

# Hawai'i Microgrid Tariff

IDEA Campus Energy 2020  
Microgrid Workshop  
Denver Colorado  
February 11, 2020

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# Hawai'i Grid

- Highest electricity prices – over 30 cents retail
- 49<sup>th</sup> in per capita electricity use (little thermal load)
- 43<sup>rd</sup> in carbon emissions
- 69% petroleum, 13% coal, all imported – a little LNG
- 4 times as much residential solar as utility scale solar
- Solar up to 70 percent of generation at peak some days
- Separate grid on each island
- Most population near coasts, at risk for storms

# Act 200

- “The purpose of this Act is to encourage and facilitate the development and use of microgrids through the establishment of a microgrid services tariff”
- “Any person or entity may own or operate an eligible microgrid project”
  - Not limited to utility customers, microgrid “residents”, or Hawai’i entities
- Development has been inhibited by: “a lack of standard terms regarding the value of services exchanged between the microgrid operator and the utility”
- A tariff designed to “provide fair compensation for electricity, electric grid services, and other benefits provided to, or by, the electric utility, the person or entity operating the microgrid, and other ratepayers”

# Tariff Proposal

# Microgrid Types

- Customer Microgrids
  - Don't use utility infrastructure
  - May have one or multiple customers
    - Landlord exemption
    - Not holding oneself out to serve the public
- Hybrid microgrids
  - Use utility infrastructure
  - Have multiple customers
  - Per PUC no “retail wheeling” for now
    - Means customers pay full retail rate

# Microgrid Operator

“Microgrid operator” means an entity that

- is the single point of operational communication and control between a microgrid project and the utility grid operator
- acts as the single point of financial responsibility for purchases and sales of energy and other services on behalf of the microgrid
  - except in instances where a utility provides direct energy delivery and metering to customers of a hybrid microgrid during grid connected mode

# Right to Establish Microgrids

- Any customer or group of customers or third-party developer acting on their behalf can form a microgrid subject to the interconnection requirements of the tariff.
- The owner and the operator of a multi-customer microgrid qualified under the tariff is not a public utility.

# Renewable Energy Standard

- Microgrids must advance state renewable energy goals
- Microgrids can deploy a "mixed resource profile" to include renewable energy but able to provide "extended grid support if necessary"
  - Long term resilience will (today) require fossil fuel
  - Back-up generation is frequently unreliable
  - The microgrid should be able to internally balance renewables for its own benefit and the benefit of the grid
- PUC suggests a rising standard



# Sales to Grid by the Microgrid

- Microgrids may provide services on a non-discriminatory basis under any available tariff, market, or procurement process now or hereafter operated by the utility for which they qualify
- Islanding at utility direction should be considered as a service separate from demand response.
  - It has different costs than typical demand response and may be provided in more limited circumstances
- May need a separate basis for delivering services in an emergency if the microgrid can help support a local portion of the grid
  - Requires the utility to create a more modular grid

# Sales of Energy to the Microgrid

- Energy provided to the microgrid is sold to the microgrid operator acting on behalf of included customers in the aggregate
  - In certain hybrid types, the utility bills its customers in the microgrid at regular tariff rates
- A microgrid operator purchasing in bulk for included customers should be eligible for any tariff for which its aggregate purchases qualify
- Microgrids should be able to opt-in to a time-of-use tariff.
- Charges for standby service (if any) reflect low likelihood of:
  - Simultaneous outages of all internal microgrid resources
  - Outages of multiple microgrids due to any common cause

# Interconnection

- Generally defer to the outline in the working group draft
- Consider requiring synchronous connection capability
- Treat the microgrid as a single controllable resource
  - Don't require separate standards for each included resource
  - Don't restrict resource combinations
- Address communication capability with the grid operator
  - May be addressed in individual service tariff requirements

# Hybrid Microgrids

	Type	Wires Ownership	Customer Billing	Sales to Grid
1.	Customer Hybrid	<ul style="list-style-type: none"><li>• Utility in whole or in part.</li><li>• “Lease” of wires.</li><li>• Wire maintenance as agreed in lease</li></ul>	<ul style="list-style-type: none"><li>• By Operator</li></ul>	<ul style="list-style-type: none"><li>• By Operator</li></ul>
2.	Billing Hybrid	<ul style="list-style-type: none"><li>• Utility in whole or in part.</li><li>• “Lease” of wires.</li><li>• Wire maintenance as agreed in lease</li></ul>	<ul style="list-style-type: none"><li>• By utility</li><li>• Utility bill passes through operator charges</li></ul>	<ul style="list-style-type: none"><li>• By Operator</li></ul>
3.	Utility Hybrid	<ul style="list-style-type: none"><li>• Utility in whole or in part.</li><li>• Wires maintained by utility</li></ul>	<ul style="list-style-type: none"><li>• By utility</li><li>• Full utility billing</li></ul>	<ul style="list-style-type: none"><li>• By microgrid customers or Operator as aggregator</li></ul>

# Other Hybrid Microgrid Issues

- Liabilities in all cases attach to the responsible party
  - The utility maintains the infrastructure and is responsible for failures due to maintenance (unless wires are leased)
  - In types one and two the microgrid operator is responsible for its operational errors behind the point of common coupling
  - In Type 3, the microgrid operator either:
    - Only “operates” in island mode and would have liability then
    - Or acts as aggregator for all included generation
- Need to establish a mechanism and basis for billing services in island mode for Type 3

# Resilience Payments

- Local governments and the Hawai'i Emergency Management Agency identify critical facilities for resilience
- Utility and PUC identify critical circuits that serve critical facilities
- Tariff provides scaled support for microgrids serving critical facilities and integrating with critical circuits based on level of criticality, level of threat, and size of microgrid, with credit for energy justice areas
- Can consider requiring microgrid to provide islanding services at direction of utility

# Other Tariff Issues

- Consumer protection
  - For multi-customer microgrids that include residential or small business customers
  - Based on existing landlord-tenant requirements
    - Requires full disclosure of terms at the beginning of the contract
- Operational Co-ordination
  - Especially around islanding
- Operator qualifications
- Microgrid services operation agreements

# Questions?

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“The economy is a subset of the ecology”