



Silicon Valley Clean Water BAYWORK Workshop on Wheels

ENERGY STORAGE SYSTEM FOR POWER DEMAND MANAGEMENT

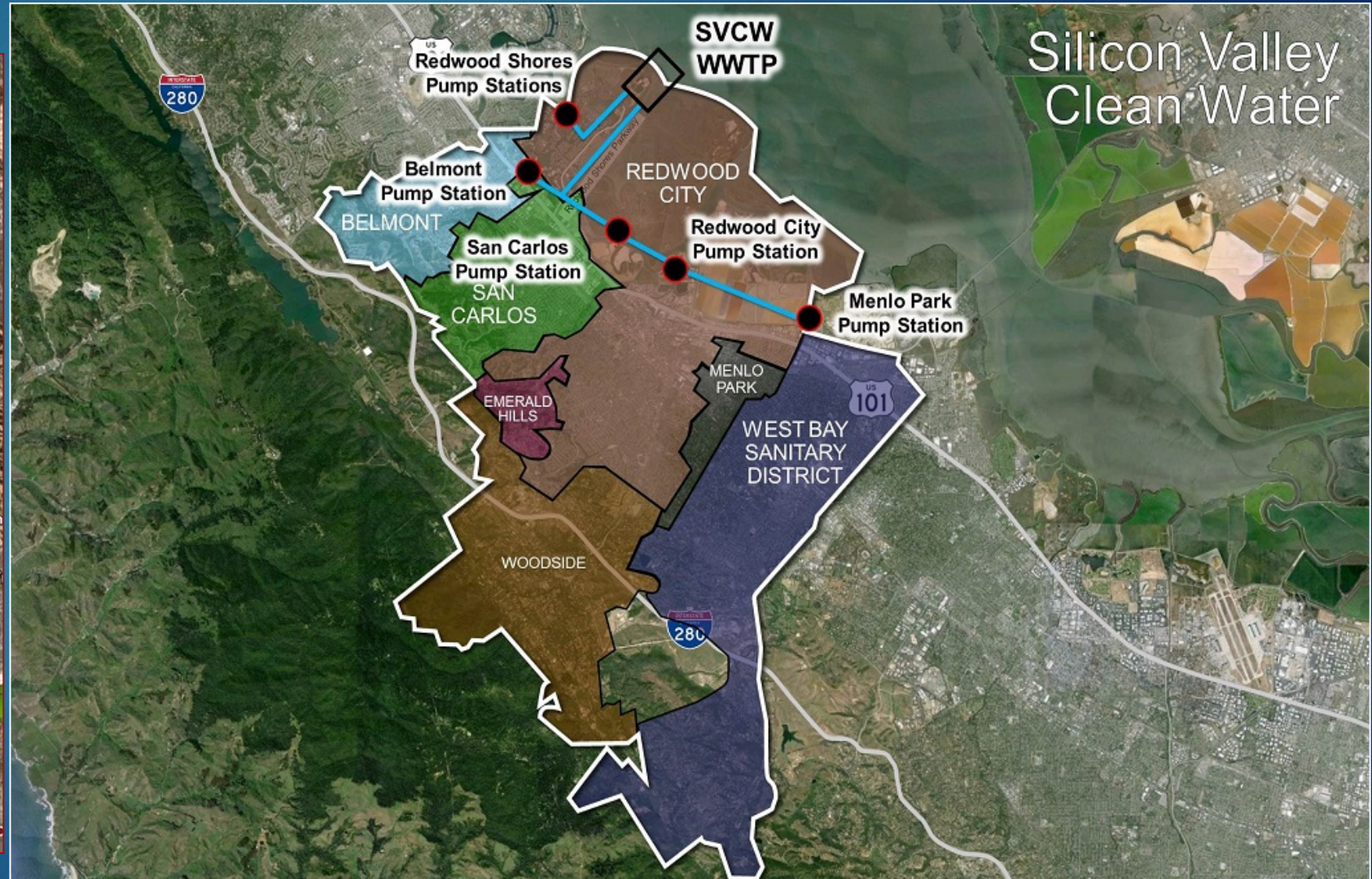
OCTOBER 15, 2020

Presentation Outline

