



Microgrid 2017

CONFERENCE

Nov. 6-8, 2017 • Boston, MA



Workshop 1:

Business Models For Microgrid Deployment

Location: Georgian Room

Introduction

Joseph Sullivan

VP Energy Policy and Development

jsullivan@concord-engineering.com

Office 856-427-0200

Mobile 856-298-9016



Topic

Microgrid Implementation Models

In this presentation we will examine the various development and ownership models currently being used and proposed for Microgrids.

- Privately Owned Campus or single user microgrids
- Third Party Owned Campus microgrids on contiguous property
- Utility owned microgrids on contiguous property
- Utility owned microgrids on non-contiguous properties (Urban systems)
- Hybrid Utility and private owned microgrids.



Key Definitions

- Microgrid (DOE & EPRI)
- A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid and that connects and disconnects from such grid to enable it to operate in both grid-connected or “island” mode
- MRC adds that a microgrid also provides a significant amount of normal power on-site generation



Key Definitions

Combined Heat and Power (CHP)

The production of electric power and thermal energy from one source of fuel

Distributed Generation

Generation on-site can be CHP, generators w/emissions control, emergency generators, solar PV, battery or Storage

Resiliency

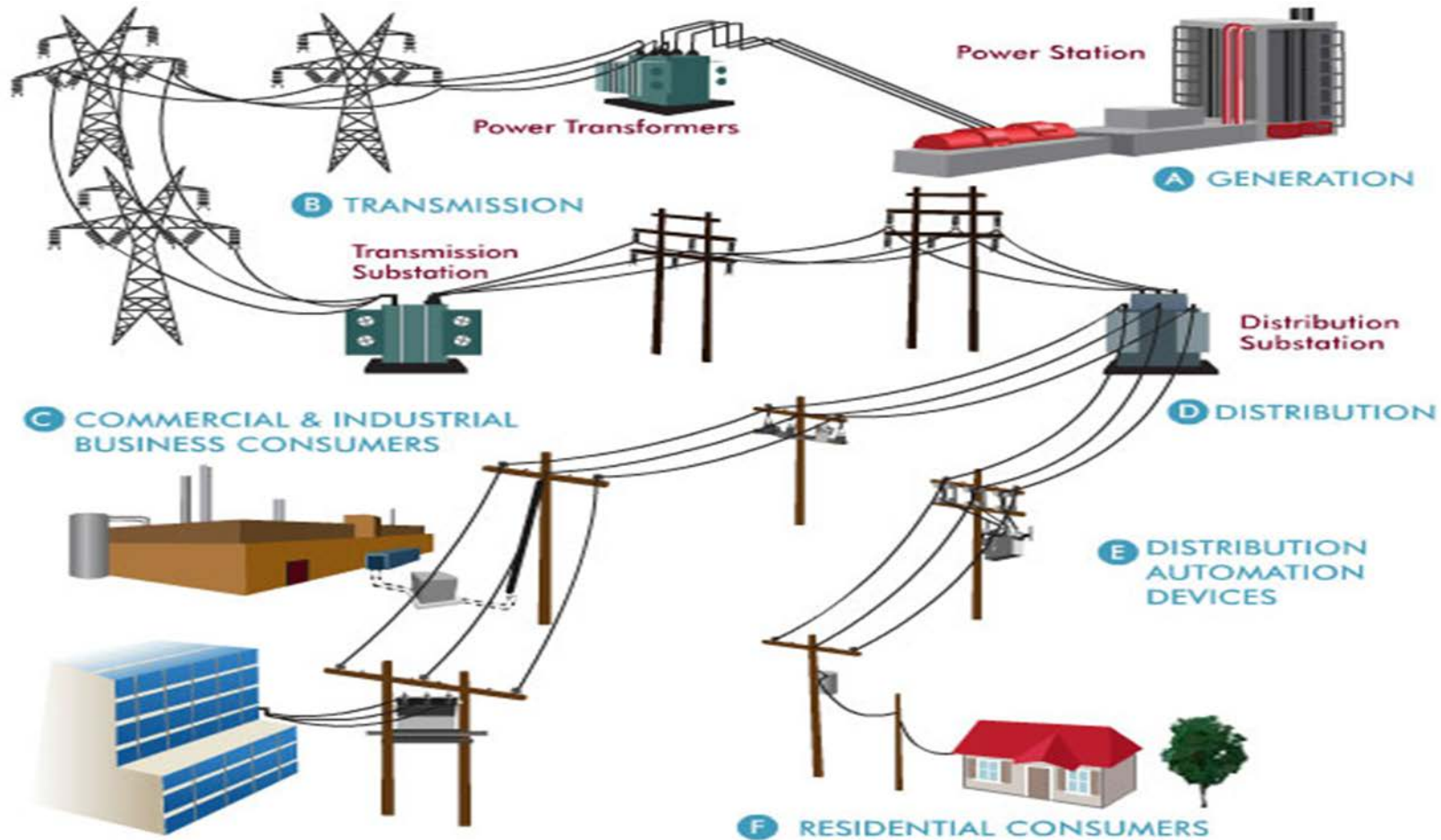
The ability of an onsite power system or microgrid to be able to operate for an extended time period (minimum 72 hours) disconnected from and independent of the electrical grid. Providing the host site with all critical power needed to sustain essential operations.



