

# Enabling Regulatory and Business Models for Broad Microgrid Deployment

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# Outline

1. Introduction
2. Vision for the Future
3. Review of Microgrid Business Models
4. Key Regulatory Considerations, Issues, Challenges
5. Emerging Regulatory Practices
6. Discussion of Suggested DOE Microgrid R&D Program Activity

# Introduction

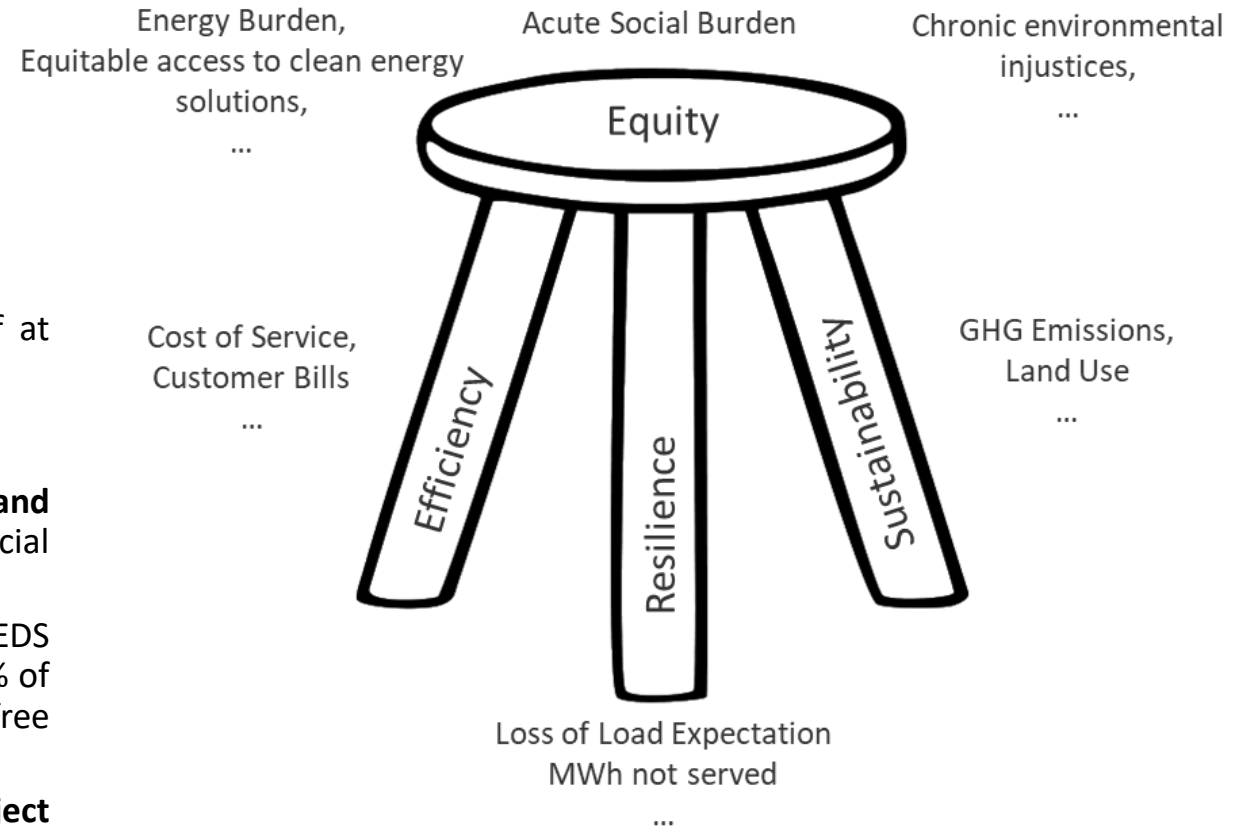
*The United States electricity sector is moving to a more distributed future. Microgrids offer a pathway to this future by providing opportunities to reduce costs and emissions while bolstering the resilience of the nation's electricity system.*

## Vision

- Facilitate a transition to a **more resilient and reliable** electric grid
- **Decarbonize** the electricity infrastructure
- **Reduce the cost and implementation time** of microgrids.
- Support **equitable energy transition** through prioritized provision of at least 40% of microgrid benefits going to disadvantaged communities

## Goals

- Promote microgrids as a core solution for increasing the **resilience and reliability** of the EDS, supporting critical infrastructure and reducing social burdens during blue and black sky events
- Ensure that microgrids serve as a driver of **decarbonization** for the US EDS by acting as a point of aggregation for larger number of DERs, with 50% of new installed DER capacity within microgrids coming from carbon-free energy sources by 2030.
- **Decrease microgrid capital costs** by 15% by 2031, while reducing **project development, construction and commissioning** times by 20%.



