DOCKETED	
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Project Title:	Business Meeting Agendas, Transcripts, Minutes, and Public Comments
TN #:	241547
Document Title:	January 26 Business Meeting Presentation
Description:	**** THIS DOCUMENT SUPERSEDES TN 241277 ****
Filer:	Dorothy Murimi
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	2/16/2022 2:37:04 AM
Docketed Date:	2/16/2022

California Energy Commission
Business Meeting
January 26, 2022
10:00 a.m.

Pledge of Allegiance

I pledge allegiance to the Flag
of the United States of America,
and to the Republic for which it stands,
one Nation under God, indivisible,
with liberty and justice for all.

Consent Calendar: a. – d.

a. Aspen Environmental Group. Contact: Hilarie Anderson
b. University of California, Berkeley, Energy Institute at Haas School of Business. Contact: Lynn Marshall
c. Allotrope Partners LLC. Contact: Kate Reid
d. California State Pipe Trades Council (CSPTC) Amendment to Provider Application. Contact: Sam Cantrell

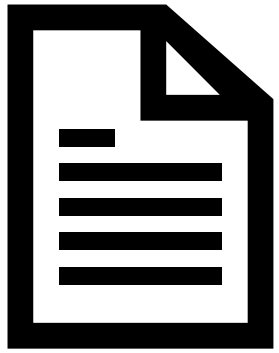
Item 2: California Energy Demand 2021-2035 Forecast

January 26, 2022 Business Meeting

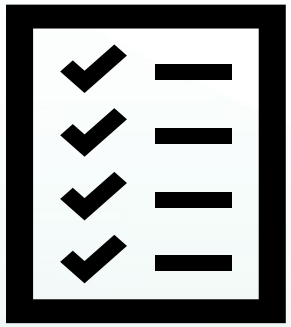
Nick Fugate, Forecaster
Energy Assessments Division, Demand Analysis Office

Benefits & Purpose of the Forecast

- Integrated Energy Policy Report (IEPR)

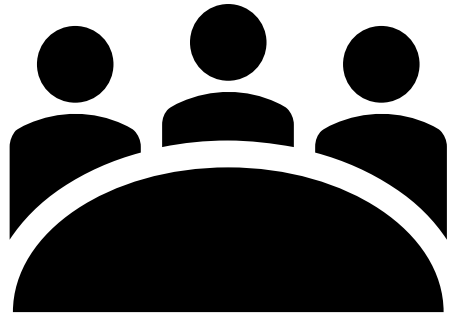


- Procurement and system planning at the CPUC and ISO
  - Integrated Resource Planning
  - Distributed Resource Planning
  - Resource Adequacy
  - Transmission Planning



Stakeholder Process

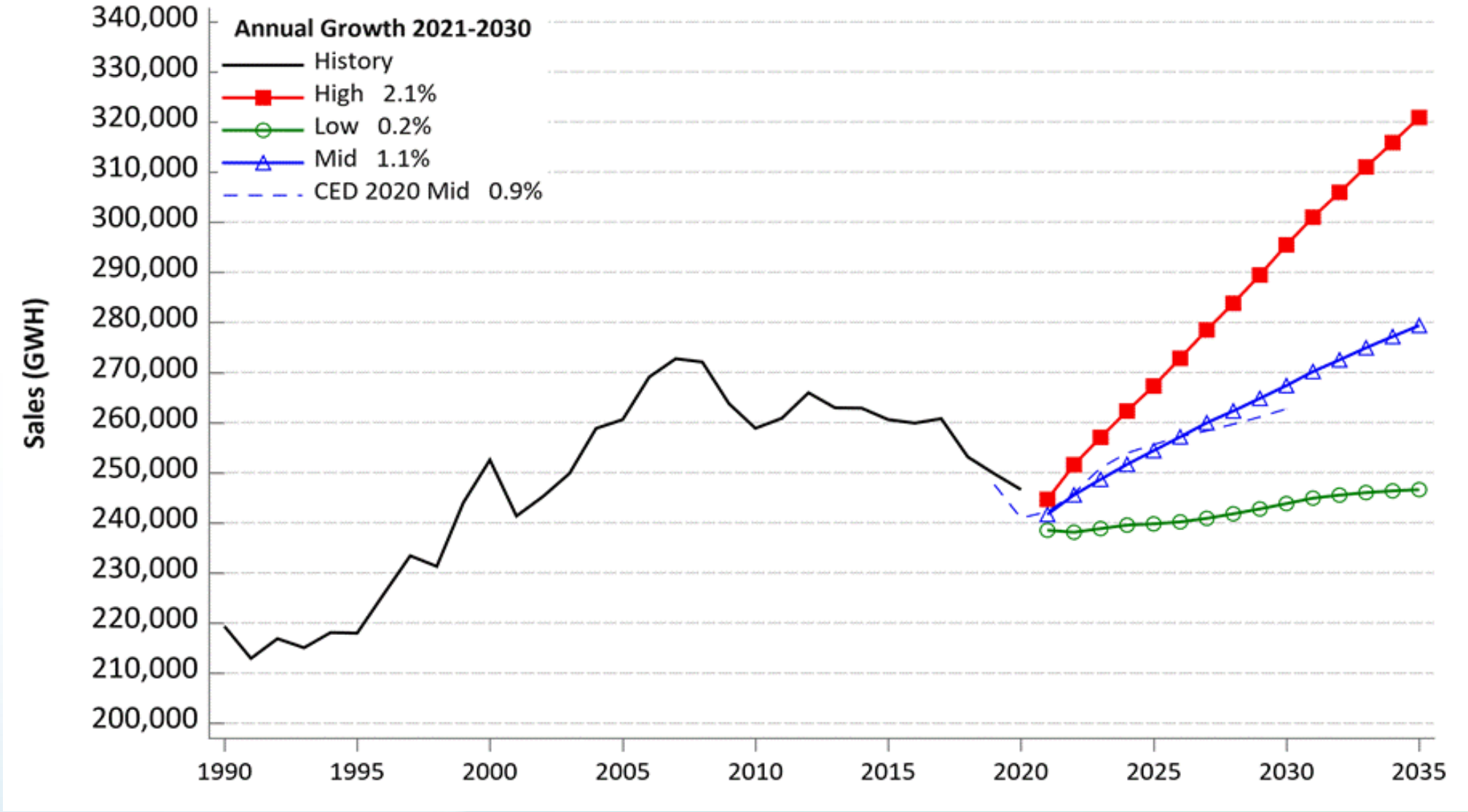
- 5 IEPR workshops
- 6 Demand Analysis Working Group meetings
- Joint Agency Steering Committee discussion
- Final revisions made in response to stakeholder comments
  - Corrected EV charging profiles
  - Adjusted 2021 weather-normal peak estimate