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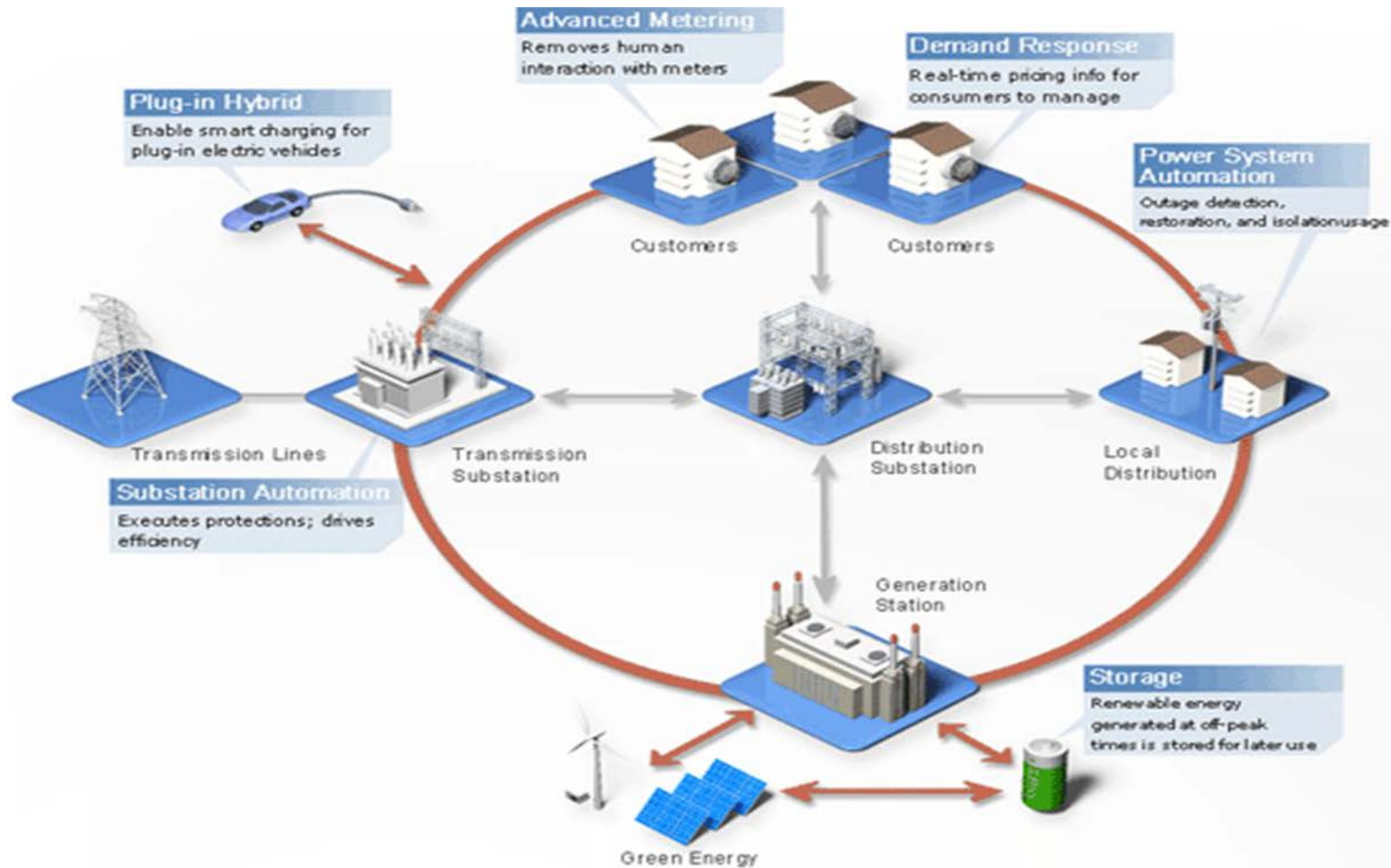
Current Electric Grid



