Valley Clean Energy Board Meeting – February 10, 2022
via video/teleconference

Item 13 – Carbon Neutral by 2030 Draft Report

Public Comments

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VALLEY CLEAN ENERGY

Zero-Carbon Portfolio Construction: Final Report

Valley Clean Energy Alliance

10 February 2022

ENERGEIA

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Deliverables, Scope and Approach

Project Deliverables

Scope

Approach

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Project Deliverables

- Develop a Portfolio Study Report per the matrix to the right in 2030 including:
  - Potential renewable resources and associated capacities and costs
  - Risk analysis
  - Discussion of possible future industry trends in renewable resources

Specified Analytical Framework

POWER SOURCE	HOUR BY HOUR	CARBON NEUTRAL
RENEWABLE	R/HBH	R/CN
CARBON-FREE	CF HBH	CF/CN

ANAYLYSIS TIME FRAME

Portfolio definitions include:

- **Hour by Hour:** Renewable or Carbon Free electricity is used to meet demand every hour of the day
- **Carbon Neutral:** VCE's carbon-emitting energy usage is offset by VCE's annual renewable generation
- **Renewable Electricity:** Includes biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current and is assumed to be free of GHG emissions
- **Carbon Free Electricity:** Identical to Renewable Electricity and includes large hydroelectric generation

Source: VCE (2021), *RFP NO. 2021CFPS*

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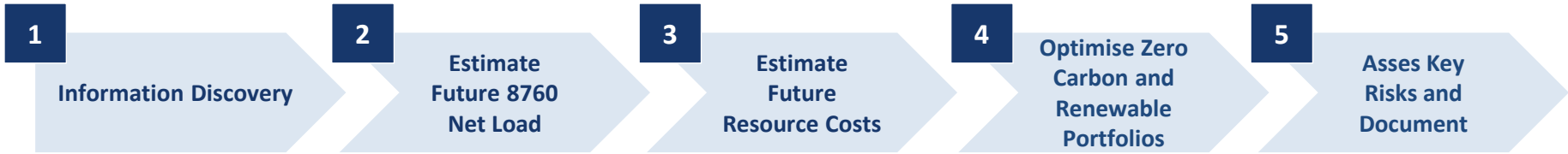
Overview of Energeia's Scope and Approach



- Data Request
- Industry Trends research

- IRP 8760 forecast
- Existing and planned 8760 resourcing
- Behind-the-Meter (BTM) review
- Agree key risks and sensitivities
- Validate with VCE

- Capital and operating costs by technology
- Fuel and carbon mitigation costs
- Agree key risks and sensitivities
- Validate with VCE

- Identify least cost 8760 100% renewables and zero carbon portfolios
- Identify least cost annual 100% renewables and zero carbon portfolios
- Consider market interactions
- Agree key risks and sensitivities
- Validate with VCE

- Develop Risk Report
- Develop Final Portfolio Study Report
- Develop data pack

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Estimate Future 8760 Load

Develop 8760 Baseline Supplies

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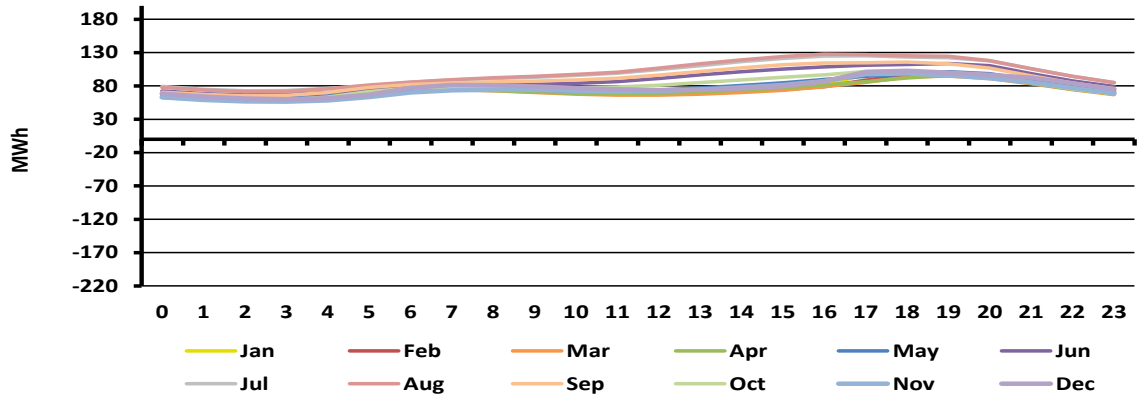
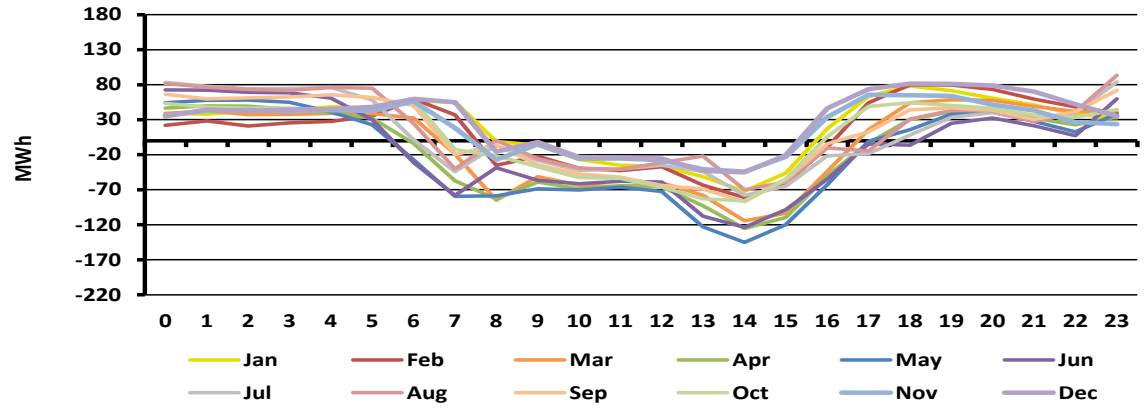
2021 IRP (Energeia): Avg. Net Loads incl. PPAs

2020



Source: VCE IRP (2020)

2030



Source: VCE IRP (2020)

- Table of assumed PPAs was provided by VCE and is included in the appendix
- Graphic showing load net of PPAs in 2020
  - No change from IRP as current for 2020
- By 2030, baseline contracts will increase the 'Duck Curve' significantly
  - VCE is mainly short resources before 5pm and after 4pm

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Estimate Future Resource Costs

Future Industry Trends

Forecast Technology Costs

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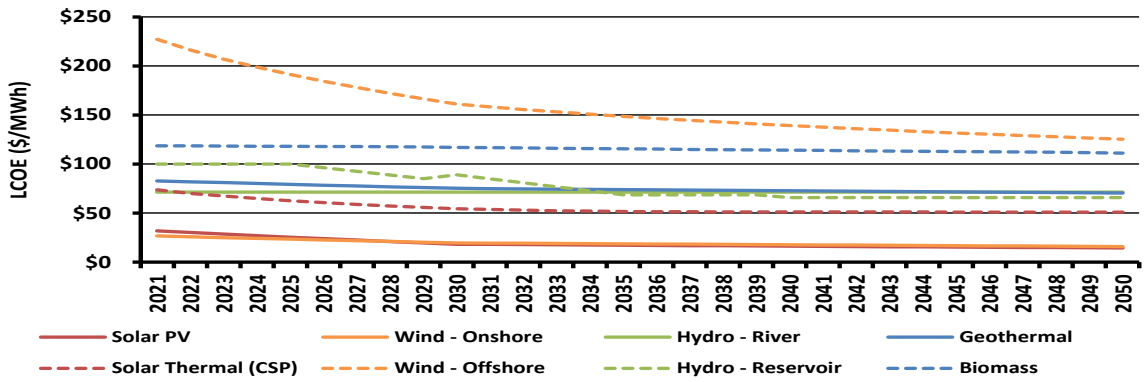
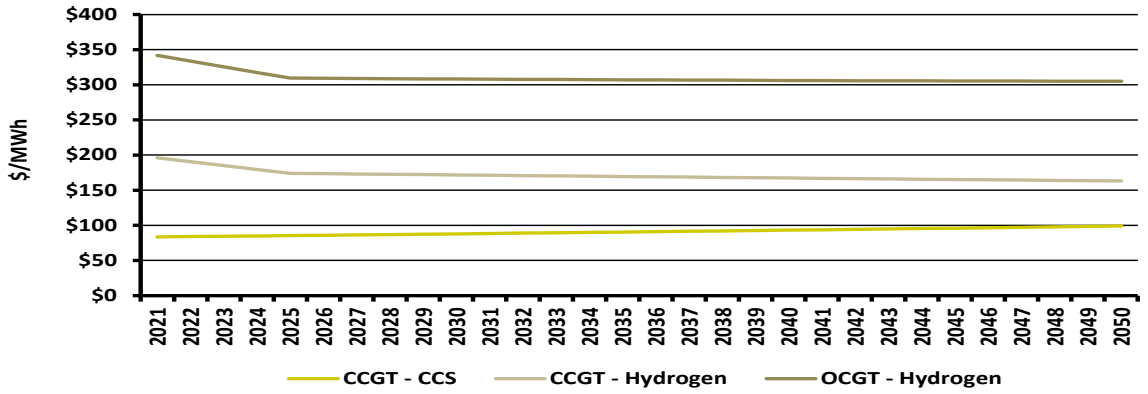
Levelized Cost of Future Clean Resources

RE Technology Costs



Source: NREL (2021), *Annual Technology Baseline;* Note: CSP = Concentrated Solar Power

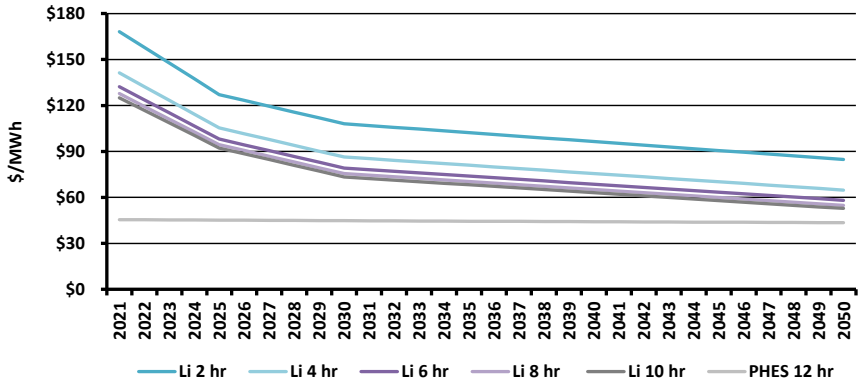
Thermal Technology Costs (incl. Fuel)



Source: NREL (2021), *Annual Technology Baseline*
Note: CCGT = Combined Cycle Gas Turbine, OCGT = Open Cycle Gas Turbine,
CCS = Carbon Capture Sequestration; Capacity factors of 90% used for CCGT and 20% used for OCGT

- Energeia completed a wide scan of potential utility scale resources, which assessed advantages, disadvantages, breakthrough potential, etc. by technology
- Overall, major utility scale costs expected to remaining relatively flat to 2050
  - Offshore wind, battery storage and hydrogen costs expected to fall significantly in next 10 years
  - Other resource costs largely flat

Storage Costs (excl. energy)



Source: NREL (2021), *Annual Technology Baseline*
Note: Li = Lithium, PHES = Pumped Hydro Energy Storage

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Optimize Zero Carbon and Renewable Portfolios

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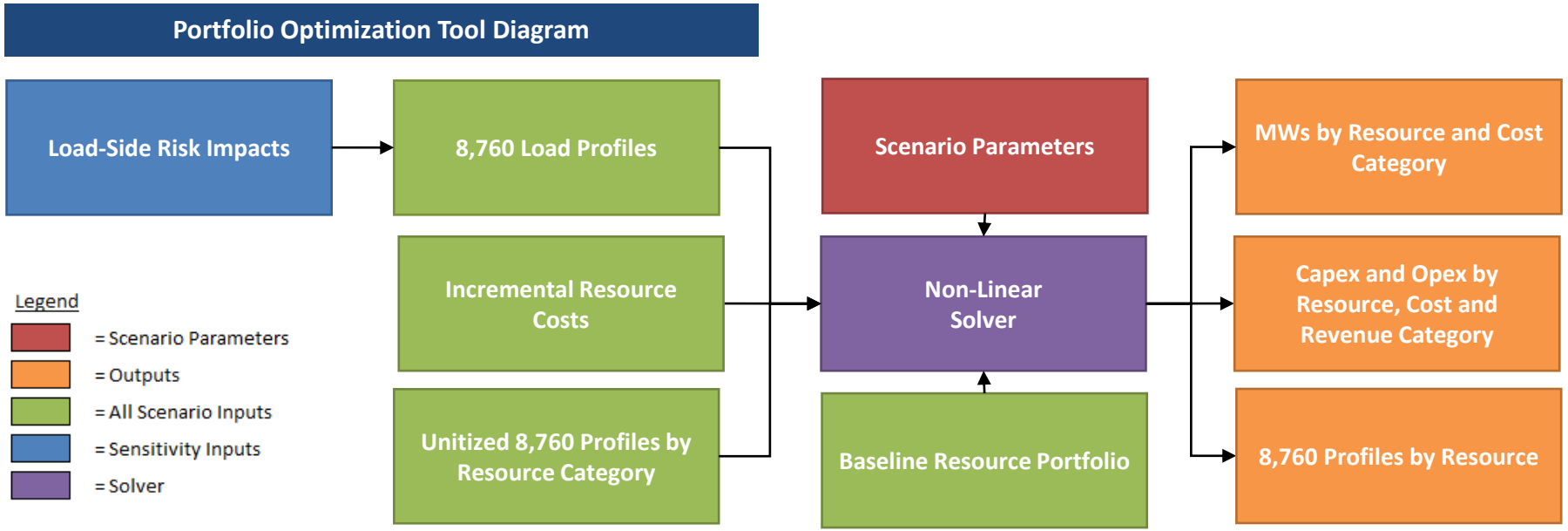
Energeia's Portfolio Optimization Model



