

NewGen NEWS

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Feature Article: Microgrids - Threat, Opportunity, or Both for Utilities?



It is difficult to pick up any energy industry publication or read an article in the paper about the utility market without seeing the term microgrid. While a more recent addition to the mainstream energy conversation than the trendy topics of rooftop solar, electric vehicles (EV), or Nest thermostats, microgrids may be the platform for key customers to sever from the conventional grid or advance distributed renewable generation. Microgrids have entered the discussion because they hold the promise of optimally integrating, facilitating, and operating localized generation, distributed renewables, EVs, energy storage, and managed demand. Simply put, a microgrid is a smaller or “micro” version of the larger electrical grid capable of balancing distributed generation or power supply and consumption resources to maintain electrical service within its boundaries.

As with the other trends listed above, microgrids will further drive utilities to make an uncomfortable decision: should we offer and sell more than just electricity to our customers? As microgrids and related technologies evolve, they may erode one of a utility’s best customer classes: high consumption, high load factor customers such as industrial parks, campuses, or data centers.

Microgrids are currently difficult to justify on a solely economic or cost savings basis. Most existing applications were driven out of reliability or related needs. In addition, many microgrids currently in operation were supported with grants from the federal government and/or state energy commissions and governments. However, given their potential benefits, microgrids are increasingly discussed as a key element in the continued evolution of the energy market and utility services.

Microgrids are expanding from their historical applications - island, combined heat and power, campus, or remote applications. Microgrids are now championed for their potential benefits of integrating renewables and energy storage applications and

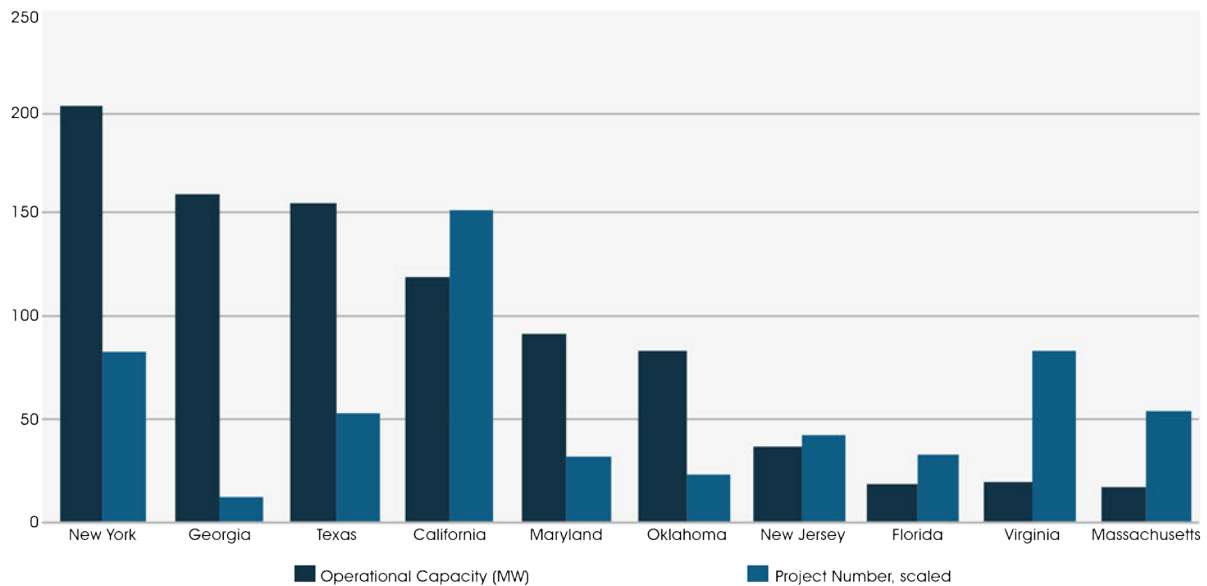
improving reliability on an increasingly variable grid. Few utilities own and operate microgrids due to the customer-specific versus broad nature of the benefits. However, that is changing given the increasing demands on the grid. Utilities are now investing in microgrids for resiliency (e.g. the ability to withstand catastrophic events) purposes and where reliability can be significantly improved. Recent weather events, such as Super Storm Sandy and even wildfires in California, are driving further interest in grid resiliency and microgrid applications.

The U.S. DOE Microgrid Exchange Group defines microgrids as a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that act as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island-mode.

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Current Microgrid Capacity in the U.S.