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Future Electric Grid

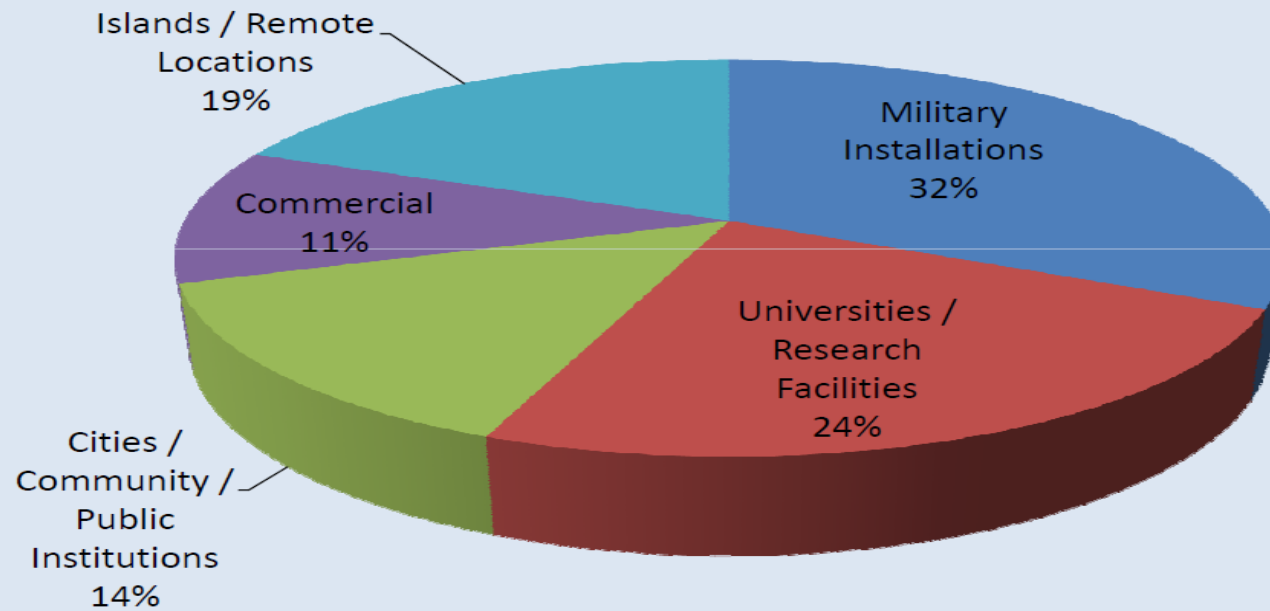


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Microgrid Deployment

Who Is Building Microgrids?