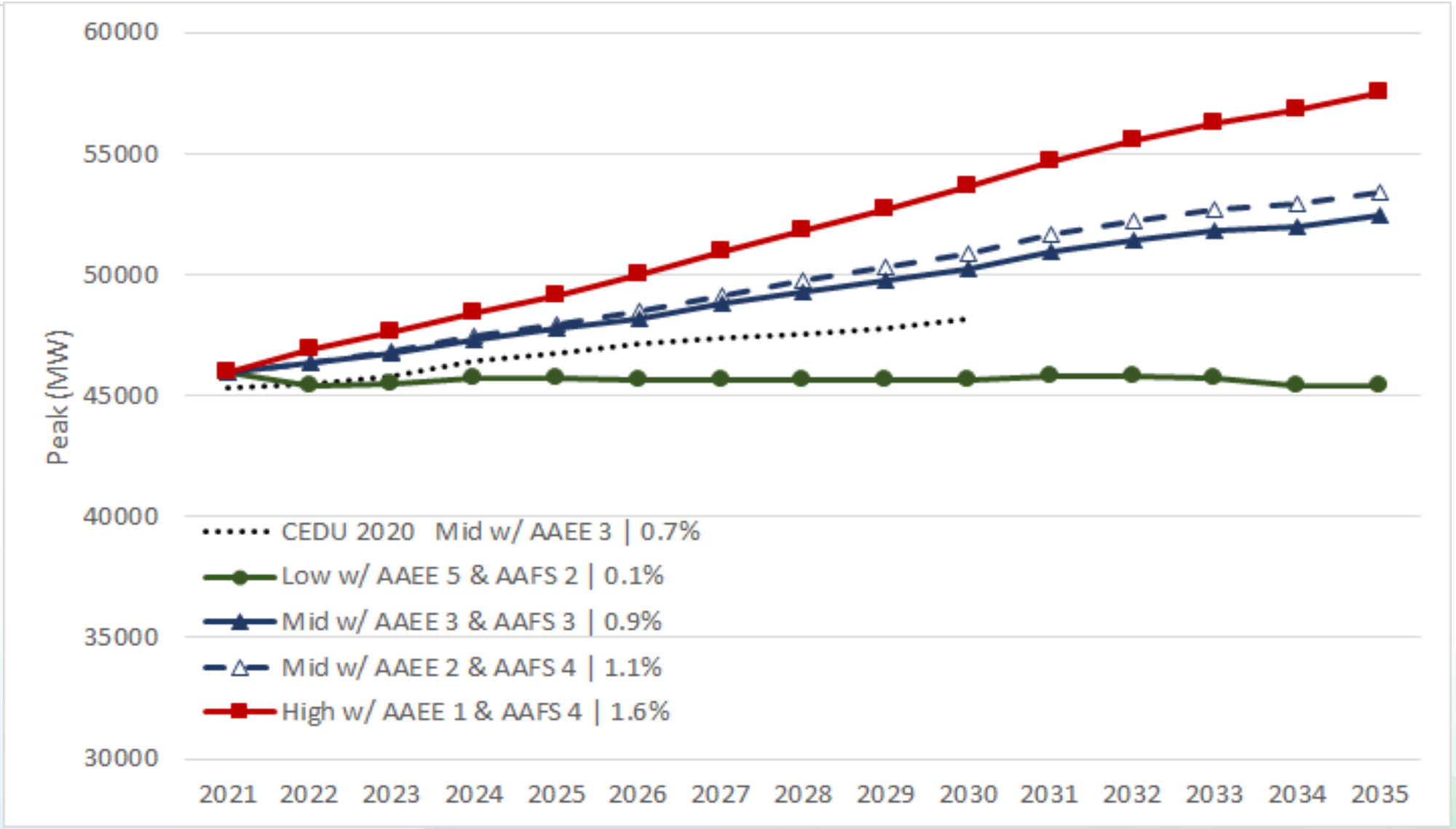
Analytic Improvements

- Forecast extended to 2035
- Climate change adjustment to peak forecasts
- Title 24 commercial PV & storage requirements
- Updated Additional Achievable Energy Efficiency
- New “Additional Achievable” scenarios for fuel substitution

Statewide Electricity Sales



Managed Peak Demand (CAISO)



Single Forecast Set

- IEPR forecast has many components:
  - Baseline / AAEE / AAFS scenarios
  - Annual, hourly, and peak demand
  - Extreme weather variants

- Agreement between CEC, CPUC, and ISO identifies:
  - Specific planning uses
  - Components of forecast appropriate for each

Staff Recommendation

- Adopt California Energy Demand 2021-2035 Forecast

Item 3: Update on Russell City Energy Center

January 26, 2022, Business Meeting

Presented by:
Elizabeth Huber: CME Office Manager, Siting, Transmission and Environmental Protection Division,
Nika Kjensli: ESRB Program Manager, California Public Utilities Commission, and
Kelly McAdoo, Hayward City Manager, Hayward, California

Requirements Under CEC-Approved Order

Requirements Under CEC-Approved Order

Joint Agency Investigation

100 RCA and Documents Reviews

12 Witness/First Responder Interviews

9 Onsite inspections

3 Commissioner Tours

1 Weeklong Audit

CEC and CPUC Authorities

	CEC	CPUC
Statutory Authority	25532	761.3
Regulations/General Order	CCR 1770	GO 167-B
Oversight	Inspects and enforces compliance activities through CEQA-equivalent process	Implements and enforces standards for the maintenance and operation of power plants
California benefit	Assures jurisdictional power plants operate in compliance with air and water quality, public health and safety, and specific conditions of certification	Ensures power plants are effectively and appropriately maintained and efficiently operating, and ensures electrical reliability and adequacy

Electric Safety and Reliability Branch

Regulates power plants owned by generating asset owners (GAO), by enforcing General Order 167-B.

Purpose of this order is to implement and enforce operation and maintenance standards to ensure reliable electric generation.

Joint Agency Working Group

Plan Review and Project Restart

Item 4: Draft Report to the CPUC on Supply-Side Demand Response

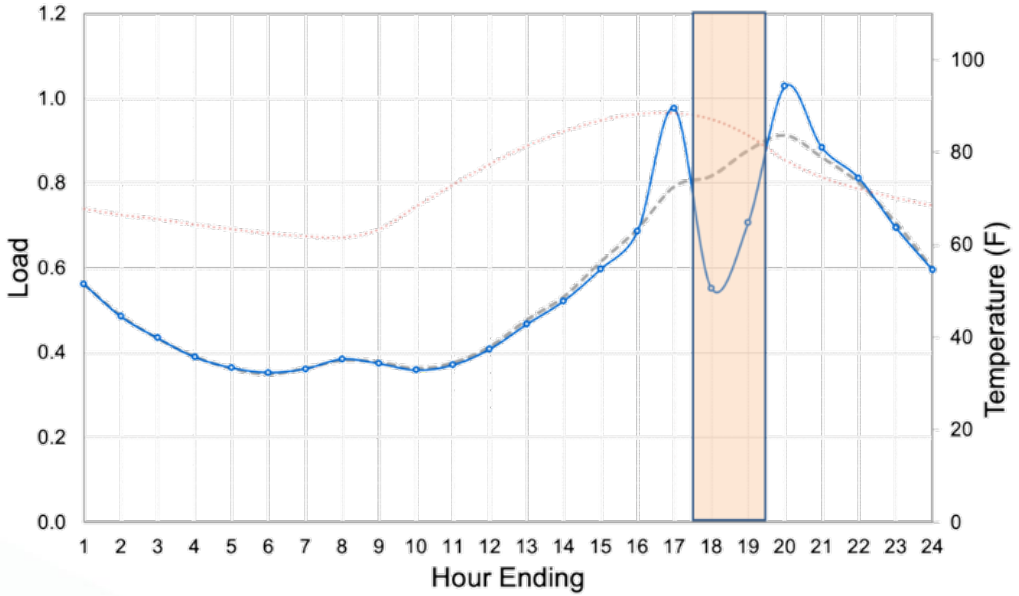
January 26, 2022 Business Meeting

Erik Lyon, Advisor
Office of Vice Chair Gunda

Benefits to Californians

Demand Response (DR):

- Provides greater reliability to the grid
- Reduces costs
- Reduces fossil fuel consumption
- Aligns electric demand with renewable energy generation
- Reduces the need for new power plants and transmission lines



Source: Grounded Analytics

Overview

What is the best way to measure DR's contribution to reliability?

