Redwood Coast Airport Renewable Energy Microgrid

SB 1339 Microgrid Workshop

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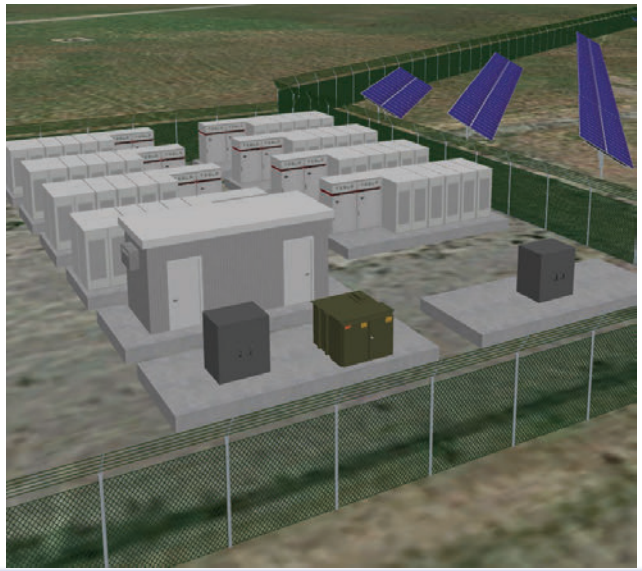


Motivation

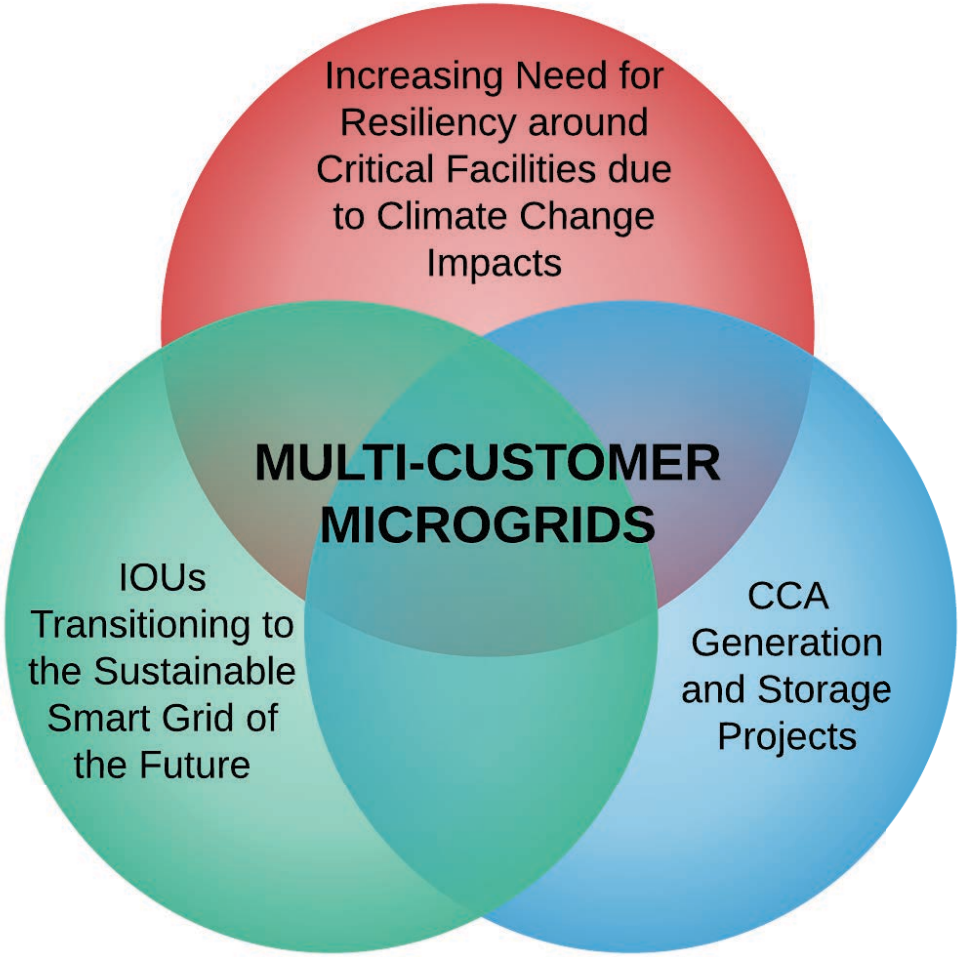
Humboldt County is a rural, isolated community at the end of a transmission line.

