

DOCKETED

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A Roadmap for Commercializing Microgrids in California

July 26, 2017

Rey Gonzalez

California Energy Commission

Jose Aliaga-Caro

California Public Utilities Commission

Peter Klauer

California Independent Systems Operator



Purpose of the Workshop

- Review the work completed to date
- Review information gained at the April 25, 2017 Microgrid Workshop in San Diego
- Review results of Energy Commission funded microgrid research designed to support the development of the Microgrid Roadmap
- Agree and prioritize the recommended actions and next steps identified at the April 25th workshop
- Develop the key elements need to develop the initial draft of the Roadmap for Commercialization of Microgrids in California.



Agenda

9:30	Opening Comments Energy Commission CPUC CAISO	Fernando Pina Jose Aliaga-Caro Peter Klauer
9:45	Recap of the Previous Microgrid Workshops	Mike Gravely (By WebEx)
10:00	New Energy Commission Microgrid research effort Results	Peter Asmus Navigant
10:40	Results from Microgrid Internet Survey	Jeff Root Ecotech Resources



Agenda

11:00am Review Key Recommended Actions for Draft Roadmap

Financial – Costs and Benefits
Peter Klauer, CA ISO

Regulatory – Opportunities and Challenges
Jose Aliaga-Caro , CPUC

Technical – Opportunities and Challenges
Rey Gonzalez, CEC

Noon – 1pm

Lunch Break



Agenda

1:00pm Review Key Recommended Actions for Draft Roadmap

Regulatory – Opportunities and Challenges
Jose Aliaga-Caro , CPUC

Technical – Opportunities and Challenges
Rey Gonzalez

3:00pm Addition of any New Roadmap Topics Rey Gonzalez
CEC

3:30pm Open Discussion All

4:00pm Overview of the Process for Drafting the Microgrid Roadmap Mike Gravely
(by WebEx)

4:15pm Discuss Next Step and Schedule for final Workshop in Late September Mike Gravely
(by WebEx)

4:30pm Adjourn All



Agenda

Recap of the Previous Microgrid Workshops

Mike Gravely
(By WebEx)



Recap of Previous Microgrid Workshops

- March 6, 2015 - Staff Workshop on Microgrid Assessment and Recommended Future RD&D investments.
- May 24, 2016 - Joint Energy Agency Workshop to Kick-Off the Development of a Roadmap to Commercialize Microgrids in California.
- September 6, 2016 - Staff Workshop Microgrids—Why are Customers Choosing Microgrids and How are they Working?
- April 25, 2017 - California Microgrid Roadmap Scoping Workshop



Recap of Previous Microgrid Workshops

Key Takeaways from Previous Work:

- Microgrids have Huge Potential
- Difficult to Develop Clear Business Case
- Need Clarifications on How Microgrids Best Fit
- Different Ownership Models
- Grant and Incentive Funding
- Need Clear Benefits and Value Streams



CALIFORNIA ENERGY COMMISSION

MICROGRID RESEARCH ROADMAP:
CASE STUDY HIGHLIGHTS
JULY 26, 2017

OVERVIEW OF NAVIGANT RESEARCH PROGRESS TO DATE

- **California and North America Microgrid Analysis and Case Studies**

- Identify microgrid projects which are or were funded by at least 50% private investment or non-governmental grant funding that are either online or will be online next year
- Develop case studies on up to 10 microgrid projects for California *and* North America, answering the following questions:
 - **What were the primary drivers behind the project?**
 - **How did the sponsor determine the value of investment?**
 - **What metrics were used to determine to support development?**
 - **What was total cost (and cost \$/MW)?**
 - **What was the business model and how was the project financed?**
 - **Did market participation revenue play a role in the business case analysis?**
 - **How many stakeholders were involved with the project?**
- ***Purpose of case studies:*** *What lessons can be learned from these case studies to help shape the CEC microgrid research roadmap? Is there a way to better target state R&D EPIC funding in order to meet state policy goals on climate change, renewable energy, distributed energy resources and grid modernization via microgrids?*

SUMMARY OF CASE STUDIES COMPLETED TO DATE (CA)

- **Nine California Microgrids Profiled: Summary Details**

- Projects total 21 MW of peak capacity
- Average size is 2.25 MW (153 kW to 13.5 MW is the size range)
- Solar PV and some form of energy storage is deployed in every microgrid
- Business models ranged from PPAs to owner financing to utility rate basing