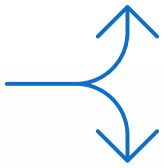
CPUC requested CEC to take a fresh look

CEC established stakeholder working group

CEC staff developed recommendations for the CPUC

CEC Working Group Approach

Robust stakeholder process with weekly meetings including utilities, DR and storage providers, customers, energy consultants, agencies, and the ISO



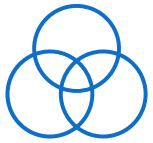
Phase 1

1. Principles Working Group
2. Methodologies Working Group

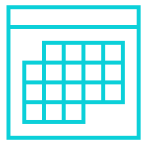
Phase 2: Combined Working Group

Recent focus on interim solutions for 2023

Findings Overview



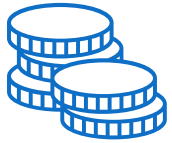
Interrelated challenges for DR need to be addressed holistically



Planned timeline incompatible with developing a permanent solution by 2023

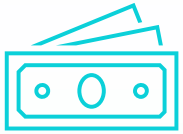
Two proposals are viable to temporarily address key challenges

Key DR Challenges



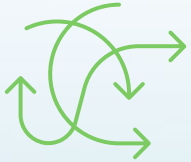
Crediting: Most utility DR resources not subject to ISO's rules for ensuring reliability

QC Methodology: Current approach does not accurately value contribution to reliability



Incentive Mechanisms: Penalties for underperformance not designed for DR

Settlements: Baseline methods do not accurately account for weather-sensitive resources



Process: Onerous, expensive, opaque, and inflexible

Timeline Issues

2023 Compliance Year

- QC process already underway by December 2021
- Insufficient time to develop permanent methodology by 2023

2024 Compliance Year (and beyond)

- RA reform working group proposing significant changes
- Slice-of-Day framework likely to be recommended and adopted
- CEC Working Group must wait for recommendations to ensure compatibility

Interim Proposals

LIP-Informed Effective Load Carrying Capability (ELCC)

What is the amount of ‘perfect capacity’ a DR resource can replace without impacting reliability?

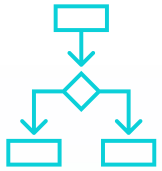
Incentive-based “PJM/NYISO” Approach

How much capacity will DR providers offer if they will be penalized for failing to deliver?

Interim Recommendations

Status quo DR counting methodology to continue for another year

Two new methodologies for 2023



DR providers can choose between status quo and new methodologies

California ISO provide exemptions for new methodologies

Direct investor-owned utilities to move DR onto supply plans

Long-term Recommendations

- Extend CEC stakeholder working group process
- Develop a comprehensive, permanent solution for subsequent years
- Ensure alignment with changes to resource adequacy framework

Next Steps

Public comment period through February 4

CEC staff consider revisions to report

Request CEC adoption at February 16 business meeting

Submit report to CPUC

Item 5: Pecho Energy Storage Center

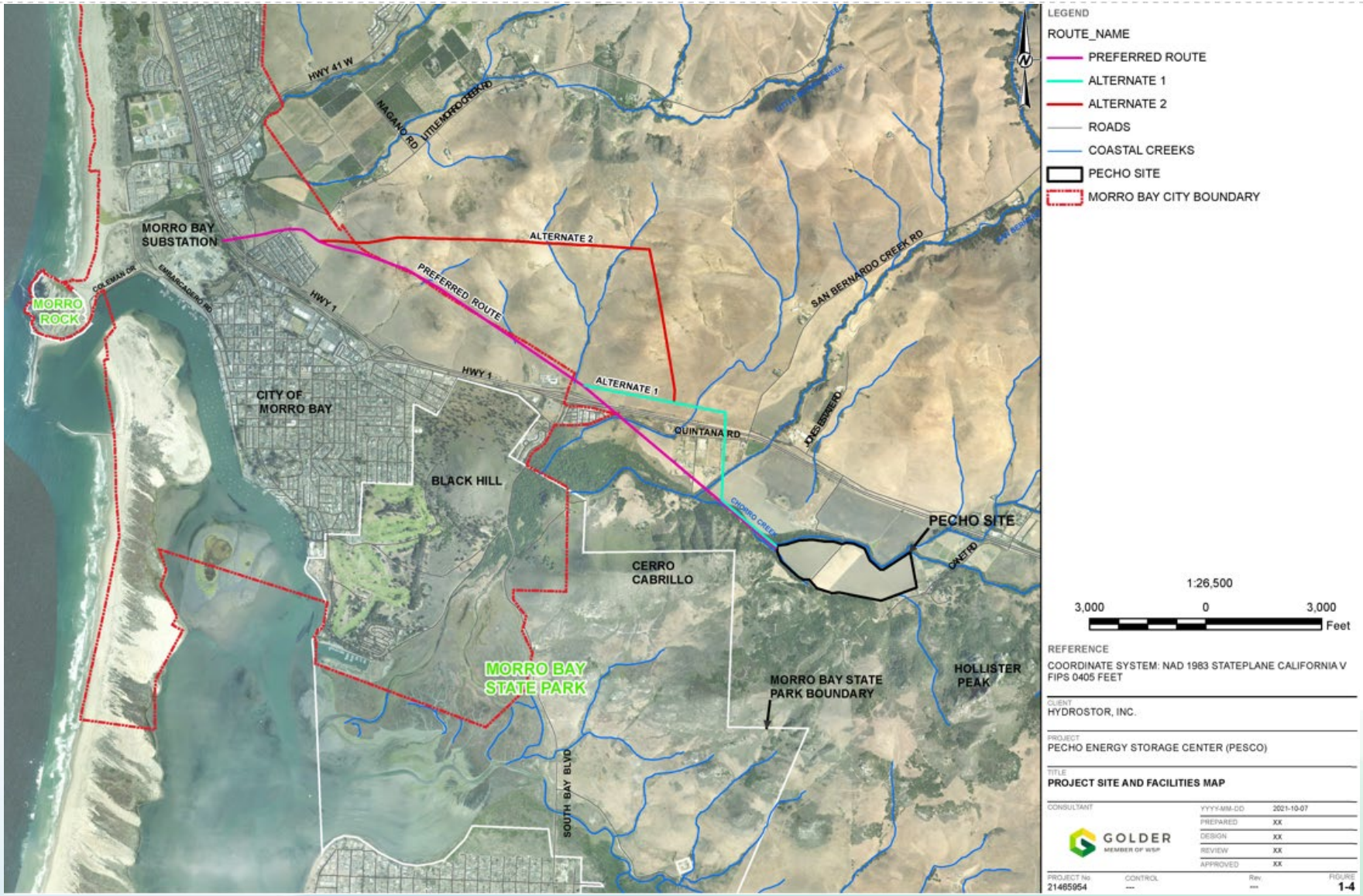
January 26, 2022, Business Meeting

Eric Knight, Manager
STEP, Siting & Environmental Office

Proposed Order No. 22-0126-5

- Find Pecho application for certification (21-AFC-01) incomplete
- Adopt list of deficiencies
- Direct applicant and staff to file Notice of Intention exemption information
- Appoint a committee

Pecho Project Location



Pecho Project Simulation

Staff Recommendation

Adopt Order No. 22-0126-5

HYDROSTOR

ADVANCED COMPRESSED AIR ENERGY STORAGE

CEC Business Meeting – 1/26/2022 (Agenda Item #5)

- ***Hydrostor & Advanced Compressed Air Energy Storage Overviews***
- ***Pecho Energy Storage Center – Project Overview***

About Hydrostor

Hydrostor is the global leader in Advanced Compressed Air Energy Storage (A-CAES)

Founded: 2010

Offices: Toronto, Canada (HQ), SF Bay Area, Adelaide, Australia (satellite)

Operating Facilities:
2 (Canada – Toronto Hydro; Canada – IESO)

Company Financing:
$250 M investment by Goldman Sachs – Jan. 2022

Project Pipeline:
900+ MW commercially bid in CA in 2020-21, 4 GW project pipeline (focused on U.S., Canada, Australia)

A-CAES is a breakthrough for long-duration energy storage:

- Uses only water, pressurized air and commercially proven equipment to provide long-duration, *emissions-free* storage.
- Provides similar characteristics to pumped hydro storage, but with the key advantage of being able to *flexibly site* where the grid needs it.