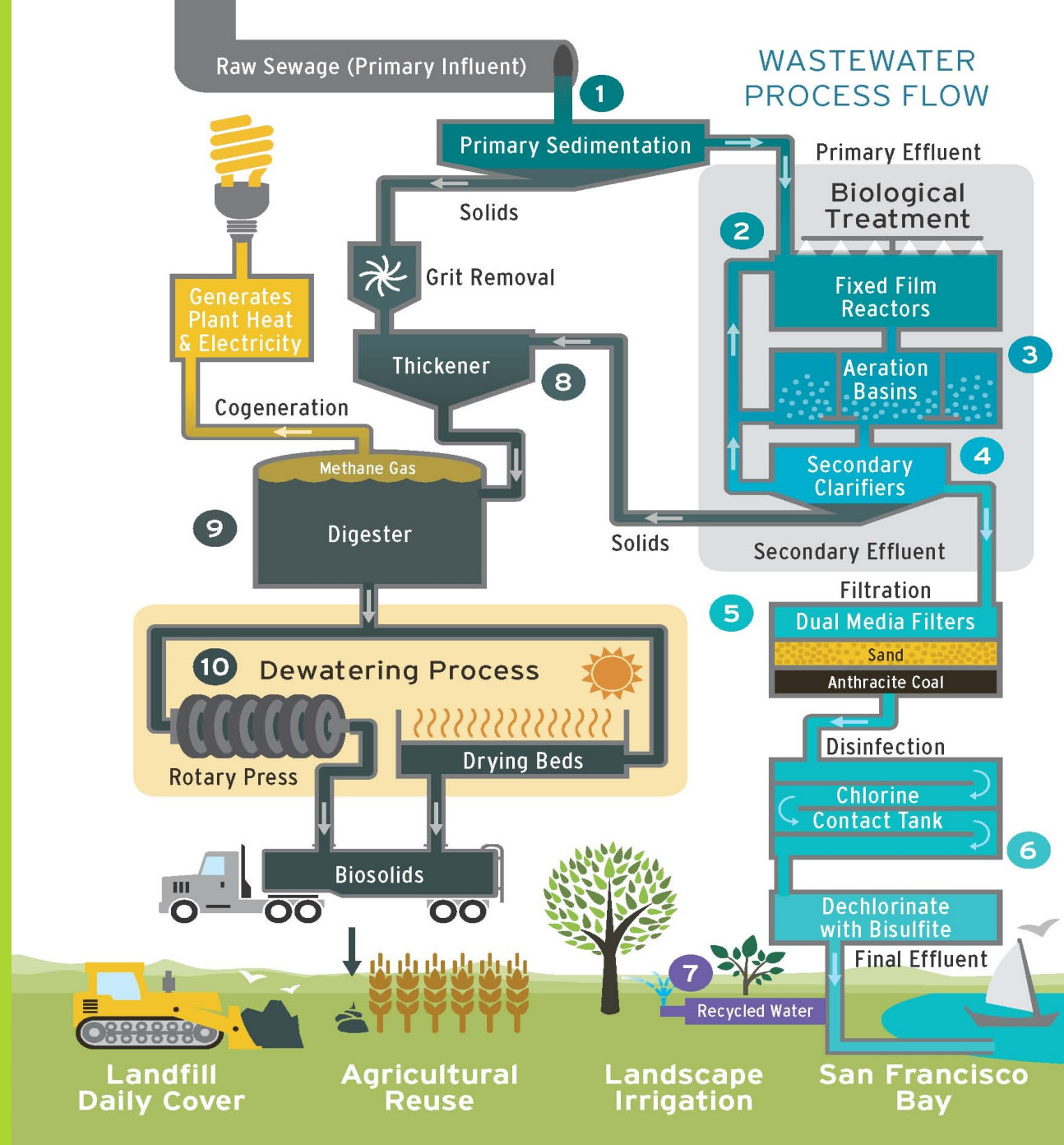
- ▶ Overview of SVCW
- ▶ Energy Storage (Battery) System
- ▶ Project Features
 - ▶ Scope
 - ▶ Budget and Delivery
- ▶ Benefits
- ▶ Barriers/Challenges
- ▶ Lessons Learned
- ▶ Questions