We are vulnerable to tsunamis, earthquakes, landslides, floods, wildfires and now PSPS events.

Project Objective

Demonstrate a viable, replicable business model for a community scale microgrid that:

- provides resilience to critical community services,
- allows for greater penetration of distributed renewables,
- provides multiple local benefits, and
- reduces greenhouse gas emissions.

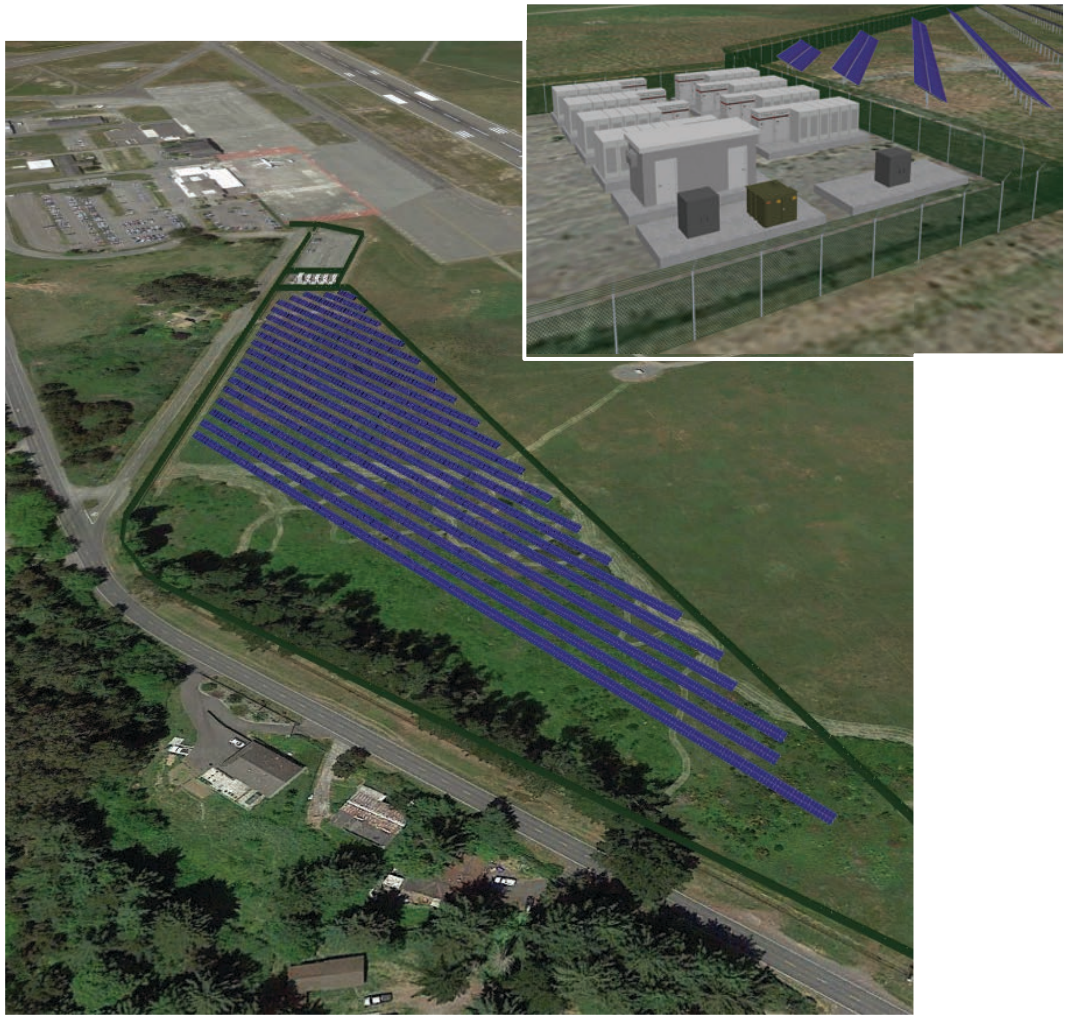


Key Project Partners

- Schatz Energy Research Center, prime contractor
- CA Energy Commission, co-funder
- Redwood Coast Energy Authority, local CCA, distributed generation owner & co-funder
- Pacific Gas & Electric, distribution system operator