How Advanced-CAES Works (A-CAES)

A-CAES integrates <u>proven</u> technologies and construction approaches in innovative ways to produce a superior long-duration grid-scale energy storage solution

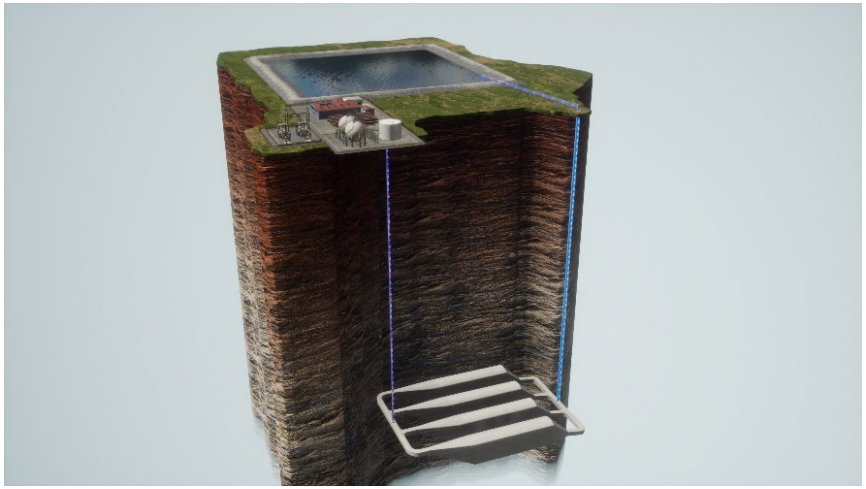
<u>STEP 1</u>
Compress air using electricity

Electricity runs a compressor to produce heated compressed air

Unique to Hydrostor

<u>STEP 2</u>
Capture heat in thermal Store

Heat is extracted from the air stream and stored in a proprietary thermal store



Unique to Hydrostor

<u>STEP 3</u>
Store compressed air in purpose-built cavern

Air is stored in a purpose built cavern using water to maintain constant pressure

<u>STEP 4</u>

Convert the air to Electricity

Water forces air to the surface where recombined with heat and expanded through a turbine

- ***<u>Major Equipment</u>:*** Utilize off-the-shelf, commercially proven power generating equipment, including air compressors, turbo-expanders, generators and heat exchangers
- ***<u>Underground Storage Caverns</u>:*** Purpose-built underground cavern construction using industry standard and well-proven mining techniques
- **<u>Efficiency:</u>** Round Trip Efficiencies (RTE) of the A-CAES process are approximately **60%**

Long Duration Energy Storage Attributes

	**Fossil Plant Replacement**	• Provides synchronous dispatchable generation with fast ramp rates • Projects can be flexibly sited in areas of highest benefit to the grid • Commercially attractive alternative to new and existing natural gas plants (no emissions and lower permitting hurdles) • Can leverage existing transmission infrastructure while minimizing land use and related environmental impacts
	**Transmission Deferral**	• Non-wires alternative to defer transmission system & network investments • Long-duration alleviates grid congestion during peak periods, and enables transmission alternatives requiring longer-term outage management • Projects can be flexibly and strategically sited near critical load pockets and infrastructure
	**Renewable Integration**	• Provide dispatchable or baseload renewables at rates ~$60-120/MWh • Optimize large solar/wind project utilization and economics through time-shifting of generation to reduce curtailments

***Pecho*: 400 Megawatts (MW) for 8 hours = 3,200 MWh**

***Gem*: 500 Megawatts (MW) for 8 hours = 4,000 MWh**

Statewide Benefits of A-CAES LD Energy Storage

- ***Provides 500 MW (Gem) and 400 MW (Pecho) of new quick-starting synchronous generation with fast ramp up/down capabilities***
- ***Projects support California Climate Policies and Renewable Portfolio Standards (RPS) by maximizing renewable generation and integration***
- ***No fossil fuel use during operations – no combustion emissions***
- ***A-CAES Technology produces fresh water from ambient air during operation***
- ***Displaces older and less efficient generation with carbon-free generation***
- ***Flexible capacity with minimal response time: local and regional voltage support and primary frequency response***
  - ***Fossil fuel-free and emissions-free spinning reserve***
  - ***Flexible capacity with minimal start time***
  - ***Peaking energy for local contingencies***
  - ***Voltage support & primary frequency response***
  - ***Long duration generation capacity to assist with prolonged system contingencies***

Pecho Energy Storage Center - SLO County, CA

***Project Capacity*: 400 MW**
***Storage Duration*: 8 Hours (3,200 MWh)**
***POI*: PG&E Morro Bay Switchyard (230 kV)**
***Target Commercial Operation Date*: Q1 2027**

Pecho Energy Storage Center - Vicinity Map

Local Benefits of Pecho Energy Storage Center

- ***Repurposes existing San Luis Obispo County electrical infrastructure including the CAISO-controlled Morro Bay Switching Station***
- ***Helps replace the loss of generation from Diablo Canyon Nuclear Power Plant decommissioning***
- ***Facilitates the efficient integration of onshore and offshore renewable energy development***
- ***Total Installed Cost: $750 million to $900 million***
- ***Construction Jobs:***
  - ***Average Construction Workforce: ~200 over 4+ years***
  - ***Peak Construction Workforce: ~450***
  - ***Total Construction Labor: ~1.6 million man-hours***
- ***Operations & Maintenance Jobs: 25-40 Full-time equivalent positions***
- ***Fiscal Benefits: Over $500 million in Regional Direct & Indirect Economic impacts***
- ***Hydrostor will work closely with San Luis Obispo County to establish a Community Benefits Program in connection with the project***

