Community Microgrids:
Time for a New Regulatory Compact?

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Introduction

• **Objectives:**
  - Gain an understanding of the regulatory history of electricity in the U.S.
  - Learn how that history has resulted in the current “regulatory compact” that has existed for the better part of 100 years
  - Identify how the introduction of competition has resulted in regulated and deregulated markets at both the wholesale and retail levels
  - Examine actual microgrid projects in several different states
  - Explore how changes to the regulatory compact are required to allow for the proliferation of community microgrids
Overview

• **Roadmap:**
  – Brief History of Electricity Regulation
  – Overview of U.S. Markets Today
  – Microgrid Case Studies
  – Regulatory Challenges for Microgrids
  – Opportunities for a New Regulatory Compact
Overview

• **Community** = Utility-Scale (not Campus or Remote) Microgrids
  – **Definitions:**
  
  ➢ Generally, a microgrid is a small, localized network within a clearly defined electrical boundary consisting of end-use customers (load); distributed energy resources (DER); the wires connecting DER to the load (distribution assets); and the metering and communication technologies that balance DER and load, and enable it to operate in either grid-connected mode or in island mode (controls)

  » DER may include distributed generation such as diesel generators, CHP, solar; energy storage, EVs; energy efficiency, demand response and other demand side management
Overview

- **Community** = Utility-Scale (not Campus or Remote) Microgrids
  - Definitions (cont.):
    - Campus microgrids serve a single customer site or facility such as a university, military base, or corporate or industrial facility
      - Campus microgrids can operate in parallel with the grid under normal conditions and also serve as a back-up source of power during a blackout
    - Remote microgrids, in contrast, are off-grid systems that may be found on islands, remote villages, or remote industrial facilities where it is technically or economically infeasible to interconnect with the grid
Overview

• **Community** = Utility-Scale (not Campus or Remote) Microgrids
  – **Definitions (cont.):**
    - Community microgrids serve multiple customers across multiple properties within a community, such as a hospital, police station, grocery store and gas station
    - Community microgrids integrate with the local utility by utilizing the existing distribution-level infrastructure and can operate in parallel with the grid under normal conditions and serve as a stand-alone source of power during an outage
A Brief History of Electricity Regulation

• In the beginning…
  – Industrialization
  – Private investors (IOUs)
  – Municipalities (Muni’s)
  – Rural electric cooperatives (Co-op’s)
A Brief History of Electricity Regulation

- **Vertically integrated utility**
  - One entity (IOU/muni/co-op) owns & operates the generation, transmission, and distribution of electricity to its customers

Image: Energy Information Administration
A Brief History of Electricity Regulation

• Vertically integrated utility
  – Avoid duplication
  – Economies of scale
  – Natural Monopoly
A Brief History of Electricity Regulation

• The Regulatory Compact

The State gives the utility:

– Exclusive franchise territory
– Recover and earn a return on prudent capital investments
– Power of eminent domain
– Limitation on liability

The utility gives the public:

– Obligation to serve all
– Service quality standards
– Consent to regulation
– Just and reasonable rates
Overview of U.S. Markets Today

• Federal Law vs. State Law

<table>
<thead>
<tr>
<th>Federal</th>
<th>State</th>
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<tbody>
<tr>
<td>• Transmission in Interstate Commerce</td>
<td>• Generation</td>
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<td>• Federal Energy Regulatory Commission (FERC)</td>
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<td>• State Public Utility/Regulatory Commissions</td>
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Overview of U.S. Markets Today

• **Steps toward competition (Federal)**
  – FERC Order No. 888
  – FERC Order No. 2000
Overview of U.S. Markets Today

• **Steps toward competition (Federal)**
Overview of U.S. Markets Today

• **Steps toward competition (States)**
  – Deregulation (or restructuring) of retail electricity markets
  – No longer vertically integrated utilities
  – Unbundled rates
  – Retail choice
Overview of U.S. Markets Today

- Steps toward competition (States)
Overview of U.S. Markets Today

• **Steps toward competition (States)**
Overview of U.S. Markets Today

• **Quick Recap:**
  - For about 100 years or so, the U.S. electricity market has consisted of vertically integrated utilities that are regulated as monopolies.
  - The passage of PURPA, EPAct 1992, and FERC Order No. 888, in particular, led to deregulation and competition at the wholesale level.
  - States began to move toward deregulation and competition at the retail level, but that process was largely halted.
    - Most States have traditional (monopoly) regulation of vertically integrated utilities; while some States are deregulated and allow retail competition in generation.
Microgrid Projects in Regulated & Deregulated Markets

• Traditional (monopoly) State examples:
  – Alabama
    - Alabama Power’s Smart Neighborhood™ Project
      - Serves 62 new, high-efficiency homes tied to a new microgrid & local grid
      - DERs consist of solar array, energy storage, and natural gas-fired generator
      - Partnership among Alabama Power, DOE, Oak Ridge National Laboratory, Signature Homes, EPRI, various vendors
      - $1.8 million from DOE; undisclosed cost share from Alabama Power; presumably those costs rate based since microgrid provides larger grid reliability
      - Alabama Power owns & operates all components of the microgrid
Microgrid Projects in Regulated & Deregulated Markets

• **Traditional (monopoly) State examples:**
  – North Carolina
    - Duke Energy’s Proposed Hot Springs Microgrid Project
      - The microgrid will serve the Town of Hot Springs via the town’s only feeder, will provide grid support when grid-tied, and can island in emergencies
      - DERs will consist of 2 MW (AC) solar PV and 4 MW of energy storage
      - The cost of the project was redacted in the public version of the CPCN application
      - Duke Energy will rate base the project as a non-wires alternative to needed upgrades on its system
      - Duke Energy will own & operate all components of the microgrid
Microgrid Projects in Regulated & Deregulated Markets