- **Specific Project Highlights**

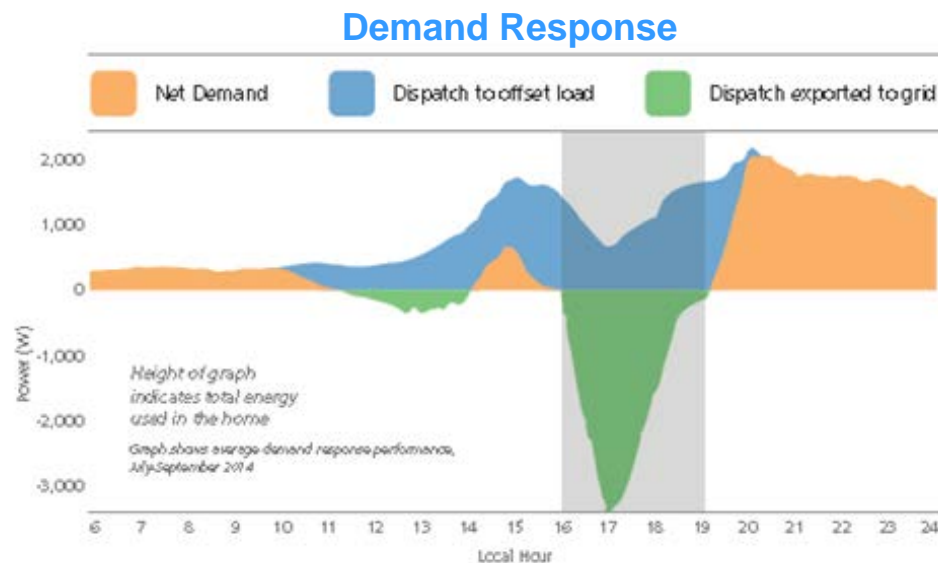
- **Wastewater Public Agency, San Bernardino, 13.5 MW, Advanced Microgrid Solutions**
- **Agricultural Operation, Oxnard, 1.5 MW, UniEnergy Technologies**
- **Affordable Housing Complex, Sacramento, 153 kW, Sunverge Energy**
- **Zoo, City of San Diego, 190 kW, Princeton Power Systems**
- **Winery, Rutherford, Napa Valley, 980 kW, Princeton Power Systems**
- **Farm/Winery, Sonoma, 1.2 MW, Wooster Energy Engineering**
- **Military Base, Oceanside, 354 kW, Cleanspark**
- **Unidentified Commercial Customer, Thousand Oaks, 2.4 MW, Cleanspark**
- **Private School, Ojai, 1 MW, JLM Energy**

PROJECT HIGHLIGHT #1: INLAND EMPIRE UTILITIES AGENCY

- **An incremental microgrid incorporating the following DERs:**
 - 3.5 MW of solar PV developed under a PPA
 - 1 MW wind turbine developed under a PPA
 - 2.8 MW fuel cell (powered by biogas) developed under a PPA
 - 3.65 MW of Tesla li-ion batteries developed under a EMSA (see below)
 - 2.5 MW of back-up diesel generators
 - Load controls and demand response (DR)
- **Advanced Microgrid Solutions (AMS) integrated batteries under a “Energy Management Services Agreement”**
 - IEUA paid no direct capital costs for “microgrid”
 - Project incorporates “virtual net metering”
 - IEUA pays fixed equipment fees to AMS
 - Also pays “bonus” fees to AMS if performance milestones are met
 - Once a savings threshold is met, shared savings arrangement kicks in
 - IEUA annual savings: a floor of \$55,000 and no ceiling
 - Savings flow from demand management and DR services to SCE and CAISO

PROJECT HIGHLIGHT #2: R STREET MIDTOWN PROJECT

- **A unique affordable housing project incorporating concepts of solar PV + energy storage nanogrids into a city block microgrid that also serves as a Virtual Power Plant (VPP) for SMUD**
 - West Coast's first net zero energy community development
 - Pacific Housing hopes to replicate affordable housing with solar + storage technologies in other California regions
 - DOE, SMUD & PG&E funds covered the energy infrastructure costs (10% of total housing project costs)
 - Overall project financed via home sales
 - In DR events, 100% of target storage capacity delivered to SMUD
 - 100% of reserve storage capacity for islanding of critical loads
 - Customers w/CPP saved \$50/month more on bills during test period
 - Homes sold out in 1 year



PROJECT HIGHLIGHT #3: SOLAR-TO-EV (SAN DIEGO ZOO)

- **A utility rate-based microgrid that is part of a Smart City initiative**
 - All infrastructure is owned by SDG&E, with the exception of the EV charging stations
- **Project was deployed in 2012 at a cost of \$1 million**
 - First of its kind Solar-to-EV charging project in U.S.
- **Partners include Smart City San Diego, SDG&E, UC-San Diego, GE, CleanTECH San Diego, and Princeton Power Systems**
 - Though small in size – 190 kW – the project incorporates parking lot rooftop solar PV, 5 EV charging stations, and li-ion batteries
 - An example of a microgrid controlled through smart inverter technology provided by Princeton Power Systems
- **While other utilities in the US have struggled to put microgrids into their rate base, this one was successful for the following reasons:**
 - Linkage to goal of Smart City concept, which is broader than just electricity
 - Linkage to transportation (40% of California's carbon emissions), so helping San Diego comply with AB 32, the state's climate change law
 - SDG&E and City of San Diego saw convergence of value in overall goals of the project