Contact Information

Curt Hildebrand

Senior Vice President, Commercial Affairs

curt.hildebrand@hydrostor.ca

Item 6: Gem Energy Storage Center

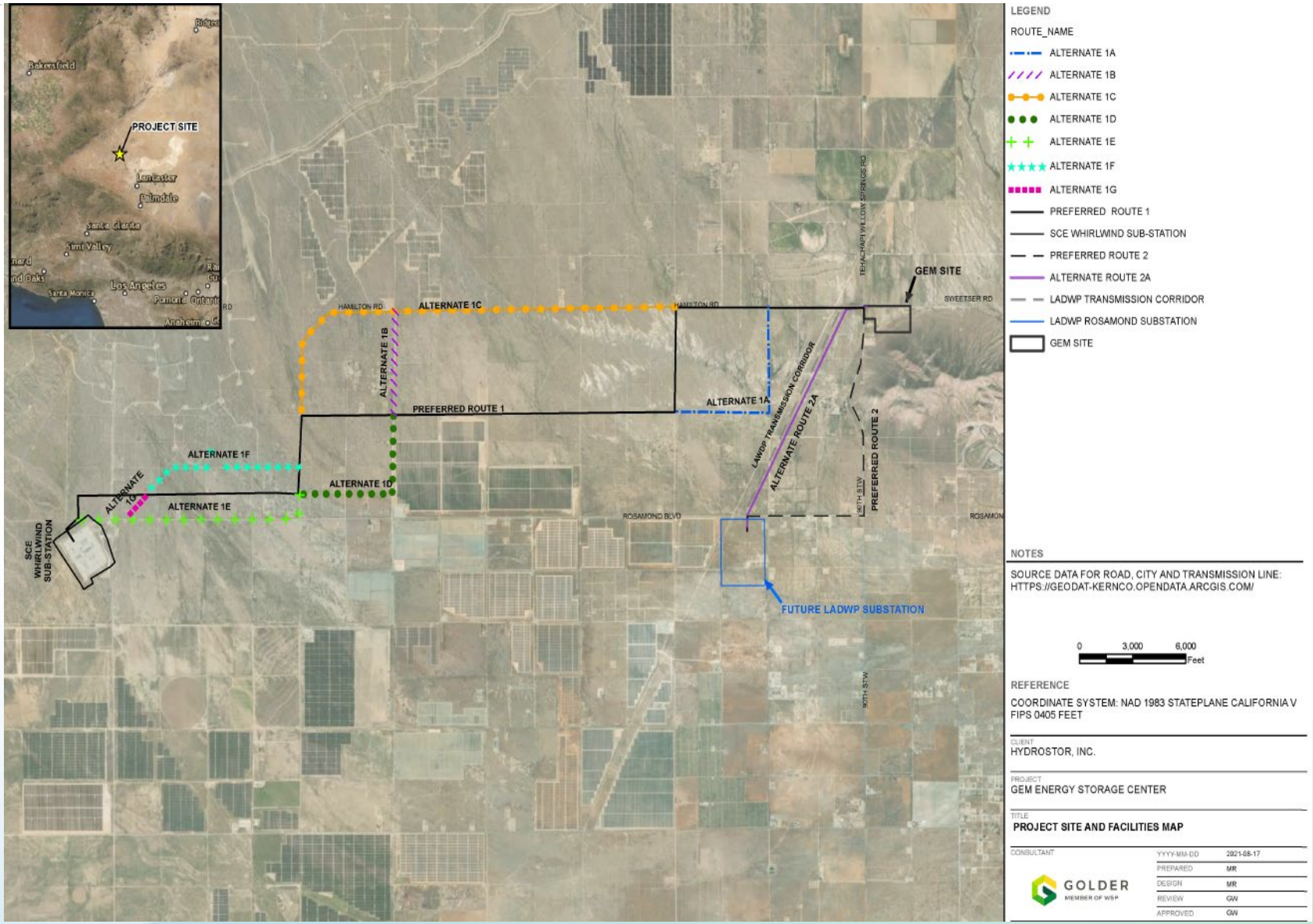
January 26, 2022, Business Meeting

Eric Knight, Manager
STEP, Siting & Environmental Office

Proposed Order No. 22-0126-6

- Find Gem application for certification (21-AFC-02) incomplete
- Adopt list of deficiencies
- Direct applicant and staff to file Notice of Intention exemption information
- Appoint a committee

Gem Project Location



Gem Project Simulation

Staff Recommendation

Adopt Order No. 22-0126-6

HYDROSTOR

ADVANCED COMPRESSED AIR ENERGY STORAGE

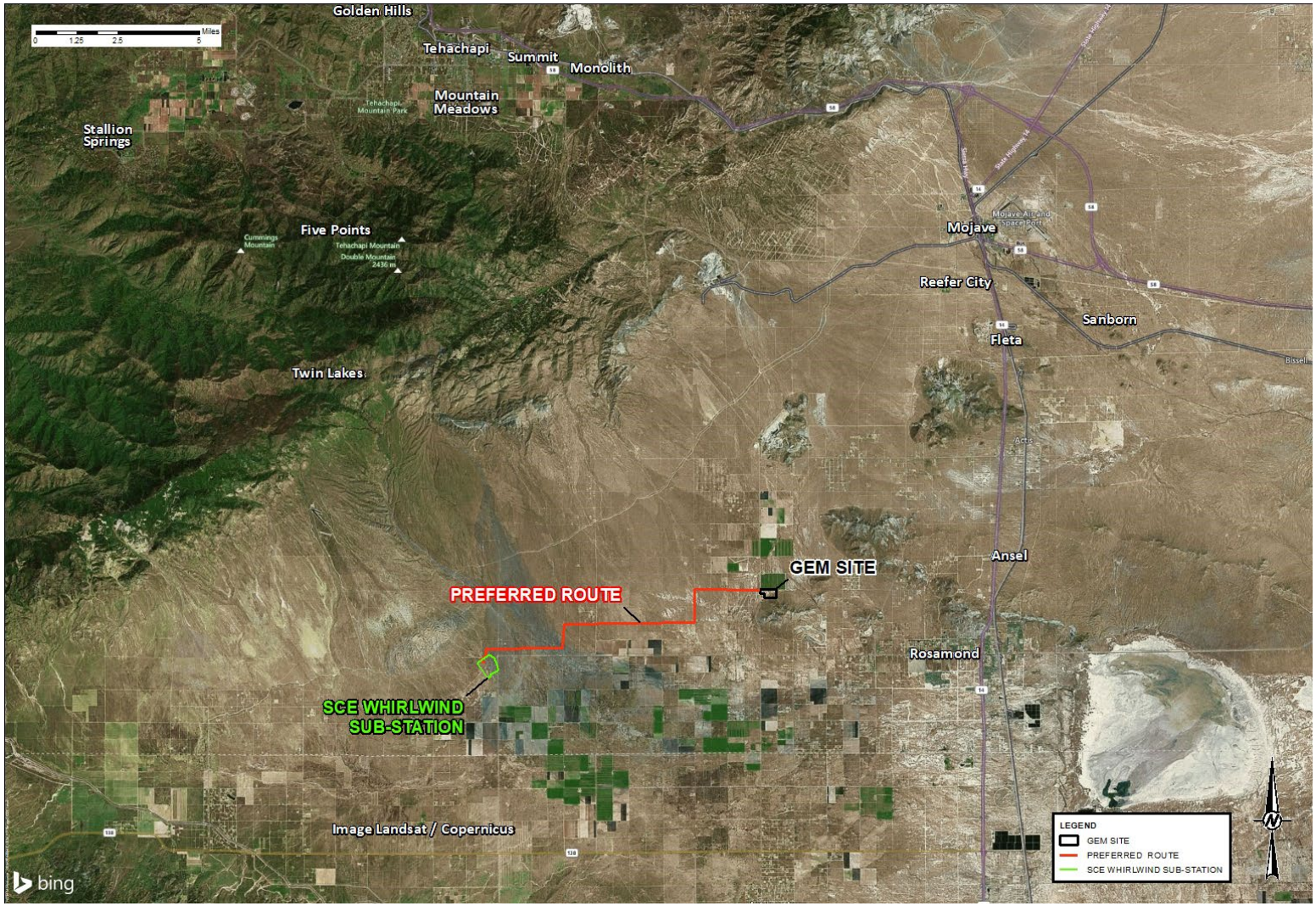
CEC Business Meeting – 1/26/2022 (Agenda Item #6)

Gem Energy Storage Center – Project Overview

Gem Energy Storage Center – Kern County, CA

***Project Capacity*: 500 MW**
***Storage Duration*: 8 Hours (4,000 MWh)**
***POI*: SCE Whirlwind Substation (230 kV)**
***Target Commercial Operation Date*: Q1 2027**

Gem A-CAES Project Vicinity Map – Antelope Valley



Local Benefits of Gem Energy Storage Center

- ***Provides enhanced integration and maximizes the utilization of intermittent renewable resources located in and around the Tehachapi Renewable Resource Area***
- ***Total Installed Cost: $900 million to $1.0 billion***
- ***Construction Jobs:***
  - ***Average Construction Workforce: ~250 over 4+ years***
  - ***Peak Construction Workforce: ~550***
  - ***Total Construction Labor: ~2 million man-hours***
- ***Operations & Maintenance Jobs: 25-40 Full-time equivalent positions***
- ***Fiscal Benefits: Over $500 million in Regional Direct & Indirect Economic impacts over project 50+ year commercial lifespan***
- ***Compressed Air Energy Storage projects are not part of any state-imposed program with special property tax treatment***