• Deregulated (competitive) State examples:
  – Illinois
    ➢ ComEd’s Bronzville Project
      ▪ To serve 10 community facilities: police headquarters, health clinics, schools, public works buildings, restaurants, among others
      ▪ The microgrid will consist of a solar array, energy storage, diesel back-up generators, and other yet to be determined DERs
      ▪ It will interconnect with an existing, already operational microgrid and the two microgrids will communicate with each other as a “microgrid cluster”
      ▪ ComEd will not own generation assets; competitive bid or lease
Microgrid Projects in Regulated & Deregulated Markets

• Deregulated (competitive) State examples:
  – Illinois (cont.)
    ➢ ComEd’s Bronzville Project (cont.)
      ▪ $5 million from DOE; $25 million to be rate based by ComEd
      ▪ Illinois Commerce Commission accepted ComEd’s rationale for rate basing these assets: the learnings of the project will benefit all of ComEd’s customers
      ▪ ComEd also agreed to work with others to develop a microgrid services tariff and to address third party owned microgrids in its footprint
Microgrid Projects in Regulated & Deregulated Markets

• Deregulated (competitive) State examples:
  – Maryland
    ➢ Baltimore Gas & Electric “Public Purpose” Microgrids
      ▪ Public Purpose: provide specific benefits to citizens during critical times
      ▪ The Maryland PSC rejected the proposal on several grounds, including:
        » the traditional ratemaking process could have been used instead of a surcharge;
        » no cost-benefit analysis had been performed supporting rate base approach;
        » lack of investment from the intended beneficiaries or from BGE’s shareholders;
        » lack of state or federal funding resources;
        » no proposal to include third party participation in the design;
        » “island mode” would conflict with Maryland’s retail choice laws
Microgrid Projects in Regulated & Deregulated Markets

• **Deregulated (competitive) State examples:**
  – **Maryland (cont.)**
    - **Pepco Public Purpose Microgrids**
      - Pepco proposed to rate base the costs of the two microgrids
      - The Maryland PSC rejected the proposal for some of the same reasons it rejected the BGE proposal, including:
        - lack of microgrid participant contribution;
        - failure to seek state or federal funding resources; and
        - the cost-benefit analysis did not support using a rate based approach
Microgrid Projects in Regulated & Deregulated Markets

• Partially Deregulated (select customers only) example:
  – California
    - SDG&E’s Borrego Springs Project
      - Serves 2,800 customers, 2,500 of which are residential customers
      - DERs include diesel generators, energy storage, demand response, and solar PV, including customer-owned rooftop solar
      - Partnership among SDG&E, DOE, Pacific Northwest National Laboratories, University of San Diego, various vendors
      - $8 million from DOE; $2.8 million from CEC, $2.8 million in private funding from SDG&E and vendors, and $4.4 million rate based by SDG&E
      - SDG&E owns & operates all components of the microgrid (except rooftop solar)
Microgrid Projects in Regulated & Deregulated Markets

• **Key Takeaways:**
  – In both the traditional or deregulated markets, the proposed and approved microgrid projects:
    ➢ owned and operated by distribution utilities
    ➢ rate based at least some portion of the cost
  – Thus, even in competitive markets, the current regulatory compact favors the distribution utility business model and cost recovery
  – So what?
Regulatory Challenges for Microgrids

• **Barriers, generally:**
  – Definitions
  – Degree of regulation
  – Interoperability
  – Interconnection Standards
  – Cybersecurity
Regulatory Challenges for Microgrids

• **Barriers within traditional markets:**
  - Franchise rights may exclude non-utility ownership of microgrids
  - Non-utility would need to obtain utility status to
    ➢ make electric sales
    ➢ cross rights-of-way
  - Cost-based ratemaking acts as disincentive to reduce cost
    ➢ energy efficiency & demand response
Regulatory Challenges for Microgrids

• **Barriers within deregulated markets:**
  
  – Utilities are prohibited or limited in owning generation (DER)
    ➢ Disincentive for utilities to pursue microgrids
  
  – Non-utility microgrid still needs access to distribution system
    ➢ Interconnection Rules
    ➢ Stand-by Charges
    ➢ Exit Fees
Opportunities for a New Regulatory Compact

• **State-level Initiatives:**
  
  – Grid modernization
    - NY REV, DC MEDSIS, IL NextGrid, among others
  
  – Microgrid tariffs
    - Hawaii and California
  
  – Grants and Programs
    - MA, NY, NJ, CT, CA, others
Opportunities for a New Regulatory Compact

• National/Federal-level Initiatives:
  – IEEE 1547
    ➢ Interconnection standards
  – FERC DER Aggregation Proceeding
    ➢ Participation in RTO markets
Opportunities for a New Regulatory Compact

• **Quid pro quo:**
  – Changes to the regulatory landscape should not be limited to the distribution utilities, microgrids should also see changes:
    ➢ **Definitions** regarding the different types, sizes of microgrids
    ➢ **Standards** applicable to microgrids
      ▪ Interconnection
      ▪ Reliability
      ▪ Cybersecurity
    ➢ **Regulation** of microgrids depending on type
      ▪ Utility? Electric supplier? Something else?
Opportunities for a New Regulatory Compact

• New Regulatory Compact:
  – If these initiatives are implemented, what would be the result?

  ➢ State-distribution utility compact
    ▪ The State grants the utility a franchise for distribution assets if…

  ➢ State-microgrid owner compact
    ▪ The State permits a microgrid owner to operate if…
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