SUMMARY OF CASE STUDIES COMPLETED TO DATE (NA)

- **Eight Microgrids Profiled: Summary Details**

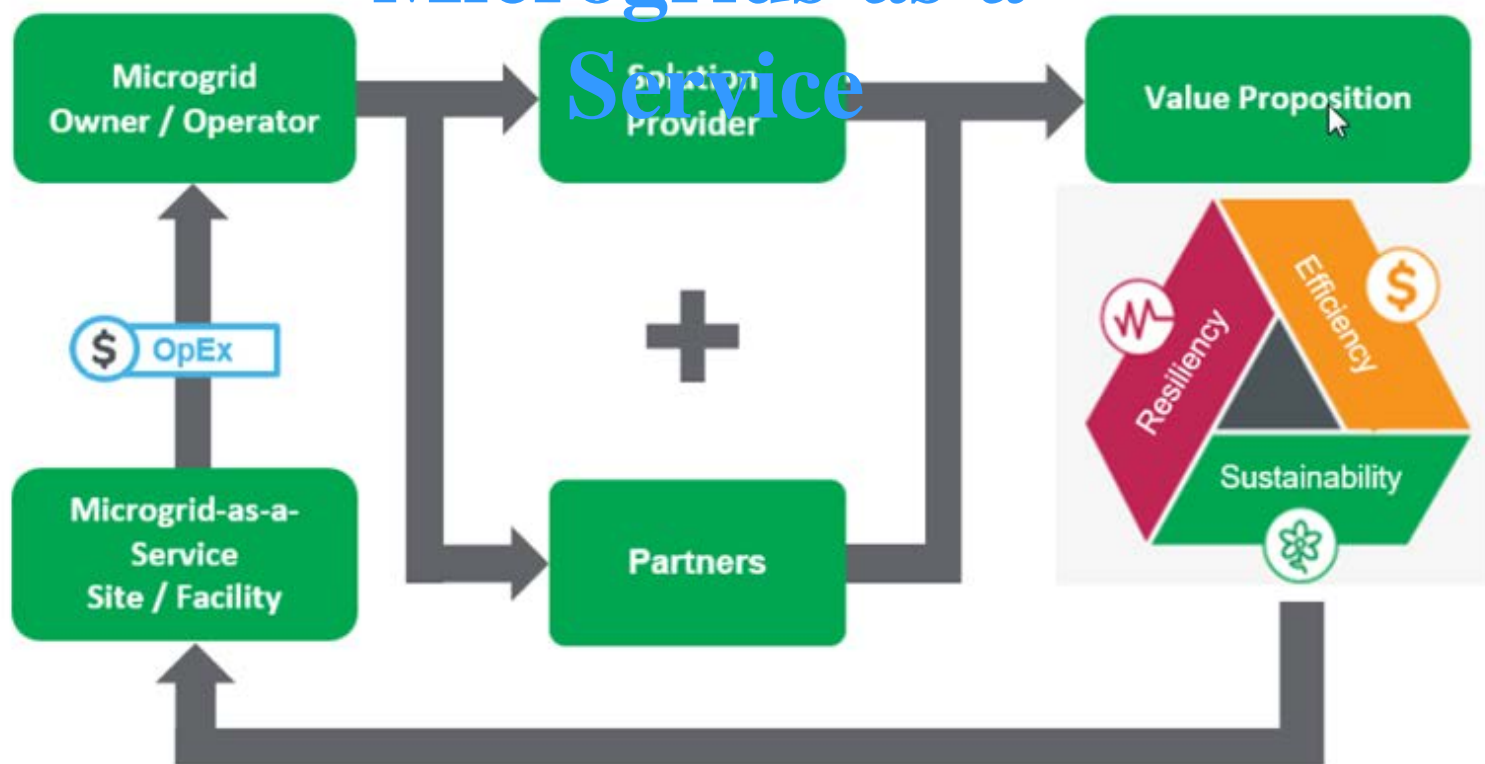
- Projects total 30.8 MW of peak capacity
- Average size is 3.8 MW (450 kW to 15.6 MW is the size range)
- Greater diversity of resources than CA projects
 - Wind and biogas deployed in greater numbers of projects
- Business models include “Microgrids-as-a-Service” and ESPC approaches

- **Specific Project Highlights**

- **Survivalist Condo, Kansas, 450 kW, Sustainable Power Systems**
- **County Facilities, Maryland, 6.75 MW, Schneider Electric**
- **Military Base, Georgia, 15.6 MW, Schneider Electric**
- **Data Center, Minnesota, 2.4 MW, OATI**
- **Auto Manufacturing Facility, Maryland, 610 kW, TimberRock Energy Solutions**
- **Commercial Facility, Denver, 2.8 MW, Younicos**
- **Commercial Facility, Missouri, 1 MW, Princeton Power Systems**
- **Affordable Housing, New York, 1.2 MW, Demand Energy**