- Energeia's portfolio optimization tool was used to determine least cost resource portfolios
- Key inputs include VCE's 2030 hourly demand profiles, baseline capacity, and costs by resource type
- Each portfolio scenario was parametrized to reflect the constraints, including risk scenarios
- A non-linear solver was used to identify the least cost portfolio mix given all conditions
  - A key limitation of non-linear solvers is that there may be other, lower cost solutions due to the complexity of the system
  - Energeia undertook multiple runs to help mitigate this risk

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Optimized Resource Solutions by Portfolio

Proposed Portfolios (MW)										
Scenarios	**Power Source**	**Solar**	**Wind**	**Geothermal**	**Small Hydro**	**Large Hydro**	**4-Hour BES**	**8-Hour BES**	**12-Hour PES**	**OCGT**
HBH	Carbon Free	0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.7	112.3
HBH	Renewable	0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.7	112.3
CN	Carbon Free	0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
CN	Renewable	0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0

Source: Energeia research and analysis

- Resource modelling found wind and geothermal to be the lowest cost resources for meeting all scenarios in 2030
- A green hydrogen fueled Open Cycle Gas Turbine is used in the hour-by-hour scenario to ensure load is met every hour at least cost[1]
- There is no difference between the portfolios using Carbon Free vs. Renewable electricity as hydropower is never the cheapest option with the prices being used

[1] RNG was also considered as a fuel, but green hydrogen was used in the analysis because it is projected to be lower in cost after 2030

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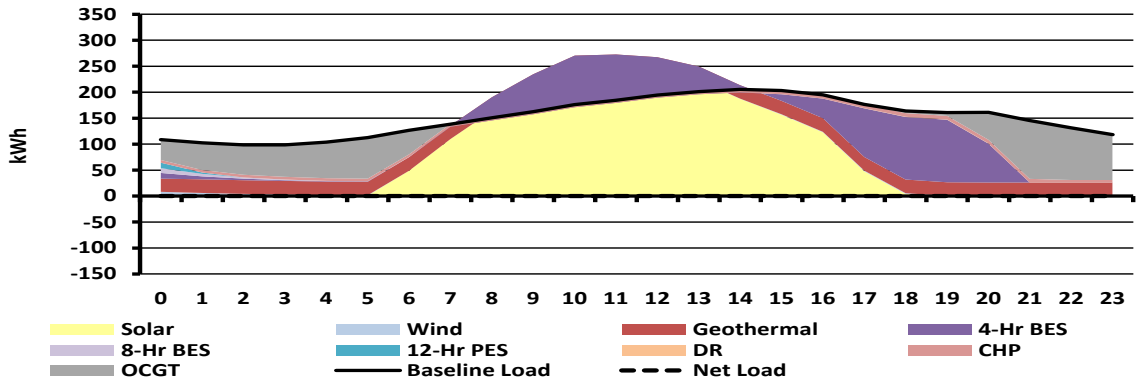
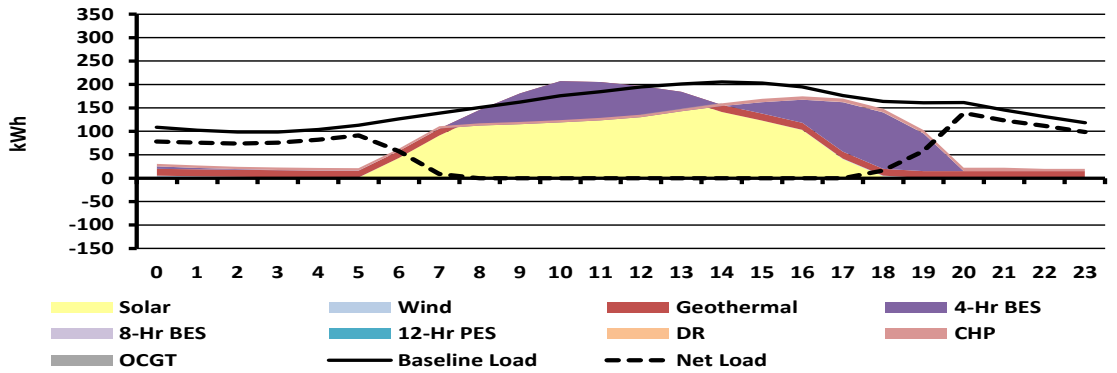
Peak and Minimum Days

Hour-by-Hour – 2030 Peak Day



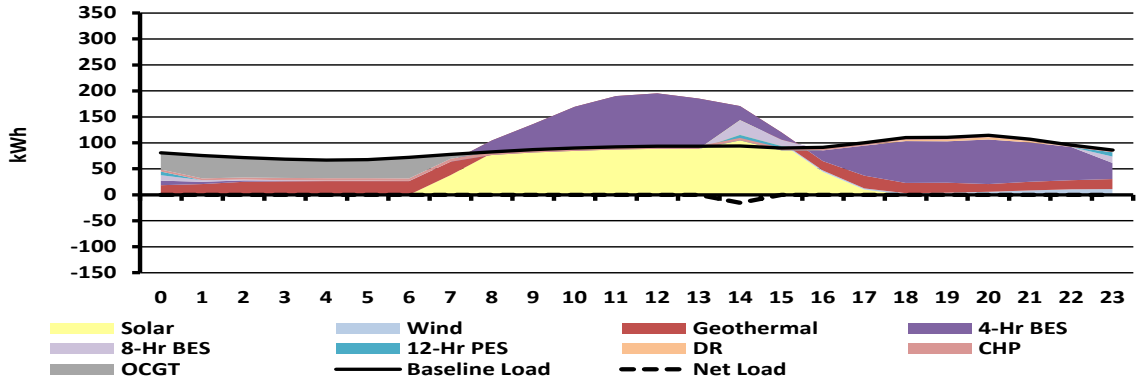
Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Carbon Neutral – 2030 Peak Day



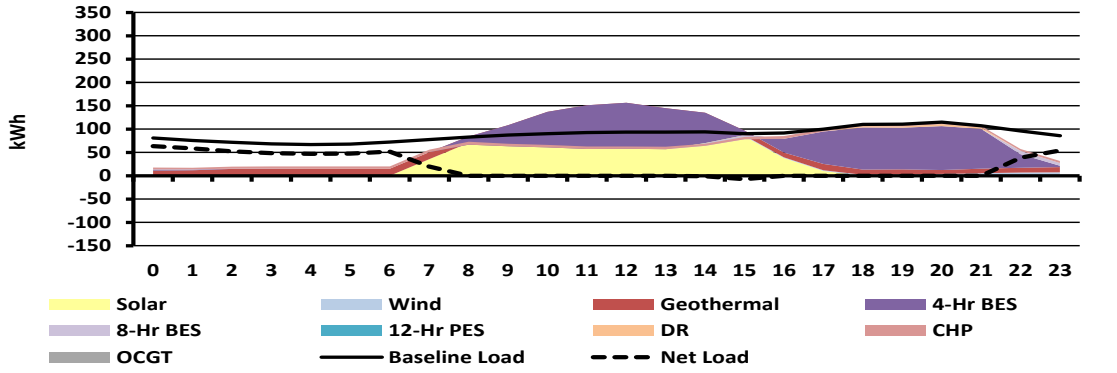
Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Hour-by-Hour – 2030 Minimum Day



Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Carbon Neutral – 2030 Minimum Day



Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Annual Portfolio Costs

Annual Resource Costs ($M/Yr)

Scenarios	Power Source	Solar	Wind	Geo-thermal	Small Hydro	Large Hydro	4-Hour BES	8-Hour BES	12-Hour PES	OCGT	Total ($M/Yr)
HBH	Carbon Free	$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9	$46.5
HBH	Renewable	$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9	$46.5
CN	Carbon Free	$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0	$16.5
CN	Renewable	$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0	$16.5

Source: Energeia research and analysis
Notes: HBH = Hour-by-Hour; CN = Carbon Neutral; Hydro = Hydropower; BES = Battery Energy Storage; PES = Pumped Energy Storage; OCGT = Open Cycle Gas Turbine

Annual Total Portfolio Costs ($M/Yr)

Scenarios	Power Source	Resources	RA/AS/ FRA	CAISO	Net
HBH	Carbon Free	$46.5	$0.0	($3.9)	$42.6
HBH	Renewable	$46.5	$0.0	($3.9)	$42.6
CN	Carbon Free	$16.5	$0.0	$0.5	$17.0
CN	Renewable	$16.5	$0.0	$0.5	$17.0

Source: Energeia research and analysis
Notes: HBH = Hour-by-Hour; CN = Carbon Neutral; RA = Resource Adequacy; AS = Ancillary Services; FRA = Flexible Resource Adequacy; CAISO = CA Independent System Operator

- The incremental resource portfolio to meet hourly demand with zero carbon generation is approximately three times more costly at $46.5m compared to $16.5m for a carbon neutral portfolio
  - These costs are in addition to VCE's current annual resource costs of $50m to $60m
- Oversized resources in the HBH scenario generate more CAISO revenue

Key Risks

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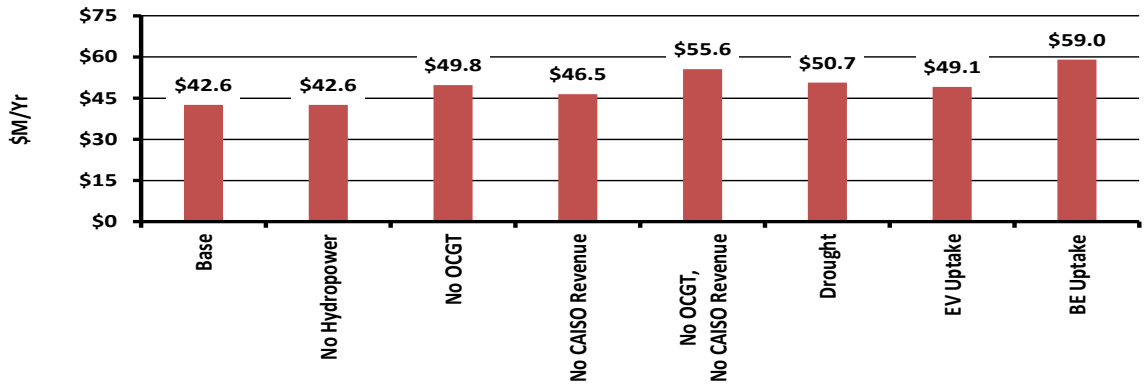
Key Risk Analysis

- Portfolio feasibility and cost risk factors were discussed with the working group, and a set of key risks agreed, which were then assessed against the optimized portfolios by scenarios
  - **Risk of low rainfall**
    - Impact on hydro resources not modelled as no hydro resources included in optimal portfolio
    - Impact on pumping loads tested using VCE data on pumping loads
  - **Risk of resource availability for contracting**
    - Limited availability of geothermal, wind, etc. resources tested against California's SB350 assumptions
    - Green hydrogen-based combustion is an immature technology, impact of excluding it tested[2]
  - **Risk of CAISO prices being lower and even negative**
    - Impact of zero CAISO benefits tested
  - **Risk of programs impacting on portfolio costs**
    - Impact of higher-than-expected EV load tested
    - Impact of higher-than-expected building electrification tested

[2] The hour-by-hour portfolio without green hydrogen-based combustion is $49.8m, which is $7.2m dollar more than the base hour-by-hour portfolio

