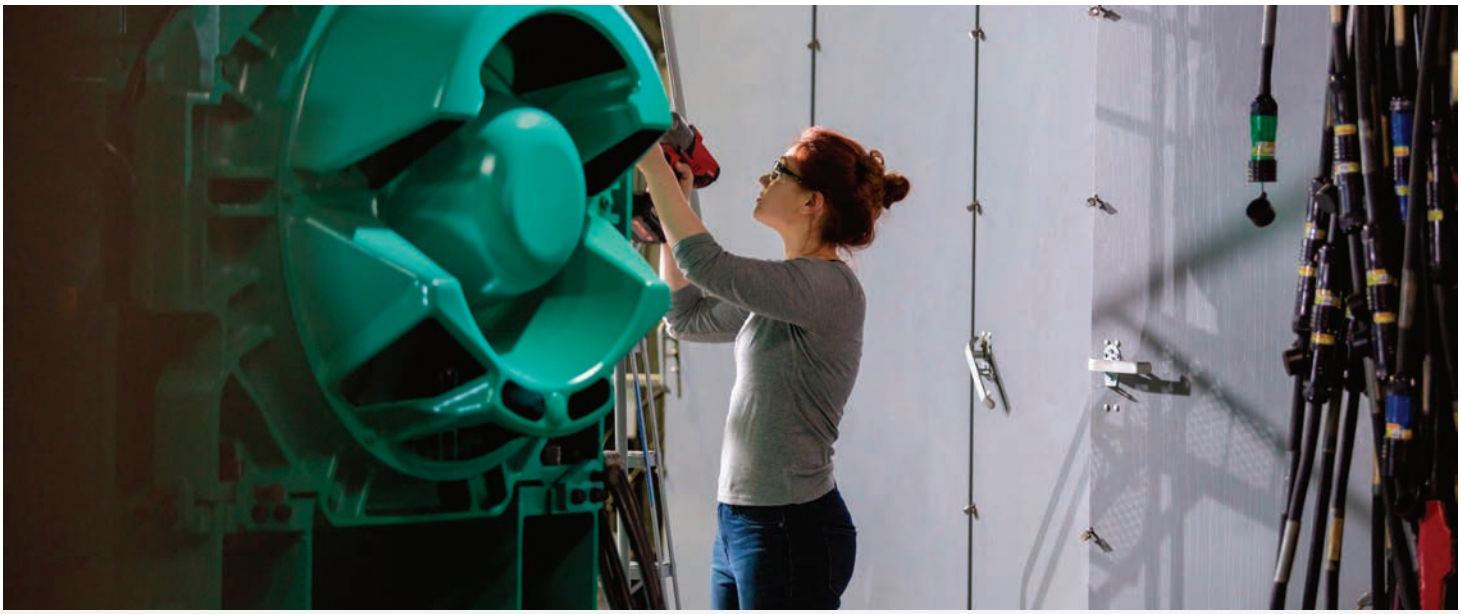
PJM customers well-positioned for distributed energy 6

Need for more distributed energy within PJM 8

Multiple benefits of microgrids 9

Next wave of technology integration: Asset-Backed Demand Response . . 10

Action PJM businesses can take now 11



Introduction: Welcome to the era of energy innovation

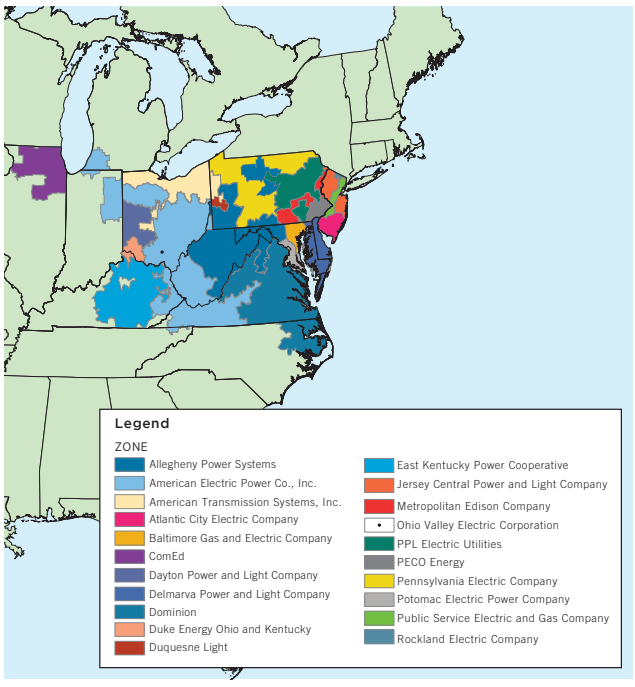
Distributed energy resources have evolved. No longer merely rooftop solar panels or backup generators, they are imbued with software intelligence and new capabilities. These advanced technologies create opportunities for businesses to:

- **Leverage electricity markets with demand response, price management, and the sale of energy to the grid**
- **Gain greater control over energy costs**
- **Assure electric supply even when storms or other events cause power outages**

Moreover, the increasing deployment of distributed energy resources are causing shifts in the century-old electric grid and a rethinking of business models.