NEW MICROGRID BUSINESS MODELS

Microgrids-as-a-Service



(Source: Schneider Electric)

PROJECT HIGHLIGHT #4: US MARINE CORPS LOGISTICS BASE

- **A microgrid serving a marine base stretching over 3,600 acres with 400 facilities totaling ~15.6 MW of peak capacity**
- **Developed as part of a 23-year plus \$170 million contract with Constellation**
 - Schneider Electric was brought in during the investment grade audit to address cyber security concerns and data management challenges
- **Microgrid is first DOD “net zero energy” base; to serve as model for future deployments**
- **Cost for microgrid was \$4.2 million, financed entirely by savings generated under the Energy Savings Performance Contract**
 - Constellation energy efficiency upgrades
 - Installation of a 8.5 MW biogas
 - Installation of 4.1 MW landfill gas project
 - Steam supplied by adjacent Procter & Gamble 50 MW cogeneration facility
- **Key to project’s success is Schneider Electric’s data historian and cyber security tools**
 - Microgrid was designed to fit into tight budget, eliminating “bells and whistles”

PROJECT HIGHLIGHT #5: PENA STATION WEST

- **A unique \$10 million “portfolio” microgrid featuring a mixed ownership model involving a 382-acre transit-oriented district located adjacent to the Denver airport, a Panasonic facility requiring premium power, Xcel Energy, the local utility, and energy storage/controls from vendor Yunicos of Berlin, Germany.**
- **The project consists of these DERs owned by the following entities:**
 - 1.6 MW carport solar PV array installed at Denver International Airport but owned and operated by Xcel Energy
 - A 259 kW rooftop solar PV array hosted, owned and operated by Panasonic
 - A 1 MW/2MWh front-of-the-meter li-ion battery hosted by Panasonic but owned by Xcel Energy
 - Yunicos installed the battery and provides system wide microgrid controls
- **Microgrid helps Xcel manage 30% solar PV penetration on a feeder**
 - Battery provides peak demand reduction and frequency regulation services
 - Panasonic received resiliency benefits of a microgrid through special back-up power contract with Xcel
- **While the carport solar PV array was rate-based, the remainder of the project could not be rate-based due to mix of customers, vendors and use cases**

PROJECT HIGHLIGHT #6: MARCUS GARVEY APARTMENTS

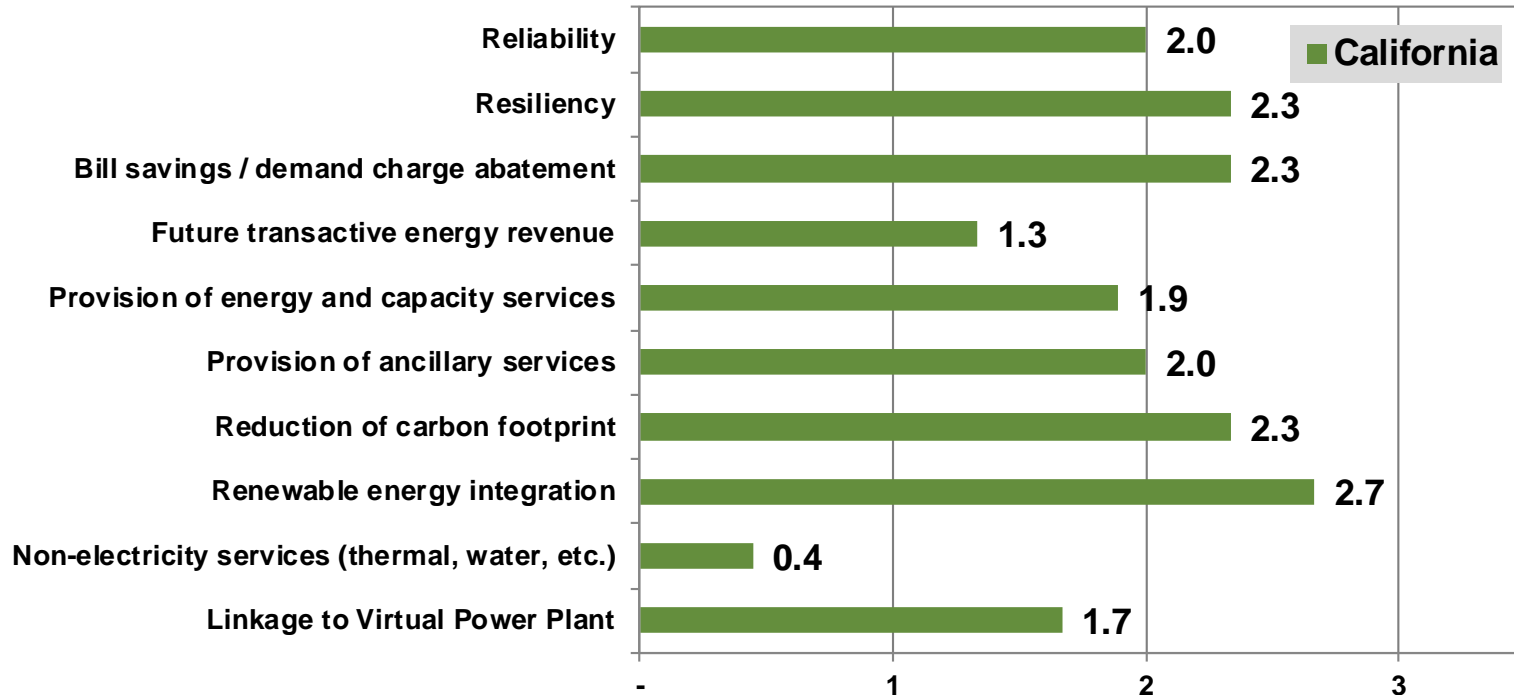
- **A large affordable housing complex that owned its own, outdated distribution grid is developing a state-of-the-art microgrid that provides community resiliency benefits while also serving as a DR resource for Consolidated Edison.**
- **The apartment complex covers 10 city blocks, 32 buildings, 625 units**
- **It is located at a substation that needs to drop 53 MW in load to avoid \$1.2 billion grid upgrade**
- **The DER portfolio consists of the following:**
 - 400 kW of solar PV
 - 400 kW Bloom Energy fuel cell
 - 300 kW/1.2 MWh li-ion battery
- **Demand Energy provided its DEN.OS controller for a microgrid whose solar, storage and controller cost ~\$3 million**
 - The energy storage component was developed under a shared savings business model between developer and Demand Energy; financing derived from energy efficiency savings
 - While the microgrid is not allowed to export to the grid, it will provide DR to ConEd