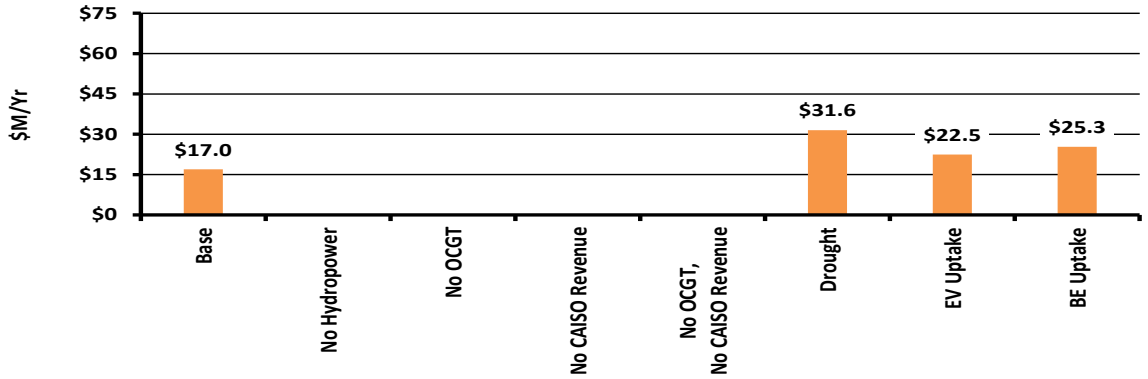
Annual Costs by Portfolio – Key Risk Factor Impacts

Hour-by-Hour Balancing



Source: Energeia research and analysis; Note: OCGT = Open Cycle Gas Turbine, EV = Electric Vehicle, BE = Building Electrification

Carbon Neutral Balancing



Source: Energeia research and analysis; Note: OCGT = Open Cycle Gas Turbine, EV = Electric Vehicle, BE = Building Electrification

- Added constraints generally increase portfolio costs
- The most expensive portfolio contains the most constraints:
  - No OCGT increases costs by $7.2M p.a.
  - No CAISO sales increases costs by $3.9M
- Some risk factors do not impact costs under this scenario as it does not incorporate hydropower or OCGT
  - CAISO sales assumed as a core part of the scenario

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Potential Pathways

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Pathways – Key Recommendations

- Resources present in both portfolios should be purchased first. These resources include wind, 4-Hr BES and 8-Hr BES.
- The costs of battery storage systems are expected to decline significantly over the next decade (Appendix A), while the costs of wind resources are projected to remain relatively stagnant, suggesting the optimal strategy is delaying purchases of BES.
- Regarding resource placement, co-locating batteries at solar or wind sites, if possible, may minimize revenue lost to curtailment.

Note: BES = Battery Energy Storage

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Background

Key CA CO2 Policies and Targets

Key CCA, POU and IOU Trends

VCE Board Policies and Targets

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Background

- In 2018, the California Governor issued Executive Order B-55-18[1] to Achieve Carbon Neutrality, which set a zero carbon goal by no later than 2045, and negative emissions thereafter, and the State Legislature passed Senate Bill No. 100[2], requiring all electricity consumed in California to be 100% carbon neutral by 2045.

- Since then, a growing number of California utilities have set more ambitious targets, including the Sacramento Municipal Utilities District (SMUD), whose Board approved[3] a net zero carbon generation target by 2030, and the Los Angeles Department of Water and Power (LADWP), whose Board approved[4] a net zero target by 2035.

- California community choice aggregators (CCAs) are also increasingly setting carbon and/or renewable targets above those of state minimum levels, including San Jose Clean Energy's goal of carbon neutrality by 2030, 17F 18F Peninsula Clean Energy's goal of 100% renewable energy on a 24/7 basis by 202519F and finally, Marin Clean Energy's goal of 85% renewable by 2029.

- Valley Clean Energy (VCE) is in the process of reviewing its decarbonization pathways and engaged Energeia to analyze the feasibility, costs and benefits of pursuing renewable and carbon-free portfolios on an hour-by-hour and annual carbon neutral basis by 2030 to inform its Strategic Plan and Integrated Resource Plan (IRP).

[1] State of California (2018), *Executive Order B-55-18 To Achieve Carbon Neutrality*
[2] State of California – Legislative Information (2018), *Senate Bill No. 100*
[3] SMUD (2021), *Our 2030 Clean Energy Vision*
[4] Mayor of LA (2021), *Targets – Renewable Energy*

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Estimate Future 8760 Load

Average 8760 Load Profiles

VCE Power Purchase Agreements

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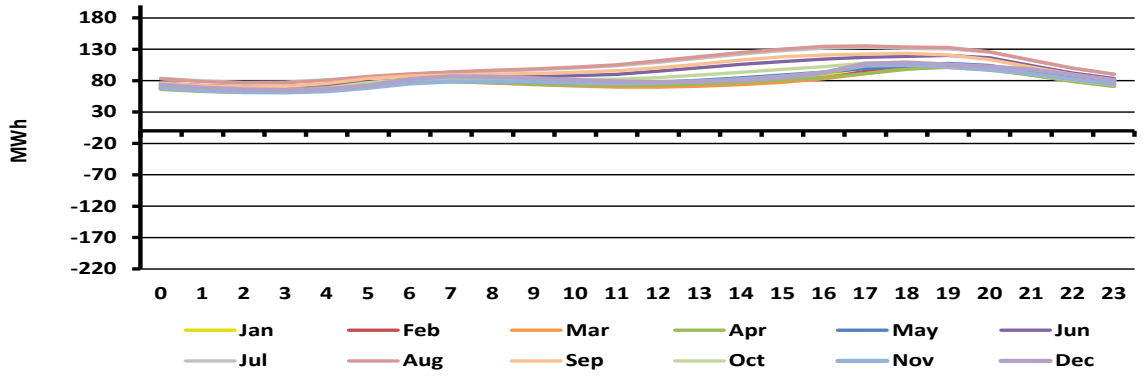
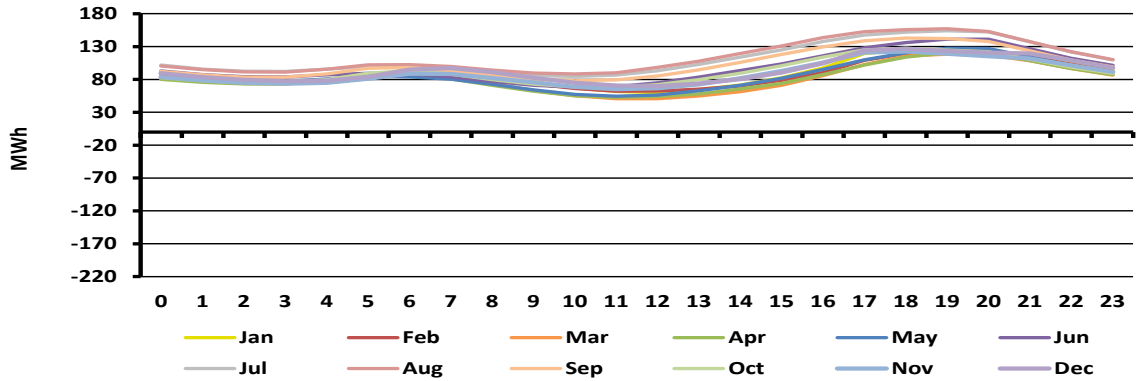
2021 IRP (Energeia): Average Loads incl. DER

2020



Source: VCE IRP (2020)

2030



Source: VCE IRP (2020)

- Charts are showing VCE load including DER and PPAs active in 2020
- Daily average loads net of load modifying Distributed Energy Resources (DER)
  - No change as current and correct as of 2020
- Behind the meter PV creating small Duck Curve by 2030
  - This data will be updated in next IRP

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Power Purchase Agreement Assumptions

Registered PPAs

Name of Counter Party	Project Name	Project Technology	Solar (MW)	Storage (MW)	DR (MW)	Geothermal (MW)	VCE Allocation	Project Start Year	Project Start Month	PPA Term (Years)
California Joint Powers Authority	Indian Valley Short Term PPA	Hydroelectric Generation	2.9				100%	2020	May	5
Aquamarine Westside LLC	PPA	AC Solar PV	50				100%	2021	October	15
Putah Creek Solar Farms LLC	Renewable PPA	AC Solar PV	3	3 (4-hrs)			100%	2022	Jan	20
VESI 10 LLC	Tierra Buena Energy Storage	Lithium (RAR Attributes)	0	2.5 (4-hrs)			100%	2022	June	10
Leapfrog Power Inc.	Resource Adequacy Agreement	Demand Response (RAR Attributes)	0	0	7		100%	2021	June	10
Gibson Renewables LLC	Renewable PPA	Solar PV, Lithium Battery Storage	20	6.5 (4-hrs)			100%	2023	October	20
Resurgence Solar I, LLC	Renewable PPA	Solar PV AC Coupled w/ Li-Ion Storage	90	75 (4-hrs)			100%	2023	January	20
Willow Springs Solar 3 LLC	Willow Springs Solar 3	Solar + Storage	72	36 (4-hrs)			100%	2024	January	15
		Geothermal				15	100%	2026		20
		Long-Duration Storage	5	(8-hrs)			100%	2026		15

- All PPA's loaded into the IRP tool are included in the table above
- New CEC regulations require firm capacity from 5pm to 10pm to address Diablo replacement

Source: VCE

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Estimate Future Resource Costs

Low Carbon Fuel Price Forecast

Resource Research Results

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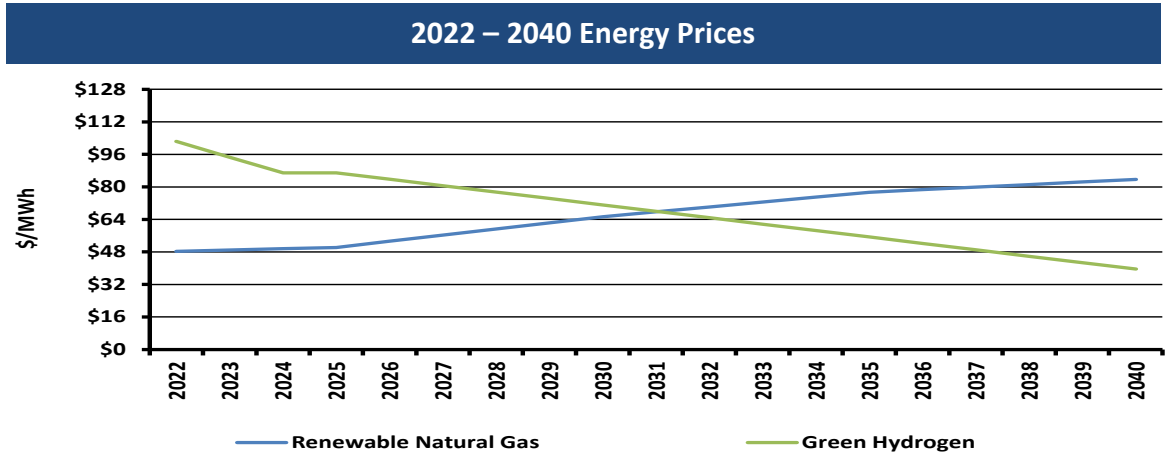
Green Hydrogen vs. Renewable Natural Gas Forecasted Pricing



Source: American Gas Foundation (2019), Energeia research and analysis

- The price of green hydrogen is forecasted to be lower than renewable natural gas after 2030, suggesting generation costs will be lower for turbines compatible with hydrogen
- The prices are exclusive of any government incentives

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Key Future Zero Carbon Generation Technologies

Name	Category	Fuel Type	Description	Energy Efficiency	Advantages	Disadvantages	Availability	Potential Breakthroughs
Thermal Generation Technologies								
Combined Cycle Turbine (CCGT)	Combustion	Hydrogen / Renewable Methane / Methane + CCS	Generates power via combustion in a combustion turbine followed by a steam turbine to use waste heat	50-60%	• Higher efficiency than OCGT • Mature technology • Fuel flexible • Provides inertia	• Higher capex than OCGT • Emissions from combustion • Less flexible than OCGT	• Limited availability of hydrogen or renewable methane • Pilot projects only	• Higher temp combustion turbine
Open Cycle Turbine (OCGT)	Combustion	Hydrogen / Renewable Methane / Methane + CCS	Generates power via combustion in a gas turbine	30-40%	• Higher ramp rate than CCGT • Mature technology • Fuel flexible • Provides inertia • Lower capex than CCGT	• Lower efficiency than CCGT • Emissions from combustion • Less flexible than a OCGT	• Limited availability of hydrogen or renewable methane • Pilot projects only	• Higher temp combustion turbine
Carbon Capture and Sequestration (CCS)	Combustion	Coal / Methane	Captures and stores CO2 from coal or methane combustion to prevent it from entering the atmosphere	80%	• Allows use of relatively low-cost methane and coal fuel	• Unproven technology • Generates waste stream	• Commercially available • Pilot projects only	• New electrochemical process converts CO2 through a mineralization approach and produces green hydrogen.
Small Modular Reactor	Fission	Uranium	Generates heat from fission, used to drive steam turbine	33-37%	• Smaller (<300 MW) than conventional nuclear (<1,600 MW) • Lower and more stable fuel costs compared to methane	• Relatively immature technology • Potential community resistance	• Pilot projects only	• None identified
Pebble Bed Reactor	Fission	Uranium	Generates heat from fission, used to drive steam turbine	Up to 50%	• Smaller (<300 MW) than conventional nuclear (<1,600 MW) • Lower and more stable fuel costs compared to methane • Fuel pebbles touted as inherently safe	• Relatively immature technology • Potential community resistance	• Pilot projects only	• None identified
Proton Exchange Membrane Fuel Cell (PEMFC)	Chemical	Hydrogen	Fuel cell generates electricity and water using hydrogen	30-50%	• Higher ramp rate than SOFC • Maturing technology	• Lower efficiency than SOFC • Most only run on hydrogen	• Limited availability of hydrogen • Pilot projects only	• DOE targeting higher efficiencies and increased fuel stack hours
Solid Oxide Fuel Cell (SOFC)	Chemical	Hydrogen / Renewable Methane	Fuel cell generates electricity and water using hydrogen or methane	63-81%	• Higher efficiency than PEMFC	• Lower efficiency than SOFC • Immature technology • Less flexible than SOFC	• Limited availability of hydrogen • Pilot projects only	• DOE targeting higher efficiencies and increased fuel stack hours