Contact Information

Curt Hildebrand

Senior Vice President, Commercial Affairs

curt.hildebrand@hydrostor.ca

Item 7: Electric Vehicle (EV) Ready Communities Phase II - Implementation

January 26, 2022 Business Meeting

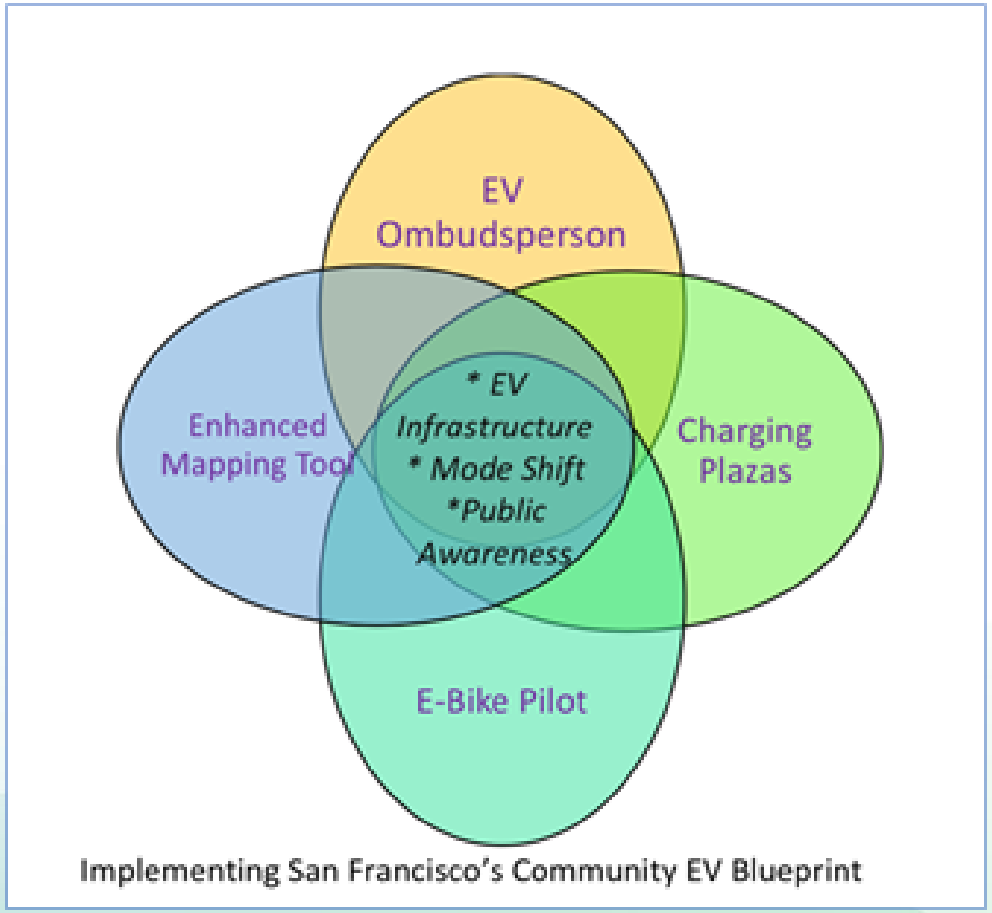
Patrick Brecht, Energy Commission Specialist II
Fuels and Transportation Division, Transportation Integration and Production Office

Benefits to Californians

- **Improve** access to EV charging infrastructure
- **Reduce** barriers to zero emission transportation
- **Increase** mobility options in disadvantaged communities (DAC)
- **Support** green job creation

San Francisco Department of the Environment $2,384,797

- Increase Public Awareness
  - ➢Establish EV Ombudsperson
- Expand Charging Infrastructure
  - ➢100 Level 2 and 25 DCFCs
  - ➢3 public fast-charging plazas
- Accelerate Mode Shift
  - ➢Delivery-app workers to use e-bikes



Implementing San Francisco's Community EV Blueprint

County of Los Angeles Internal Services $2,500,000

- Will deploy light-duty EV infrastructure through DAC EV infrastructure project
- Expand Charging Infrastructure
  - 130 Level 2 chargers for Public Agency DAC Program
  - 60 Level 2 chargers for Multi-Family Program
- Provide holistic approach to regional transportation electrification issues

Kern Council of Governments
$1,799,485

- Install 32 minimum Level 2 and DCFCs at 10 sites minimum throughout Kern County
- Expand and support MioCar electric carsharing business
- Install additional EVSE to support workforce development
- Conduct outreach and education activities

Staff Recommendation

- Approve agreements/amendments
- Adopt determination that projects are exempt from CEQA

Item 8: Santa Clara Valley Transportation Authority – (VTA) ZVI-21-012

January 26, 2022 Business Meeting

Esther Odufuwa, Energy Commission Specialist I
Fuels and Transportation Division
Medium and Heavy Duty Zero Emission Technologies Office, Freight & Transit Unit

Benefits to California

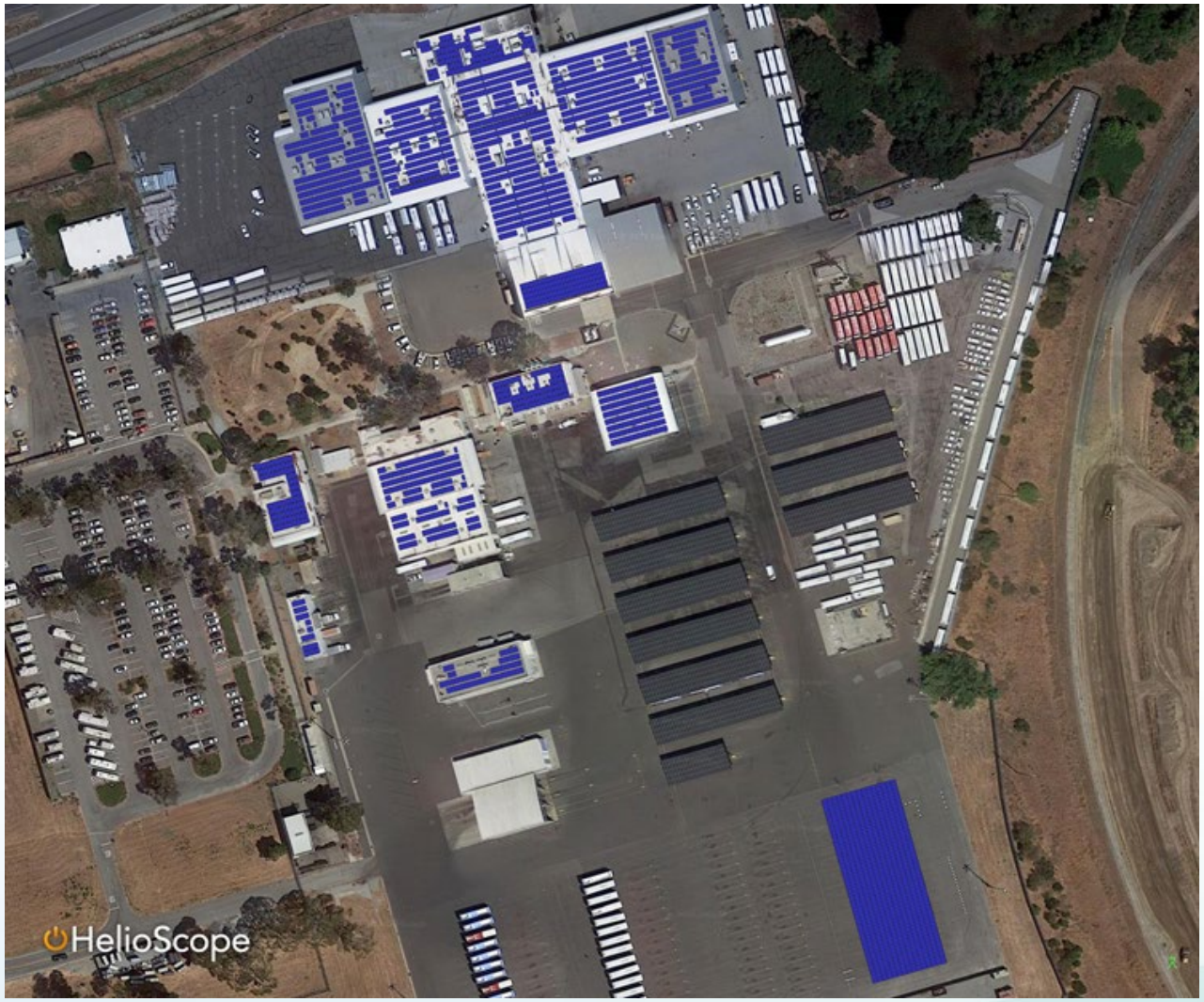
Photo credit: Santa Clara Valley Transportation Authority