Source Data: GTM Research

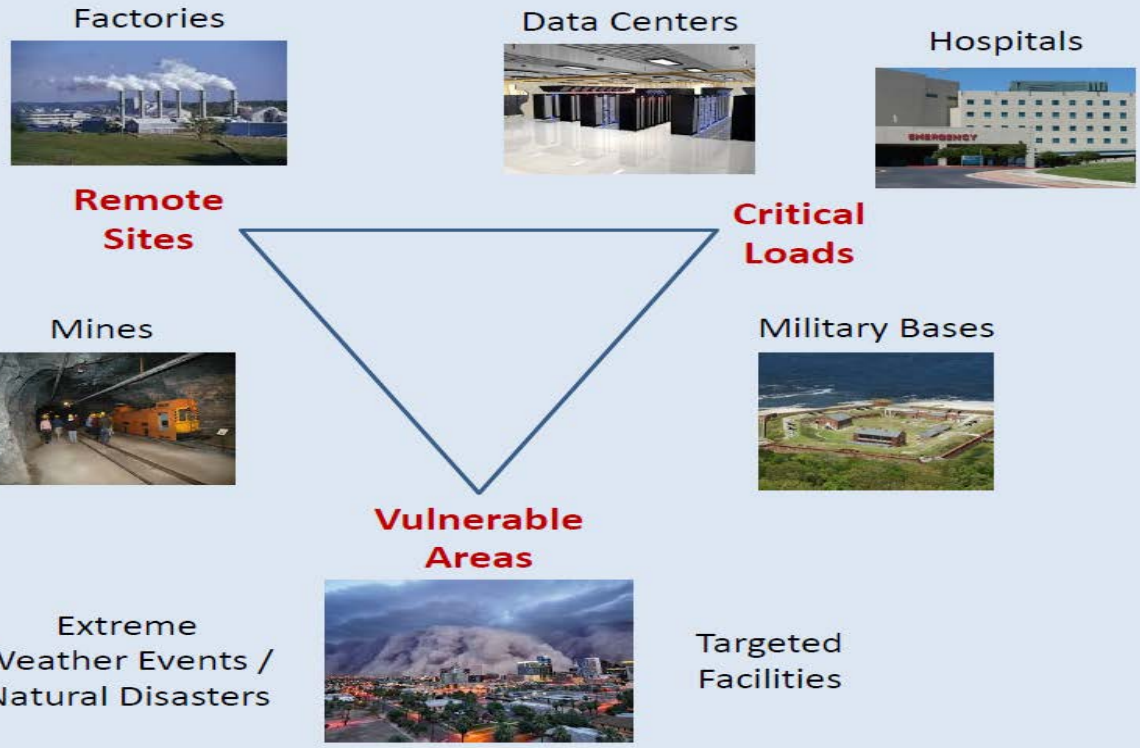


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Value Proposition

Who Benefits from Microgrids?



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Ownership or Development options

1. Privately Owned Campus or single user microgrid
2. Third Party Owned Campus Microgrid on Contiguous property
3. Utility owned microgrid on contiguous Property
4. Utility owned microgrid on non-contiguous property (urban)
5. Hybrid utility and private owned microgrids