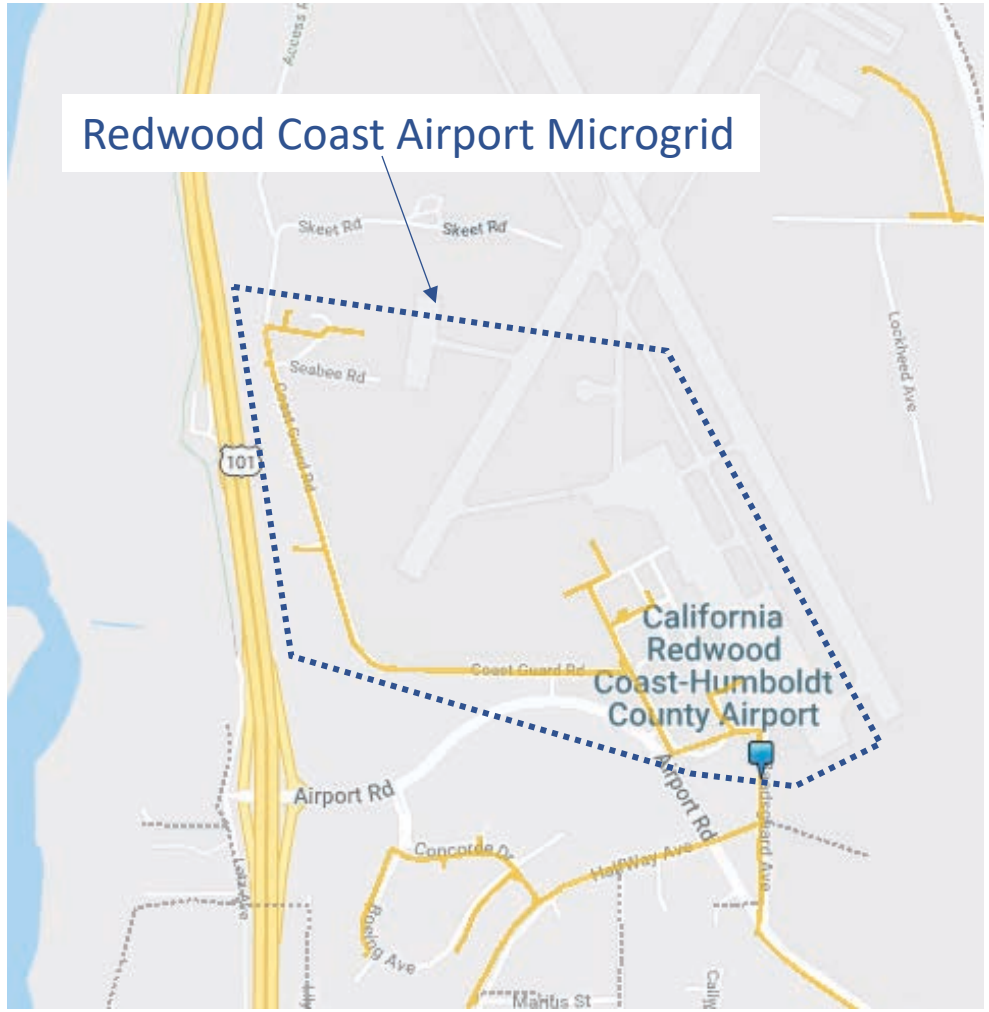
Project Description

- First front-of-meter, multi-customer microgrid on PG&E's system
- 2.2 MW PV array DC-coupled to 2.2 MW/8.8 MWh battery storage → CAISO wholesale market participation
- 320 kW_{AC} net-metered PV array → reduce airport electric bills
- Microgrid controllers → will allow the system to island and provide uninterruptible power for long periods



Project Description

- End-of-line Janes Creek 1103 distribution circuit
- Microgrid circuit includes 20 retail accounts
- 19 unbundled CCA customers, 1 bundled PG&E customer
- Key customers:
  - California Redwood Coast-Humboldt County Airport
  - US Coast Guard



(Source: PG&E Integration Capacity Analysis Map)