Source: GTM Research

As expected after Super Storm Sandy, Massachusetts, New Jersey, and New York have all recently announced plans including funding microgrids for grid modernization, renewables, and resiliency purposes. We are also seeing trends from historically single isolated microgrids to 'clusters', or groups of smaller microgrids clustered together to create a larger, more dynamic and resilient microgrid. Com Ed was recently awarded a \$1.2 million grant from the U.S. DOE to begin building and testing a master controller to manage and operate clusters of microgrids in and around the Chicago area. Individual clusters are being identified for microgrids that include a diverse mix of critical infrastructure, assets, or services. These clusters will eventually be operated together, as one larger microgrid, by the master controller to further harden the system and improve resiliency.

In Southern California, SDG&E operates what they believe to be the largest microgrid in the U.S. (by count of customers) at 1,000 customers in Borrego Springs, California.⁽¹⁾ Borrego Springs is an isolated, small community of about 3,400 people, about a 90-mile drive northeast of San Diego. The microgrid includes rooftop solar photovoltaic (PV), a utility-scale PV array, battery storage, and two diesel generators. Until 2009, the Borrego Springs community routinely experienced outages lasting hours and up to days due to the single, 30-mile sub transmission line serving the community. In 2009 the initial microgrid began operation and maintained power critical to municipal needs during these outages. Now, this initial microgrid is expanding to provide power to the broader community during scheduled and unscheduled outages.

With growing interest in renewables, self-generation, and reliability, it is not unexpected that microgrids

are increasingly discussed as a key element in the continued evolution of the energy market. The military has increasingly become a leader and test bed for renewable and energy security applications; and microgrids are no exception. Citing security benefits and reliability at home and abroad, the military has goals to decrease energy intensity by 3% annually and generate 25% of their electricity from renewable sources.

The U.S. Army's Net Zero initiative aims to improve resource (e.g. water, solid waste, and energy resources) security and increase operating flexibility to the point that an installation produces its own energy and water supplies in addition to reducing/reusing/recycling all solid waste on site. Microgrids are a key strategy for the U.S. Army and military to achieve their goals and integrate renewables. The military's investment in microgrid capacity is expected to nearly triple in the next three years to approximately 55 MW.

Data centers and energy parks are also growing markets and applications for microgrids. The Niobrara Energy Park in Northeast Colorado, at a maximum capacity of 650 MW, has been dubbed the "world's largest planned microgrid" by Forbes.⁽²⁾ The energy park is ideal for a microgrid sitting at the nexus of transcontinental fiber backbones, regional electric transmission lines, and interstate natural gas pipelines. Initial approvals for the energy park include natural gas generation, 50 MW of PV, energy storage, and the ability to export 200 MW or more of electricity to Denver or beyond.

While costs for microgrids are still prohibitive in many cases, their growth is likely to continue with further advancements expected. Storage is one of the key elements to unlocking the benefits and cost-effectiveness of a microgrid; however, battery storage

(1) Key, Peter. (2015, July). Warming up to microgrids. *Energy Biz*

(2) Asmus, Peter. (2014, August). My Microgrid's Bigger Than Yours. *Forbes*. Retrieved from <http://www.forbes.com/sites/pikeresearch/2014/08/21/my-microgrids-bigger-than-yours/>.

economics remain elusive. That may be changing as recent developments and broader trends point towards a better alignment of cost and benefits. A recent report by AECOM noted battery prices may be cut in half by 2020, further supporting microgrid growth. Similar to other emerging technology regulations, California is leading the way by requiring three large utilities acquire 1,325 MW of energy storage capacity by 2020. If California's bet, along with Tesla's recent battery announcements further drive the costs of batteries down, inquiries by institutional or industrial customers about microgrids may increase substantially and rapidly.

Under current technology expectations and market trends, the microgrid market is expected to grow by more than 350% in the next five years to almost \$830M per year with ideal sizes between 2 and 40 MW.⁽³⁾ If you are a utility serving an institutional, military, or critical load, you may expect a call in the near future about how you could benefit from a microgrid, if you have not

received one already.

The question for most of our clients and utilities, similar to past emerging trends, will be to cede the opportunity of a new service to a third party or to provide the service itself. Will utilities take a "wait and see" approach or proactively engage these customers with an interest in microgrids and emerging technologies to collaborate and derive mutual value from the effort? Local utilities are still seen as a trusted expert and advisor to customers on how to conserve and optimize energy consumption. This is an opportunity for utilities to build on this trust and provide new services, operate a microgrid on behalf of an institutional customer for a fee, and improve reliability for the critical needs/customer while benefiting the broader community. If utilities cede the opportunity, they may see continued demand destruction and loss of revenues similar to trends in energy efficiency technologies and distributed generation, only this time, it may be one of their largest customers.

