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# Community Microgrids: Time for a New Regulatory Compact?

IDEA2019: The Energy for More Resilient Cities

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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)

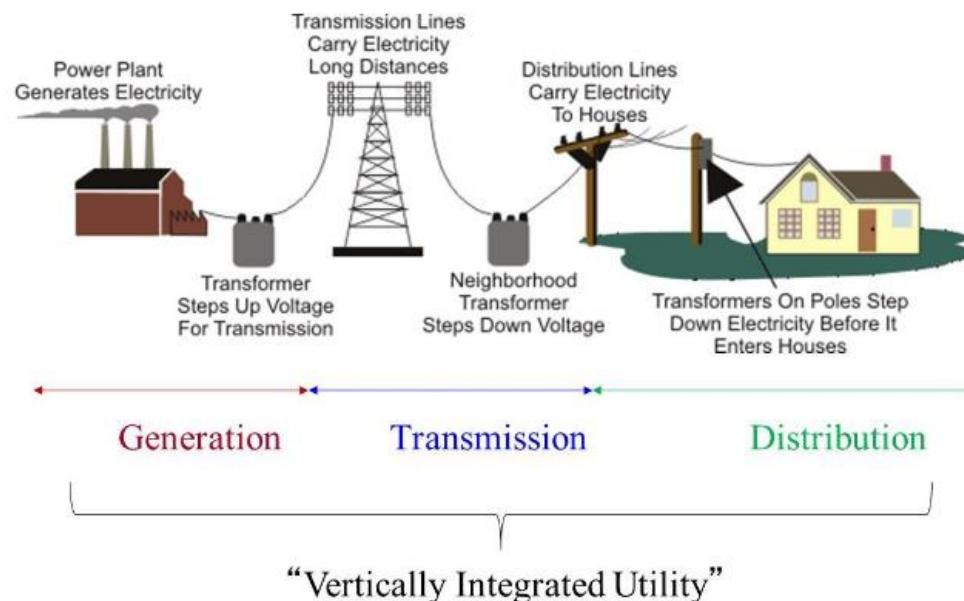




# A Brief History of Electricity Regulation

- **Vertically integrated utility**

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





# 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**

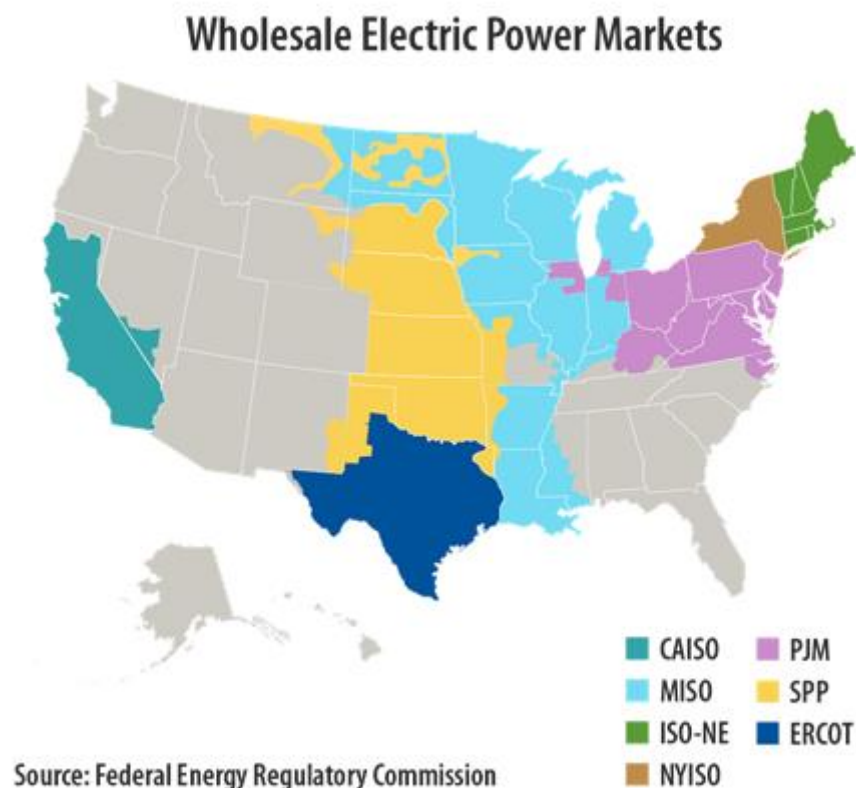
Federal	State
<ul style="list-style-type: none"><li>• Transmission in Interstate Commerce</li><li>• Wholesale Sales</li><li>• Federal Energy Regulatory Commission (FERC)</li></ul>	<ul style="list-style-type: none"><li>• Generation</li><li>• Distribution</li><li>• Retail Sales</li><li>• State Public Utility/Regulatory Commissions</li></ul>

## Overview of U.S. Markets Today

- **Steps toward competition (Federal)**
  - Public Utility Regulatory Policy Act of 1978 (PURPA)
  - Energy Policy Act of 1992 (EPAAct 1992)
  - 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)**

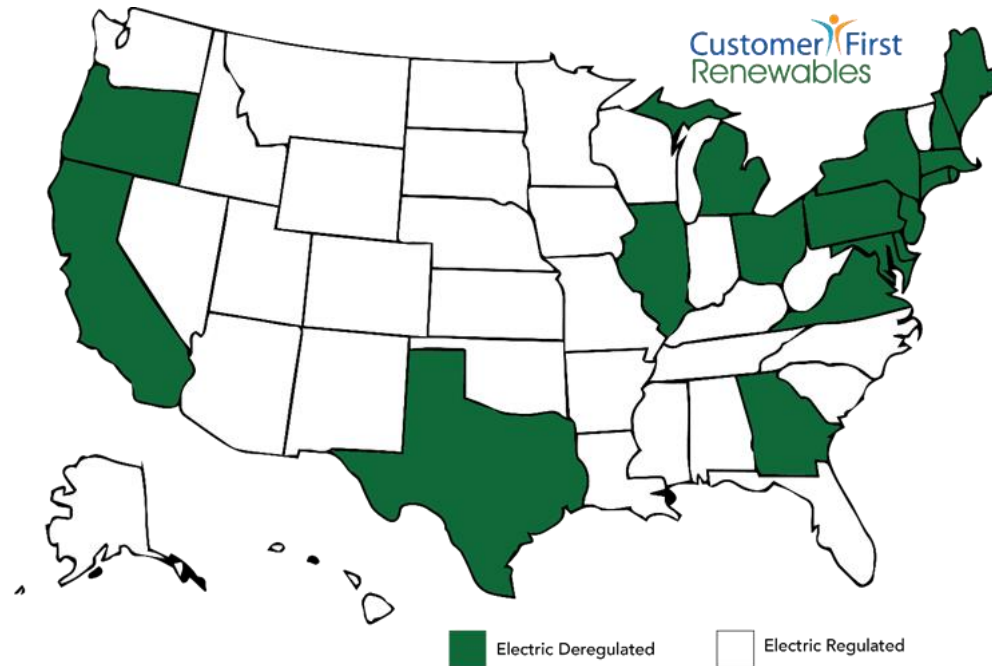


Image: Consumer First Renewables

<http://competitiveenergy.org/consumer-tools/state-by-state-links>

## 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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