# 1. Purpose of Topic 7

- Vision

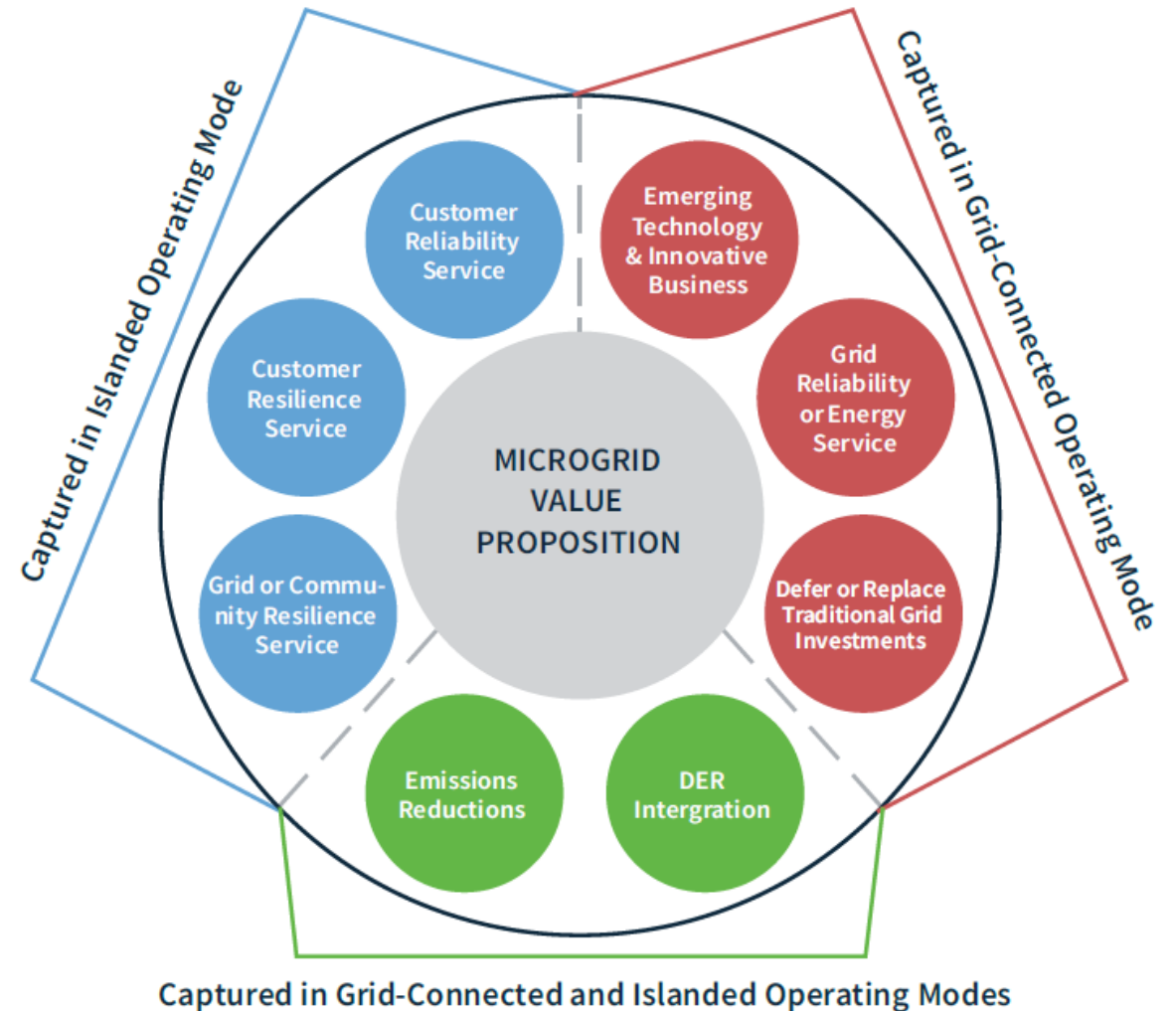
- A future in which utility regulatory frameworks and approaches enable prudent microgrid investment from the private sector, regulated utilities, communities, and states
- This future will see microgrids as not only an essential resilience solution, but also as a core building block for power system planning and operations featuring higher penetrations of DER

- Goals

- Systematically identify a variety of regulatory and institutional issues involved in microgrid deployment across a variety of microgrid use cases and business models
- Focus specifically on the issues facing multi-property or multi-party microgrids
- Summarize recommended activities for the DOE Microgrid R&D Program