(3) Saadeh, Omar. (2015, July). North American Microgrids 2015: Advancing Beyond Local Energy Optimization. *GTM Research*. Retrieved from <http://www.greentechmedia.com/research/report/north-american-microgrids-2015>.



Energy Insights

March of the markets – utilities/entities entering ISO markets

In the last 12 months, APS, PacifiCorp, NV Energy, and Puget Sound Energy have joined or announced they will be joining CAISO's energy imbalance market (EIM). By the fall of 2016, the CAISO EIM will include all or a portion of eight western states (AZ, CA, OR, WA, NV, UT, ID and WY) and serve more than 35 million people in the West. This will leave seven states in the U.S. without some form of an energy market (e.g. ISO or EIM), and six of those states are located in the Southeast. Colorado is now the lone Western state without some form of a market.

SCOTUS Strikes Down Mercury Regulations (MATS)... for now

On June 29th, the U.S. Supreme Court struck down the U.S. EPA limits on mercury emissions for power plants (mercury and air toxic standards or MATS). While this was initially seen as a potential victory for many coal-fired power plants and utilities, it does not materially impact the original rule. The ruling likely just extended the date by which all plants must comply with the rule. The U.S. Supreme Court remanded the rule to the D.C. Circuit Court and required the U.S. EPA to consider costs within the rule, but stopped well short of requiring any

cost-benefit analysis. The eventual result of the ruling is likely to provide a further extension to those plants not already in compliance; however, many plants across the U.S. have already upgraded to comply with the rule.

Energy Project Highlight

Financial Planning Services CPS Energy, Texas

NewGen recently delivered a financial planning and budgeting tool for CPS Energy. The model consolidated multiple financial reports and analyses into a single tool. The model was custom built to integrate seamlessly with CPS' existing accounting system, automate the upload of key financial reports, and provide CPS' finance team with the tools to evaluate financial performance on a monthly basis, as well as project financial results over a 25-year period on monthly, quarterly, or annual basis. The model also included a custom dashboard on the CFO's desktop with the key performance indicators that mattered most to her, providing an easier and timely method to monitor CPS' financial performance.



Water, Wastewater, and Stormwater Insights

Final Clean Water rule announced

On May 27th, the U.S. EPA announced the final changes to the proposed Clean Water Rule. Published copies

[Water, Wastewater, and Stormwater Insights cont.](#)

of the rule are currently available on the U.S. EPA's website. The final rule, which was amended to address concerns expressed regarding the scope of the waters to which the Clean Water Act would apply, is slated for adoption in the fall of 2015 unless forestalled by other Congressional action.

Record breaking ending to drought in Plains

During May 2015, drought coverage in the nation reduced 12.84% according to the U.S. Drought Monitor (USDM). According to the USDM, this represents the "second-greatest decrease in the 16-year history" of the USDM. The USDM also reports that "statewide drought coverage fell from 68 percent to 5 percent in Kansas, from 59 to 0 percent in Oklahoma, from 51 to 17 percent in Colorado, and from 31 to less than 1 percent in Texas." Drought continues to remain a concern on the West Coast with 70% of the State of California in extreme or exceptional drought. Further, since May parts of Texas and Kansas have been placed back under an "abnormally dry" status. Utilities need to continue to carefully monitor their rate revenue streams during these wet periods as reduced consumption in the summer months may have an adverse impact on the utility's financial condition.

Constitutional ruling on tiered water rates

In April, an appeals court in Orange County, California ruled that a previously applicable tiered water rate structure adopted by San Juan Capistrano was unconstitutional. The ruling affirmed that the rates violated California Proposition 218 as they were not tied to cost of service principles. The rates being challenged were subsequently changed in 2013 prior to the appellate court decision. Utilities should remain aware of this ruling and may wish to evaluate the compliance of or defensibility of their current tiered pricing structures with the marginal cost of providing service.

Changes to Water and Wastewater Regulation in Texas

The Public Utility Commission of Texas (PUC) is currently in the process of amending the substantive rules for water and wastewater providers operating in the State, as well as amending the rate filing package and annual reporting forms used by these utilities. These amendments are required by bills filed during the 83rd session of the Texas Legislature transferring economic regulation of water and wastewater utilities from the Texas Commission on Environmental Quality to the PUC. The amended rules were considered in open session in July and deliberations are on-going. NewGen is supporting the Office of Public Utility Counsel (OPUC) in these efforts as described in the following Project Highlight.