Key Future Renewable Energy Technologies

Name	Category	Capacity Factor	Description	Advantages	Disadvantages	Availability	Potential Breakthroughs
Generation Technologies							
Onshore Wind	Wind	51%	A windmill is used to turn a turbine to generate electricity on land	• Mature technology • Relatively low $/kWh capex • Relatively constant generation	• Community resistance • Limited resource availability	• Commercially available • Limited to areas of high wind resource	• Larger turbines increasing efficiency and reducing costs
Offshore Wind	Wind	40-50%	Floating windmills are used to generate electricity in the ocean	• Mature technology • Relatively low $/kWh capex • Relatively constant generation	• Community resistance • Limited resource availability	• Commercially available • Limited to areas of high wind resource • Limited to coast areas	• Larger turbines increasing efficiency and reducing costs
Single Axis Solar PV	Solar	30-35%	Photo-voltaic(PV) panels on a single axis tracking system are used to generate electricity	• Mature technology • Relatively low $/kWh capex	• Strongly seasonal • Limited resource availability	• Commercially available • Limited to areas of high solar resource	• Solar technology increasing efficiency and lowering costs
Concentrated Solar Power (CSP)	Solar	25%	Mirrors are used to concentrate solar energy on a working fluid, which is used to transfer heat to a steam turbine	• Includes storage • Firm capacity • Relatively low $/kWh	• Strongly seasonal • Limited resource availability • Relatively immature	• Commercially available • Limited to areas of high solar resource • Pilot scale	• High temp steam turbines can reduce costs
Geothermal	Geothermal	72%	Underground geothermal energy is used to drive a steam turbine	• Relatively high capacity factor • Firm capacity • Mature technology	• Limited resource availability • Relatively high $/kWh capex	• Commercially available • Limited to areas of high geothermal resource	
Ocean Tidal	Tidal	20-35%	Tidal energy is used to drive an electric generator	• Predictable resource • Complementary generation profile	• Requires tidal estuary • Relatively expensive per kWh • Immature technology	• Commercially available • Limited to coastal areas • Limited to tidal areas	
Ocean Wave	Wave	25-32%	Wave energy is used to drive an electric generator	• Predictable resource • Complementary generation profile	• Requires coast access • Relatively expensive per kWh • Immature technology	• Commercially available • Limited to coastal areas	
Run-of-River Hydro	Hydropower	40-80%	Water flow is used to drive an electric generator	• Relatively low $/kWh capex • Firm capacity	• Community resistance • Subject to rainfall	• Commercially available • Limited to areas of high hydro potential	
Reservoir Hydro	Hydropower	35-43%	Water is stored in dams and then released to drive an electric generator	• Relatively low $/kWh capex • Includes storage • Firm capacity	• Community resistance • Subject to rainfall • Subject to other uses, e.g. fish	• Commercially available • Limited to areas of high hydro potential	
Waste-to-Energy	Waste	70%	Methane is captured from waste and used to drive a combustion turbine	• Relatively low $/kWh cost • Methane reduction boost • Firm capacity	• Local emissions from combustion	• Commercially available • Limited to areas with significant waste streams	
Biomass	Biomass	50-60%	Methane is captured from biomass or biomass is burned directly to drive a combustion turbine	• Firm capacity	• Local emissions from combustion	• Commercially available • Limited to areas with significant biomass streams	• Improvements in bio-digester technology increases efficiency and reduces cost

Key Future Storage Technologies

Name	Cycle Time	Description	Round-trip Losses	Advantages	Disadvantages	Availability	Potential Breakthroughs
Storage Technologies							
Capacitors	Seconds	Capacitors used to rapidly charge and discharge small amounts of electricity directly	5%	• Fastest response of any technology • Mature technology	• Relatively expensive per kWh • Unable to store significant energy • 10-20% losses per day	• Widely available	
Flywheels	Seconds	Uses a flywheel to rapidly charge and discharge relatively small amounts of electricity using an electric generator	5%-50%	• Relative fast response times • Mature technology	• Relatively large footprint • Relatively expensive per kWh • 20-50% losses over 2 hours	• Widely available	
Battery	Hours	Electrochemical reactions are used to store and discharge electricity directly	10%	• Relatively responsive • Relatively low losses • Mature technology	• Relatively high cost per kWh • Thermal runaway	• Widely available	• Metal air and liquid metal formulations may improve cost effectiveness
Flow	Hours	Stores electricity in two chemicals, which can be stored indefinitely	40%	• No standing losses if turned off • Relatively safe	• Unproven technology • High parasitic losses while on • Relatively high $/kWh	• Commercially available • Pilot scale	
CSP	Hours	Stores energy as heat in working fluid, which is then used to drive a heat recovery-based steam generator	1%	• Very low round trip losses • Can be coupled with CSP • Relatively low $/kWh capex	• Unproven technology • Safety of high operating temp	• Commercially available • Pilot scale	• High temp steam turbine technology could increase efficiency, lower $/kWh
Hydrogen-Compression	Hours	Uses steel or carbon fiber based receiving vessels to store relatively small amounts of hydrogen	53%	• Mature technology • Relatively compact footprint • Relatively low $/kWh capex	• Amount of space required • High round trip losses	• Widely available	• Material science could reduce cost
Hydrogen-Salt Cavern	Weeks	Uses air compressors to store large amounts of hydrogen in salt caverns	42-55%	• Relatively low cost per kWh • Mature technology	• Requires access to a salt cavern • High losses • Relatively slow response	• Limited availability of salt caverns	
Compressed Air Energy Storage (CAES)	Weeks	CAES stores electricity in underground formations including salt caverns and an expander to drive a turbine generator	42-55%	• Relatively low $/kWh capex • Mature technology	• Requires access to a salt cavern • High losses • Relatively slow response	• Limited availability of salt caverns	• Isobaric systems potentially reduce volume by 77%
Hydrogen-Organics	Months	Uses chemical processes to store hydrogen, typically as ammonia or methanol	59-89%	• Mature technology • Relatively high energy density	• Storage of volatile chemicals • Relatively high losses • Relatively high $/kWh	• Widely available	• High potential for cost reduction
Pumped Hydro	Months	Pumps water into reservoirs for later use to drive water turbine generators	80%	• Mature technology • Relatively low $/kWh capex • Relatively low standing losses	• Requires access to reservoir • Scale required • Relatively slow response	• Limited availability of reservoirs	

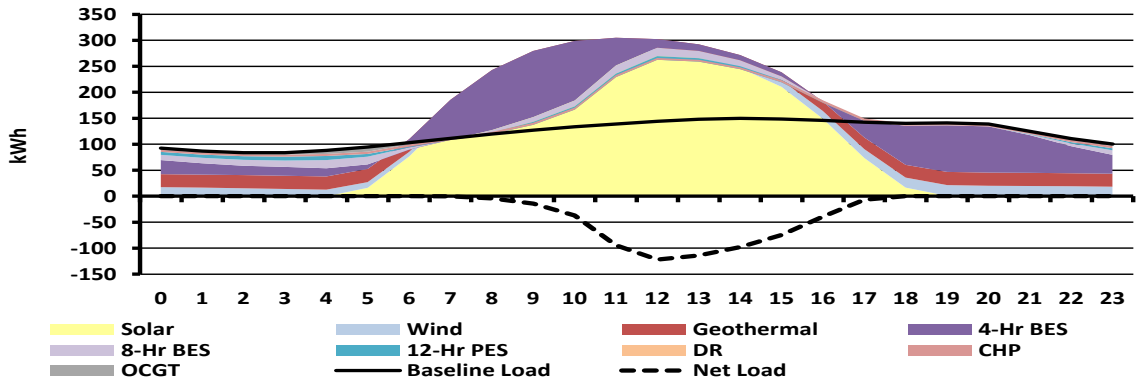
Optimize Zero Carbon and Renewable Portfolios

- Summer and Winter Day
- Annual Portfolio Costs
- Scenario Configurations
- Detailed Scenario Results

ENERGEIA

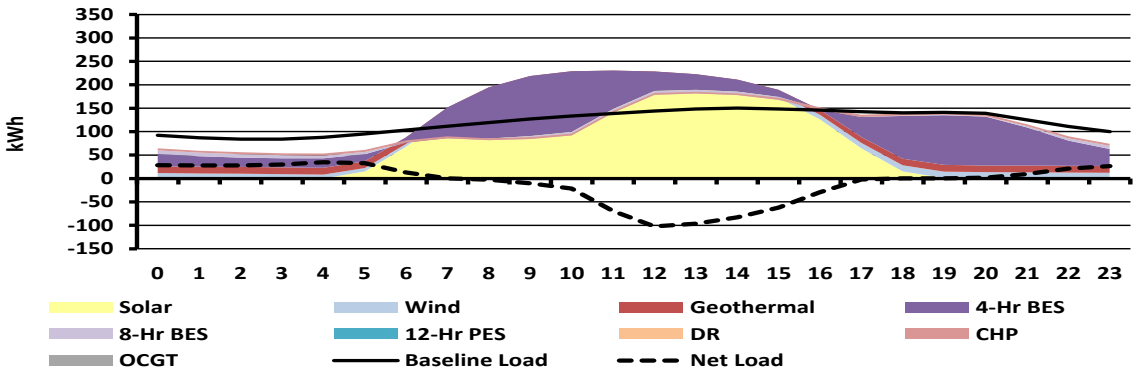
Average Summer and Winter Days

Hour-by-Hour – 2030 Average Summer Day



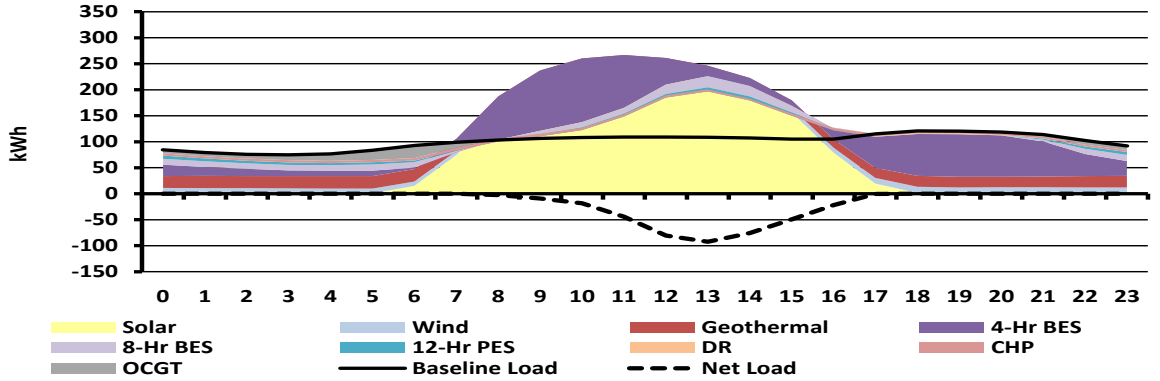
Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Carbon Neutral – 2030 Average Summer Day



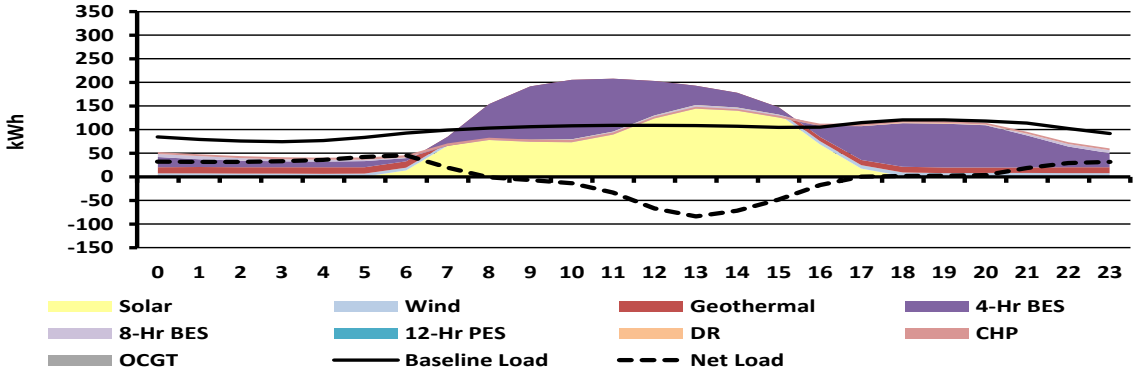
Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Hour-by-Hour – 2030 Average Winter Day



Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Carbon Neutral – 2030 Average Winter Day

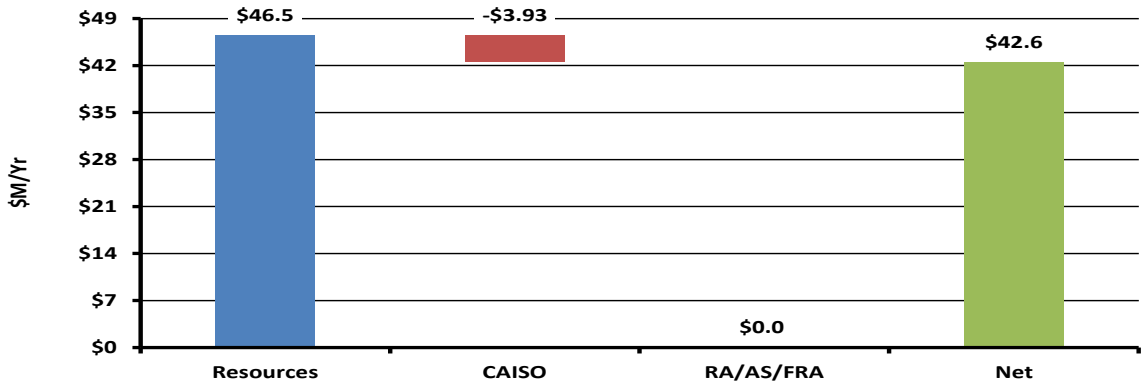


Source: VCE (2020), Energeia modelling; Note: BES = Battery Energy Storage, PES = Pumped Energy Storage, DR = Demand Response, CHP = Combined Heat and Power, OCGT = Open Cycle Gas Turbine

Seasons are based on PG&E's electricity rates. Summer includes May to Oct, and Winter includes all other months.

Annual Portfolio Costs – CASIO, RA, etc.

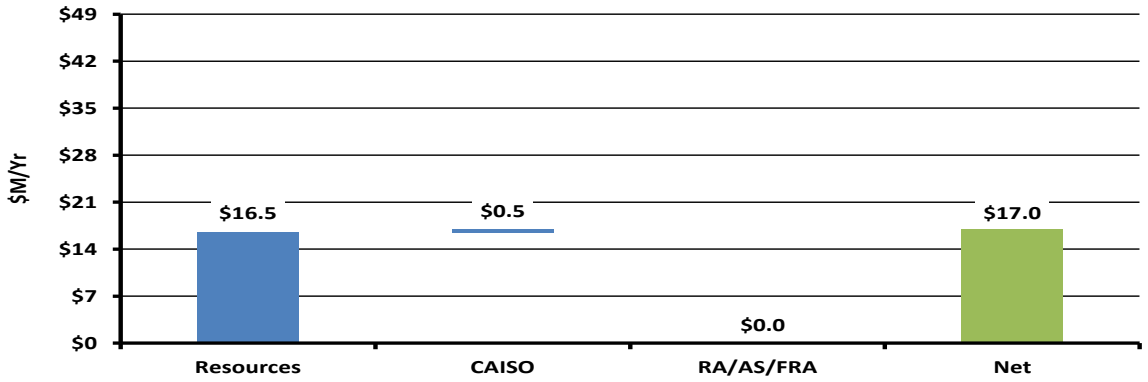
Hour-by-Hour Balancing



Source: Energeia research and analysis
Note: RA = Resource Adequacy; AS = Ancillary Services; RFA = Flexible Resource Adequacy

- The HBH portfolio supplies all needed Resource Adequacy (RA), Flexible RA and ancillary services requirements
- CAISO exports generate significant revenue, reducing costs by nearly 10%

Carbon Neutral Balancing



Source: Energeia research and analysis
Note: RA = Resource Adequacy; AS = Ancillary Services; RFA = Flexible Resource Adequacy

- The CN portfolio also supplies all needed Resource Adequacy (RA), Flexible RA and ancillary services requirements
- CAISO grid purchases and sales almost perfectly offset under this scenario

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Scenario Configurations

All Scenarios

#	Scenario	Electricity Type	Summary	Large Hydro	Small Hydro	OCGT	CAISO Revenue
1	HBH	Carbon Free		✓	✓	✓	✓
2	HBH	Renewable		×	✓	✓	✓
3	HBH	Carbon Free	No Hydro	×	×	✓	✓
4	HBH	Renewable	No Hydro	×	×	✓	✓
5	HBH	Carbon Free	No OCGT w/Green Hydrogen or RNG	✓	✓	×	✓
6	HBH	Renewable	No OCGT w/Green Hydrogen or RNG	×	✓	×	✓
7	HBH	Carbon Free	No CAISO Revenue	✓	✓	✓	×
8	HBH	Renewable	No CAISO Revenue	×	✓	✓	×
9	HBH	Carbon Free	No OCGT, No CAISO Revenue	✓	✓	×	×
10	HBH	Renewable	No OCGT, No CAISO Revenue	×	✓	×	×
11	HBH	Carbon Free	No Hydro, No OCGT	×	×	×	✓
12	HBH	Renewable	No Hydro, No OCGT	×	×	×	✓
13	HBH	Carbon Free	No Hydro, No OCGT, No CAISO Revenue	×	×	×	×
14	HBH	Renewable	No Hydro, No OCGT, No CAISO Revenue	×	×	×	×
15	CN	Carbon Free		✓	✓	✓	✓
16	CN	Renewable		×	✓	✓	✓
17	CN	Carbon Free	No Hydro	×	×	✓	✓
18	CN	Renewable	No Hydro	×	×	✓	✓
19	CN	Carbon Free	No OCGT w/Green Hydrogen or RNG	✓	✓	×	✓
20	CN	Renewable	No OCGT w/Green Hydrogen or RNG	×	✓	×	✓
21	CN	Carbon Free	No CAISO Revenue	✓	✓	✓	×
22	CN	Renewable	No CAISO Revenue	×	✓	✓	×
23	CN	Carbon Free	No OCGT, No CAISO Revenue	✓	✓	×	×
24	CN	Renewable	No OCGT, No CAISO Revenue	×	✓	×	×
25	CN	Carbon Free	No Hydro, No OCGT	×	×	×	✓
26	CN	Renewable	No Hydro, No OCGT	×	×	×	✓
27	CN	Carbon Free	No Hydro, No OCGT, No CAISO Revenue	×	×	×	×
28	CN	Renewable	No Hydro, No OCGT, No CAISO Revenue	×	×	×	×

Grey = Not Valid

Source: Energeia research and analysis
Notes: HBH = Hour-by-hour, CN = Carbon Neutral

- A wide number of scenarios were assessed
- Scenarios 1, 2, 15 and 16 used to assess key risk factors
- Greyed out permutations considered infeasible

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Detailed Scenario Results (1/3)

Name Plate Capacity (MW)

#	Scenario	Electricity Type	Scenario Summary	Solar	Wind	Geother-mal	Small Hydro	Large Hydro	4-Hour BES	8-Hour BES	12-Hour PES	OCGT
1	HBH	Carbon Free		0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.6	112.3
2	HBH	Renewable		0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.6	112.3
3	HBH	Carbon Free	No Hydro									
4	HBH	Renewable	No Hydro	0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.6	112.3
5	HBH	Carbon Free	No OCGT	0.0	28.4	29.1	0.0	0.0	83.5	74.3	24.2	0.0
6	HBH	Renewable	No OCGT	0.0	28.4	29.1	0.0	0.0	83.5	74.3	24.2	0.0
7	HBH	Carbon Free	No CAISO Revenue	0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.6	112.3
8	HBH	Renewable	No CAISO Revenue	0.0	39.3	11.3	0.0	0.0	42.3	65.4	10.6	112.3
9	HBH	Carbon Free	No OCGT, No CAISO Revenue	0.0	28.4	29.1	0.0	0.0	83.5	74.3	24.2	0.0
10	HBH	Renewable	No OCGT, No CAISO Revenue	0.0	28.4	29.1	0.0	0.0	83.5	74.3	24.2	0.0
11	HBH	Carbon Free	No Hydro, No OCGT									
12	HBH	Renewable	No Hydro, No OCGT	0.0	28.4	29.1	0.0	0.0	83.5	74.3	24.2	0.0
13	HBH	Carbon Free	No Hydro, No OCGT, No CAISO Revenue									
14	HBH	Renewable	No Hydro, No OCGT, No CAISO Revenue	0.0	28.4	29.1	0.0	0.0	83.5	74.3	24.2	0.0
15	CN	Carbon Free		0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
16	CN	Renewable		0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
17	CN	Carbon Free	No Hydro									
18	CN	Renewable	No Hydro	0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
19	CN	Carbon Free	No OCGT	0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
20	CN	Renewable	No OCGT	0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
21	CN	Carbon Free	No CAISO Revenue									
22	CN	Renewable	No CAISO Revenue									
23	CN	Carbon Free	No OCGT, No CAISO Revenue									
24	CN	Renewable	No OCGT, No CAISO Revenue									
25	CN	Carbon Free	No Hydro, No OCGT									
26	CN	Renewable	No Hydro, No OCGT	0.0	26.1	0.0	0.0	0.0	100.0	7.7	0.0	0.0
27	CN	Carbon Free	No Hydro, No OCGT, No CAISO Revenue									
28	CN	Renewable	No Hydro, No OCGT, No CAISO Revenue									

Source: Energeia research and analysis
Notes: HBH = Hour-by-hour, CN = Carbon Neutral

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Detailed Scenario Results (2/3)

Costs by Resource ($M/Yr)

#	Scenario	Electricity Type	Scenario Summary	Solar	Wind	Geother-mal	Small Hydro	Large Hydro	4-Hour BES	8-Hour BES	12-Hour PES	OCGT
1	HBH	Carbon Free		$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9
2	HBH	Renewable		$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9
3	HBH	Carbon Free	No Hydro									
4	HBH	Renewable	No Hydro	$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9
5	HBH	Carbon Free	No OCGT	$0.0	$2.4	$18.8	$0.0	$0.0	$10.6	$16.4	$7.5	$0.0
6	HBH	Renewable	No OCGT	$0.0	$2.4	$18.8	$0.0	$0.0	$10.6	$16.4	$7.5	$0.0
7	HBH	Carbon Free	No CAISO Revenue	$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9
8	HBH	Renewable	No CAISO Revenue	$0.0	$3.3	$7.3	$0.0	$0.0	$5.3	$14.4	$3.3	$12.9
9	HBH	Carbon Free	No OCGT, No CAISO Revenue	$0.0	$2.4	$18.8	$0.0	$0.0	$10.6	$16.4	$7.5	$0.0
10	HBH	Renewable	No OCGT, No CAISO Revenue	$0.0	$2.4	$18.8	$0.0	$0.0	$10.6	$16.4	$7.5	$0.0
11	HBH	Carbon Free	No Hydro, No OCGT									
12	HBH	Renewable	No Hydro, No OCGT	$0.0	$2.4	$18.8	$0.0	$0.0	$10.6	$16.4	$7.5	$0.0
13	HBH	Carbon Free	No Hydro, No OCGT, No CAISO Revenue									
14	HBH	Renewable	No Hydro, No OCGT, No CAISO Revenue	$0.0	$2.4	$18.8	$0.0	$0.0	$10.6	$16.4	$7.5	$0.0
15	CN	Carbon Free		$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0
16	CN	Renewable		$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0
17	CN	Carbon Free	No Hydro									
18	CN	Renewable	No Hydro	$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0
19	CN	Carbon Free	No OCGT	$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0
20	CN	Renewable	No OCGT	$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0
21	CN	Carbon Free	No CAISO Revenue									
22	CN	Renewable	No CAISO Revenue									
23	CN	Carbon Free	No OCGT, No CAISO Revenue									
24	CN	Renewable	No OCGT, No CAISO Revenue									
25	CN	Carbon Free	No Hydro, No OCGT									
26	CN	Renewable	No Hydro, No OCGT	$0.0	$2.2	$0.0	$0.0	$0.0	$12.7	$1.7	$0.0	$0.0
27	CN	Carbon Free	No Hydro, No OCGT, No CAISO Revenue									
28	CN	Renewable	No Hydro, No OCGT, No CAISO Revenue									

Source: Energeia research and analysis
Notes: HBH = Hour-by-hour, CN = Carbon Neutral

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Detailed Scenario Results (3/3)

Totals ($M/Yr)