# 1. Microgrids offer a variety of value streams

- Trend toward higher proportion of distributed generation assets leads to:
  - Change in architecture, planning, and operations
  - Change in the enabling regulatory environment(s)
- Microgrids offer a building block for this energy future
  - Flexible and scalable opportunity to achieve balance between resilience, emissions, cost – with focus on equity
  - Particularly unique offering in the resilience dimension due to islanded operation ability
- This multi-value-stream type of investment is both an opportunity and a challenge
  - Microgrids may not fit neatly into a single regulatory or business model paradigm
  - Different typologies, resource mixes, and regulatory environments mean there's no one-size-fits-all approach



Source: Smart Electric Power Alliance, 2020

## 2. Specific vision for the future

### **Regulatory and business model aspects that support the top-level vision:**

- Confident development of appropriate and cost-effective microgrids supported by a fair and just regulatory environment
- Regulatory constructs that appropriately value microgrids, while ensuring microgrids pay fairly for the services they use
- Regulatory constructs that do not preclude microgrid solutions
- Future-proofed policy and regulatory frameworks that can accommodate the pace of technological advancement
- Technical standards and interconnection processes that allow stakeholders to integrate systems within/across utility service territories
- Overarching framework that ensures investments continue to equitably benefit and protect the public

# 3. Microgrid Use Cases

These use cases describe the major category of application, the primary function, and the intended customers for microgrids

Facility-level	Campus-level	Public Purpose
Remote	Community	Non-wires Alternative "Anchor"
Temporary	Networked (future case)	Utility Pilots

# 3. Microgrid Business Models

We define a microgrid business model as the means by which a microgrid project is planned, developed and operated, covering both technical and commercial aspects

Owner Financing,  
Operation &  
Maintenance (single  
customer)

Owner Financing with  
Utility/Private O&M  
(single customer)

Privately-Owned  
Microgrid-as-a-service  
or Power Purchase  
Agreement (single  
customer)

Utility Financed (single  
customer)

Utility Rate Base, Multi-  
Property

Privately-Owned Multi-  
Property

Publicly-Owned Multi-  
Property

# 3. Case Studies of Existing Microgrids

## **Blue Lake Rancheria**

- Use case: Community, Public Purpose
- Business model: Publicly-owned multi-property
- Solutions: Direct public purchase of distribution infrastructure

## **Bronzeville**

- Use case: Community, Public Purpose, ~Networked, Pilot
- Business model: Utility Rate-Base Multi-Property
- Solutions: Pilot support from DOE, one-off reg approval due to pilot (“learning value”)

## **Montgomery County, Maryland (2x)**

- Use case: Facility-level, Public Purpose
- Business model: Privately-owned microgrid-as-a-service / PPA
- Solutions: Gov-signed long-term contract for energy and resilience services; developers comply with interconnection; devs utilize gov contract to secure financing

# 4. Key Regulatory Considerations, Issues, and Challenges

Regulatory considerations and challenges can be distinct depending on the ownership structure and use case of the microgrid. We focus on the following two combinations:

## **1. Utility Rate Base Multi-Property Microgrid**

- a. Community-level Microgrids
- b. “NWA Anchor” Microgrids
- c. Networked Microgrids

## **2. Privately-owned Multi-Property Microgrids**

- a. Community-level Microgrids
- b. Networked Microgrid

# 4. Issues for ALL Multi-Property Microgrids

1. Lack of Clarity on Microgrid Ownership Rules
2. Lack of Clarity on Microgrid Component Ownership Rules
3. Traditional Interconnection Standards, Rules, and Procedures Do Not Address Issues Unique to Multi-Property Microgrids
4. Lack of Clear Definition for Resilience
5. Lack of Standardized, Accessible, and Credible Methods to Quantify the Value of Resilience
6. Lack of Institutional Experience with Microgrids
7. One-Off Evaluation of Projects

# 4. Issues for Utility Rate Base Multi-Property

## **Across Use Cases**

1. Lack of Clear Incentives to Deploy Microgrids
2. Lack of Clear Conditions for Regulatory Approval
3. Storage Asset Ownership
4. Lack of Established Consumer Protections for Participating Customer-owned DER

# 4. Issues for Utility Rate Base Multi-Property

## **Specific to Community Microgrids**

1. Regulatory Concerns Surrounding Equity
2. Lack of Standard Methods to Determine Fair Cost, Benefit, and Risk Allocations
3. Lack of Regulatory Requirements for Utilities to Consider Microgrids during Planning
4. Lack of Technical Performance Standards During Islanding Conditions
5. Treatment of Partial Requirements Service (PRS) Customers