How did we get here? What has this journey taught us? And what can businesses do to maximize the benefits of these new technologies, especially during grid-stressing periods, such as extremely hot or cold weather?

This paper focuses on opportunities available to businesses and institutions within the PJM Interconnection, one of the world's largest organized wholesale markets, serving 65 million people in a broad swath of the United States. (See map on the right.)



Map credit: PJM

We trace today's advancements back two decades to when regulators began opening wholesale power and distribution electric markets to competition from outside of the incumbent utilities. Advocates of change pointed to innovation as a likely outcome of competition; citing the telecommunications industry as an example. Its deregulation launched a cellular revolution and soon a range of new services emerged — from Google Maps to mobile electronic banking — offered at little or no cost to the consumer.

Fast forward to today, and it turns out that the early advocates of electric competition were correct. From the opening of markets came distributed energy resources, the power industry's 'cell phone,' offering customers a range of new electricity choices and the ability to partake in services and markets once out of their reach. Most interesting, it is now possible to do so with little or no capital investment made by the customer.

Read on for insight into this evolution and how it is bringing businesses within PJM greater control over their energy supply through asset-backed demand response, a new way to improve electric reliability and energy price management.

What exactly are distributed energy resources?

First, let's define distributed energy resources. It is easy to understand the term, if you know the basics of electricity delivery.

Since the regulation of the electric industry in the early 1900s, the United States has supplied power through a centralized grid structure. Large power plants produce electricity that is sent over a series of transmission and distribution wires until it reaches businesses and homes. To be exact, 8,652 power plants[1] (2017 data) send electricity through 700,000 circuit miles[2] of transmission down to distribution lines that deliver service to about 145 million customers[3].

But now this centralized system is becoming increasingly decentralized as customers install on-site generation — like solar panels, natural gas generating units, energy storage, and combined heat and power units. These power sources are distributed throughout the grid footprint, rather than placed centrally. Hence the term distributed energy resources.

Commonly employed distributed energy resources

- **Renewable energy:** Typically, rooftop solar, ground-mounted solar panels, or small-scale wind turbines.
- **Fossil fuel generator:** Natural gas or diesel-fueled generator sets (gensets) sized for local energy production.
- **Combined heat and power (CHP):** Units that convert the waste heat from their electricity production into usable steam, heat, or hot water.
- **Fuel cell:** A cell that produces electricity from a chemical reaction rather than combustion.
- **Battery energy storage:** Most commonly lithium-ion batteries that absorb energy and discharge it when needed.
- **Demand response:** Wholesale or retail programs offered by utilities or grid operators — regional transmission organizations (RTOs) and Independent System Operators (ISOs) —that compensate customers to reduce their demand on the grid when it is under strain[4]. Customers are paid for lowering their electricity use when called upon.
- **Microgrid:** Multiple distributed energy resources located behind the customer meter at a single point of interconnection to the local distribution system. Microgrids can island and keep electricity flowing to customers during a power outage. They range in size and complexity from a single smart building to a larger system such as a university campus or industrial/commercial park[5].

1 "How many power plants are there in the United States?" Energy Information Administration, www.eia.gov/tools/faqs/faq.php?id=65&t=2

2 "Assessing HVDC Transmission for Impacts of Non-Dispatchable Generation," Energy Information Administration, 27 June, 2018

3 Hoff, Sara. "U.S. Electric System Is Made up of Interconnections and Balancing Authorities." U.S. Electric System Is Made up of Interconnections and Balancing Authorities - Today in Energy - U.S. Energy Information Administration (EIA), U.S. Energy Information Administration, 20 July 2016, www.eia.gov/todayinenergy/detail.php?id=27152#

4 PJM Reliability Assurance Agreement, Article 1, Definitions.

5 North America Electric Reliability Corporation SPIDER WG Terms and Definitions, Working Document, available at: www.nerc.com/comm/PC/System%20Planning%20Impacts%20from%20Distributed%20Energy%20Re/SPIDERWG_Terms_and_Definitions_Working_Document_-_2019-04-09.pdf.

History: From open access and competition came innovation

Distributed energy resources are not new *per se*, but have grown dramatically in sophistication and use — and dropped in price — over the last decade.

Beginning in the late 1970s, solar panels were being installed on the roofs of select buildings in reaction to the Arab Oil Embargo. However, the technology was too costly at the time for the mass market.