Key Lessons Learned

1. We are demonstrating a replicable model → CCA's are well suited to deploy microgrids in their communities
2. Interconnection
   - Grid-Interactive Mode → wholesale distribution tariff (WDT)
     - Start early, important to understand potential upgrade costs and mitigation options, ability to iterate is critical
   - Island Mode
     - Currently nothing in place to allow third party generator to energize islanded portion of distribution utility's grid
     - Compensation and operational responsibility tariff's are needed
3. CAISO participation → hybrid resource initiative is important, must allow for battery reserve capacity for resilience

Experimental Tariffs

- **Operational Roles and Responsibilities Agreement –** Establishes roles, responsibilities and operational requirements for the microgrid in both blue sky and islanded mode
- **Microgrid Infrastructure Cost Recovery Tariff** – Recovery of distribution owner costs to install and operate the microgrid
- **Islanded Grid Services Tariff*** – Compensation to the microgrid infrastructure funders and generation owners for helping form the islanded microgrid
- **Islanded Energy Tariff*** – Compensation to the generation provider for energy supplied while in island mode

**The two islanded tariffs may be combined.*

Experimental Tariffs

Operational Roles and Responsibilities Agreement

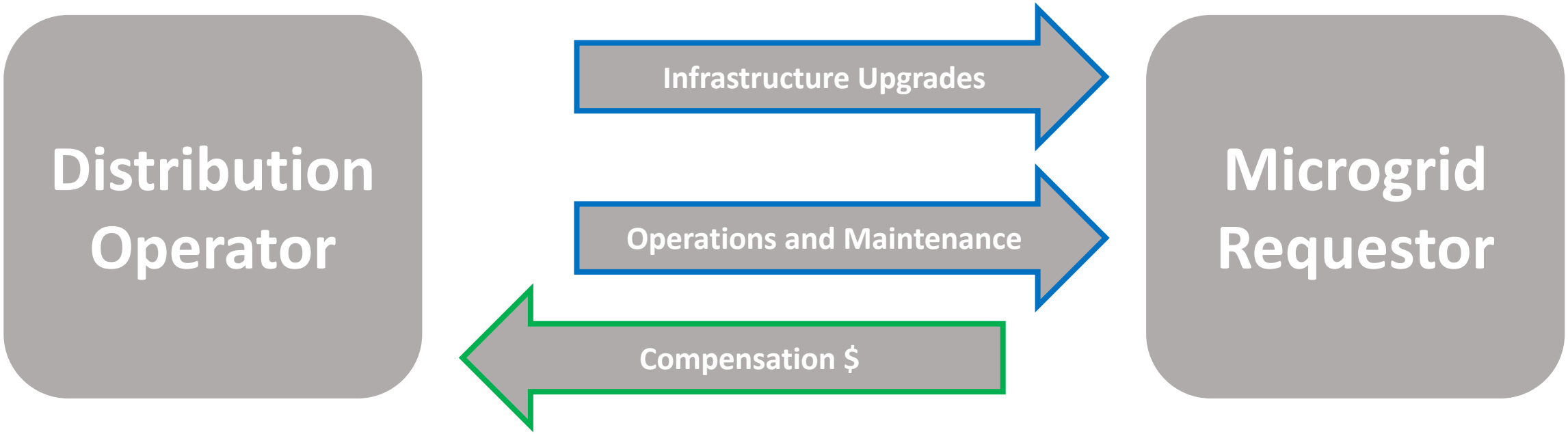
- Formalizes roles, responsibilities and requirements to maintain safety and reliability standards on the microgrid; will ensure that both grid-connected and islanded operation are covered by new and/or existing agreements
- May include a table of protection, monitoring, and control parameters to which the third-party generator must be responsive to maintain safety and reliability

