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Yerba Buena Energy Storage Pilot Project and Supply Side Pilot

CAISO/CPUC Multiple-Use Applications Workshop

May 3, 2016

Existing Pilots at PG&E – Energy Storage MUA

Supply Side Pilot (SSP)
~1 MW
Bay Area Sub-laps

Project Initiation: 2014
Operational Date: April 2015
Commenced CAISO Market Ops: August 2015

Current Use Cases:
- Participating in CAISO Proxy Demand Response (PDR).
- Conducting peak shaving/ load shifting for the customer.

Yerba Buena
4 MW / 28 MWh NAS Battery
Customer R&D Facility, San Jose

Project Initiation: 2007
Operational Date: May 2013
Completed Islanding Commissioning: Sep 2013

Current Use Cases:
- Half energy reserved for islanding/backup for the adjacent customer facility
- CAISO market participation started in Jan 2016

Mapping to MUA Use Cases in Issue Paper

Supply Side Pilot (SSP):
MUA Use Case #3

Yerba Buena Battery Energy Storage System (BESS):
MUA Use Case #1

TABLE 5 – MUA Use Cases

Serving Regulatory Functions for -	MUA Use Cases				
	In-Front-Of-Meter (IFOM)	Behind-The-Meter (BTM)			
	#1	#2	#3	#4	#5
Retail Customer Services		X	X		X
Distribution Grid Services	X	X		X	X
Wholesale Market	X		X	X	X

Peak Shaving/ Load Shifting

Islanding

CAISO

Energy Storage Pilot Functions

To date, PG&E pilots have focused on three main energy storage functions:

1. **Wholesale Market:** CAISO NGR Market Participation (Yerba Buena, Vaca Dixon) and CAISO PDR Participation (Supply Side Pilot)

2. **Distribution Grid Services:** Islanding at Yerba Buena

3. **Retail Customer Service:** Peak shaving and load shifting in Supply Side Pilot

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YERBA BUENA ENERGY STORAGE PILOT

Context for Yerba Buena Example

1. **IFM/BTM**: Yerba Buena is in front of the meter

2. **Metering:** Retail metering arrangement stayed consistent for HGST (customer), even under islanding condition