Overview of SVCW

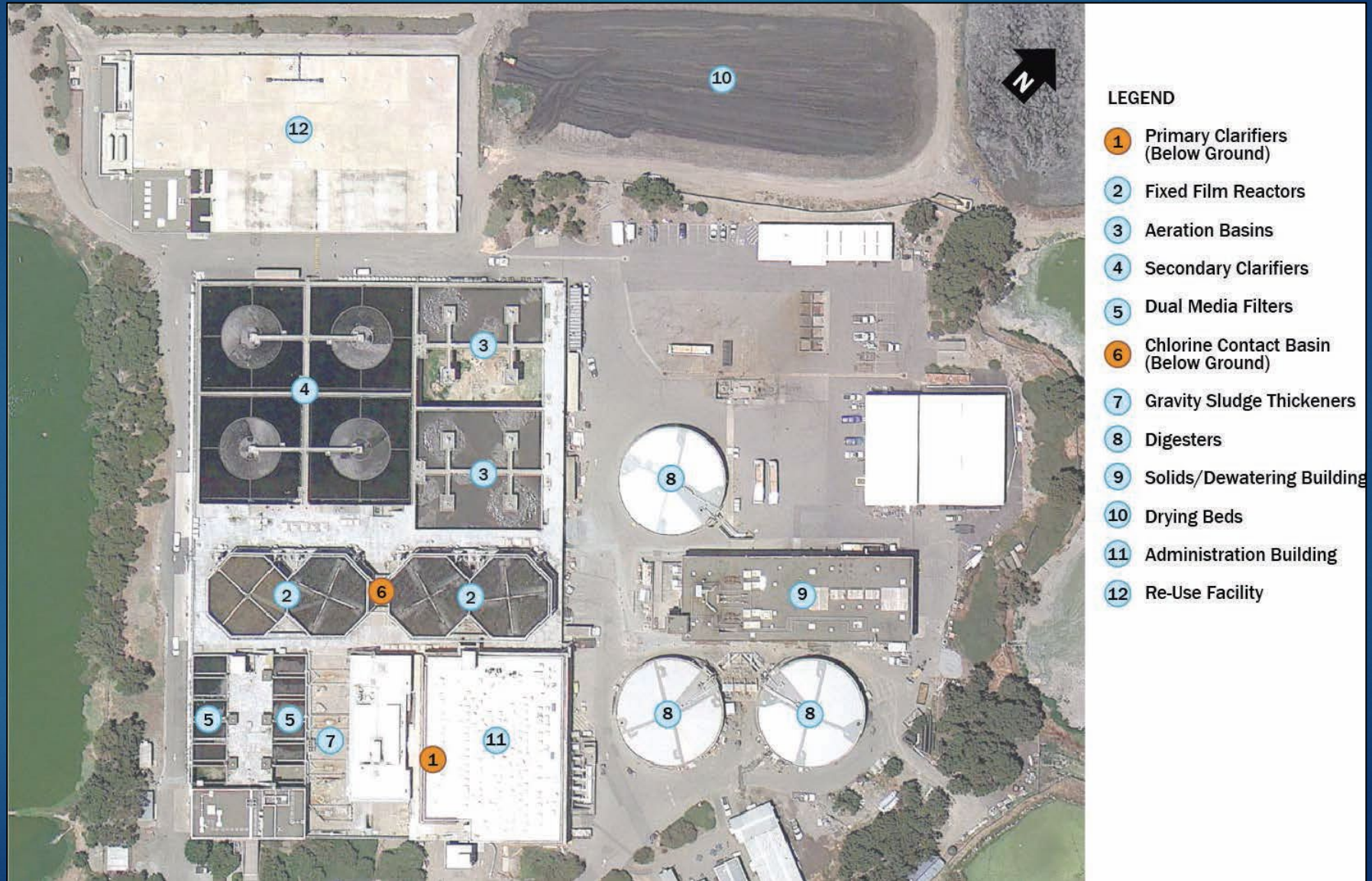
SVCW Service Area



SVCW Treatment Plant Process



SVCW Plant Aerial

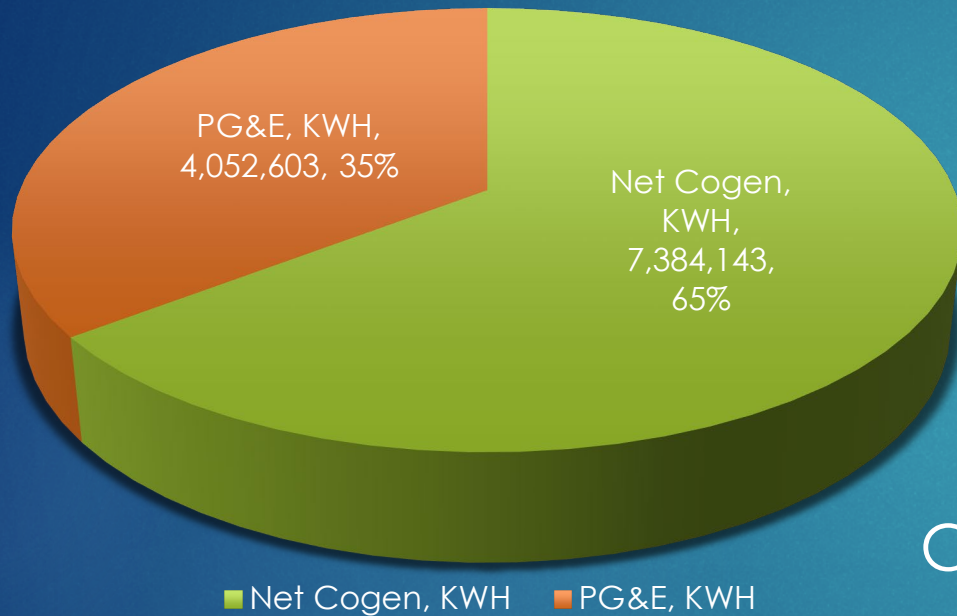


SVCW Cogeneration System Highlights

- ▶ (2) 633 kW GE Jenbacher Engines
- ▶ Gas Blending System
- ▶ Gas Treatment System
- ▶ Waste Heat Recovery