# 4. Issues for Utility Rate Base Multi-Property

## **Specific to Utility-owned NWA Anchor Microgrids**

1. Lack of Existing Practice or Regulatory Requirements for Utilities to Consider NWA during Planning
2. Lack of Standardized Approaches, Business Models, and Roles for Designing NWA
3. Lack of Alignment Between Optimal NWA Design and Optimal Microgrid Design
4. Lack of Clear Regulatory Standard for Incremental Investment Justification
5. Lack of Unified Regulatory Treatment (e.g. separate proceedings)

# 4. Issues for Utility Rate Base Multi-Property

## **Specific to Utility-owned Networked Microgrids**

1. Addressing Fair Compensation for Customer-owned DER under Direct Utility Control
2. Lack of Peer-to-Peer Energy Trading and Distribution Network Wheeling Framework

# 4. Issues for Privately-owned Multi-property

Generally, even farther afield than utility-owned multi-property

Across all Use Cases

1. Utility Economic Disincentives under Cost-of-Service Regulation
2. Lack of institutional Experience Designing Microgrid Services Tariffs for Resilience
3. Lack of Clarity on Jurisdiction/Applicability of Public Utility Regulation
4. Lack of Clarity on Terms, Conditions, Tariffs, and Consumer Protection Rules
5. Exclusivity of Franchise Agreements
6. Lack of Rules Governing Electricity Retailing by Non-Utility Microgrid Owners
7. Lack of Rules Governing Utilization of Utility Distribution Network Lines
8. Lack of Clear Technical Interconnection Procedures
9. Lack of Precedent or Framework for Intra-Microgrid Peer Trading
10. Lack of Clarity on Ability to Seek Remuneration During Blue Sky Conditions
11. Lack of Clarity on Ownership of Microgrid Equipment

# 4. Issues for Privately-owned Multi-property

Specific to Networked Microgrids

1. Lack of Precedent or Framework for Inter-Microgrid Peer-to-Peer Trading
2. Lack of Institutional Experience Regulating Cyber Security

# 5. Emerging Regulatory Practices

## Hawaii PUC Docket 2018-0163

- Act 200 directed HPUC to establish “microgrid services” tariff
- Aims to formulate an interconnection and compensation framework for privately-owned, multi-property community microgrids
- Tariff focused on compensating for resilience benefits (while other compensation issues may be addressed in other dockets)
- How to prove “broad based public benefits?”
- HPUC has signaled openness to allowing distribution-level wheeling during outages (when utility infrastructure used for the microgrid)

# 5. Emerging Regulatory Practices

## CA PUC Rulemaking 19-09-009

- Driven by SB 1339, directing CA PUC to further develop policies related to microgrids
- Open proceeding, aims to:
  - accelerate deployment of microgrids and other resilience solutions in response to wildfire-driven public safety power shutoffs
  - identify and address regulatory issues to facilitate the commercialization of a variety of microgrids, with an emphasis on multi-property microgrids.
- Track 1 suite of short-term solutions including:
  - Standardized, pre-approved system designs for interconnection
  - Methods to increase simplicity and transparency of microgrid approval
  - Prioritizing interconnection at key locations, facilities, or customers
- Track 2 has 6 actions, including
  - Local gov microgrids allowed to provide electricity to critical needs customers on adjacent parcels (limited)
  - Creation of microgrid tariff (a simplifying mechanism)

## 6. Proposed Activities to Fill Gaps

### Higher level philosophical approach

- Meeting regulatory bodies where they are today
- Addressing regulatory barriers through technical innovation, where possible
- Pushing the envelope with visions of the future role of microgrids

# 6. Proposed Activities to Fill Gaps

## **Training and Direct Institutional Support**

- Direct TA to regulators on multi-property microgrid regulatory framework
- Support for “regulatory sandbox” microgrid pilots
- Multi-property microgrid regulation “boot camp”

## **Tools and Methods**

- Quantifying the value of resilience in regulatory proceedings

## **Collation of Existing Resources**

- Improved dissemination of efforts on resilience for local governments
- Curated information library on microgrid regulation
- Microgrid modeling tools’ usability and usefulness improvements

# 6. Proposed Activities to Fill Gaps

## **New Information Resources**

- Model Interconnection Procedures for Multi-property microgrids
- Standardized microgrid system designs for interconnection of multi-property microgrids
- Reference book on microgrid services tariff design (including resilience)
- Systematic development and improved dissemination of regulatory case studies
- Handbook on integrating microgrids into utility planning

## **Forward Looking Activities**

- New coordination and communication architectures for privately-owned multi-property networked microgrid future
- “Future of microgrid regulation” workshop

# Thank you!

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Backup follows

# DOE efforts to date for microgrid-enabling regulatory and business model research

- NARUC and NASEO Microgrids State Working Group
- Voices of Experience industry engagement project focused on microgrids
- Several National Labs' research reports focused on regulatory and business model development
- Industry consultant tracking key state regulatory developments