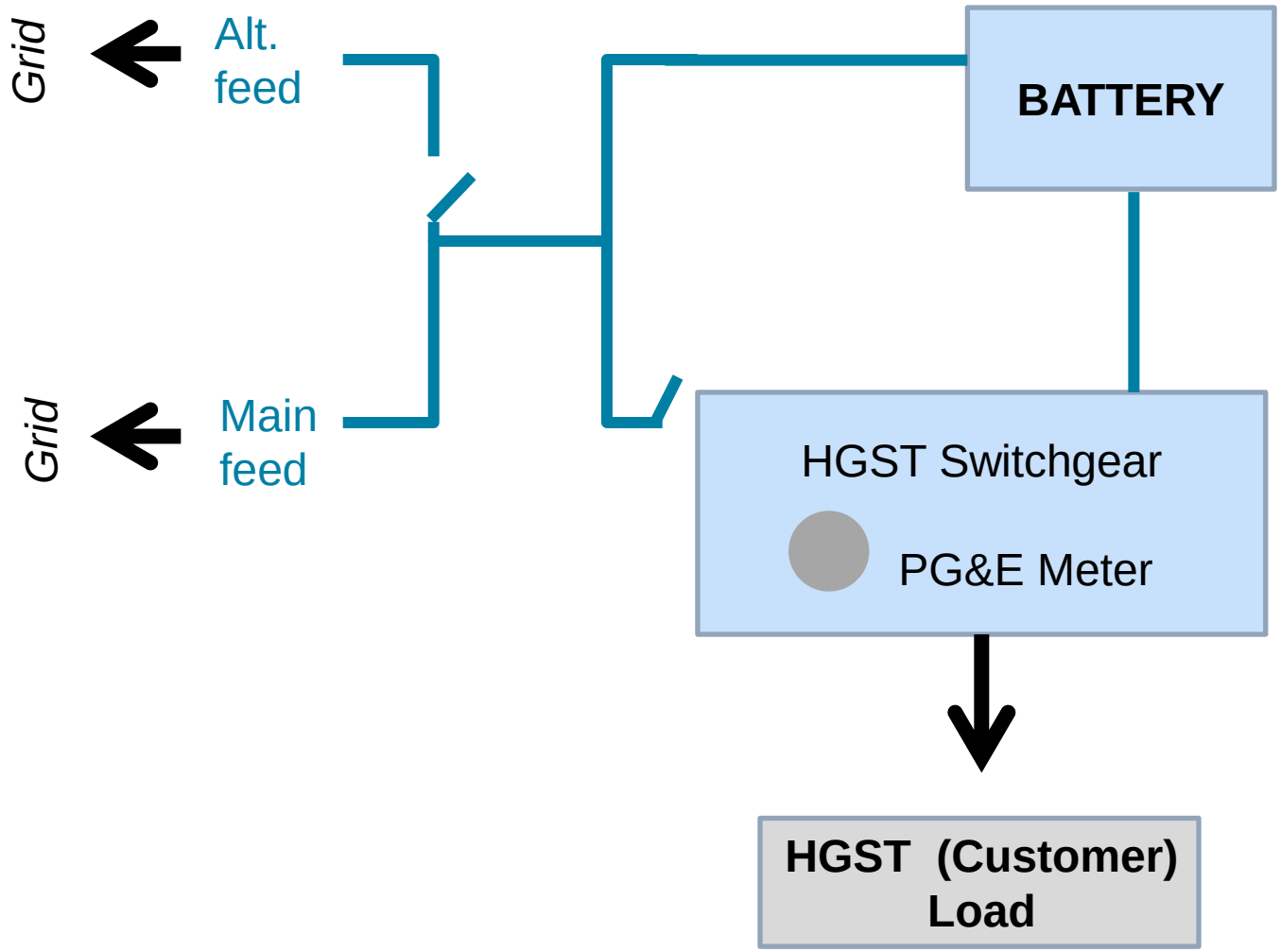
3. **Pilot Project:** Yerba Buena BESS was brought into the CAISO NGR market as part of EPIC 1.1; it is a pilot project and is not considered to be precedential
   - pilot focuses on one resource; does not address testing aggregated DER performance

Multi-Use Applications: Use Case #1

PG&E reserves half of the battery *energy content* for islanding with the other half market participating