#	Scenario	Electricity Type	Scenario Summary	Resources	RA/AS/FRA	CAISO	Net
1	HBH	Carbon Free		$46.5	$0.0	-$3.9	$42.6
2	HBH	Renewable		$46.5	$0.0	-$3.9	$42.6
3	HBH	Carbon Free	No Hydro				
4	HBH	Renewable	No Hydro	$46.5	$0.0	-$3.9	$42.6
5	HBH	Carbon Free	No OCGT	$55.6	$0.0	-$5.8	$49.8
6	HBH	Renewable	No OCGT	$55.6	$0.0	-$5.8	$49.8
7	HBH	Carbon Free	No CAISO Revenue	$46.5	$0.0	$0.0	$46.5
8	HBH	Renewable	No CAISO Revenue	$46.5	$0.0	$0.0	$46.5
9	HBH	Carbon Free	No OCGT, No CAISO Revenue	$55.6	$0.0	$0.0	$55.6
10	HBH	Renewable	No OCGT, No CAISO Revenue	$55.6	$0.0	$0.0	$55.6
11	HBH	Carbon Free	No Hydro, No OCGT				
12	HBH	Renewable	No Hydro, No OCGT	$55.6	$0.0	-$5.8	$49.8
13	HBH	Carbon Free	No Hydro, No OCGT, No CAISO Revenue				
14	HBH	Renewable	No Hydro, No OCGT, No CAISO Revenue	$55.6	$0.0	$0.0	$55.6
15	CN	Carbon Free		$16.5	$0.0	$0.5	$17.0
16	CN	Renewable		$16.5	$0.0	$0.5	$17.0
17	CN	Carbon Free	No Hydro				
18	CN	Renewable	No Hydro	$16.5	$0.0	$0.5	$17.0
19	CN	Carbon Free	No OCGT	$16.5	$0.0	$0.5	$17.0
20	CN	Renewable	No OCGT	$16.5	$0.0	$0.5	$17.0
21	CN	Carbon Free	No CAISO Revenue				
22	CN	Renewable	No CAISO Revenue				
23	CN	Carbon Free	No OCGT, No CAISO Revenue				
24	CN	Renewable	No OCGT, No CAISO Revenue				
25	CN	Carbon Free	No Hydro, No OCGT				
26	CN	Renewable	No Hydro, No OCGT	$16.5	$0.0	$0.5	$17.0
27	CN	Carbon Free	No Hydro, No OCGT, No CAISO Revenue				
28	CN	Renewable	No Hydro, No OCGT, No CAISO Revenue				

Source: Energeia research and analysis
Notes: HBH = Hour-by-hour, CN = Carbon Neutral

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Energeia USA

Overview

Relevant Experience

ENERGEIA

Introduction to Energeia

Energeia US Team



Mustafa Edrees

Yoana Battraw

Taylor Nguyen
Min Kyaw

- Offices in Davis, California and Sydney, Australia
- Eight full-time experts with renewable energy industry experience
- Backgrounds in economics, science, engineering and marketing

Energeia US Headquarters in Davis, CA

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Energeia's Relevant Experience

Client	Project	Relevant Experience
SMUD unicipal t	Alternative Fuels Assessment	Energeia was engaged to perform an alternative fuels assessment to identify optimal low cost, low carbon fuels for retooling of five aeroderivative LM6000 engines. Energeia performed wheel to well analyses of multiple pathways for renewable gas production and ultimately identified multiple key pathways for SMUD to pursue to decarbonize their peaker plants.
SMUD unicipal t	Integrated Distributed Resource Plan	Energeia used its in-house utility simulator tool, uSim, to determine the distribution system impacts and associated costs and benefits of DERs as envisioned in the Sacramento Municipal Utility District's 2018 Integrated Resources Plan. Energeia also estimated DER values as avoided distribution capital and O&M for distribution.
The City of Davis	Climate Action and Adaption Plan Analysis	Energeia is part of the team assessing the Davis CAAP through analysis of vehicle and building electrification, rooftop PV and energy efficiency opportunities and the associated costs and benefits. This project involves modelling of all connection points and vehicles in Davis.
Commission The Reliable One	Battery Valuation and Framework	Energeia developed a production cost and capacity expansion tool to support OUC's evaluation of future battery energy storage projects. We defined the key value streams and methodologies to quantify monetary and non-monetary benefits as they apply to OUC and the Florida Municipal Power Pool (FMPP) and identified the key use cases for battery storage for value stacking.
es Department of d Power	Once Through Cooling Reliability Study	Energeia developed specific, reliable, implementable, practical and least cost DER solutions tailored to address LADWP's forecast system constraints expected to arise under a range of alternative 1.5 GW thermal generation plant repowering scenarios, including a no repowering scenario.
es Department of d Power	Distributed Energy Resources Integration Study	Energeia analyzed LADWP's cost-of-service at the system, transmission, 34.5kV and 4.8kV level, and by time period, to identify optimized DER programs, incentives and cost-reflective rate design for delivery of optimized DER adoption patterns and minimization of LADWP's overall cost-of-service and customer electricity costs

Thank You

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Valley Clean Energy Board Meeting – February 10, 2022
via video/teleconference

Item 14 – CC Power Long Duration Storage (LDS): Tumbleweed Project

Public Comments

To Provide Public Comment on any agenda item please:

- E-mail 300 words or less to: meetings@valleycleanenergy.org

OR

Join the Public Comment Queue by

- "Raising Hand" on Zoom Meeting

OR

- Press *9 if joining by phone

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Emailed comments received **after** the item has concluded but before the end of the meeting will not be read but will be included in the meeting record.

VALLEY CLEAN ENERGY

Item 14 – CC Power LDS Tumbleweed Project: Overview

1. Long Duration Storage Procurement Goals
2. CPUC Mid-term Reliability Procurement Order
3. LS Power Tumbleweed Project Overview
4. CC Power Participating Members
5. Allocations and Authority
6. Contract Structure
7. Conclusion

VALLEY CLEAN ENERGY

Item 14 – CC Power LDS Tumbleweed Project: LDS Joint Procurement Goals

- Enhance portfolio value via cost-effective resources: value of energy + capacity > costs
- Integrate intermittent resources (solar + wind)
- Support grid reliability
- Share development and project performance risk via new joint powers agency → California Community Power (CC Power)
- “Right-size” project subscription
- Meet potential CPUC procurement mandates

VALLEY CLEAN ENERGY

Item 14 – CC Power LDS Tumbleweed Project: Mid-term Reliability Procurement Order (MTR)

D.21-06-035 adopted by CPUC on June 24, 2021 to address mid-term reliability

- LSEs required to collectively procure 11,500 MW net qualifying capacity (NQC) of new resources
- Follow-on to November 7, 2019 CPUC decision mandating 3,300 MW NQC procurement for 2021-2023 to maintain reliability
- Contract of at least 10 years
- Allocated to LSEs by load share
- Resources must be zero-emission or RPS eligible (no fossil resources)
- 4,500 MW of obligation subject to specific category requirements

VALLEY CLEAN ENERGY

Item 14 – CC Power LDS Tumbleweed Project: Procurement Order Timing

Procurement Obligation in NQC (MW) for All LSEs by Category and Year

Procurement Category	2023	2024	2025	2026	Total
Zero-emissions generation, generation paired with storage, or demand response resources	-	-	2,500	-	2,500
Firm zero-emitting resources	-	-	-	1,000	1,000
Long-duration storage resources	-	-	-	1,000	1,000
Remaining New Capacity Required			-	-	7,000
Total Annual Capacity Requirements	***2,000***	***6,000***	***1,500***	***2,000***	***11,500***

1,000 MW of LDS ordered by CPUC

- Technology agnostic
- 8-hour minimum discharge duration
- COD June 2026 – demonstrate reasonable effort by February 2023
- 10-year minimum term
- Subject to Effective Load Carrying Capability (ELCC) adjustments

CPUC Interim ELCCs

Procurement Category	2023	2024	2025 *Indicative*	2026 *Indicative*
4-Hour Battery	96.3%	90.7%	74.2%	69.0%
6-Hour Battery	98.0%	93.4%	79.6%	75.1%
8-Hour Battery	98.2%	94.3%	82.2%	**78.2%**
8-Hour Pumped Storage Hydro				76.8%
12-Hour Pumped Storage Hydro				80.8%

VALLEY CLEAN ENERGY

Item 14 – CC Power LDS Tumbleweed Project: Project Overview

Tumbleweed was the highest-ranking LDS project

- **Developer – LS Power**
- **Technology –**Lithium-ion, 8 hours discharge duration
- **Project size** - 69 MW/552 MWh
- **Product** – Tolling Agreement w/full capacity rights
- **Location –** Rosamond, Kern County
- **COD –** Q2 2026
- **Price -** fixed $/kw-mo, no escalation
- **Term –** 15 years

VALLEY CLEAN ENERGY

Item 14 – CC Power LDS Tumbleweed Project: Member Participation

7 CCAs agreed to move forward with joint LDS procurement for Tumbleweed

- MTR LDS procurement mandate for the 7 CCAs is 96.5 MW
- 123.4 MW adjusted by ELCC
- Tumbleweed is 69 MW nameplate – meeting 56% of ELCC adjusted need under the MTR
- Capacity to be allocated based on MTR share obligation

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Sonoma Clean Power

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Item 14 – CC Power LDS Tumbleweed Project: Allocations & Authority

Each CCA will seek their respective governing body authority to participate

- Initial expected share based on MTR obligation
- Minimum authority needs to cover:
  1) contingency risk of one or more CCA's not executing and
  2) 25% step-up cap due to default
- Maximum authority will be based on individual CCA's appetite to take additional volume

CCA	% Entitlement Share	Intitial Entitlement Share MW	Minimum Authority to Seek MW
CPSF	16.06%	11.08	16.94
PCE	19.69%	13.59	20.77
RCEA	3.62%	2.50	3.82
SJCE	22.28%	15.37	23.50
SVCE	21.25%	14.66	22.41
SCPA	12.95%	8.94	13.66
VCE	4.15%	2.86	4.38
Total	100.00%	69	

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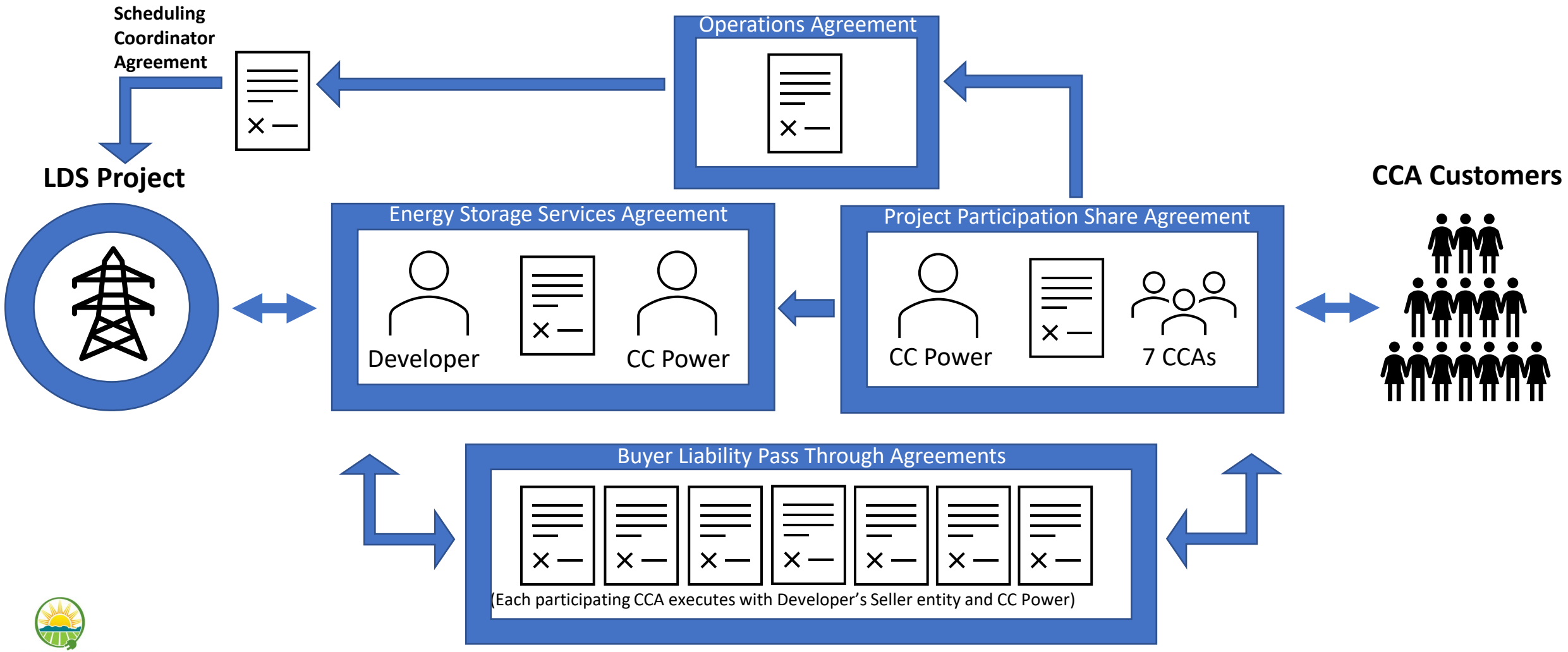
Item 14 – CC Power LDS Tumbleweed Project: Contract Structure

VCE to execute the PPSA and the BLPTA (the Operating Agreement will be signed at a later date)



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Item 14 – CC Power LDS Tumbleweed Project: Conclusion

VCE must procure ~5 MW of qualifying LDS to meet MTR

- Tumbleweed was selected through a robust and competitive solicitation process
- Tumbleweed net present value (NPV) to participating CCAs is highly uncertain
- Project is expected to include project labor agreement
- Contracting Structure includes a “step-up” provision which exposes VCE to taking up to 25% additional capacity (based on contract share)
- Procurement of Long Duration Storage (8-hours or more) is mandated through MTR order
- VCE’s expected share of Tumbleweed is 2.86 MW (56% of obligation)
- Need approx. 2.5 MW of additional LDS - remaining shortlisted projects ***may*** meet or exceed remaining needs[1]

1) Additional need is to satisfy CPUC mandates. Per the Carbon Neutral study VCE has a need beyond the mandate which can be procured at a later date.