Experimental Tariffs

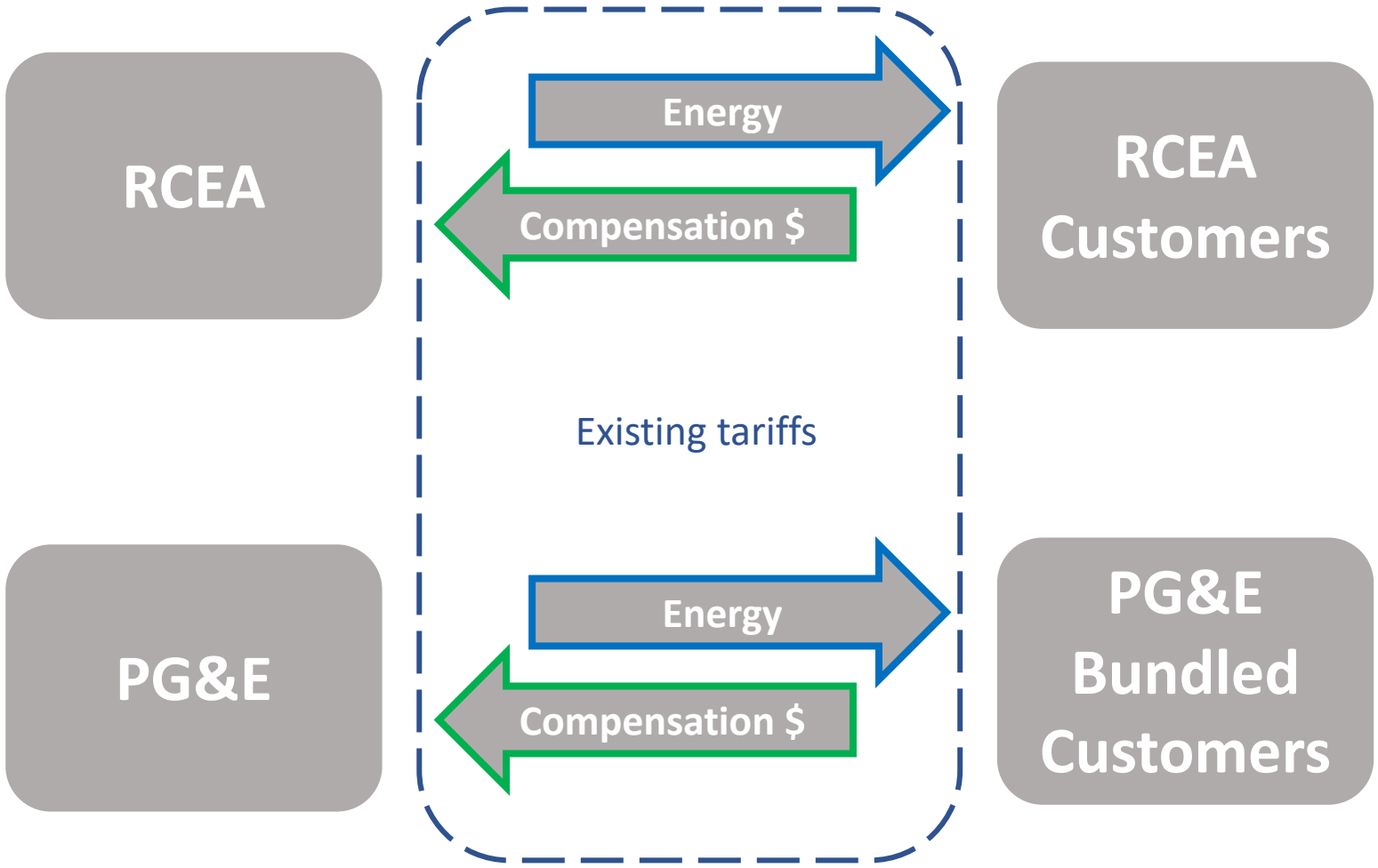
Tariff Development Principles

1. Customer/community requested distribution upgrade costs will not be socialized
2. If a customer/community requested microgrid delivers grid-related benefits to the distribution operator's broader customer base, those benefits should be paid for at their fair market value
3. The Microgrid Tariff should not replace existing programs, rates, or incentives
4. Customer rates will not be impacted in the Experimental Arcata Tariff