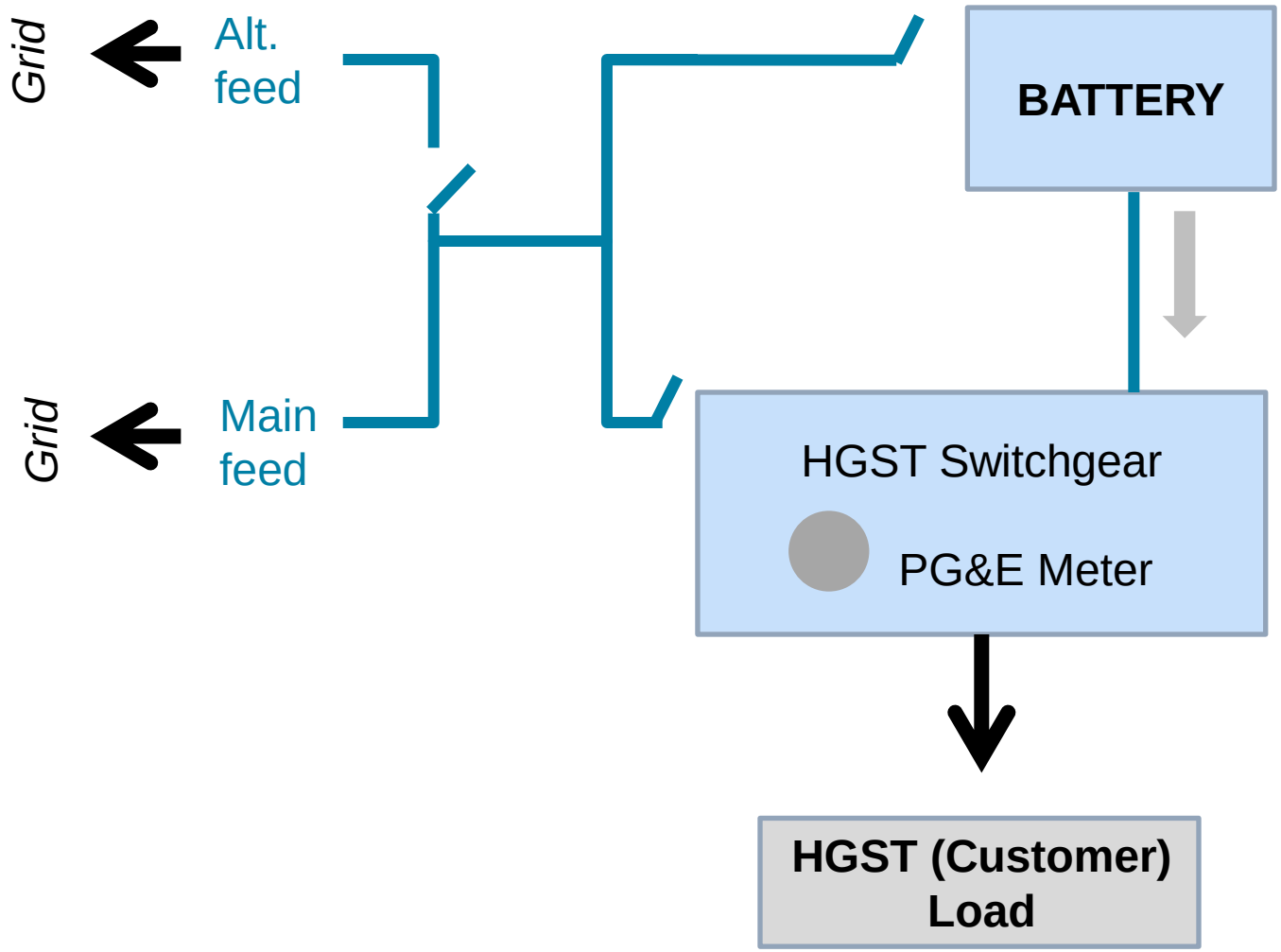
Yerba Buena Simple Single Line Diagram

Normal Conditions



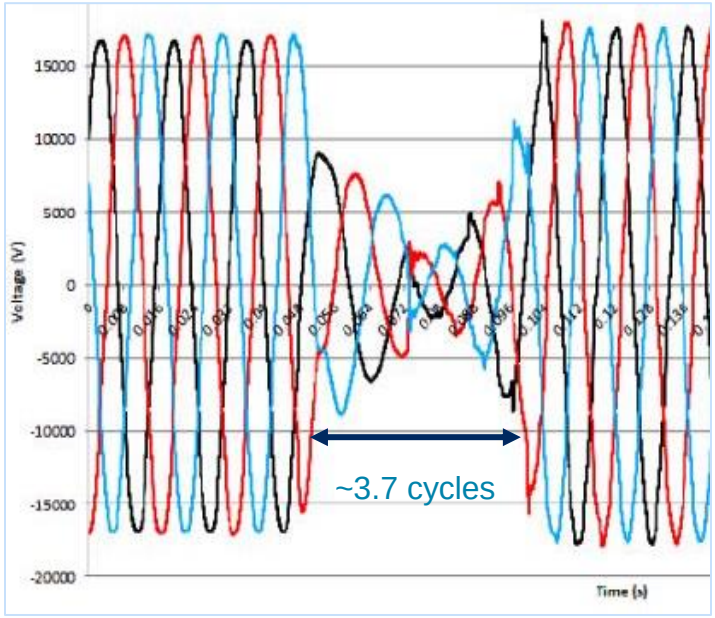
Yerba Buena Simple Single Line Diagram

Island Conditions

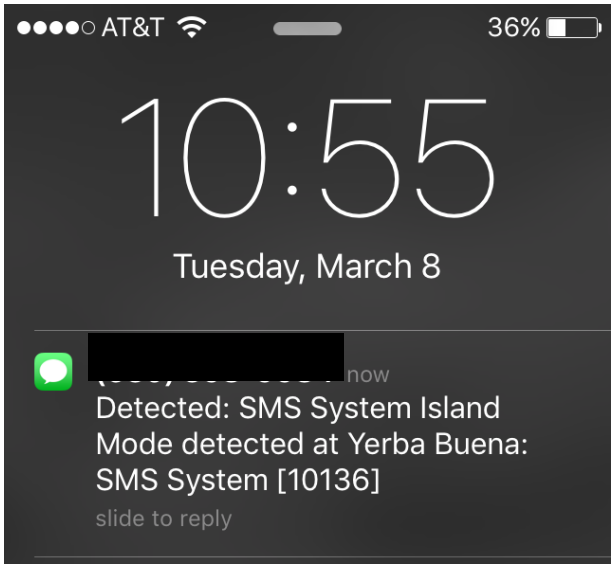