EPA asserts no widespread water pollution from fracking

In a draft report released in June, the U.S. EPA has found that hydraulic fracturing associated with oil and gas well drilling has not "led to widespread, systemic impacts on drinking water in the United States." While the Agency has recognized instances in which such practices have or have the potential to impact drinking water supplies, evidence of widespread water pollution does not exist. The draft report is currently under review and comment.

Water, Wastewater, and Stormwater Project Highlight

Regulatory Rule-making Support Office of Public Utility Counsel, Texas

The OPUC, which serves as the independent consumer advocate for utility customers within the State of Texas, has engaged NewGen to provide expert advice and assistance associated with the PUC's amendment to the water and wastewater substantive rules, rate filing packages, and annual reporting forms. NewGen is assisting OPUC in reviewing the proposed changes and providing technical guidance to OPUC staff through the comment and adoption process.



Low commodity prices dent hauler revenues

First quarter (Q1) results for America's largest publicly traded waste management companies indicate recycled commodity pricing is driving significant losses. Comparing Q1 2014 to Q1 2015, recycling related revenues, Waste Management, Waste Connections, Republic Services, and Progressive Waste Solutions were down an average of 20.5%. Low recycled commodity pricing was identified by all four as a major driver for the decreases.

Paper recovery rate rises above 65 percent

The U.S. paper recovery rate edged up slightly in 2014 according to the American Forest & Paper Association. The U.S. paper recovery rate grew to 65.4% in 2014, from 2013's rate of 63.5%, or 1.9 percentage points. The paper industry has a goal of 70% by 2020.

The industry's goal to achieve higher recovery rates comes as the amount of paper generated each year continues to decline. In 2014, 78.21 million tons of paper were generated versus 105.32 million tons in

Solid Waste and Recycling Insights cont.

1999 (the highest amount ever recorded).

U.S. EPA releases its annual report on municipal solid waste generation

As reported in the June 19, 2015 issue of the Waste 360 Daily Wire, the U.S. Environmental Protection Agency has released its annual report on municipal solid waste generation. The report, [*Advancing Sustainable Materials Management: Facts and Figures 2013*](#), has been renamed from previous years when it was called *Municipal Waste in the United States: Facts and Figures*.

Solid Waste and Recycling Project Highlight

Procurement

Santa Fe County, New Mexico

NewGen was retained to assist the County in the management of a solid waste and recycling collection procurement. The County is interested in more comprehensively managing solid waste and recycling activities throughout the County. As part of that objective, NewGen is assisting in the preparation of the Request for Proposal (RFP), evaluation of the proposals, and ultimate negotiations with the private hauler(s). Services to be provided by the private hauler(s) will include automated curbside solid waste and recycling collection, and potentially bulky waste collection.



Recent Hires

Nancy Casselberry, Marketing/Administration

Austin, Texas | ncasselberry@newgenstrategies.net

Ms. Nancy Casselberry joined NewGen in July 2015. Prior work experience includes working as a marketing and communications project manager for a software company and working with a non-profit organization to help small businesses develop marketing and financial plans. Prior to that Ms. Casselberry worked at a public relations firm developing and executing advertising and promotional

plans for national and regional firms. She graduated from the University of Texas with a B.S. in Communications.

Texas Rural Water Association's Training & Technical



Conferences and Seminars

Conference - July 16, 2015

Mr. Dave Yanke spoke at the Texas Rural Water Association's Training & Technical Conference in Galveston, Texas on July 16th. His session was titled "Rate Fairness for Big and Small Customers". This session discussed the arguments made for offering discounts to large water users, as well as why they perhaps should not be offered. Mr. Yanke addressed potential cost disparities and how to address them from a rate standpoint as well as from an educational perspective.

2015 TPPA Annual Meeting - July 20, 2015

Mr. Joe Mancinelli and Mr. Max Bernt spoke at the TPPA Annual Meeting in a session titled Establishing Effective Financial Policies for your Utility. The session discussed important considerations in establishing the financial policies and metrics including debt service coverage, capitalization ratios, and reserves.

State of Texas Alliance for Recycling (STAR), Compost Council Summit & Training - October 7, 2015

Mr. Dave Yanke will be speaking at the State of Texas Alliance for Recycling (STAR), Compost Council Summit & Training in Denton, Texas on October 7th. He will be presenting the findings of a commercial food waste collection study NewGen just completed for the Houston-Galveston Area Council. His presentation will identify the challenges, opportunities, and solutions associated with the collection of commercial food waste within H-GAC's 13-county planning region, an area with over 6 million people.

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