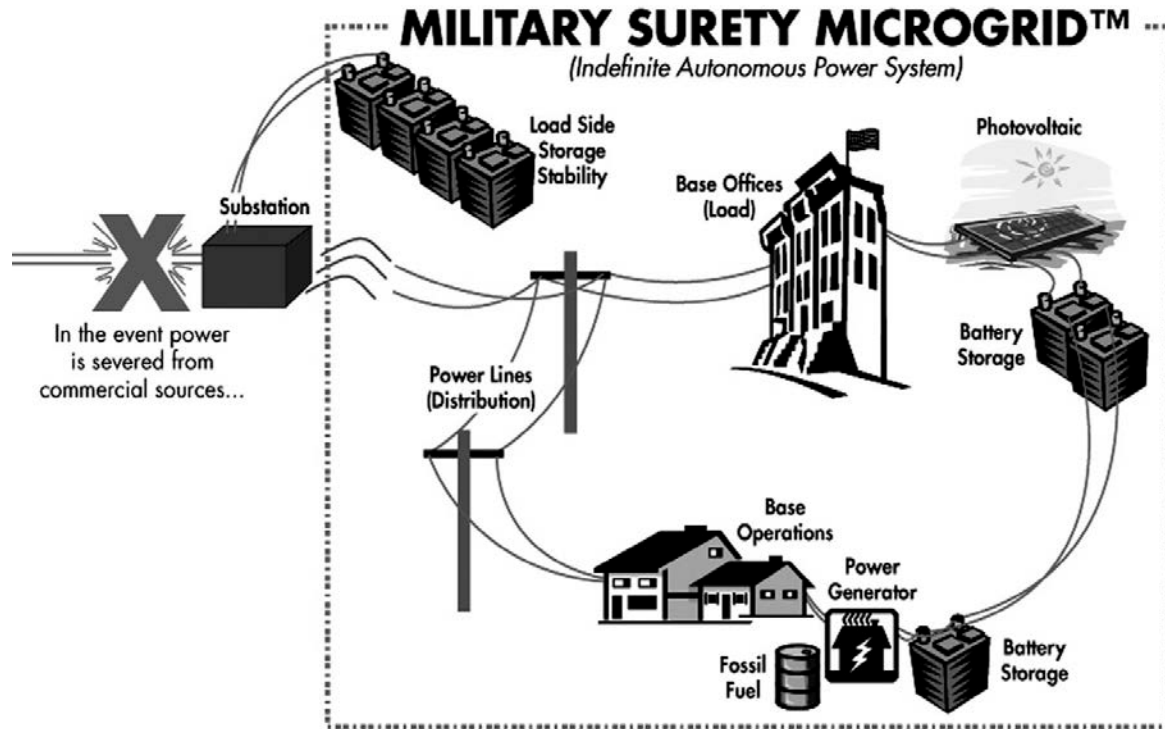


Privately Owned Campus or Single User Microgrid (Traditional Private Wires)

- Single contiguous property
- Electric power integral to microgrid typically CHP
- Electrical distribution by owner
- Chilled Water distributed from Central Plant
- Hot Water/Steam distributed from Central Plant



Private Owned Campus Contiguous Property Military Base Example for Single User Microgrid (Private Wires)



- Ownership Options

1. Privately owned generation and wires and pipes Campus, Hospital, Base
2. Third party owned generation private wires and pipes (U MD)
3. Third party owned generation, wires and pipes (MSU)
4. Proposed Utility owned (mostly prohibited in deregulated markets)