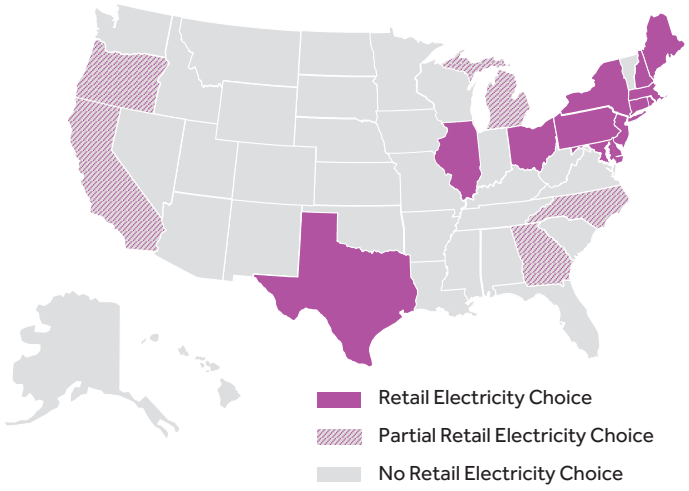
Simple diesel back-up generators are another form of distributed energy that has been used for decades, especially by customers who suffer great cost or service loss from power outages. Real-world examples include manufacturers or hospitals. But diesel backup — used on its own — has largely acted as a short-term solution in a crisis; it has not transformed the nature of the grid to ensure more reliable or cost-effective power.

Distributed energy resources began to rise in the 1970s as the power industry felt the influence of a range of regulatory changes made over several years to nurture competition and clean energy. First, regulators opened wholesale electric markets and later, in certain states, instituted retail choice, which allows customers to choose an energy supplier other than the local utility.

These major regulatory changes included:

1. The Public Utility Regulatory Policies Act (PURPA) of 1978, which ensured a market and fair rates for electric power and steam produced by small power plants, such as CHP. PURPA created a wedge that opened competition to utility power.
2. The Energy Policy Act of 1992 (EPAct 92), which created open access on transmission lines and a new class of generators to compete with utilities to build power plants. EPAct 92 also instituted a production tax credit for wind power plants.
3. Order 888 by the Federal Energy Regulatory Commission (FERC) in 1996 that required vertically-integrated utilities provide universal access to their transmission systems.
4. FERC Order 2000 in 1999 that mandated the creation of competitive wholesale markets by the formation of RTOs and ISOs.
5. FERC Order 719 in 2008 allowed demand response to participate in the wholesale competitive power markets in a manner similar to generation and removed select barriers to load curtailment serving as a supply resource.
6. FERC Order 745 in 2011 guaranteed demand response would receive comparable compensation to generation in the wholesale power markets — the right to receive wholesale prices.

As changes were made in rules for generation investments, open access, and centralized wholesale markets, retail electricity choice took hold in 13 key states. Analysts draw a direct link between its rise and the growth of renewable energy. As described by the National Renewable Energy Laboratory, retail choice "created a competitive environment in which suppliers turn to renewable energy offerings as a way to differentiate themselves from their competitors."[6] Many of these states served as a launching ground for renewables and other forms of distributed energy resources that have gained a market foothold.



Source: "An Introduction to Retail Electricity Choice in the United States," NREL.

Government incentives also helped, notably federal production tax credits and incentive tax credits for renewable energy. The tax credits led to the formation of new business and financing models in the early 2000s, such as solar power purchase agreements,[7] which made it possible for customers to secure renewable energy for little or no money down.

But it wasn't growth in renewable energy, alone, that gave rise to today's distributed energy resources. Changes also were underway that improved use of fossil fuels for distributed

6 An Introduction to Retail Electricity Choice in the United States. National Renewable Energy Lab, Aug. 2017, www.nrel.gov/docs/fy18osti/68993.pdf.

7 Solar Power Purchase Agreements. U.S. Environmental Protection Agency, 13 Mar. 2019, www.epa.gov/greenpower/solar-power-purchase-agreements.

generation, which began to heavily influence electricity production and use.

Since the early 2000s, advanced drilling technologies have led to more abundant natural gas supplies in the United States, driving down prices and making on-site natural gas generation an increasingly appealing alternative for customers.

In addition, the overall technology behind backup generators has advanced, becoming more flexible and efficient with better dual-fuel capabilities, greater reliability, and cleaner output.

And finally, greater opportunity arose during this time period for customers to take charge of their energy, particularly as demand response came to the fore, offering them the ability to earn revenue for decreasing energy use when the grid is under strain.

Each of these resources — renewables, fossil fuel gensets, demand response — offer different value propositions.

Renewables are the cleanest form of energy, emissions free. And they are derived from free fuel, typically wind or sun. However, renewables are also intermittent; when the wind isn't blowing or sun isn't shining they do not produce energy. Adding battery energy storage helps extend their use, but generally only for a few hours.