Microgrid Cost Recovery Tariff

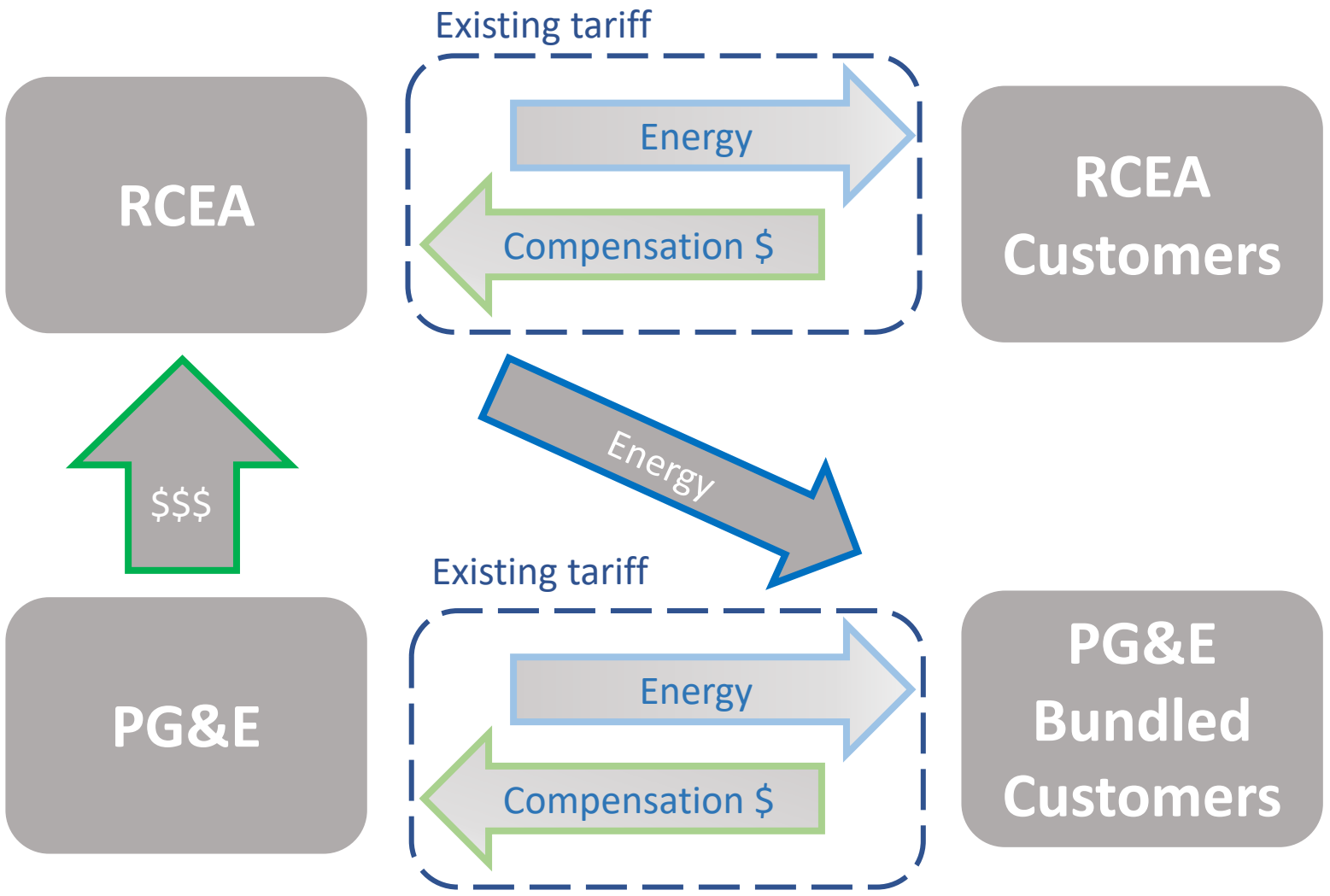


Islanded Energy Tariff – Blue Sky



No incremental tariff necessary

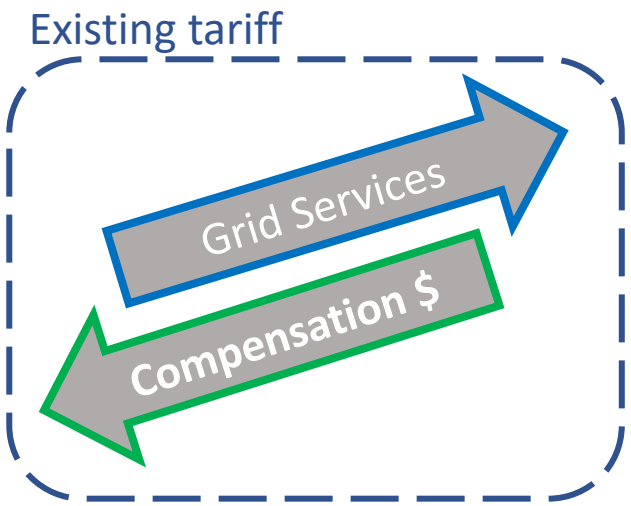
Islanded Energy Tariff – Islanding Event