WHAT IS THE VALUE PROPOSITION FOR A MICROGRID?

- **The CEC and Navigant seek to explore what value propositions are driving microgrids that have not been supported by government grants.**
- **The following value propositions were put forward to project developers and owners:**
 - Reliability
 - Resiliency
 - Transactive energy
 - Bill savings/Demand charge abatement
 - Provision of capacity and energy services
 - Provision of ancillary services (DR, frequency regulation, etc.)
 - Reduction of carbon footprint
 - Non-electricity services (thermal energy, water, etc.)
 - Linkage to “virtual power plants” and other DER concepts.
- **Two additional value propositions were put forward**
 - EV charging
 - Cyber security

VALUE PROPOSITIONS DRIVING MICROGRIDS

California Case Study

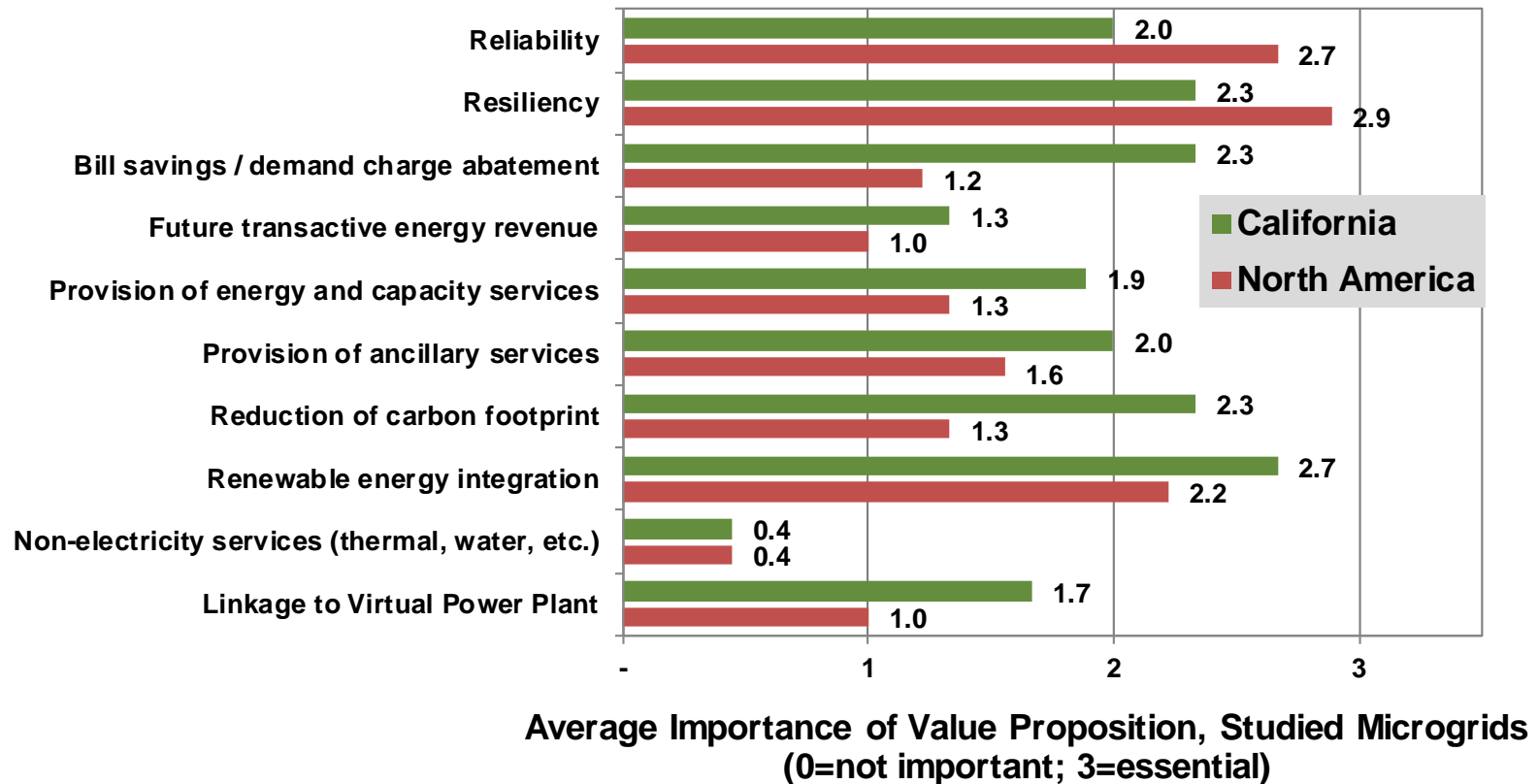


**Average Importance of Value Proposition, Studied Microgrids
(0=not important; 3=essential)**

(Source: Navigant Research)

VALUE PROPOSITIONS DRIVING MICROGRIDS TODAY

California vs North America



(Source: Navigant Research)

INSIGHTS: CALIFORNIA VERSUS NORTH AMERICA PROJECTS