Valley Clean Energy Board Meeting – February 10, 2022
via video/teleconference

Item 15 – 2022 Customer Rates

VALLEY CLEAN ENERGY

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VALLEY CLEAN ENERGY

Item 15 – 2022 Customer Rates

Overview

- Background
- 2022 Customer Rate Scenarios
- Customer Outreach
- Recommendation
- Discussion

VALLEY CLEAN ENERGY

Item 15 – 2022 Customer Rates

Background

- All electric utilities develop forecasts based upon informed technical estimates. These forecasts incorporate factors such as future weather, load, market power prices, and other business conditions. Actual outcomes inevitably vary and in extreme instances, outcomes may vary significantly.
- Primary financial drivers remain the same included in FY 2021/22 budget adoption
  - Power market costs continuing to increase above forecast in 2021
  - 2021 PCIA remaining high into early 2022
  - Delayed 2022 PG&E Bundled Rate changes
  - Error in financial estimations overvalued positive impacts of VCE's long-term PPA's
- 2023 Short-term outlook: continued volatility with PG&E PCIA rates and generation rates.
- Longer-term outlook (2024+): increased stability and cost certainty due to long-term PPA's and cost-recovery rate structure.

VALLEY CLEAN ENERGY

Item 15 – 2022 Customer Rates

Background (continued)

- November 8th PG&E filed a November update for its 2022 Power Charge Indifference Adjustment (PCIA) and Generation Rates

- November 10th VCE Board adopted cost-based rate policy and deferred consideration of an expanded customer rate structure
  - The cost-based rate setting approach is designed to meet VCE's annual expenditures and build long-term fiscal stability through the establishment and maintenance of reserves.

- January 20, 2022 CAC Recommended Rates and Implementing Procedure

- January 24, 2022 CPUC proposed decision (PD) filed.
  - 2022 PCIA set to decrease 57%
  - 2022 PG&E's average generation rates set to increase by 33%
  - All rate changes are inclusive of PG&E December actuals

VALLEY CLEAN ENERGY

Item 15 – 2022 Customer Rates

2022 Customer Rate & Budget Scenarios

Using the information from CPUC proposed decision on January 24, 2022, staff conducted a financial analysis that included three rate scenarios:

1. **Scenario 1** (Low Income/At-Risk* Credit): 2.5% rate credit (Approx. $750k) for CARE/FERA customers; all other revenues directed to reserves.
2. **Scenario 2** (Base Case): no modifications; all revenues directed to reserves.
3. **Scenario 3** (Low Income/At-Risk* + Credit): 3.5% rate credit (Approx $1M) for CARE/FERA customers plus 1% rate credit (Approx. $750k) for other customers; all other revenues directed to reserves.

*Includes CARE/FERA and Medical Baseline customers

VALLEY CLEAN ENERGY

Item 15 – 2022 Customer Rates

Updated Customer Rate & Budget Scenarios - Staff's recommendation – Scenario 1

	Actuals			Actual YTD (6 Month)	Budget Scenarios	Preliminary Forecast*		
Scenario 1	FY2019	FY2020	FY2021	FY2022	CY2022	CY2023	CY2024	CY2025
Revenue	51,035	55,249	54,657	29,677	89,750	69,500	70,750	71,050
Power Cost	38,540	41,538	54,234	30,133	66,990	52,400	47,100	48,400
Other Expenses	3,850	4,346	4,267	2,276	5,292	5,398	5,506	5,616
Net Income	8,646	9,365	(3,844)	(2,732)	17,468	11,702	18,144	17,034
Scenario 2	FY2019	FY2020	FY2021	FY2022	CY2022	CY2023	CY2024	CY2025
Revenue	51,035	55,249	54,657	29,677	90,500	70,250	71,500	71,800
Power Cost	38,540	41,538	54,234	30,133	66,990	52,400	47,100	48,400
Other Expenses	3,850	4,346	4,267	2,276	5,292	5,398	5,506	5,616
Net Income	8,646	9,365	(3,844)	(2,732)	18,218	12,452	18,894	17,784
Scenario 3	FY2019	FY2020	FY2021	FY2022	CY2022	CY2023	CY2024	CY2025
Revenue	51,035	55,249	54,657	29,677	89,000	68,750	70,000	70,300
Power Cost	38,540	41,538	54,234	30,133	66,990	52,400	47,100	48,400
Other Expenses	3,850	4,346	4,267	2,276	5,292	5,398	5,506	5,616
Net Income	8,646	9,365	(3,844)	(2,732)	16,718	10,952	17,394	16,284

VALLEY CLEAN ENERGY

Item 15 – 2022 Customer Rates

Estimates of Rate Effect on Average Customer Classes (total electricity bill)

Customer Class	Residential	Small Commercial	Med Commercial	Large Commercial*	Ag
Current Annual Bill	$1,860/yr	$ 4,500/yr	$ 55,200/yr	$ 98,400/yr	$ 21,600/yr
Current Monthly Bill	$155/mo	$ 400/mo	$4,600/mo	$ 8,200/mo	$ 1,800/mo
Monthly Impact of 12% total Elec. Bill (33% adj. on Generation)	**Approx. $19/mo**	**Approx. $48/mo**	**Approx. $745/mo****	**Approx. $1,221/mo****	**Approx. $ 214/mo**

Notes:
CARE customers total elec. bill reduced by approximately 35%; FERA by 18%.
* Large Commercial does not include the less than 10 largest commercial customers (E-19 and E-20) as it would be a non-representative average for the majority of large commercial customers. The average monthly impact for E-19 and E-20 customers would be approximately $830 based on an average monthly bill of approximately $34,500.
** Medium and Large Commercial rates include the limited portion of the demand charges on the generation portion of the bill, resulting in approximate 0.5% higher increases.

VALLEY CLEAN ENERGY

Financial Reserves Target

Staff is seeking feedback on VCE setting rates for 2022 at a level that will fully fund the 2022 budget and build back reserves that have been used over the past 18 months to stabilize customer rates

- Staff's recommendation is that VCE establish a minimum target of 80-90 days cash reserve by the end of 2022 which would provide two key benefits:
  (1) increased financial stability while taking a significant step toward establishing an investment grade credit rating
  (2) preparing for future PCIA and power market volatility

Note: staff will be bringing back a financial reserve policy update later in 2022 for Board consideration.

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Customer Outreach & Communications

VCE continues a measured, transparent customer outreach strategy with an emphasis on VCE's additional benefits such as more choice in electricity supply, local control, and community reinvestment through energy contracts and programs.

Based on VCE matching PG&E rates and other CCAs undertaking similar rate actions, staff does not anticipate significant opt-out customer activity in response to the rate changes. VCE will continue to monitor customer activity as the rates are implemented for possible adjustments.

Item 15 – 2022 Customer Rates

Recommendation

1. Approve VCE 2022 Customer Rates (Scenario 1):
   a. Customer rates for 2022 to match PG&E 2022 generation rates for all customer classes.
   b. A rate credit of 2.5% for CARE and FERA customers in 2022
2. Conduct a mid-year rates review in Q2 2022 to assess rates forecast and determine the feasibility of:
   a. allocating additional funds for 2022 clean energy content procurement
   b. allocating additional funds to program implementation
   c. providing additional rate credits for all customer classes during peak summer months in 2022.
3. Direct Staff to continue to develop and evaluate the feasibility of a revised rate structure with three customer options: (1) Standard Green (default) and (2) UltraGreen (100% renewable) with cost-based rates and adding a (3) least-cost customer rate option.

VALLEY CLEAN ENERGY

Valley Clean Energy Board Meeting – February 10, 2022
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Item 16 – 2022 Budget

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VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Overview

- Background of Budget Development
- Updated FY 2021-22 (6-month) Financials
- Key factors Influencing VCE 2022 Budget
- 2022 Budget Scenarios
  - Scenario 1 (Low Income/At-Risk* Credit): 2.5% rate credit for CARE/FERA customers
  - Scenario 2 (Base Case): All revenues directed to reserves.
  - Scenario 3 (Low Income/At-Risk* + Credit): 3.5% rate credit for CARE/FERA customers plus 1% rate credit for other customers
- Recommendation
- Discussion

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Background

VCE has taken key actions leading up to the CY2022 budget adoption.

- June 2020 - FY 2020-21 Budget adoption with fiscal mitigation policy adjustments
- October 2020 - FY 2020-21 Mid-year budget update to monitor Pandemic Impacts
- May 2021 – FY 2021-22 Budget update with load update.
- June 2021 – FY 2021-22 Budget adoption with extended fiscal mitigation policy
- October 2021 – Budget update with power costs and financial model corrections.
- October 2021 – Board adopted rate increase to preserve cash reserves.
- November 2021- VCE Board adopted cost-based rate policy and deferred consideration of an expanded customer rate structure
  - The cost-based rate setting approach is designed to meet VCE's annual expenditures and build long-term fiscal stability through the establishment and maintenance of reserves.
- November 2021 – Adopted change from fiscal year to calendar year.

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Current FY Update – FY 2021-22 (6 Month) unaudited

FY 2021-22	APPROVED BUDGET FY 2021 (6 MO)	Actual YTD Dec. 31, 2022 (6 MO)	Variance
Revenue	$ 24,737	$ 29,677	$ 4,940
Power Cost	$ 27,446	$ 30,133	$ (2,687)
Other Expenses	$ 2,509	$ 2,276	$ 233
Net Income	$ (5,218)	$ (2,732)	$ 2,486

- Customer Rate Increase of 2% - The Board approved an accelerated rate adjustment of approximately 2% on the average customer bill in mid-October for $400K.
- Power Prices. Average forward market power prices have increased 57% since May 2021. The increased market price compared to contracted power purchase agreements and hedged power contract prices resulted in an offset for additional load requirements during peak season.
- Programs Costs, Regulatory Analyst role (Part-time), and contingency were budgeted for the entire fiscal year and not utilized during the first six months.

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Key Factors influencing the VCE 2022 Budget

