

Fuel Cell: Why Arrangement Makes All the Difference

Biosolids & Energy Committees



Background Summary

- Digester Gas used to fuel process & generation engines
- SCAQMD amended Rule 1110.2 to reduce emissions
- DGBU Study indicated the fuel cell had the lowest 20-year life cycle cost
- SBMWD committed to completing DGBU Program to comply w/ SCAQMD
- Researched fuel cell implementations
- Met multiple major challenges



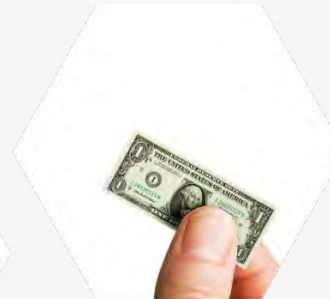
So Cal Edison
Utility Provider



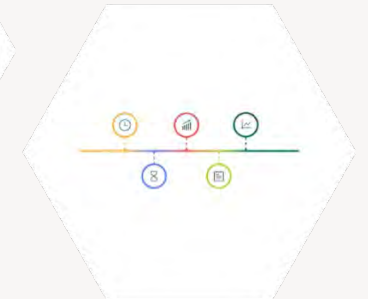
COVID-19
Pandemic



Supply Chain
Commerce Network



Inflation
Economic Principle



Timeline
Imposed Limits

Starting the Process



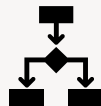
Starting Point

- No prior staff experience with fuel cell technology
- Limited organizational knowledge of fuel cell operations or procurement
- Needed to identify a procurement model that protects the Department



Learning from Others

- Talked with fuel cell manufacturers
- Talked with and visited other agencies
- Biogas contaminants can be difficult to treat, and each plant's process yields different types and concentrations of contaminants.
- Fuel cell implementations failed when a different entity was responsible for biogas conditioning.
- PPA reduces risk to the Department while providing low-cost energy instead of owning and maintaining a fuel cell



Fuel Cell Selection

- Solicited proposals for a fuel cell system based on our digester gas makeup
- Received two responses
- Negotiations with the lowest-cost proposal failed due to the inability to meet the Guaranteed Energy Production provision of the PPA
- Negotiated PPA with FuelCell Energy

Structuring the PPA



**USED RIVERSIDE'S
AGREEMENT AS THE
BASIS FOR OUR
MODEL.**



20-YEAR PPA TERM
LONG-TERM
AGREEMENT PROVIDES
RATE CERTAINTY AND
ENABLES THE
MANUFACTURER TO
FINANCE AND
MAINTAIN THE SYSTEM
FOR ITS FULL
OPERATIONAL LIFE



**DOCUMENTED
MILESTONES**
WRITTEN MILESTONES
IN PPA TO ENSURE
COMPLIANCE WITH
SCAQMD VARIANCE
AGREEMENT.



**DIGESTER GAS
SAMPLING**
SAMPLED OUR
DIGESTER GAS AND
DOCUMENTED
EXPECTED
CONTAMINANT
LEVELS. THESE WERE
WRITTEN DIRECTLY
INTO THE PPA AS
DEFINED OPERATING
CONDITIONS.



**MANUFACTURER
ACCOUNTABILITY**
FUEL CELL
MANUFACTURER
RESPONSIBLE FOR
BIOGAS CONDITIONING
AND SYSTEM
PERFORMANCE. THE
FULL ONUS TO
PERFORM IS PLACED
ON ONE
MANUFACTURER TO
PREVENT ONE ENTITY
FROM BLAMING THE
OTHER.

PPA

Signed on April 26th, 2019

Delivered Energy Contract Price \$89.00/MWh – 2.25% annual increase

Highlighted specifications and responsibilities in PPA

- Maintaining Confidentiality
- Utilities
- Permitting & SGIP compliance
- Insurance requirements
- Operations & Maintenance
- Remote Monitoring
- Performance Guarantees
- Termination of Agreement
- Milestone Schedule
- Facility Description
- Site Location and Conditions
- Requirements for Commercial Operation Certification
- Site Use Conditions – Safety, Security and Access
- Drawings – SBMWD Review before excavation
- Buyer's Meter
- Coordination with concurrent construction projects
- Plant boilers for heating digesters have biogas priority over fuel cell

Contains Biogas Quality and Contaminant Limits – Based on seven samples from 4/19/2017 to 3/28/2019