Cogeneration vs. Imported Power

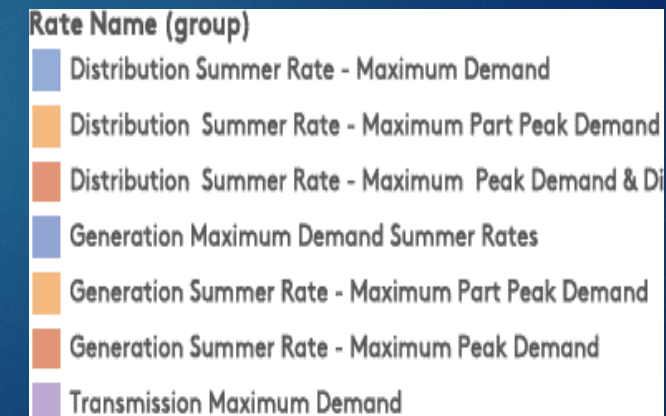
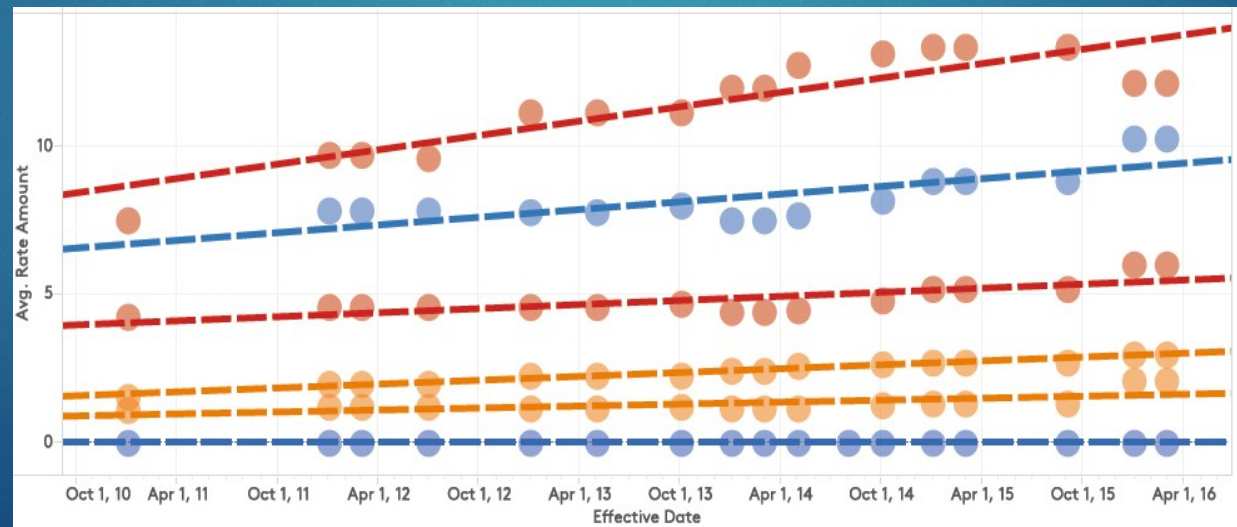
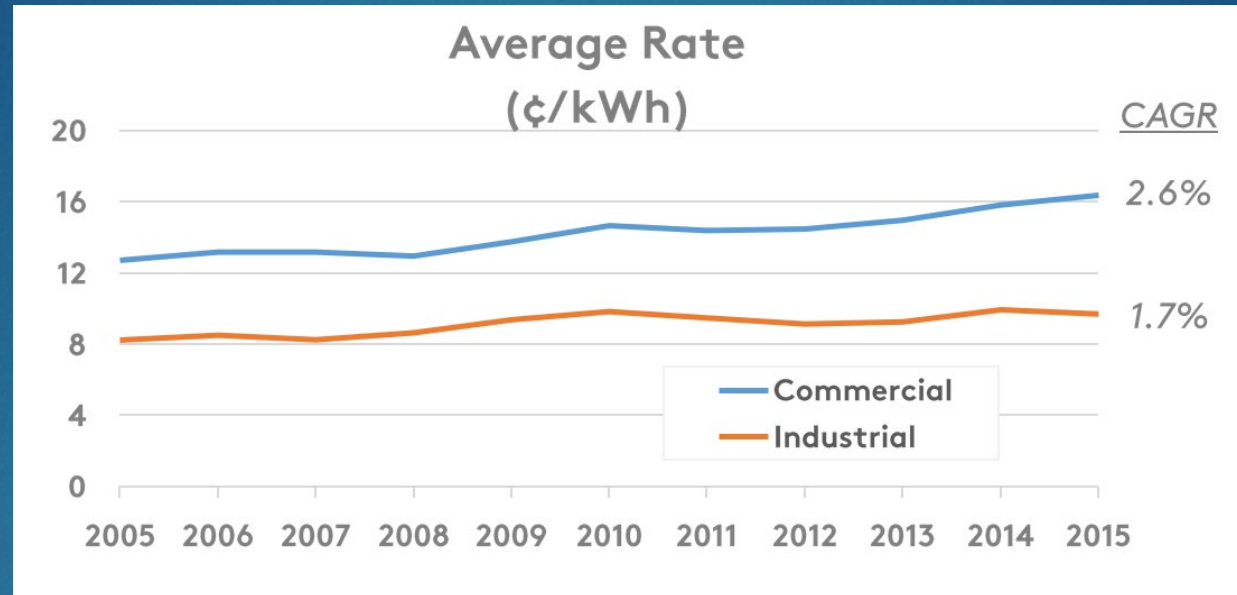


Cost of Purchased Power = 22 c/kWh

Cost of Co-generated Power = 7 c/kWh

Annual Net Savings from Co-generation = \$1.1 M

PG&E Tariff Increases



Energy Management Projects at SVCW

- ▶ 2011 – Digester mixing upgrade
- ▶ 2015 – Cogeneration system upgrade
- ▶ 2017 – FOG receiving station upgrade
- ▶ 2019 – Solar PV evaluated
- ▶ 2019 – New 12kV Primary Switchgear
- ▶ 2020 – Food waste co-digestion
- ▶ 2020 – Energy storage (Battery)

Energy Storage (Battery) System

Typical PG&E Bill

Total Electric Bill =

Customer Connection
Charge (\$/day)

+

Demand Charge (\$/kW)

+

Energy Usage Charge
(\$/kWh)

+

Flat Charges

Details of Electric Charges

06/26/2018 - 07/25/2018 (30 billing days)