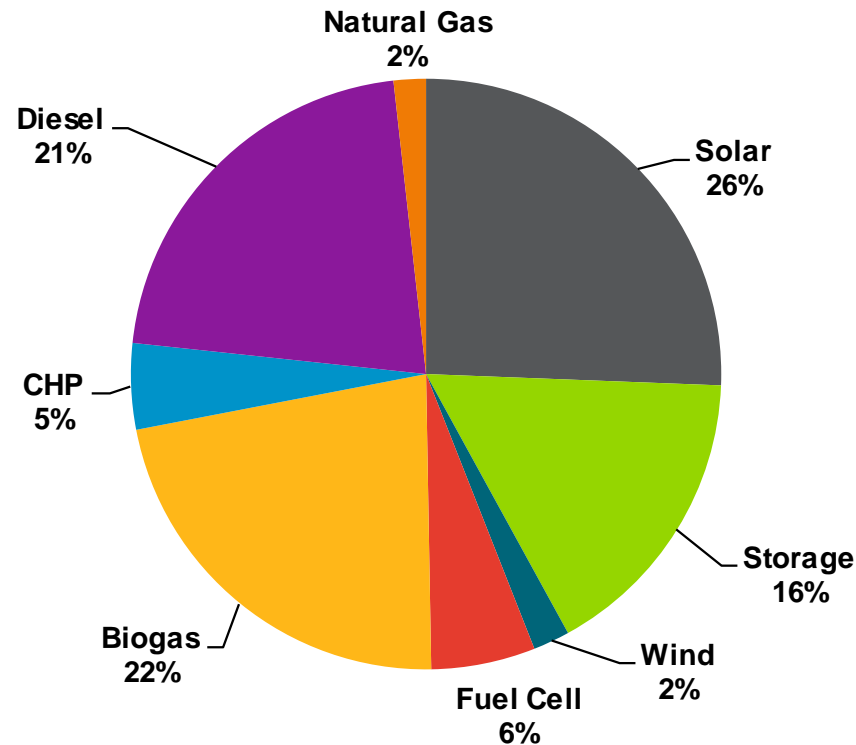
- **North America projects score higher on reliability/resiliency due (likely) to impact of extreme weather events**
 - Earthquakes less frequent, less predictable: not yet on the radar of communities/utilities
 - As San Francisco study confirms, natural gas faces bigger threat than electricity
- **California projects score higher demand charge and bill savings**
 - Higher rates than most other U.S. states
- **California projects also score higher on renewable integration and reduction in carbon footprint**
 - Likely due to state carbon reduction mandates, greater focus on renewable energy deployments
- **California projects score higher on VPP/TE/ancillary service revenue**
 - Even though market opportunities may be greater in control areas such as PJM
- **Bottom line:** Microgrids in CA and NA show a diversity of value propositions, a diversity of DER and a diversity of business models. Navigant believes this diversity will continue into the near-future. CA projects are more inclined to value state policy goals on renewables and grid services while also addressing project economics.