Islanded Grid Services Tariff – Blue Sky

RCEA

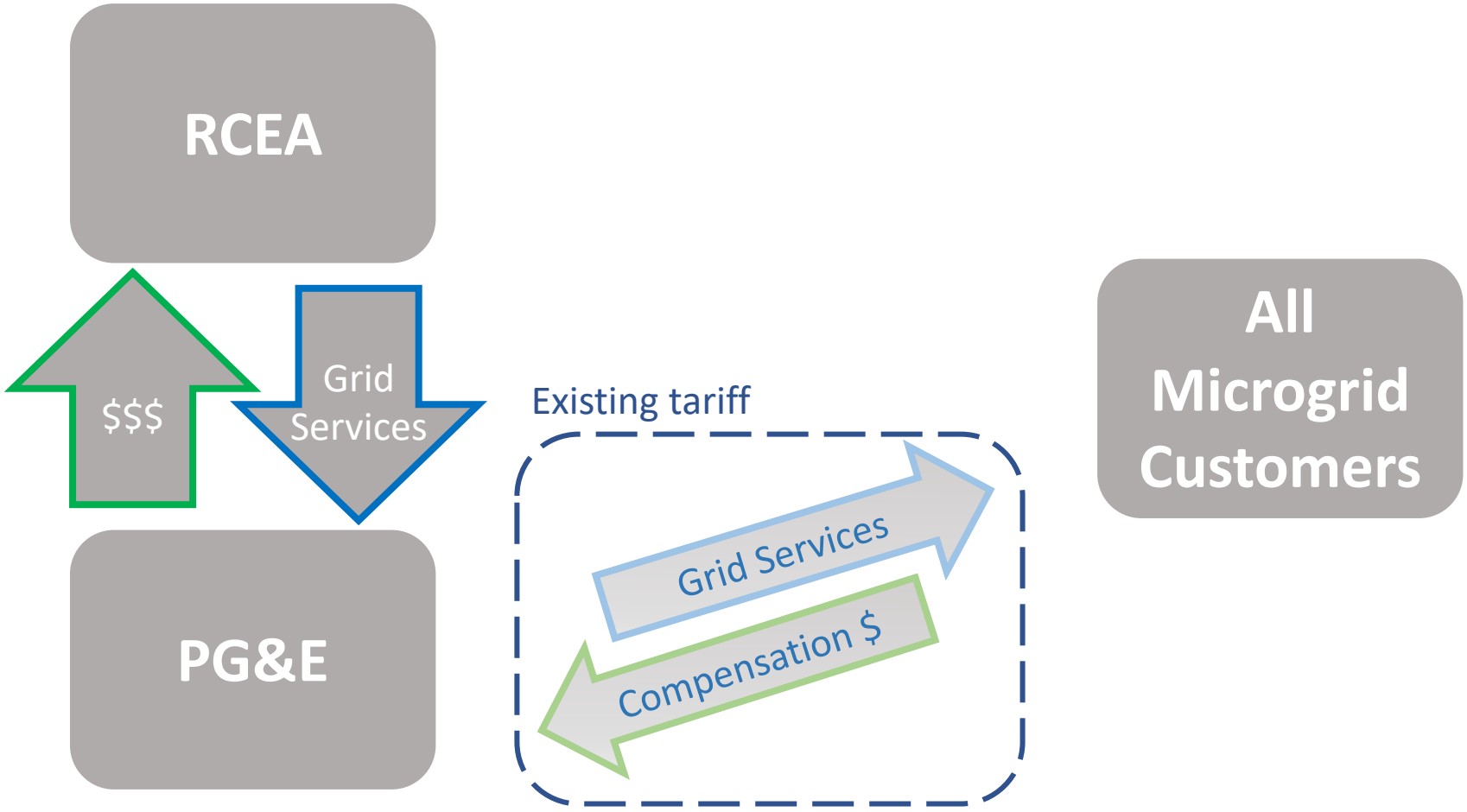
PG&E



All Microgrid Customers

No incremental tariff necessary

Islanded Grid Services Tariff – Islanding Event



Experimental Tariffs – Valuing Energy and Services

Determining value of islanded energy and grid services:

- PG&E – using microgrid revenue model based on current customer charges
- RCEA – determining levelized cost of energy from project

Next Steps

- Finalize the Microgrid Cost Recovery Tariff
- Come to agreement on how to value islanded generation and grid services
- Finalize tariffs mid-2020
- Make this work publicly available

Questions?