Service For: 1400 RADIO RD

Service Agreement ID: 5210088716

06/26/2018 – 07/25/2018

Rate Schedule: SE20P Standby Mixed Use - E20P

Customer Charge	30	days	@ \$49.28131	\$1,478.44
Demand Charge ¹				
Max Peak	651.000000	kW	@ \$20.34000	13,241.34
Max Part Peak	1,274.000000	kW	@ \$5.36000	6,828.64
Max Demand	1,274.000000	kW	@ \$15.61000	19,887.14
Energy Charges				
Peak	48,052.000000	kWh	@ \$0.15199	7,303.42
Part Peak	58,616.000000	kWh	@ \$0.10749	6,300.63
Off Peak	154,587.000000	kWh	@ \$0.08012	12,385.51
Reservation Charge - Standby				7,621.71
Reactive Power Charge				574.76
Energy Commission Tax				75.76

Total Electric Charges **\$75,697.35**

¹ Demand charges are prorated for the number of days in each rate period

50%+ of summer electric bill is due to demand charges!

PG&E Billing Rates

Rate Schedule	Customer Charge/ Meter Charge	Season	Time-of-Use Period	Demand Charges (\$/kW)	Energy Charges (\$/kWh)		PDP ^{1/} Charges	PDP ^{2/} Credits DEMAND (per kW)	PDP ^{2/} Credits ENERGY (per kWh)	Power Factor Adjustment (\$/kWh/%)		"Average" Total Rate ^{3/} (\$/kWh)	
E20 Primary Firm	\$45.16384 per day	Summer	Max Peak	\$22.77	\$0.16528		\$1.20	(\$5.57)	\$0.00000	\$0.00005		\$0.17774	
			Part-Peak	\$6.07	\$0.11759			(\$1.32)	\$0.00000				
			Off-Peak	-	\$0.08825			-	-				
			Maximum	\$18.82	-			-	-				
		Winter	Part-Peak	\$0.15	\$0.11130		-	-	\$0.00005				
			Off-Peak	-	\$0.09546		-	-					
			Maximum	\$18.82	-		-	-					

^{1/}Peak Day Pricing (PDP) (Consecutive Day and Four-Hour Event Option). All Usage During PDP Event. See specific tariff for further details.

^{2/}Peak Day Pricing (PDP) (Consecutive Day and Four-Hour Event Option). See specific tariff for further details.

^{3/}Based on estimated forecast. Average rates provided only for general reference, and individual customer's average rate will depend on its applicable kW, kWh, and TOU data.

Summer Season (May-October):

Peak Hours: 12:00 noon to 6:00 pm, Monday-Friday (except holidays)

Partial-Peak Hours: 8:30 am to 12:00 noon AND 6:00 pm to 9:30 pm, Monday-Friday (except holidays)

Off-Peak Hours: 9:30 pm to 8:30 am, Monday-Friday (except holidays); All day Saturday, Sunday and holidays

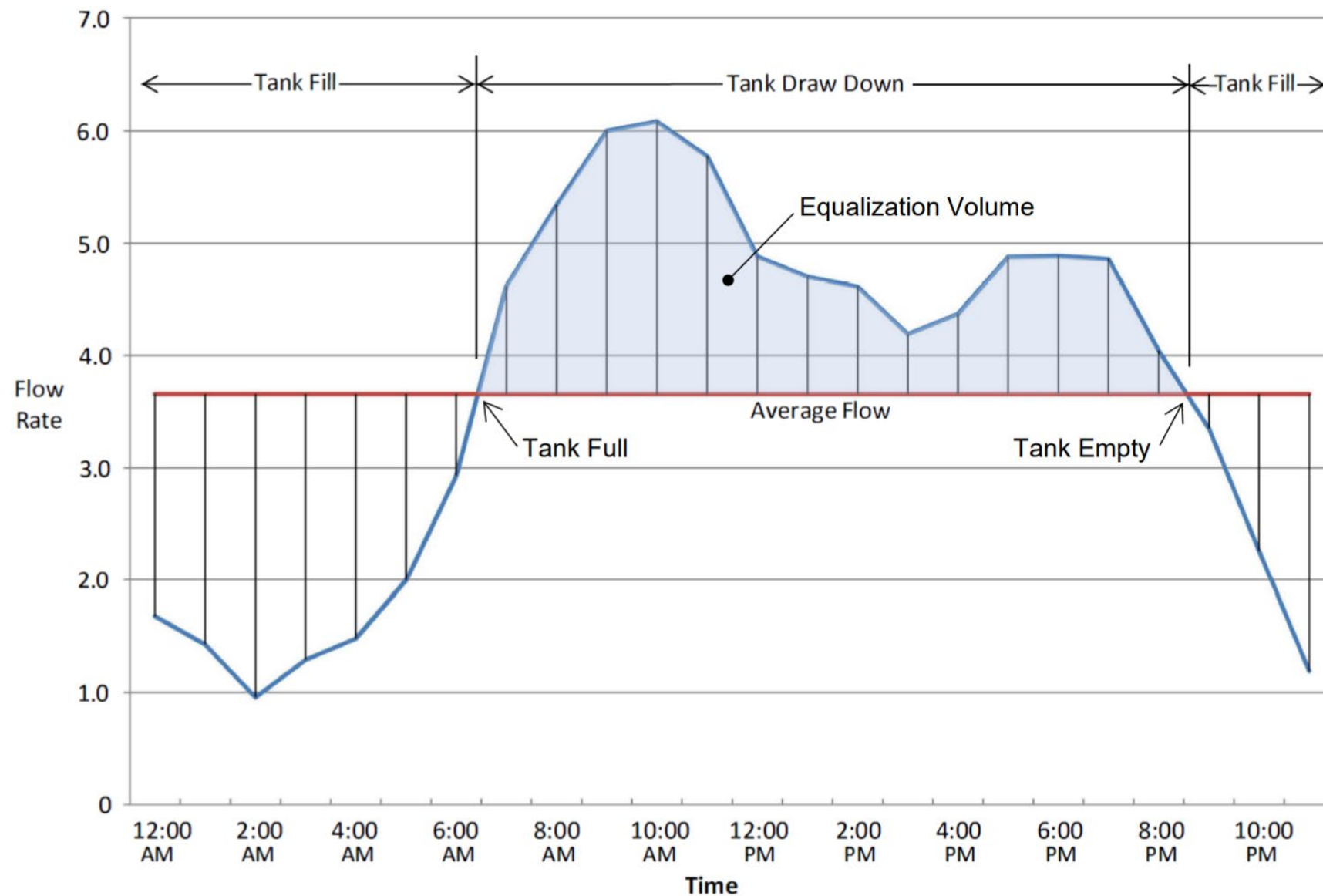
Winter Season (November-April):