CONCLUSIONS

- **Diverse microgrids for a variety of clients are moving forward today throughout CA and NA**
 - Majority of case studies (9) or 52% could be considered commercial hosts
 - Four are governmental entities (water agency, 2 DOD, county facilities)
 - Three are related to agriculture
 - Two are unique affordable housing complexes
- **Majority of projects deploy solar PV (88%) and energy storage (88%)**
- **Business models for recent projects shifting capital to operating expenses**
 - Microgrids-as-a-Service
 - Energy Savings Performance Contract vehicle
 - Shared savings between host and project developer/controls vendor
- **Most projects developed by smaller vendors offering either energy storage or controls or both**
 - Cleanspark, JLM, Princeton Power Systems, and Sunverge
- **Majority of projects are 1 MW or above (64%)**
 - Only 2 projects are above 10 MW (11%)

MICROGRID PORTFOLIO RESOURCE MIX

17 Microgrids: DER Market Shares



(Source: Navigant Research)

CEC RECOMMENDATIONS

- **Focus future R&D investment in technologies that enhance integration and control of diverse DER to limit reliance upon back-up diesel generators**
- **Do not limit funding to just solar+energy storage systems deployed as or within microgrids**
 - Diversity in renewable generation benefits the larger grid as well as a microgrid
- **Consider benefits outside of electricity when judging microgrid candidates**
 - Thermal energy, water impacts and waste management solutions can also be wrapped into microgrids
- **Seek out innovative business models that shift risks of project development to market participants with a track record and financial stability**
 - Yet also support smaller, more innovative companies that actually require R&D funding to validate promising technology or financial solutions
- **Support projects that help CA meet its Loading Order/climate regulation goals**
- **Target projects that could not move forward without government support**
 - These projects likely to be community-based projects, or projects testing out new control approaches or provision of new grid services or to meet specific customer segment needs



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Agenda

Results from Microgrid Internet Survey

Jeff Root
Ecotech Resources



Agenda

Review Key Recommended Actions for Draft Roadmap:

Financial – Costs and Benefits **Peter Klauer, CA ISO**

Regulatory – Opportunities and Challenges
Jose Aliaga-Caro , CPUC

Technical – Opportunities and Challenges
Rey Gonzalez, CEC



Key Recommended Actions for Draft Roadmap: Financial

Key Elements that need to be defined in the Roadmap

Key action items should be included in the roadmap



Key Recommended Actions for Draft Roadmap: Financial

Key Elements that need to be defined in the Roadmap:

- How microgrids can be connected, modeled, and operated
 - utility scale, community support, commercial/industrial, residential
- Grid supporting services where microgrids have an opportunity to perform (Transmission, Distribution, Customer)
- Key economic markets where microgrids can participate
- Transparency on role of microgrids in California



Key Recommended Actions for Draft Roadmap: Financial

Key Elements that need to be defined in the Roadmap:

- How microgrids can participate in wholesale and retail markets
- How microgrids can participate in multiple revenue streams
- Open (non-proprietary) educational and outreach materials known to exist for microgrids
- Current standards, protocols and procedures that apply to microgrids providing grid services



Key Recommended Actions for Draft Roadmap: Financial

Key action items that need to be included in the Roadmap:

- Define the rules under which microgrids can participate in wholesale and retail markets
 - Priority / Key Action Agency (s)
- Standardize services and capabilities microgrids can provide
 - Priority / Key Action Agency (s)
- Support pilots to demonstrate microgrid value to the grid and to their owner/operator
 - Priority / Key Action Agency (s)



Key Recommended Actions for Draft Roadmap: Financial

Key action items that need to be included in the Roadmap:

- Reduce high cost barriers to participation (Interconnection, Metering, Telemetry)
 - Priority / Key Action Agency (s)
- Define how microgrids can participate in multiple value streams (leverage rules for storage or other DER)
 - Priority / Key Action Agency (s)
- Define other revenue streams available to microgrids (VAR services, flexible energy services, emergency services, etc.)
 - Priority / Key Action Agency (s)



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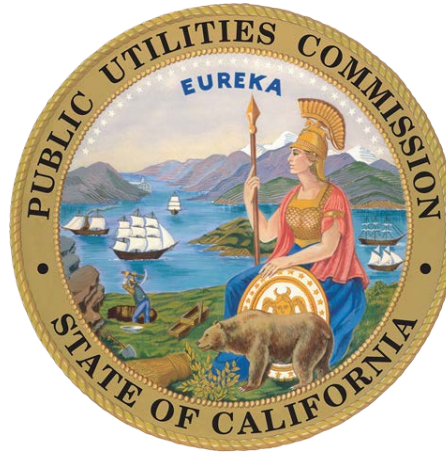
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California Microgrid Roadmap Scoping Workshop



July 26, 2017

Gabe Petlin & Jose Aliaga-Caro

Grid Planning and Reliability, Energy Division, California Public Utilities Commission





What is a Microgrid?