Fossil fuel generators act as reliable partners to renewables. With a steady supply of fuel, they are always available to run.

Demand response, meanwhile, offers value to the grid by reducing strain during periods of peak use, but need for it occurs only on occasion, usually during extreme heat or cold.

Microgrids can combine all of these resources into one system, activating whichever is most advantageous to use at a given time.

Growth and service to business and society

All of these factors helped foster a rise in distributed energy resources, which analysts see accelerating in the coming years. The worldwide market is expected to expand at a compound annual growth rate of 15.9% — from $172.5 billion in 2019 to $649.6 billion in 2028.[8] The microgrid market, in particular, is on a course to make a leap from under $4 billion in 2018 to more than $30 billion in 2027. The United States makes up about one-third of the market, according to Navigant Research.[9]

This growth is important because distributed energy resources help businesses — and the wider society — become more sustainable and reach clean energy targets.

They also boost electric reliability, which is crucial to businesses, given that they share an undo financial burden from power outages. A Lawrence Berkeley National Laboratory study found that power interruptions in 2015 cost the United States economy $44 billion per year (2015-$). Although the commercial and industrial sector makes up only 10% of electricity customers, it bore 70% of the cost.[10]

And finally, distributed energy resources aid local governments as they pursue energy resiliency — the ability to avoid power disruptions or recover quickly when they do occur. Many cities and states began actively pursuing resiliency following severe storms over the last decade, such as Superstorm Sandy and Hurricane Maria.[11]

PJM customers well-positioned for distributed energy

Businesses that operate within the PJM footprint are well-situated to leverage the distributed energy revolution. PJM offers one of the oldest and largest examples of the evolution of competitive forces in electric markets. It became

8 Global DER Overview, Navigant Research, 2nd Q 2019, www.navigantresearch.com/reports/global-der-overview

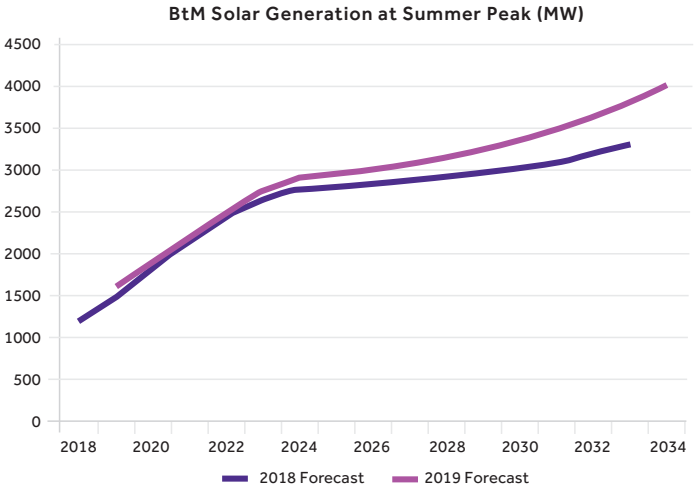
9 Wood, Elisa. "What's Driving Microgrids toward a $30.9B Market?" Microgrid Knowledge, 30 Aug. 2018, microgridknowledge.com/microgrid-market-navigant/.

10 Eto, Joseph, and Kristina Hamachi LaCammare. "The National Cost of Power Interruptions to Electricity Customers – A Revised Update." Lawrence Berkeley National Laboratory, 10 Jan. 2017, National Cost of Power Interruptions to Electricity Customers grouper, www.sciencedirect.com/science/article/abs/pii/S036054421830690X?via%3Dihub

11 Eto, Joseph, and Kristina Hamachi LaCammare. "The National Cost of Power Interruptions to Electricity Customers – A Revised Update." Lawrence Berkeley National Laboratory, 10 Jan. 2017, National Cost of Power Interruptions to Electricity Customers grouper, www.sciencedirect.com/science/article/abs/pii/S036054421830690X?via%3Dihub

the nation's first fully functioning RTO in 2002.[12] Today it accounts for $49.80 billion in annual billings.[13]

The region is seeing benefits from competition with a robust presence of distributed energy resources. As of 2018, PJM was home to 6.6 GW of retail distributed energy resources, like rooftop solar or microgrids, and 1.3 GW of what it describes as wholesale distributed energy resources (largely fossil fuel gensets) participating as demand response.[14] More growth is coming, as PJM forecasts below in a look at customer-sited or behind-the-meter (BtM) solar through 2034.