Replicable solutions

Reduced emissions

Increased resiliency

VTA Microgrid Project Overview



Rendering of solar canopy at VTA Cerone Bus yard

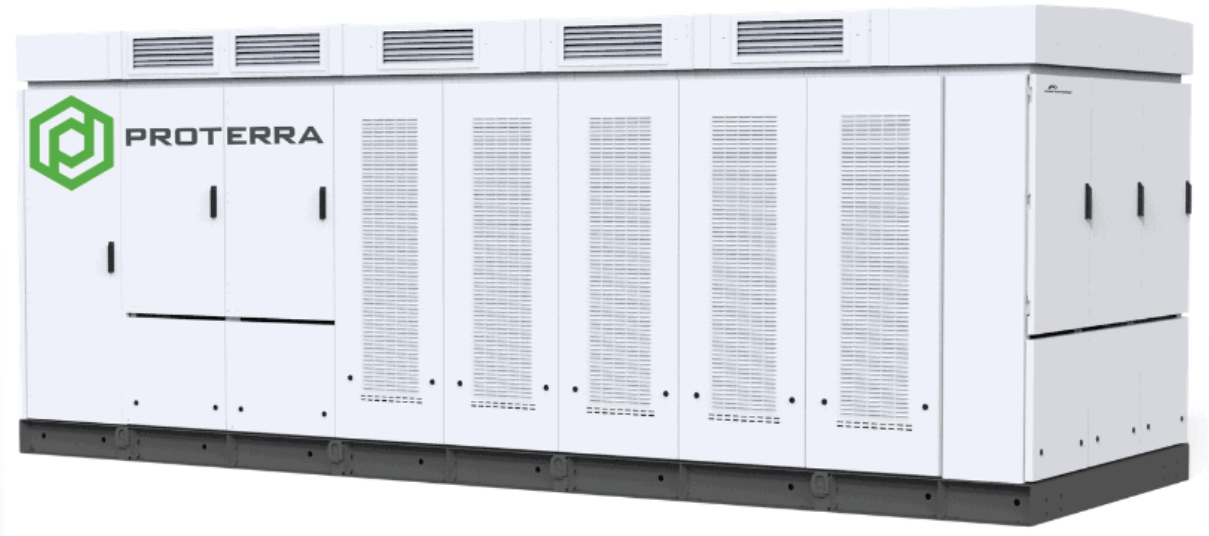
Infrastructure & Microgrid Development for VTA's Transition to Zero Emission Bus Fleet

Overview of Route Services

Santa Clara Valley Transportation Authority Service Map

Overview of Equipment

Proterra 1.5 MW Chargers



Proterra Charging Dispensers

Photo credit: Santa Clara Valley Transportation Authority

Overview of Equipment contd.

4 MWh / 1MW Battery Energy Storage System

Photo credit: Santa Clara Valley Transportation Authority

Overhead Inverted Pantograph

Photo credit: Santa Clara Valley Transportation Authority

California Market Potential

Aerial View of Santa Clara Valley Transportation Authority Site

≈ 11,500

transit buses in California

≈ 700 MW

flexible capacity

≈ 700,000

homes could be powered

Staff Recommendation

Approve

- 1 grant agreement for $4,676,000

Adopt

- Staff's determination that action is exempt from CEQA

Item 9: Bringing Rapid Innovation Development to Green Energy (BRIDGE) 2020 (GFO-20-301)

January 2022 Business Meeting

Michael Ferreira
Energy Deployment & Market Facilitation Office
Energy Research & Development Division

Benefits to CA Ratepayers

- **Advances clean energy economy**
  - Supports clean energy entrepreneurs
  - Quicker transition from fossil fuels
- **Improves grid resilience and reliability**
- **Increases renewable energy production**

Swift Solar, Inc.

High Efficiency Perovskite Tandems for Solar EVs

- More solar power from same surface area.
- Could add 17-21 miles/day, meeting 50-100% typical charging needs.
- Target markets: aerospace, electronics and solar roofing.
- Would provide peak load reduction, avoided infrastructure upgrades.

Intertie, Inc.

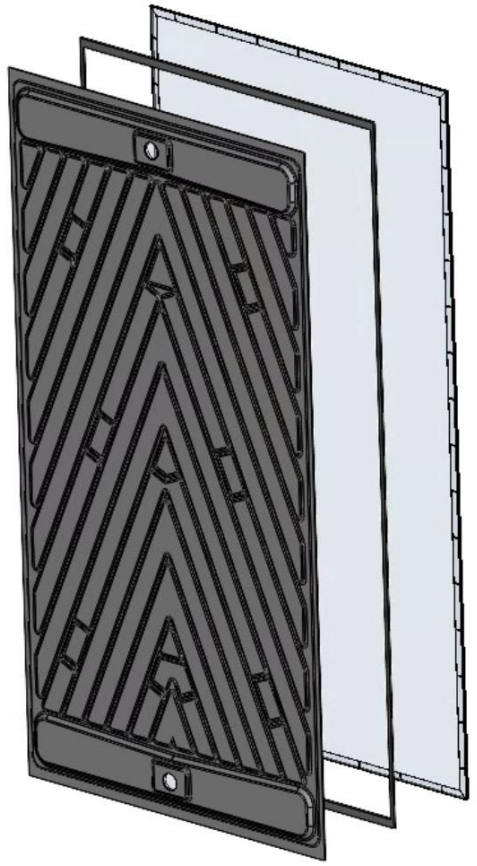
Advanced Power Electronics to Enable Fast Charging while Avoiding Grid Upgrades

- Fast charging capability using 100A circuit (175 fast chargers typically require 350A)
- Capable of providing peak shaving, demand charge reduction
- Underground battery housing improves safety, reduces operating costs, saves space, and removes siting issues
- 10% market penetration = 4,790 installations resulting in 750 MW peak load reduction