Yerba Buena – PG&E's First Microgrid Application

Island transition happens quickly



Text and SCADA alarms in place



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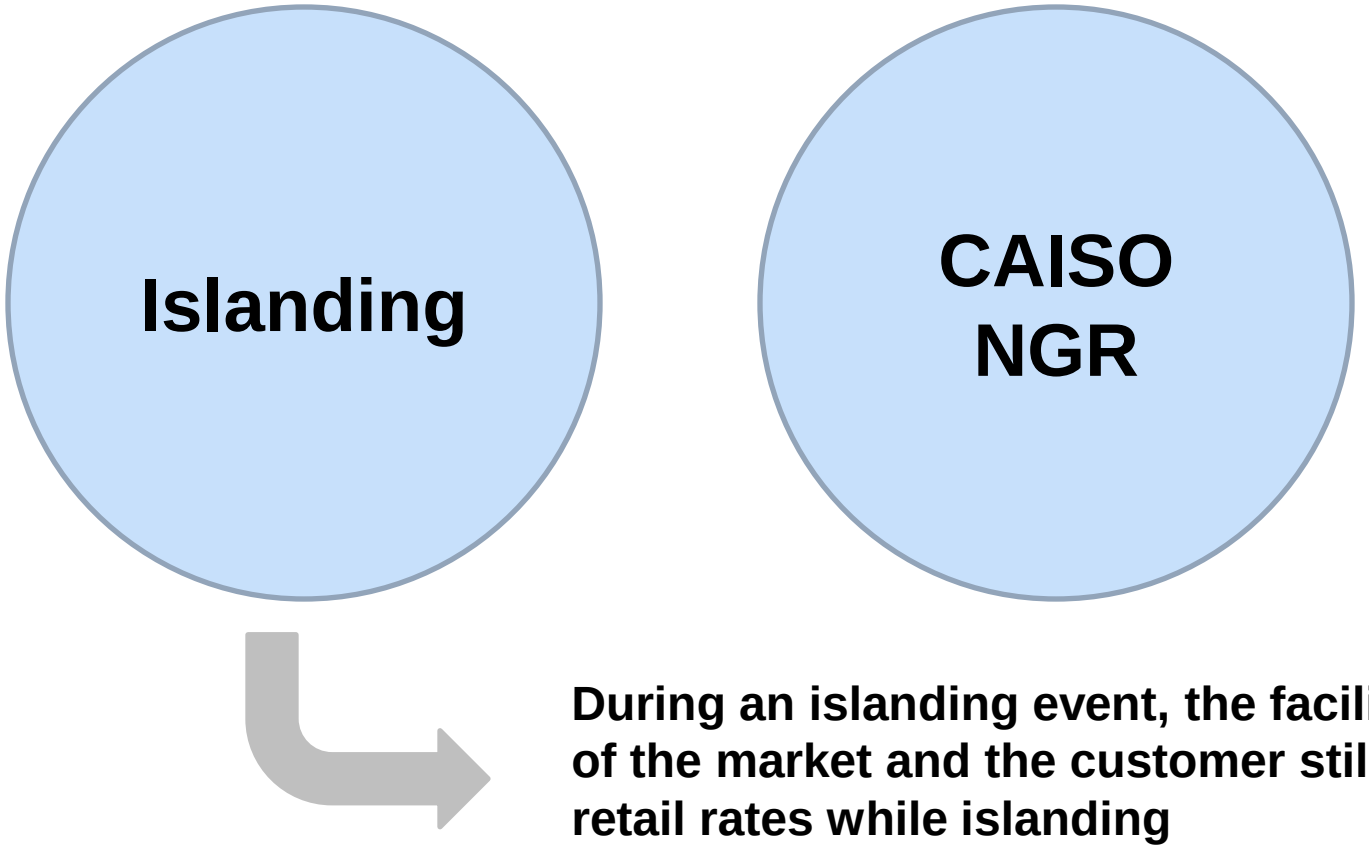
WORKSHOP QUESTIONS: YERBA BUENA EXAMPLE