2 Amendments – SCE & pandemic supply chain delays changed the Guaranteed Commercial Operation Date milestone.

WATER RECLAMATION PLANT FUEL CELL PROJECT

POWER PURCHASE AGREEMENT

BETWEEN

SAN BERNARDINO FUEL CELL, LLC

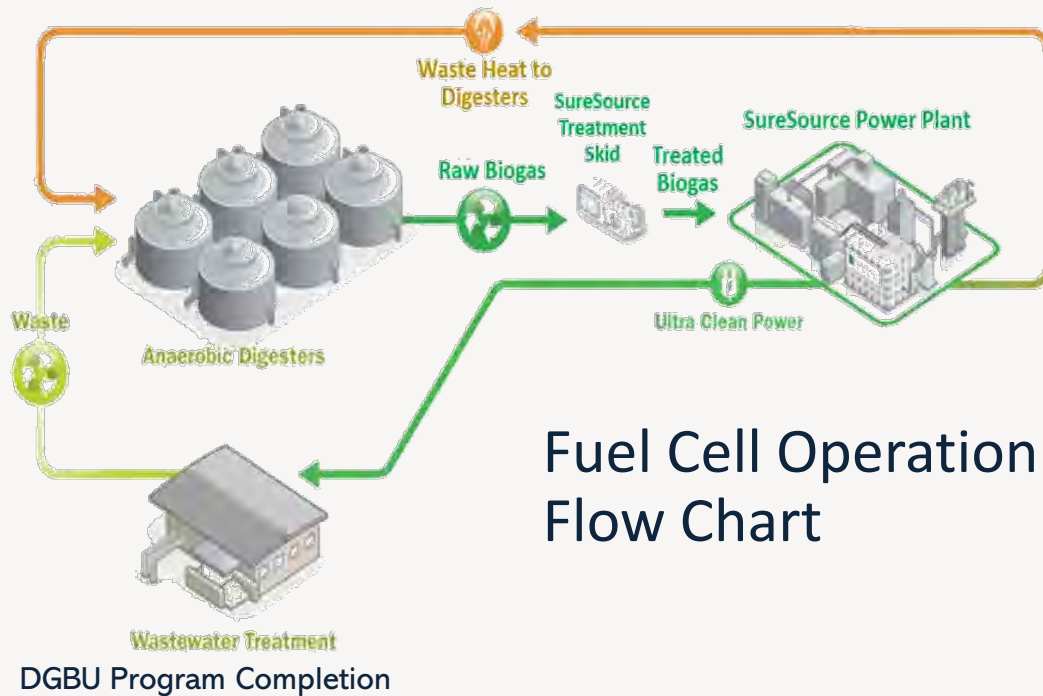
AND

CITY OF SAN BERNARDINO

DATED FOR CONVENIENCE AS OF APRIL 26, 2019

Fuel Cell Project

- SBMWD provides DG, make-up NG, and water
- FCE provides electricity and hot water
- FCE's costs are lower than anticipated for SCE
- Met the terms of the PPA
- FCE received the SGIP incentives
- Providing approximately 55% of the WRP's power to date



Fuel Cell Construction



July 2020



September 2020



July 2021

PPA Executed

April 29, 2019

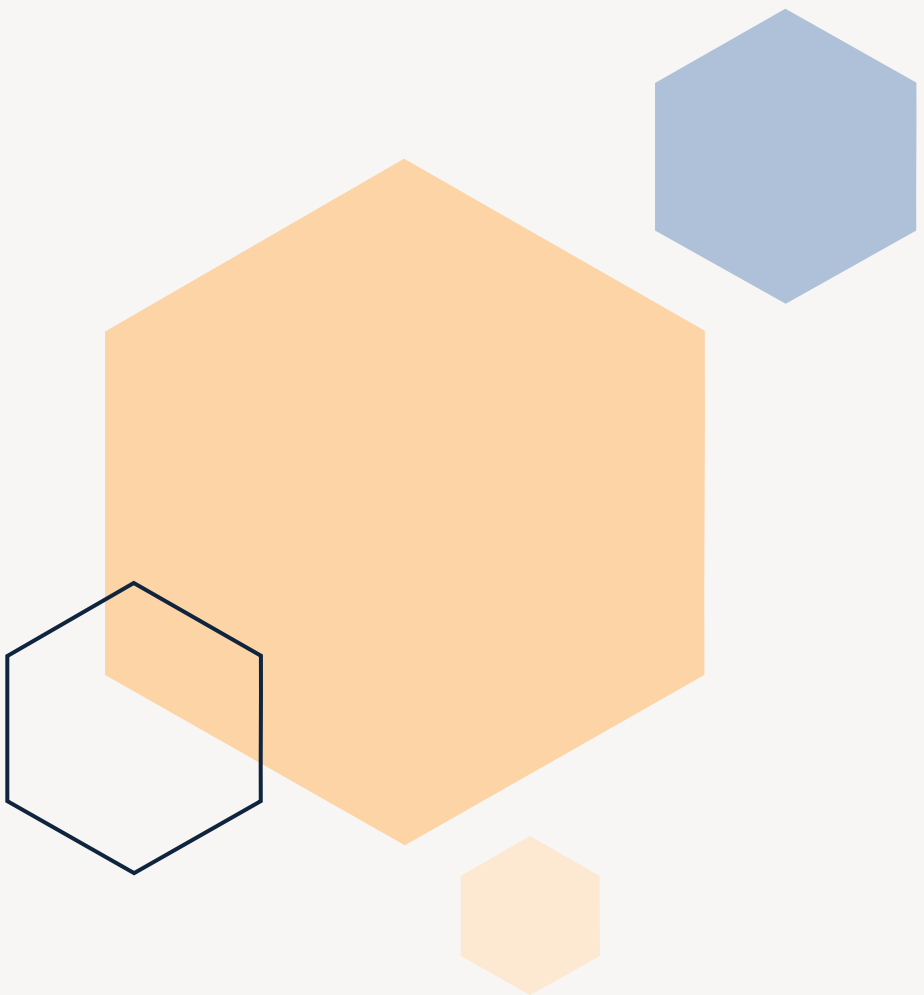
Design

Construction

Commercial Operation

June 25, 2021

DGBU Program Completion



Lessons Learned

SCE interconnect agreements take time and need to get involvement early

- SCE initially denied the Fastrack application – too much generation on the circuit
- The existing cogeneration system was misidentified in SCE's system, and the agreement needed formal termination

Water quality issues required the addition of softener exchange tanks to reduce bicarbonate

Fuel cell module requires special hauler and increased room to move

Clear PPA provisions helped resolve contractor matter regarding underground utility approvals and documentation

PPA Milestones with noncompliance penalties kept the project moving

PPA lowered SBMWD's risk exposure and was the right procurement model for us

Successful public/private partnership



Fuel Cell Project