Credit: "Distributed Solar Resources in the Long Term Load Forecast," Molly Mooney, PJM Resource Adequacy Planning Department Intermittent Resources Subcommittee, December 10, 2018

Competition also has helped reduce PJM's carbon footprint. The RTO's carbon dioxide emissions dropped on average 13% per 1 MW produced over the last decade, a phenomenon it credits largely to "encouraging the free entry of new, competing technologies."[15] Such trends within PJM are significant to the nation overall, given that its territory accounts for 21% of the U.S. gross domestic product.[16]

PJM's growing use of natural gas, as a replacement for coal-fired generation, contributed to the decrease in carbon. As noted in its 2018 Annual Report, PJM saw 5,605 MW of generation retire, mostly coal, and 10,847 MW come on line, mostly natural gas.[17]

The switch occurred in part because the region has an ample supply of natural gas. Within its footprint are two of the largest shale reserves, Marcellus and Utica, seven major interstate gas pipelines and 32 natural gas distribution companies[18]. It is important to note that ample supply does not always translate into easy delivery. For example, some older, urban areas lack adequate pipeline capability. That limits the amount of fuel that can be reliably delivered to front-of-the meter, fossil-fuel generation under certain conditions. But during periods when fuel delivery is restricted, customers can leverage distributed energy resources to ensure continued service until large generators receive fuel deliveries. In fact, this year PJM began exploring how distributed energy resources can help support grid reliability when extended winter power outages threaten reliable fuel deliveries.[19]

PJM also is noted for its sophisticated use of demand response during times of peak demand — a period when high energy use can threaten grid reliability. Under the PJM demand response program, customers can provide this service two ways. They can consume electricity from their on-site distributed energy resources instead of from the grid. Or they can employ the more conventional strategy of turning down lights, reducing air conditioning or taking other energy savings measures as identified in a strategic reduction action plan. Either approach reduces strain on the grid.

12 PJM History." PJM Interconnection, www.pjm.com/about-pjm/who-we-are/pjm-history.aspx.

13 "2018 PJM Annual Report." PJM Interconnection, Apr. 2019, www.pjm.com/-/media/about-pjm/newsroom/annual-reports/2018-annual-report.ashx?la=en

14 Stroup, Kerry. "Distributed Energy Resources in PJM: Market Integration Considerations." National Association for Regulatory Utility Commissioners, 9 May 2018, pubs.naruc.org/pub/67DA6B78-E94F-F620-E852-29EDE1C473D4.

15 "The Value of PJM Markets." PJM Interconnection, 21 June 2018, www.pjm.com/-/media/about-pjm/newsroom/fact-sheets/the-value-of-pjm-markets.ashx?la=en.

16 "The Value of PJM Markets." PJM Interconnection, 21 June 2018, www.pjm.com/-/media/about-pjm/newsroom/fact-sheets/the-value-of-pjm-markets.ashx?la=en.

17 "2018 PJM Annual Report." PJM Interconnection, April 2019, www.pjm.com/-/media/about-pjm/newsroom/annual-reports/2018-annual-report.ashx?la=en.

18 "Gas-Electric Coordination." PJM Interconnection, 11 May 2017, www.pjm.com/-/media/about-pjm/newsroom/fact-sheets/gas-electric-coordination-fact-sheet.ashx?la=en.

19 PJM Fuel Security for Black Start Resources and Fuel Security Stakeholder initiatives include consideration of role of distributed energy resources to support the bulk system reliability in combination with large front-of-the-meter generation. See Fuel Security Issue, www.pjm.com/committees-and-groups/issue-tracking/issue-tracking-details.aspx?Issue={FF552C36-048D-405A-A296-125FC8098915}. See Fuel Requirements for Black Start Resources Issue, insidelines.pjm.com/oc-eyes-better-fuel-assurance-for-black-start-units/

For June 1, 2018 through May 31, 2019, PJM designated 7,993 MW of demand response as a capacity resource.[20] Demand response from distributed energy resources in 2018-2019 totaled about 1,537 MW.[21] The remainder of the demand response came from conventional strategies.

By participating in demand response, customers not only help the grid avoid service interruptions, but also can reduce carbon emissions. This occurs when customers install environmentally efficient, on-site natural gas gensets, or participate in conventional demand reduction strategies.