*“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)





Microgrids: A Regulatory Perspective (CPUC Staff Paper, 2014)

“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

www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5118





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.





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





Formal proceeding documents are found using the Rulemaking numbers:

- R.14-08-013: Distribution Resources Plans Proceeding
- R.15-03-011: Energy Storage Proceeding
- R.11-09-011: Interconnection Proceeding (closed)
- R.17-07-007: Interconnection Proceeding (new OIR)

Other Distribution Resources Plan documents, including workshop presentations, and other background papers are on the CPUC web site:

<http://www.cpuc.ca.gov/General.aspx?id=5071>

www.cpuc.ca.gov





BACK-UP SLIDES





Existing Microgrids

(per DOE definition as reported by 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





Key Recommended Actions for Draft Roadmap: Regulatory

Key Elements that need to be defined in the Roadmap:

- What is the role of microgrids in California
- Third-Party Microgrids in California—how will they operate
- What ongoing CPUC rulemakings impact microgrids
- What Microgrid services support the CPUC DER Action Plan



Key Recommended Actions for Draft Roadmap: Regulatory

Key action items that need to be included in the Roadmap:

- Open wholesale and retail markets to microgrids
 - Priority / Key Action Agency (s)
- Interconnection rules for microgrids
 - Priority / Key Action Agency (s)
- Guidelines on when impact studies are required
 - Priority / Key Action Agency (s)
- Microgrid islanding and grid services/impacts
 - Priority / Key Action Agency (s)



Key Recommended Actions for Draft Roadmap: Regulatory

Key action items that need to be included in the Roadmap:

- Rates and tariffs that support microgrids
 - Priority / Action Agency (s)
- Methodologies to define value of special services: GHG reductions, flexible generation, islanding load reductions, etc.
 - Priority / Action Agency (s)
- Standards and protocols needed to advance microgrids
 - Priority / Action Agency (s)
- Working with California Tribal Communities and other special entities
 - Priority / Action Agency (s)



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Key Recommended Actions for Draft Roadmap: Technical

Key Elements that need to be defined in the Roadmap:

- Need clarification on standards and protocols that are required
- What technical research can be performed to accelerate resolution with regulatory challenges
- How can research open markets and new value streams for microgrids
- Define the building blocks to implementing a Microgrid from start to finish



Key Recommended Actions for Draft Roadmap: Technical

Key Elements that need to be defined in the Roadmap:

- What Cyber security issues impact microgrids
- Implementation of smart inverters and how it will improve the value of microgrids
- Microgrids can accelerate the implementation of California policy goals by permitting high concentrations of DER on the grid
- Better documentation of the lessons learned from fielded microgrids in California



Key Recommended Actions for Draft Roadmap: Technical

Key action items that need to be included in the Roadmap:

- Form working group on the status of standards and protocols that are needed to meet CA utility and CA ISO requirements
 - Priority / Action Agency (s)
- Define role of smart inverters in future microgrid applications
 - Priority / Action Agency (s)
- Define minimum cybersecurity requirements for microgrids
 - Priority / Action Agency (s)
- Develop better metrics for microgrid system performance
 - Priority/ Action Agency (s)



Key Recommended Actions for Draft Roadmap: Technical

Key action items that need to be included in the Roadmap:

- Complete analysis on role microgrids play in California utilities meeting future policy goals
 - Priority / Action Agency (s)
- Analyze commercial viability of different microgrid configurations
 - Priority / Action Agency (s)
- Role of microgrids in future grid management with higher concentrations of DER
 - Priority / Action Agency (s)



Addition of any New Roadmap Topics

Rey Gonzalez
CEC



Open Discussion



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Jose Aliaga-Caro , CPUC

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3:30pm Open Discussion All

4:00pm **Overview of the Process for Drafting
the Microgrid Roadmap** **Mike Gravely
(by WebEx)**

4:15pm Discuss Next Step and Schedule for
final Workshop in Late September Mike Gravely
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4:30pm Adjourn All



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Planning For Final Workshop

- Review Comments and Recommendations from Attendees to the July 26, 2107 Workshop
- Develop Draft Roadmap
- Review Draft Roadmap with Technical Advisory Committee
- Schedule Final Workshop
 - Hold at CA ISO Facility in Folsom
 - Planning for Late September / Early October Meeting Date
 - Provide Draft Roadmap to attendees prior to Workshop Date
- Three agencies will finalize and publish roadmap after final workshop



Written comments:

This workshop is using an electronic commenting system for submitting written comments. Stakeholders wishing to submit comments should complete the form provided on the EPIC docket webpage at:

<https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=16-EPIC-01>

Written comments should be submitted by 5:00 p.m. on August 16, 2017.

All written comments will become part of the public record of this proceeding.



Closing Comments