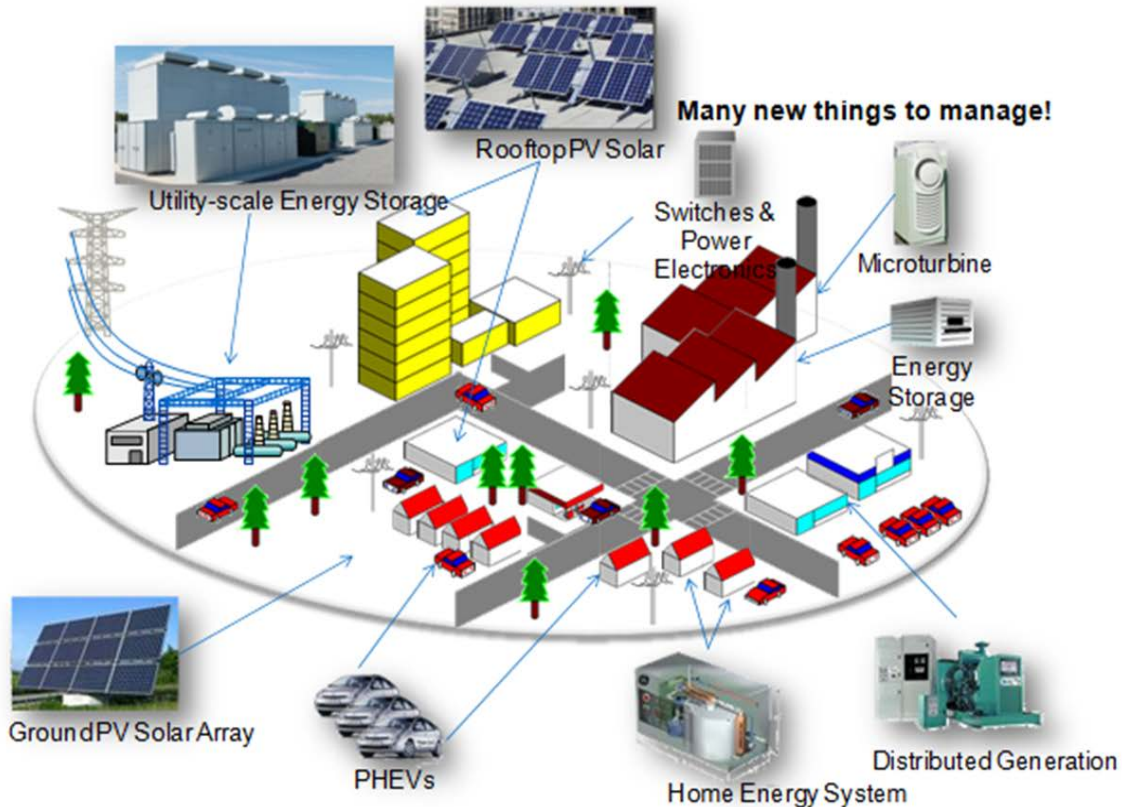


Utility Owned on Contiguous or Non Contiguous Property (Urban)

- Multiple properties/buildings within defined area individually metered EDC service
- Microgrid islandable power source DG, solar & batteries, CHP
- Electric power sold/delivered to participants through regulated utility
- Chilled Water may be distributed from Central Plant
- Hot Water/Steam may be distributed from Central Plant



Community or Urban Microgrid



Ownership Options

- Utility owned electrical power source utility owned wires and no district energy/pipes
- Utility owned electrical power source private wires and private district energy/pipes (Shands Hospital Gainesville Municipal Power)
- Utility owned electrical power source and wires with private district energy/pipes (TDEC)
- Third party owned electrical power source Utility owned wires no district energy/pipes
- Third party owned electrical power source, Utility owned wires and private district energy/pipes (Proposed Connective Thermal and TDEC)



Illinois utility's microgrid first to 'island' nearby residential customers

- The Ameren microgrid includes a 100-kilowatt wind turbine, 125-kilowatt solar array, 250-kilowatt battery and the two 500-kilowatt natural gas generators and a largely automated control system that ties all the pieces together. This setup allows Ameren Illinois to seamlessly transition customers from microgrid supply to the larger grid and back without any interruption.
- In the near-term, Ameren Illinois hopes the microgrid can improve reliability for the more than 190 nearby homes it can power. In the event of a disruption to the broader power grid, the Ameren microgrid can “island” itself away from the rest of the system and continue to supply power to its local customers.



Same State Different Flavor

- The Illinois Institute of Technology, a university on Chicago's South Side, runs on an \$18.5 million, 9-MW microgrid – which the school says had a payback period of five years.



The Current Regulatory Environment

- General regulatory climate has been favorable to DG and net metering, but ambivalent or frequently adversarial about microgrids (DUKE “microgrids are ok as long as we own them”)
- PURPA QF paved the way for onsite CHP
- First most frequently cited barrier: requirement for microgrid to have public utility status as precondition for electric sales to others (with exception of onsite or sometimes contiguous property)
- Second most frequently cited barrier: franchise violations when selling to utility customers or running wires across public rights-of-way
- Interconnection issues exist, but these have substantial precedent for CHP and DG and are manageable
- Utility and regulatory common perception: if utilities are doing their jobs, then microgrids should not be necessary (Storm Hardening)



Obstacles

- Standby Charges
- Who pays (i.e. all customers on microgrid, owners, generators, etc.)
 - What is appropriate level?
 - Tariff design ISO, EDC
- Exit Fees Recovery of System Costs (California) Poison Pill
- Interconnection Costs
 - Engineering Studies
 - Distribution System Upgrades
- Siting of power sources
- Relationship with Incumbent Utility



District of Columbia Public Service Commission (May 2017)

- A debate is occurring before the DC PSC as it considers microgrid policy within its larger grid modernization plan (FC 1130).
- Two industry giants squared off on the issue in recent comments filed before the commission.
- Exelon, one of biggest utilities in the United States, pushed for a utility role, while NRG Energy, the nation's largest independent power producer, urged the commission to ban utilities from owning and building microgrids and other forms of distributed energy.
- Similar debates are brewing in other states.