Q4. Multiple-use overlap, double payment and cost/benefit tracking

There are no clear benefit overlap or double payment concerns given Yerba Buena's configuration



During an islanding event, the facility is out of the market and the customer still pays retail rates while islanding

Q5. Interconnection Limits at Yerba Buena

Yerba Buena's Interconnection Agreement via Wholesale Distribution Tariff (WDT) contains specific charge/discharge limits

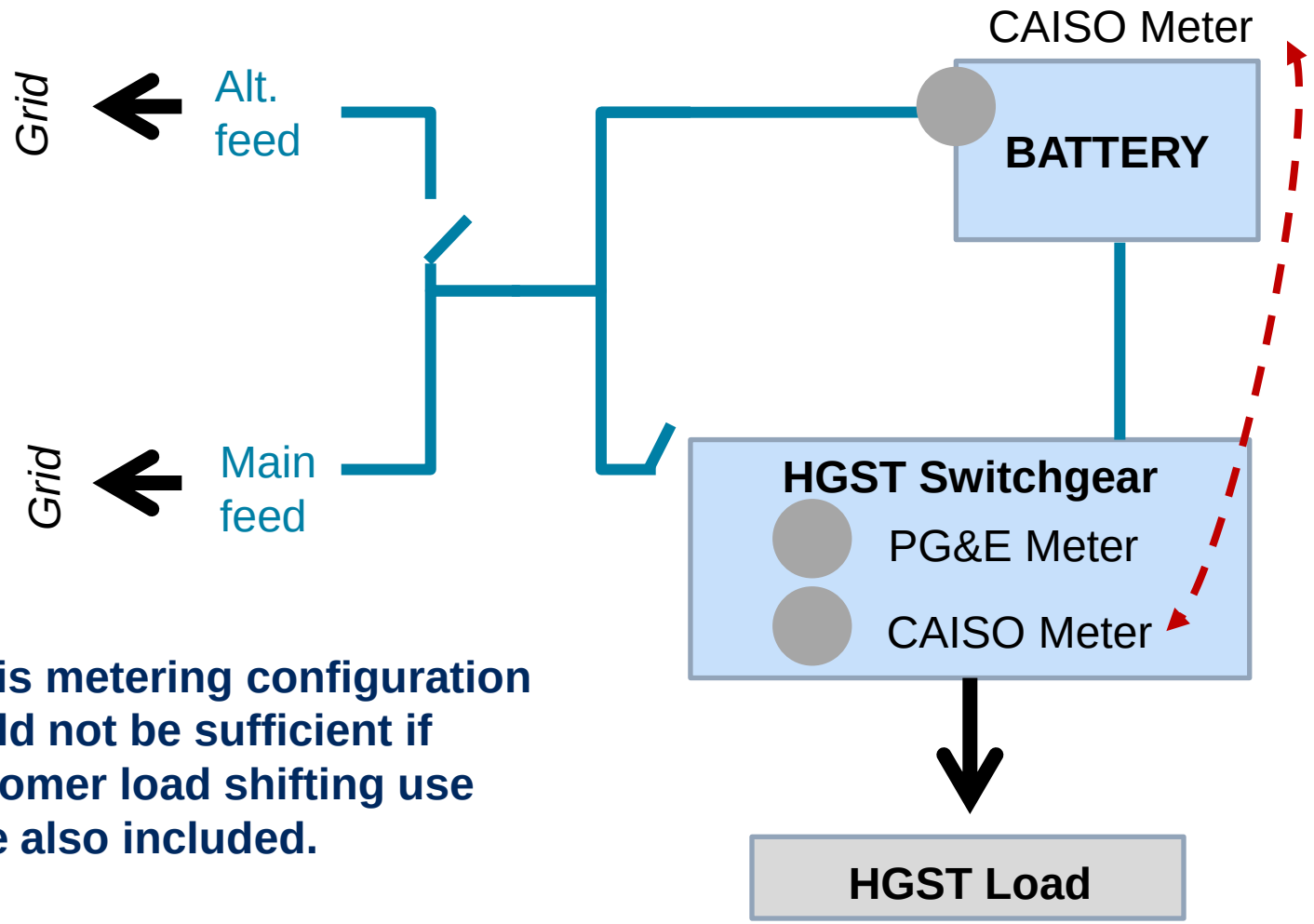
- System Impact Study identified mitigations
- Operational constraints were defined to avoid need for mitigations
- Physical assurance guaranteed via dispatch through the Distribution Control Centers