Partial-Peak Hours: 8:30 am to 9:30 pm, Monday-Friday (except holidays)

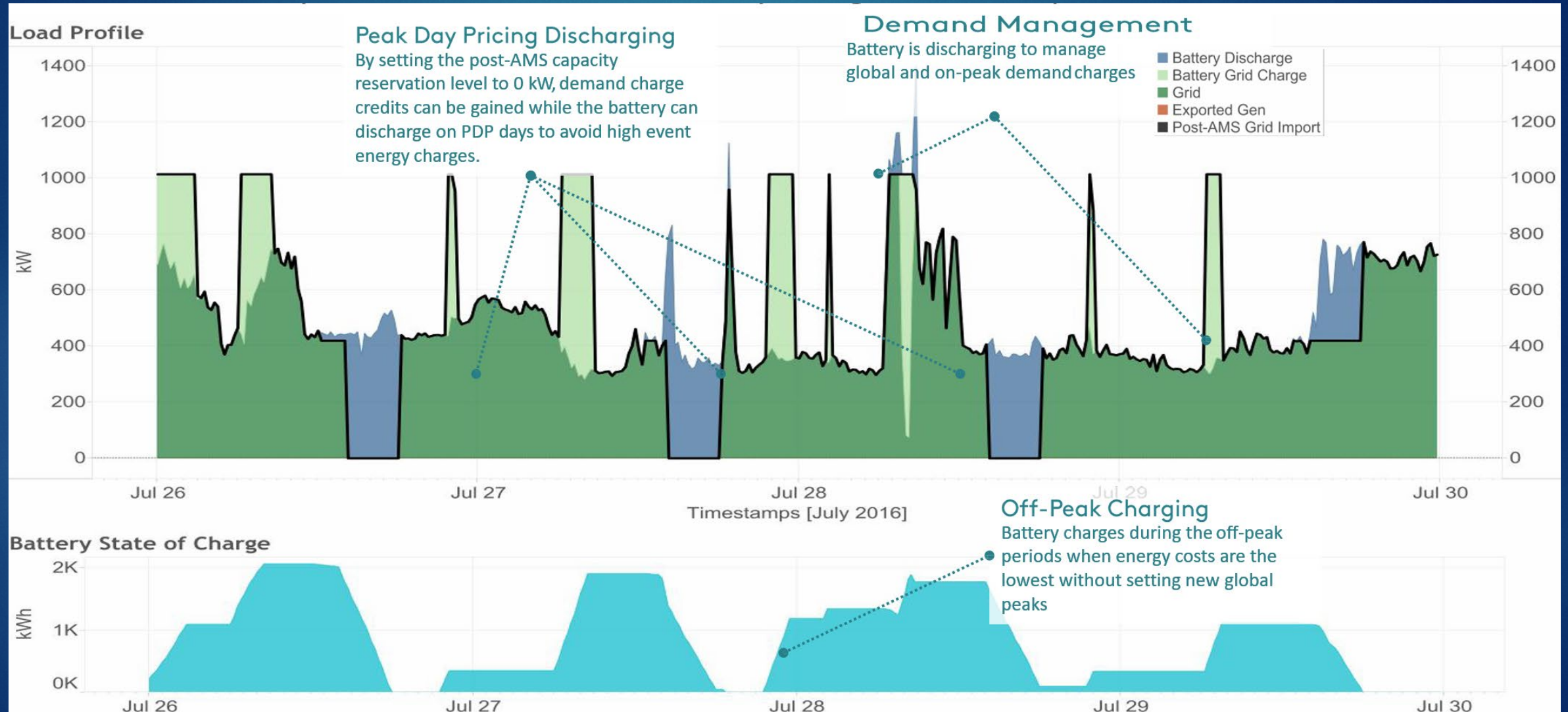
Off-Peak Hours: 9:30 pm to 8:30 am, Monday-Friday (except holidays); All day Saturday, Sunday and holidays

This table provided for comparative purposes only. See current tariffs for full information regarding rates, application, eligibility and additional options.