Arguments favoring utilities as microgrid owners

- The debate over banning utility affiliates revolves around the idea that the utility will use its market clout to favor its affiliates in competitive situations.
- Exelon argued that legal separations exist to put a wall between utilities and their affiliates.
- Two of Exelon's competitive affiliates are positioned to build microgrids. One is Exelon Microgrid, which is developing 10 to 200 MW microgrids in New York. The other is ExGen/Constellation, which serves about 225,000 commercial and industrial customers in D.C., New York, Connecticut, Illinois, Maryland, Massachusetts, New Jersey, Ohio, Pennsylvania and Texas, as well as more than 2.5 million residential customers.
- ExGen/Constellation wants to partner with its customers to install microgrids and other distributed energy resources with the money the commission plans to allot for demonstration projects this will not be possible if the commission were to adopt the recommendation to exclude affiliates from participating.
- Exelon also argued that blocking utility affiliates from the program will likely lower the number of pilot projects proposed, which undermines "the entire purpose of the program—to identify the best technologies for modernizing our energy delivery system and make the system more reliable, efficient, cost-effective and interactive."



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Arguments against utilities as microgrid owners

NRG maintained that utility ownership of microgrids and distributed energy should be “extremely limited.” Reasons that NRG cited include:

- Competitive companies are “uniquely positioned” to develop microgrids because they are often highly customized to satisfy the needs of individual electricity customers. Given the high degree of customization and differentiation among customers, “this is not the place for the monopoly utility,” NRG said. “Utility service is intended to be broadly available and non-discriminatory, and utility cost-recovery is designed to spread costs among customers.”
- It will be hard for regulators to ensure that utilities do not leverage their local name recognition and resources funded by regulated rates to gain market advantage.
- As microgrids and distributed energy become more common, the distributed grid will become more complex. Utilities will need to focus their resources on managing the new reality. (NY REV DSPP)



Some Proposed Favorable Regulatory Approaches

- Establish a clear (but sufficiently broad and flexible) definition of microgrids, with corresponding rights and responsibilities within the electrical grid
- Provide an equitable methodology for compensation of services provided by microgrids to the regulated grid, and for standby-services provided to the microgrids by regulated entities
- Support unbundling and the growth of a diversity of services on the grid, both by and to microgrids, and where these are competitively provided, allow market-based pricing and/or unregulated offerings
- Establish and maintain a level playing field for all services provided on the grid, with utilities, their affiliates, and third parties given the right to provide any or all of these services, subject to appropriate codes-of-conduct
- Identify when and under what conditions utilities can own, operate, and/or partner with microgrids – either completely, or in part



Update from New Jersey NJ Town Center Distributed Energy Resources (TCDER) microgrids

New Jersey suffered devastating damage from the impacts of Superstorm Sandy and other major storms and weather events. The NJ EMP 2015 Update contained a new section on hardening and improving utility infrastructure resiliency which supports the establishment of Distributed Energy Resources (DER) such as microgrids to improve the grid's resiliency and reliability in the event of a major emergency.



NJ Town Center Distributed Energy Resources (TCDER) microgrids

- Jan. 25, 2017 agenda meeting, the NJ Board of Public Utilities authorized the opening of an application period for Town Center microgrid feasibility studies.
- The program was developed to provide incentives for local and state government agencies to study the feasibility of TCDER microgrids.
- Applicants were limited to local government entities or state agencies which own or manage critical facilities



NJ Town Center Distributed Energy Resources (TCDER) microgrids

June 30, 2017 the NJBPU approved \$2 million in funding for 13 applications for Town Center Distributed Energy Resource Microgrid feasibility studies.

Studies were approved for Atlantic City, Camden County, Cape May County MUA, Galloways Township, Highland Park, Hoboken, Hudson County, Middletown Township, Montclair Township, Neptune Township, Paterson, Woodbridge Township, and the State of New Jersey Department of Treasury with the partners Mercer County, Mercer County Improvement Authority and Trenton.



Questions?

Joe Sullivan Concord Engineers

jsullivan@concord-engineering.com

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