

Microgrids

Rationale, Value, Enablement

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The Microgrid Conversation

Independence

self-sufficiency, self-reliance,
autonomy, freedom, liberty

Security

state / feeling of being free
from danger or threat

Resiliency

capacity to recover
quickly from difficulty

NOT Financial

Control

maintain influence or
authority over

Safety

condition of being protected
from danger, risk, or injury

Microgrid Context

- Geographically collocated / electrically connected
- Local generation
- Parallel operation
- Electrically separable
- Islanded operation
- NOT Virtual Power Plant
- NOT Island Grid

Microgrid Value / Need

- Vulnerabilities / Risks
- Priority
- Cost

Policy / Legal Considerations

- Existing code
- Operational protocol / control
- Ownership
- Reliability responsibility
- Rate structure
- Cost allocation
- Value realization
- Data sharing
- Metering
- Verification
- Upgrade costs, use of existing infrastructure

Thank You

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Reference Material





“Official” Microgrid Definitions

“A microgrid contains multiple customers, multiple resources, [has] resource interconnection on both sides of the meter, [is] islandable, [and is] capable of providing grid services using existing distribution network, but potentially involving dedicated distribution infrastructure.”
(Microgrids: A Regulatory Perspective, CPUC Staff Paper, 2014)

“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. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island-mode.” (U.S. Department of Energy)





CPUC Staff Paper, 2014

Microgrids: A Regulatory Perspective

“State utility commissions must play a role in enabling the development of microgrids as part of the larger process of grid modernization...However, microgrid architectures and technical standards must adhere to requirements of reliability, environmental protection, safety, security and resilience...”

Issues to be addressed:

- Definition of a microgrid reference architecture
- Characterization of suitability of locations for microgrid development
- Establishment of market mechanisms to enable third party provision of microgrid services
- Determination of utility relationship to (and ownership of) microgrid
- Cost allocation

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Microgrids: CPUC Proceedings

- **Interconnection Proceeding**

- The application, technical review, and interconnection processes for each interconnection within a microgrid are the same as those for typical distributed generation interconnections under Rule 21.
- R.17-07-007. Comments due 8/2. Reply comments due 8/14.

- **Energy Storage**

- Up to 1,325 MW of storage by 2020
- Policy Objectives: Integration of renewable energy sources
- Storage Use Case: Use of storage to facilitate microgrids; Outage mitigation
- Benefits: Smooth transition to islanded operation and provide energy supply for the microgrid

- **Distributed Resources Plans Proceeding**

- Demonstration Project E: Microgrid





Distributed Resources Plan (R.14-08-013)

- The goal of the Distribution Resource Plans (DRP) proceeding is to move the state towards a high-penetration distributed energy resource (DER) future that accomplishes the goals of making the grid greener and producing ratepayer benefits.
- Within the DRP, the Microgrid Project goal is to develop a demonstration project where the Utility would serve as a distribution system operator of a microgrid where DERs serve a significant portion of customer load and reliability services.





Existing Microgrids

(per DOE definition as reported by California IOUs)

PG&E

- **Santa Rita Jail (Dublin, CA)**
 - 6.6 MW (Includes Diesel, PV, Storage, Fuel Cell and Wind)
 - Demonstrate the commercial viability of a Consortium for Electric Reliability Technology Solutions (CERTS) microgrid
- **Blue Lake Rancheria (Blue Lake, CA)**
 - 2 MW (Includes Diesel, PV and Storage)
 - Demonstrate implementation of Siemens new microgrid management software to manage distributed energy resources

SCE

- **Fort Irwin (Fort Irwin, CA)**
 - 8.6 MW (Includes Gas Turbine Generator, PV and Waste to energy)
 - Provide reliable source of energy during prolonged power outages

SDG&E

- **Borrego Springs (Borrego Springs, CA)**
 - 37 MW (Includes Generators, Batteries, PV, and Ultracap)
 - Operation of a community scale microgrid





DRP: Microgrid Demonstration Projects

- **SDG&E: Borrego Springs Microgrid**
 - Approved February 2017 (D.17-02-007)
 - Area is fed by a single transmission line
 - Microgrid is operational
 - High concentration of solar generation
 - Some energy storage is installed
 - Final project results by Q3 2018
- **SCE: North Area of Mono County**
 - Approved June 15, 2017 (D.17-06-012)
 - Area is served by single transmission line
 - Includes hydro generation from SCE-owned Poole Generation Plant (11 MW)
 - No existing microgrid.
 - Microgrid would include BTM Smart Inverters and Storage
 - SCE plans to use Smart Inverter Phase II communication protocols being developed as part of the Rule 21 proceeding
 - Final project results by Q4 2019