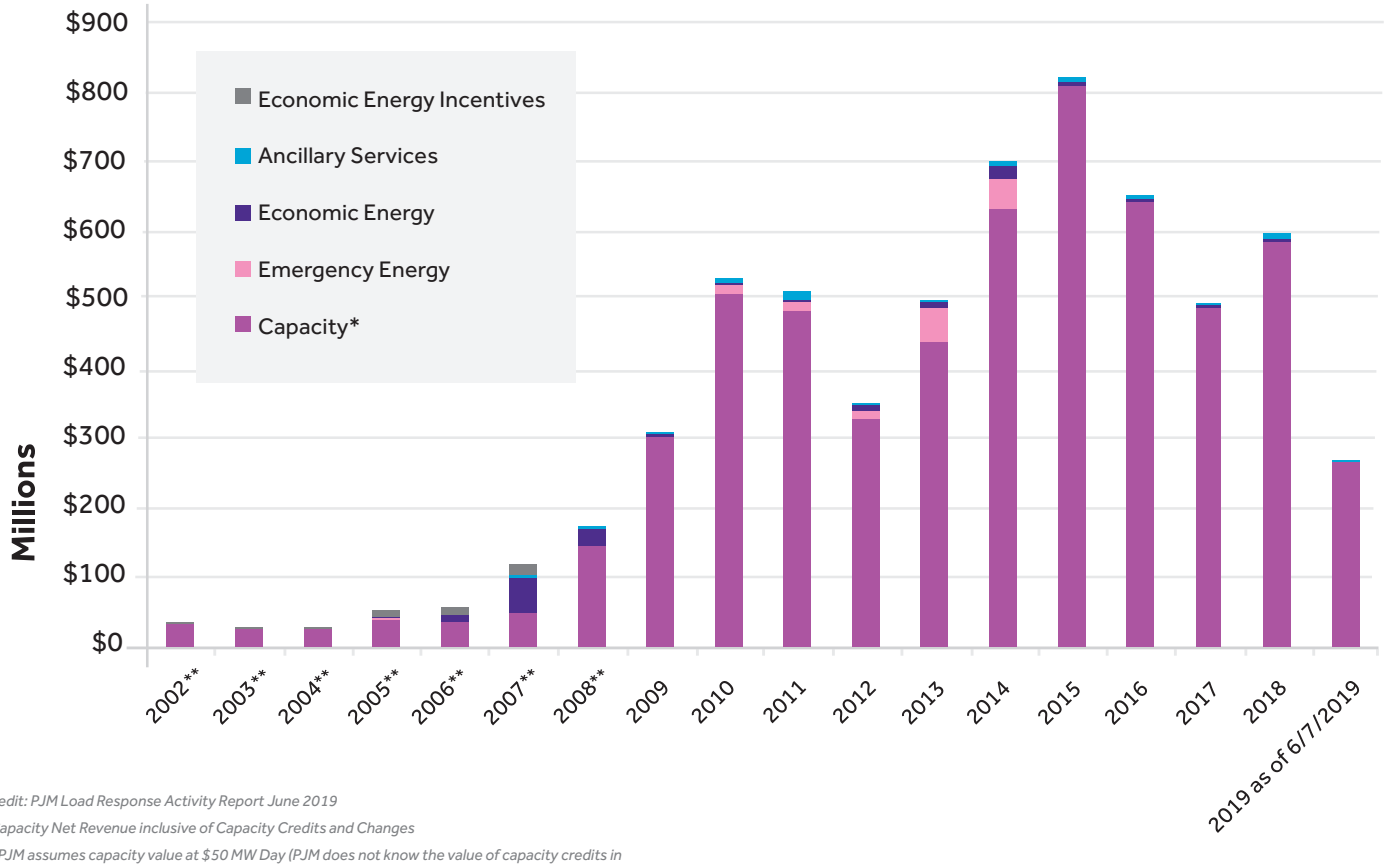
Need for more distributed energy within PJM

Hurricanes, blizzards, extreme heat, and even more common thunderstorms can cause power outages. If the grid suffers damage at the wrong time and place, the failure may cascade and affect energy users for miles.

Grid operators work diligently to avert power outages but weather and other natural disasters are formidable adversaries. That is where distributed energy resources and demand response come into play, easing grid strain and ensuring continued operations at the customer's site when nature's severity limits electric supply.

Demand response not only helps avoid service interruptions, but also offers a means for participating customers to earn revenue and better manage their utility charges in return for using less grid energy.

PJM is known for having robust demand response programs. And in recent years, revenue from the programs has been generally high, as depicted below[22]:



Credit: PJM Load Response Activity Report June 2019

**Capacity Net Revenue inclusive of Capacity Credits and Changes*

***PJM assumes capacity value at $50 MW Day (PJM does not know the value of capacity credits in the forward market prior to RPM; only a portion of capacity was purchased through the daily capacity market at the time).*

20 "Load Management Performance Report 2018/2019." PJM Interconnection, January 2019, www.pjm.com/-/media/markets-ops/dsr/2018-2019-dsr-activity-report.ashx?la=en.

21 "2018 Distributed Energy Resources (DER) that participate in PJM Markets as Demand Response." PJM Interconnection, January 2019, www.pjm.com/-/media/markets-ops/demand-response/2018-der-annual-report.ashx?la=en.

22 "Fifteen years since Northeast Blackout, reliability remains top PJM priority," PJM Inside Lines, 14 August 2018, insidelines.pjm.com/fifteen-years-since-northeast-blackout-reliability-remains-top-pjm-priority/

Businesses interested in demand response should note that PJM is making significant changes, transitioning over to models that require greater participation. For some companies, the new requirements may be difficult to meet. So PJM allows them to do so by aggregating their demand response reductions.