From Interconnection Agreement:

- **Year round between 23:00 and 9:00, Yerba Buena can discharge no more than 2MW**
- **From May 1 to Sep 1 between 15:00 and 23:00, Yerba Buena can charge no more than 2.5MW**

Q6. Unique CAISO Metering at Yerba Buena

Configuration necessitated the installation of another CAISO meter to back out customer load from CAISO settlements

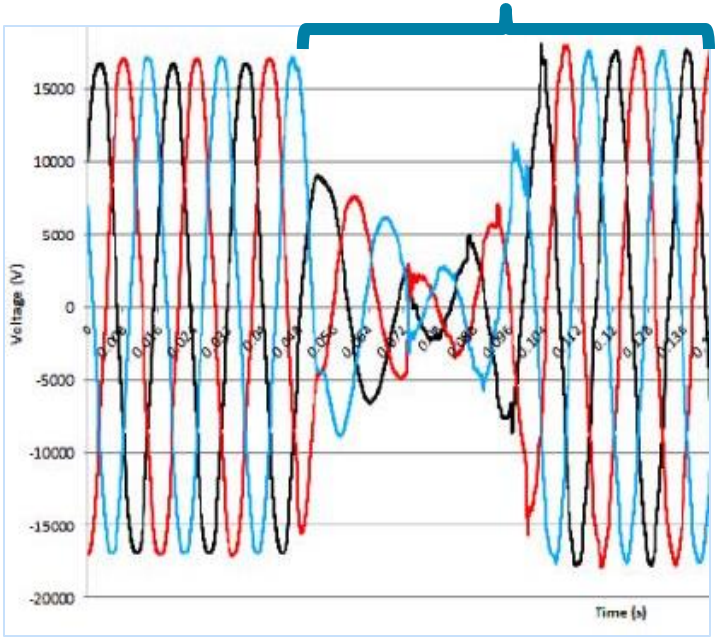


****This metering configuration would not be sufficient if customer load shifting use were also included.**

Q7. Dispatching Yerba Buena in Real Time

For IFM resources providing distribution service (deferral/islanding) and market services, distribution service must take precedent in real-time operations

Out of market



Islanding at Yerba Buena happens autonomously and PG&E takes uninstructed deviations

GENERAL ISSUES FOR MULTIPLE USE APPLICATIONS

Guiding Principles for MUA Policy

1. **Retail rates must apply to retail usage.**
   - Under no circumstances should a BTM storage device be able to charge at a wholesale rate to serve retail load.

2. **Double compensation should be avoided.**
   - A storage device should not receive compensation for an action it would have taken regardless of the additional application.

3. **Interconnection rules must address aggregations of storage devices acting in unison.**

4. **Location and timing matter for distribution services.**

QUESTIONS?