Typical Water Storage



Energy Storage

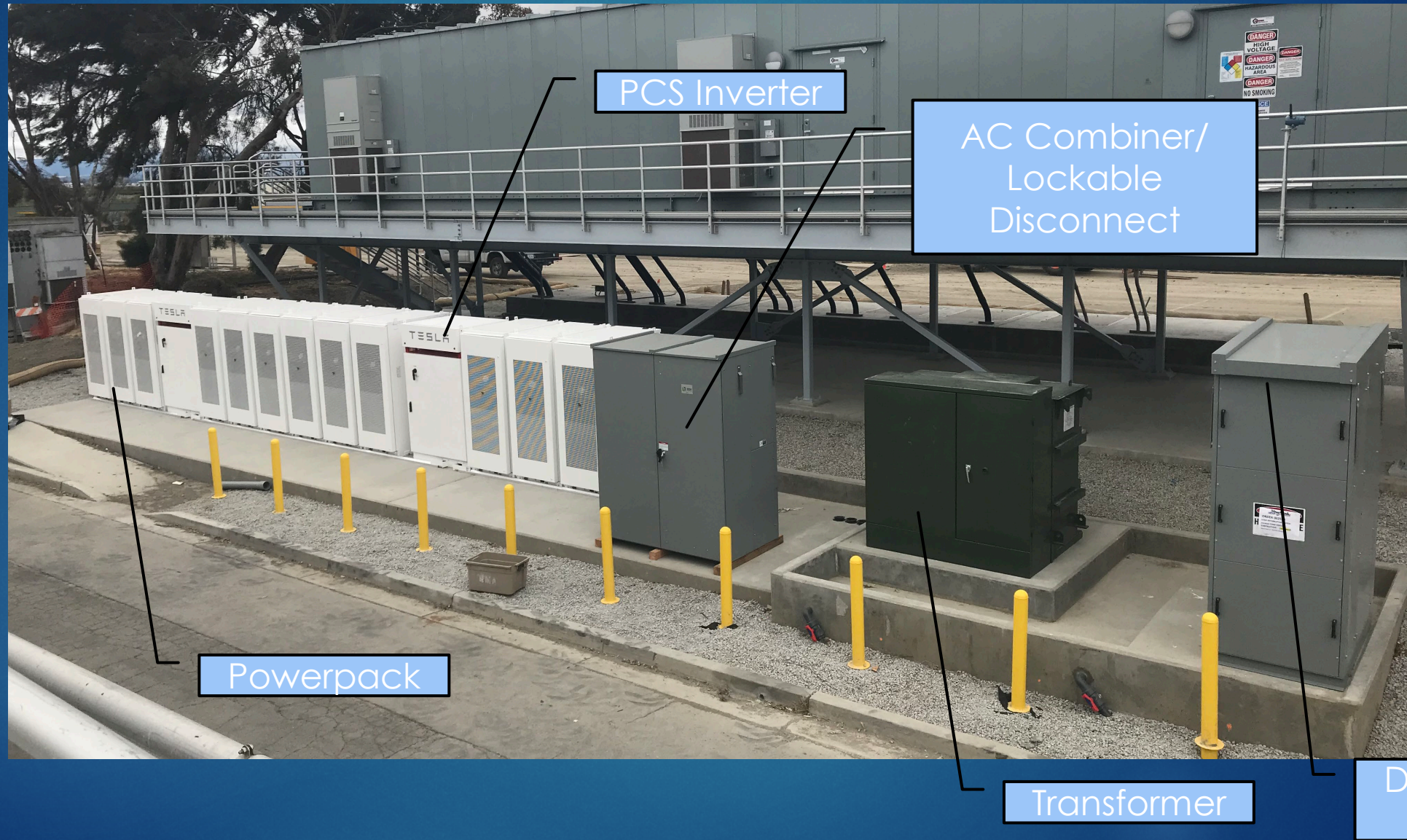


Project Features

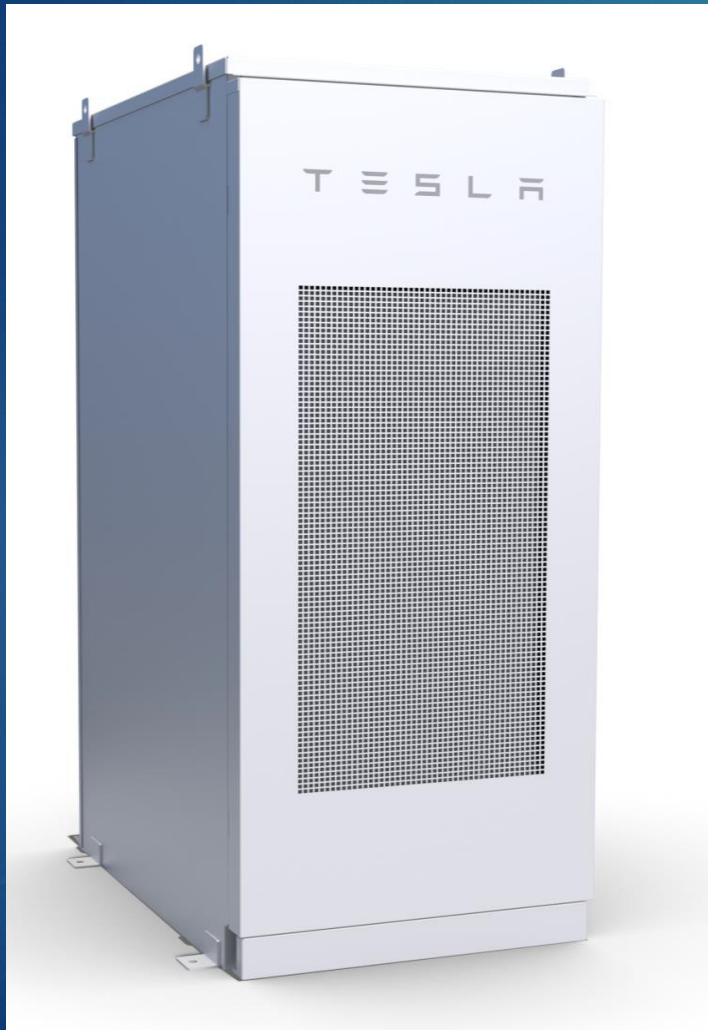
Project Scope Elements

- ▶ 1.04 MW/ 2 MWh TESLA Powerpack 2.0 Li-Ion Battery System
- ▶ Inverter
- ▶ Transformer
- ▶ Electrical Connections
- ▶ Programming
- ▶ Maintenance Contract

Battery System



Battery Technology Specifications



PROVIDER	Tesla Powerpack 2.0 x 12
BATTERY TYPE	Lithium Ion
CAPACITY	250 kW / 200 kWh (per pack)
DURATION	2-6 hrs (total system)
DIMENSIONS	57.5"(l) x 32.4"(w) x 86"(h)
WEIGHT	4,765 lbs
SITING	Ground-mounted externally

Project Budget and Delivery

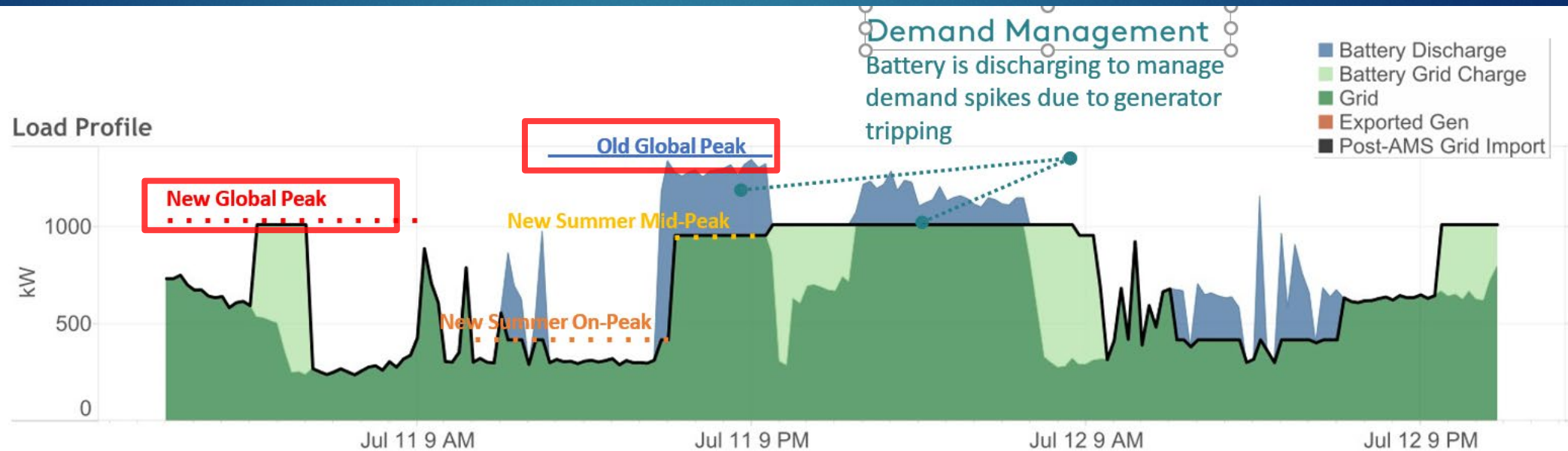
Budget Summary

- Project CIP Budget: \$2.2 M
- Construction Cost: \$1.6 M
- SGIP Grant: \$1 M

Delivery

- EPC Contractor: Advanced Microgrid Solutions
- Designer / Contractor: AMS/Core States Group
- Servicing/Asset Management: EnelX

Benefits



	BEFORE	AFTER	Δ	%
Annual Peak (kW)	2,180	1,436	744	34%
Energy (\$/yr)	\$605,545	\$614,743	\$(9,198)	(2%)
Demand (\$/yr)	\$455,779	\$280,128	\$175,651	39%
Total	\$1,146,809	\$980,357	\$166,452	15%

Barriers/Challenges

- ▶ Startup firm without a long track record in the business
- ▶ Concern with the viability of the technology
- ▶ Biggest challenge: expect from PG&E EGI group (aka Interconnection group)

Lessons Learned

- ▶ Obtain buy-in from Management and O&M
- ▶ One-year delay due to PG&E – keep float in schedule