Forming demand response aggregations — or even offering stand-along distributed energy resources — is not something most non-energy businesses have the bandwidth or expertise to undertake. PJM's designated curtailment service providers (CSPs), among them NRG, can help. CSPs have strong market positions and expertise in distributed energy resources and conventional demand response, in both retail and wholesale markets. They can bring value to businesses by:

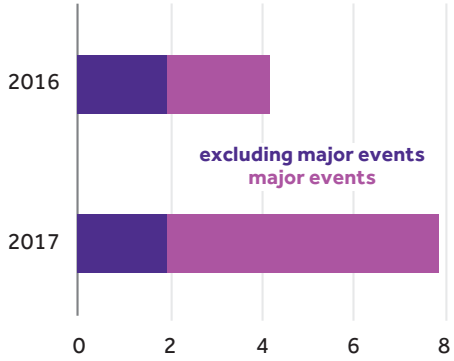
- Providing asset management services
- Assuming the responsibility for administration
- Managing customers capability
- Offering the services into the capacity, energy, or ancillary services markets
- Coordinating with the customers to communicate market dispatches under emergency or economic conditions.

Multiple benefits of microgrids

While demand response helps avert grid outages, they still occur. Nearly 27 million people were affected by 3,526 blackouts in 2017, the most recent year studied in a Blackout Tracker produced by Eaton.[23] The United States Energy Information Administration (EIA) reported the number of power outages in 2017 were nearly double that of 2016, which the U.S. agency attributed to hurricanes and winter storms.[24]

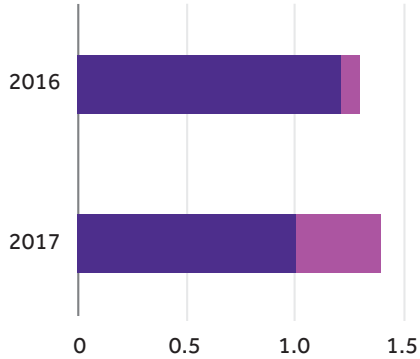
Average U.S. customer hours interrupted (SAIDI)

total duration (hours)



Average U.S. customer hours interruptions (SAIFI)

frequency (number of interuptions)



Source: "U.S. Energy Information Administration, Annual Electric Power Industry Report (EIA-861 data file)

Electric power for U.S. customers was interrupted for an average of 7.8 hours (470 minutes) in 2017, nearly doubled the average duration of interruptions experienced in 2016. More major events such as hurricanes and winter storms occurred in 2017, and the total duration of interruptions caused by major events was longer. Excluding major events, the average duration of interruptions customers experienced was almost identical in 2016 and 2017, at about 2 hours in both years. In 2017, the average customer experienced 1.4 interruptions counting major events and 1.0 interruptions excluding major events.

Businesses lose revenue when power outages interrupt their service. Some cannot manufacture or preserve products, others must curb sales and other transactions. Power outages at data centers can wreak havoc on our now Internet-dependent economy.

That is where microgrids increasingly come into play. A business served by a microgrid continues to receive power even if the grid fails. This is because the microgrid islands or separates itself from the grid disruption and relies on its distributed energy resources to provide energy service to its customers.

And like stand-alone distributed energy resources, microgrids can provide services to customers in other ways.

23 "Eaton's Blackout Tracker Annual Report Shows 36.7 Million People Affected by More than 3,500 Power Outages in 2017." Eaton, 22 March 2018, www.eaton.com/us/en-us/company/news-insights/news-releases/2018/eaton_s-blackout-tracker-annual-report-shows-36-7-million-people.html.

24 Hoff, Sara, and David Darling. "Average U.S. Electricity Customer Interruptions Totaled Nearly 8 Hours in 2017." Today in Energy - U.S. Energy Information Administration (EIA), U.S. Energy Information Administration - EIA - Independent Statistics and Analysis, 30 November 2018, www.eia.gov/todayinenergy/detail.php?id=37652.

For example, advanced microgrids may also leverage opportunities to provide capacity, energy, and ancillary services in certain wholesale markets. They can optimize price position by choosing which combination of distributed energy resources to run — and when — depending on energy prices at any given time of day.

In addition, microgrids are increasingly being employed to help customers, like hospitals, maintain a reliable flow of power to critical operations during grid disturbances. And when changes in weather cause solar or wind generators to suddenly stop producing power, microgrids can quickly pick up the slack by injecting energy into the distribution grid.