Icarus RT

Hybrid PV/Thermal Solar Storage Cogeneration System

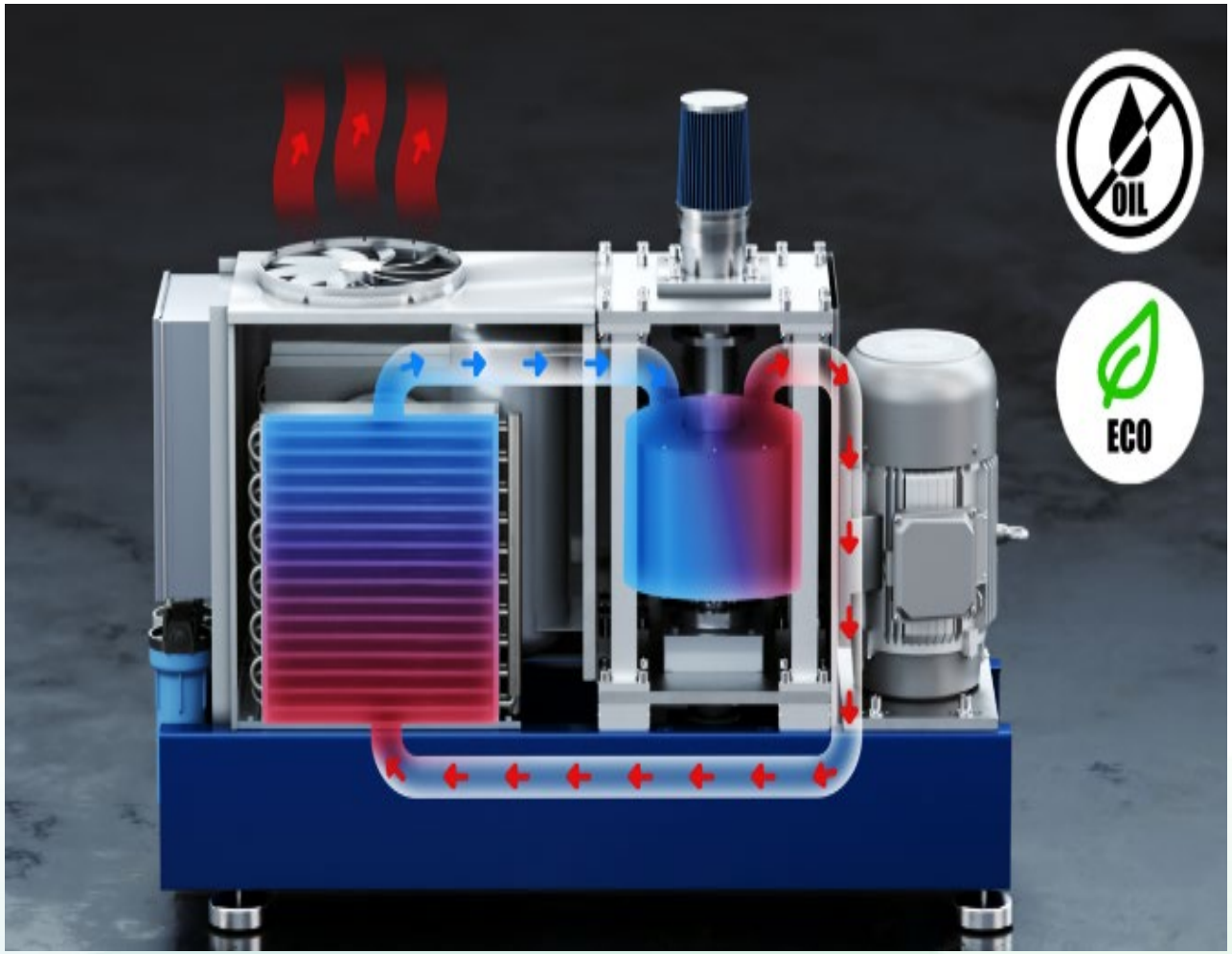
- Attaches to rear of solar panel installation
- Heat extractors reduce panel temp up to 18 °C = 12% increase in efficiency
- 280kW hybrid system demo:
  - 50,000 kWh/year more from improved efficiency ($15,000 value)
- Target markets: multifamily, commercial and industrial, represents $5 b in CA as of 2020



Carnot

Carnot Compressor Field Testing

- 20% reduction in power consumption
- No oil/filter change and disposal
- Reduced maintenance needs
- $40 billion/year global air compressor market by 2025



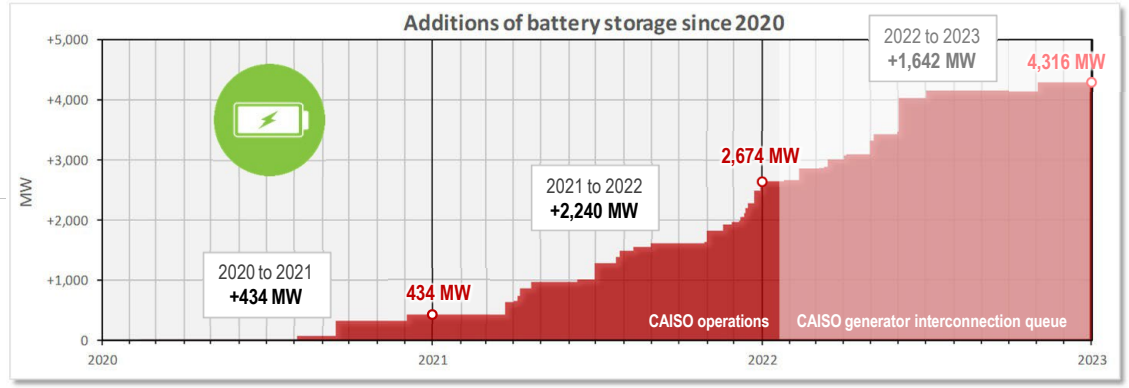
Staff Recommendation

Approve and adopt staff's findings that these projects are exempt from CEQA.

Item 11: Lead Commissioner or Presiding Member Reports

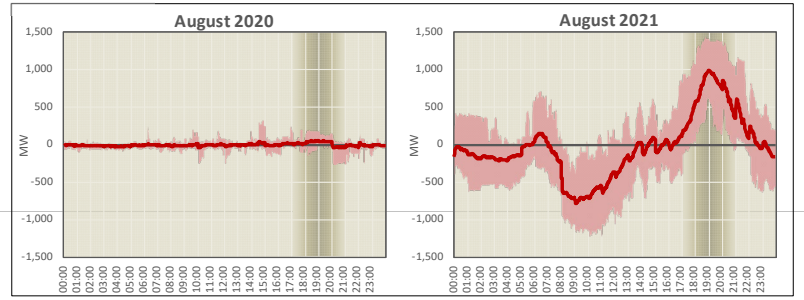
January 26, 2022 Business Meeting

Battery Storage Additions – Critical for Net Peak

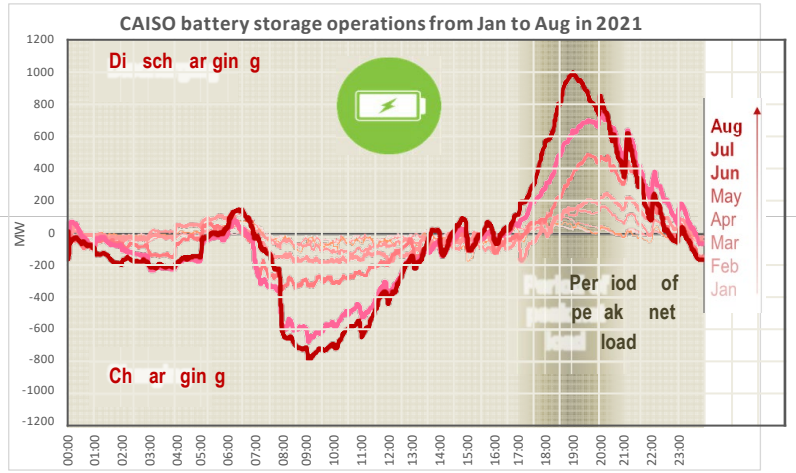


Battery Storage Performed Well in 2021 Summer

Range & Average



Monthly average



The charts are based on actual production data in 1-minute resolution