Several microgrids are now operating within the PJM footprint on the distribution system, among them the Penn Medicine Princeton Health Center, a 636,000-square-foot facility, with a microgrid that includes highly efficient combined heat and power, multiple feeders, an on-site gas turbine and diesel-fueled back-up generators to ensure exceptional reliability for the hospital.

Another sophisticated microgrid system at Princeton University not only helps the campus better manage energy costs, but also kept the energy flowing to the Princeton campus during Superstorm Sandy while its neighbors were in the dark.

And at the Philadelphia Navy Yard, several industry partners have created the Microgrid Center of Excellence. The center is working to refine microgrid technologies and hone benefits.

In 2019, PJM began to explore how[25] to allow microgrids to participate in its capacity, energy, and ancillary service markets. The grid operator is working on clarifying rules for microgrid operations, markets and settlements once a microgrid is operational in its wholesale markets.

Next wave of technology integration: Asset-Backed Demand Response

Microgrids offer many potential benefits. But most businesses don't have the time or expertise to install and operate them. Asset-Backed Demand Response (ABDR) offers an alternative.

Described as a microgrid made simple, ABDR provides advantages to customers while relieving them of the complexity and administrative burden of management and operation. Turnkey from start to finish, ABDR offers customers great gain with little effort. An energy solutions provider like NRG installs, manages, and operates the system, which is tailored to a customer's needs. The provider can even own it, if desired.

Regardless, the business customer makes little or no capital investment, but instead pays only for its energy services. So ABDR offers easy implementation, long-term budget certainty, reliable operation, risk management, and a quick return on investment.

But there is more to the story. The provider manages the system within the energy retail and wholesale markets, bringing years of commercial and technological know-how. As a result, the ABDR system becomes a financial resource.

Virtually all aspects of ABDR are coordinated by the provider's team — from the design and configuration of distributed energy resources, management of all third-party commodity agreements, and support of grid reliability. The provider even coordinates bill management through a single monthly billing program that can deliver substantial savings.

The energy system — the 'asset-backed' part of the name — creates microgrid reliability. If there is an energy service interruption, the power can stay on for an ABDR customer.

Further, at times ABDR can provide demand-side management for the customer. For example, it can turn on its on-site generation when grid energy is more expensive than the cost to operate the distributed energy system. Conversely, if energy prices are lower than ABDR production, the provider will arrange for the customer to take grid power.

This kind of sophisticated management gives rise to the second part of the name: demand response. An ABDR system can provide capacity, energy, and ancillary services to PJM wholesale markets. The ABDR system collects payment for making itself available to do so and if dispatched, receives additional revenues for providing these services.

25 PJM Begins Process to Study How Utility Connected Microgrids Fit in its Market, Microgrid Knowledge, Peter Maloney, 11 June 2019.

It is important to note that customers with ABDR do not have to cut back on operations to curb use of grid power. No lowering of lights or turning up temperatures required. Instead, the ABDR system switches on its on-site generators (i.e. distributed energy resources), which reduces the customer's energy use and enables demand response payments. In a region rich in natural gas, like PJM, a natural gas generator may be a logical form of distributed energy for an ABDR system to employ.

ABDR offers a win for everybody. The customer has a holistic energy system and predictable energy spend. Generation is on-site yet managed with the sophistication of a grid asset. The distribution and transmission grids have a flexible resource to call upon. And the digital age finds itself with electrical service that lives up to its quickly changing needs.

Action PJM businesses can take now

Two expert partners, NRG Energy and Cummins, stand ready to assist businesses interested in securing the cost and reliability benefits of ABDR. Together, the partners offer deep knowledge of energy markets, financial backing, and ownership, maintenance, and operation of equipment.

Working with this team, a business can immediately improve its energy position. As the ABDR system is being installed, NRG can help:

- Create less complex and more accurate energy bill management
- Identify energy reductions through energy efficiency audits
- Improve commodity supply contracts that leverage bulk purchases for greater cost efficiencies

Coupled with ABDR, these services position PJM businesses to leverage the best of the new energy world. It is the right market and the right time.

About NRG Energy, Inc.

At NRG, we are redefining power by putting customers at the center of everything we do. We create value by generating electricity and serving over 3 million residential and commercial customers through our portfolio of retail electricity brands. A Fortune 500 company, NRG delivers customer-focused solutions for managing electricity, while enhancing energy choice and working towards a sustainable energy future. More information is available at nrg.com. Connect with NRG on Facebook, LinkedIn and follow us on Twitter at @nrgenergy.

About Cummins

Cummins Inc., a global power leader, is a corporation of complementary business units that design, manufacture, distribute and service a broad portfolio of power solutions. The company's products range from diesel and natural gas engines to hybrid and electric platforms, as well as related technologies, including battery systems, fuel systems, controls, air handling, filtration, emission solutions and electrical power generation systems. Learn more about Cummins here. Follow Cummins on Twitter, and on YouTube.