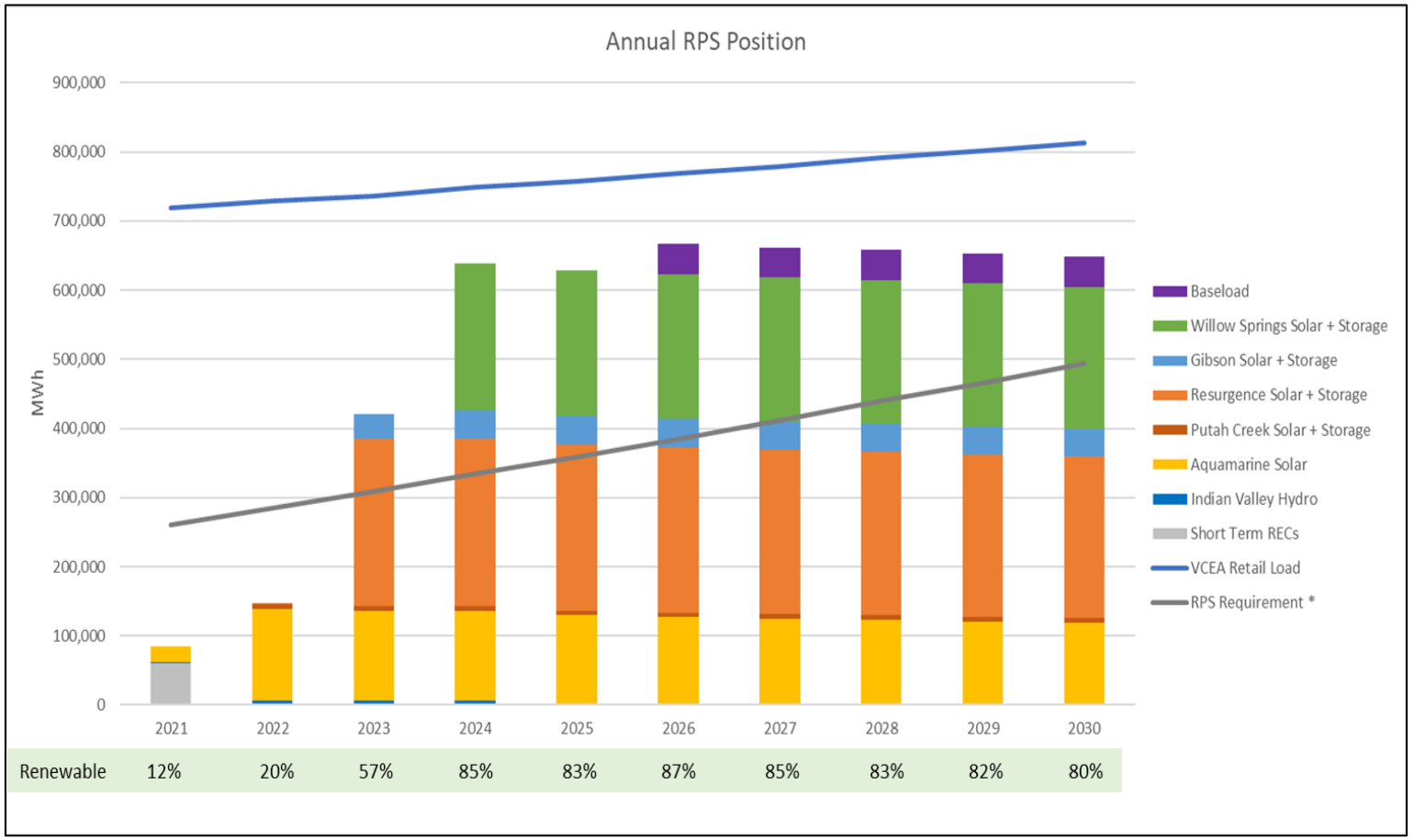
- Power Prices. Average forward market power prices increased by 57% (April-21)
- PG&E Rate Adjustments – Delays in annual rate setting. PG&E's current filings/CPUC proposed decision effective March 1st, 2022 (33% rate increase and a PCIA reduction of 57%)
- Financial Power Cost Model - Corrected forecast was approximately $13M over the three FYs 2022 to 2024
- PCIA. A net 46% increase in the PCIA from 2020/21 continued into 2022 due to delays in CPUC ERRA proceeding.
- Calendar Year Budget - Budget adoption process was shifted from fiscal year to avoid overlap with the annual load forecast updates and the beginning of the hedging process
- Long-Term Power Purchase Agreements starting in 2021 through 2024.

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Long-term Fixed Price Power Purchase Agreements

- Contracted long-term PPAs began in 2021
- 80%+ of VCE's annual load by 2024
- Reduced VCE costs compared to current RPS and RA market costs
- Significantly reduce volatility as VCE moves forward (smaller open position)



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Item 16 – VCE 2022 Budget

VCE 2022 Budget Scenarios

Using the information from CPUC proposed decision on January 24, 2022, staff conducted a financial analysis that included three rate scenarios:

1. **Scenario 1** – Staff Recommendations (Low Income/At-Risk* Credit): 2.5% rate credit for CARE/FERA customers; all other revenues directed to reserves. (~85 days cash reserves by end of 2022)
2. **Scenario 2** (Base Case): no modifications; all revenues directed to reserves. (~90 days cash reserves by end of 2022)
3. **Scenario 3** (Low Income/At-Risk* + Credit): 3.5% rate credit for CARE/FERA customers plus 1% rate credit for other customers; all other revenues directed to reserves. (~80 days cash reserves by end of 2022)

*Includes CARE/FERA and Medical Baseline customers

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

VCE 2022 Budget Scenarios

VCE budget Scenarios for 2022 build back reserves that have been used over the past 18 months to stabilize customer rates and provide a level of financial relief to VCE's low-income customers.

- Target of 80-90 days cash reserve by the end of 2022
  - Increased financial stability while taking a significant step toward establishing an investment-grade credit rating
  - Preparing for future PCIA and power market volatility.

Other Considerations

- Power Costs - purchased power contingency of 2% / $1.3M
- Customer programs costs related to launch of AgFIT and other programs.
- Additional interest expenses related to the use of credit lines resulting from the delay of the ERRA proceeding.
- 5% annual salary and contractor inflation rate based on 2021 7% inflation rate
- 5% administrative contingency rate (increased from 2.5%) for unanticipated expenses related to increase activity.

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

2022 Budget Scenario 1 (Low Income/At-Risk Credit) *Staff Recommendation*

VALLEY CLEAN ENERGY DRAFT BUDGET SUMMARY 2022 - BUDGET SCENARIO 1	APPROVED BUDGET FY 2021 (6 MO)	ACTUAL YTD Dec. 31 2022 FY 2021 (6 MO)	DRAFT BUDGET CY 2022
OPERATING REVENUE	**$ 24,737**	**$ 29,677**	**$ 89,750**
OPERATING EXPENSES:			
Cost of Electricity	27,618	30,133	66,990
Contract Services	1,369	1,297	2,640
Outreach & Marketing	117	79	247
Programs	68	-	174
Staffing	580	537	1,300
General, Administration and other	382	349	840
TOTAL OPERATING EXPENSES	**30,132**	**32,395**	**72,192**
TOTAL OPERATING INCOME	**(5,395)**	**(2,718)**	**17,558**
NONOPERATING REVENUES (EXPENSES)			
Interest income	28	9	17
Interest expense	(23)	(23)	(107)
TOTAL NONOPERATING REV/(EXPENSES)	**5**	**(14)**	**(90)**
NET MARGIN	**$ (5,390)**	**$ (2,732)**	**$ 17,468**
NET MARGIN %	**-21.8%**	**-9.2%**	**19.5%**

- Budget Scenario 1 incorporates 2.5% rate credit for CARE/FERA and Medical Baseline
- Total customer rate credit: $750k
- Directs all other revenues to reserves.
- Includes a target of ~85 days cash reserves by the end of 2022

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

2022 Budget Scenario 2 (Base Case)

VALLEY CLEAN ENERGY DRAFT BUDGET SUMMARY 2022 - BUDGET SCENARIO 2	APPROVED BUDGET FY 2021 (6 MO)	ACTUAL YTD Dec. 31 2022 FY 2021 (6 MO)	DRAFT BUDGET CY 2022
OPERATING REVENUE	**$ 24,737**	**$ 29,136**	**$ 90,500**
OPERATING EXPENSES:			
Cost of Electricity	27,618	29,746	66,990
Contract Services	1,369	1,300	2,640
Outreach & Marketing	117	85	247
Programs	68	23	174
Staffing	580	601	1,300
General, Administration and other	382	336	840
TOTAL OPERATING EXPENSES	**30,132**	**32,090**	**72,192**
TOTAL OPERATING INCOME	**(5,395)**	**(2,954)**	**18,308**
NONOPERATING REVENUES (EXPENSES)			
Interest income	28	16	17
Interest expense	(23)	(23)	(107)
TOTAL NONOPERATING REV/(EXPENSES)	**5**	**(7)**	**(90)**
NET MARGIN	**$ (5,390)**	**$ (2,961)**	**$ 18,218**
NET MARGIN %	**-21.8%**	**-10.2%**	**20.1%**

- All revenues are directed to reserves
- No customer rate credit modifications
- Includes a target of ~90 days cash reserves by the end of 2022

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

2022 Budget Scenario 3 (Low Income/At-Risk + Credit)

VALLEY CLEAN ENERGY DRAFT BUDGET SUMMARY 2022 - BUDGET SCENARIO 3	APPROVED BUDGET FY 2021 (6 MO)	ACTUAL YTD Dec. 31 2022 FY 2021 (6 MO)	DRAFT BUDGET CY 2022
OPERATING REVENUE	**$ 24,737**	**$ 29,136**	**$ 89,000**
OPERATING EXPENSES:			
Cost of Electricity	27,618	29,746	66,990
Contract Services	1,369	1,300	2,640
Outreach & Marketing	117	85	247
Programs	68	23	174
Staffing	580	601	1,300
General, Administration and other	382	336	840
TOTAL OPERATING EXPENSES	**30,132**	**32,090**	**72,192**
TOTAL OPERATING INCOME	**(5,395)**	**(2,954)**	**16,808**
NONOPERATING REVENUES (EXPENSES)			
Interest income	28	16	17
Interest expense	(23)	(23)	(107)
TOTAL NONOPERATING REV/(EXPENSES)	**5**	**(7)**	**(90)**
NET MARGIN	**$ (5,390)**	**$ (2,961)**	**$ 16,718**
NET MARGIN %	**-21.8%**	**-10.2%**	**18.8%**

- 3.5% rate credit for CARE/FERA and Medical Baseline customers
- 1% rate credit for other customers.
- Total customer rate credit: $1.5M
- Includes a target of ~80 days cash reserves by the end of 2022.

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Updated Budget Scenarios - Staff's recommendation – Scenario 1

	Actuals			Actual YTD (6 Month)	Budget Scenarios	Preliminary Forecast*		
Scenario 1	FY2019	FY2020	FY2021	FY2022	CY2022	CY2023	CY2024	CY2025
Revenue	51,035	55,249	54,657	29,677	89,750	69,500	70,750	71,050
Power Cost	38,540	41,538	54,234	30,133	66,990	52,400	47,100	48,400
Other Expenses	3,850	4,346	4,267	2,276	5,292	5,398	5,506	5,616
Net Income	8,646	9,365	(3,844)	(2,732)	17,468	11,702	18,144	17,034
Scenario 2	FY2019	FY2020	FY2021	FY2022	CY2022	CY2023	CY2024	CY2025
Revenue	51,035	55,249	54,657	29,677	90,500	70,250	71,500	71,800
Power Cost	38,540	41,538	54,234	30,133	66,990	52,400	47,100	48,400
Other Expenses	3,850	4,346	4,267	2,276	5,292	5,398	5,506	5,616
Net Income	8,646	9,365	(3,844)	(2,732)	18,218	12,452	18,894	17,784
Scenario 3	FY2019	FY2020	FY2021	FY2022	CY2022	CY2023	CY2024	CY2025
Revenue	51,035	55,249	54,657	29,677	89,000	68,750	70,000	70,300
Power Cost	38,540	41,538	54,234	30,133	66,990	52,400	47,100	48,400
Other Expenses	3,850	4,346	4,267	2,276	5,292	5,398	5,506	5,616
Net Income	8,646	9,365	(3,844)	(2,732)	16,718	10,952	17,394	16,284

Note: 2023, 2024, and 2025 forecasted financials are based on the most current available data and assumptions. These scenarios rely on future rate adjustments, reserves, or both to mitigate future power cost volatility.

VALLEY CLEAN ENERGY

Item 16 – VCE 2022 Budget

Recommendation

Consistent with the adopted rate policy, Staff is recommending that VCE set rates for 2022 at a level that will fully fund the 2022 budget, build back reserves that have been used over the past 18 months to stabilize customer rates, and provide a level of financial relief to VCE's low-income and at-risk customers.

Approve VCE 2022 Budget Scenario 1:

2022 Operating Budget Scenario 1 with $89.8M of operating revenues and $72.3M of operating expenses for a net income of $17.5M.

Discussion

VALLEY CLEAN ENERGY

Valley Clean Energy Board Meeting – February 10, 2022
via video/teleconference

Item 17 – Line of credit – Yolo County

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Item 17 – Line of Credit (VCE / Yolo County)

Overview

- Background
- Line of Credit Summary
- Recommendation

VALLEY CLEAN ENERGY

Item 17 – Line of Credit (VCE / Yolo County)

Background

- Customer Rate Stabilization – 24 Months experienced COVID-19 pandemic, 2021 PCIA, power market prices, heat storm, drought, modeling, and CPUC delays.
- Reserves Policy – 30 Day Min (2022 Reserve target of 80-90 days by December 31)
- Current Financial Instrument – Line of Credit with River City for 5M Cash with $2M letter of credit capacity.
- 2022 PCIA and PG&E rates shows VCE net income ~$17M by the end of 2022.

Line of Credit Summary (Short Term – 12 Mo)

- Type of Financing: Line of Credit (maximum of 1 draw per month)
- Maximum Amount: $5,000,000
- Maturity: December 31, 2022
- Collateral/Pledged Assets: VCE electric utility customer rates
- Security: Rate covenant
- Interest Rate: Variable rate, simple interest, based on Yolo County Treasury Pool Quarterly Earnings Rate plus 1.50% (1.99% as of 12/31/2021)
- Late Penalty: 5% and 10% annualized until paid in full
- Principal Payment Structure: Due in full on December 31, 2022
- Interest Payment Structure: Due in full on December 31, 2022

VALLEY CLEAN ENERGY

Item 17 – Line of Credit (VCE / Yolo County)

Recommendation

Staff believes that the short-term cash requirement and the reduced but continued uncertainty related to the PCIA fee, resource adequacy costs, and PG&E bundled rates for 2023 justify adding the line of credit with the County of Yolo.

This agreement allows VCE to manage minimum short-term operational reserves and build back longer-term reserves of approximately 80 to 90 days cash by the end of 2022.

Additionally, credit support from both the County and River City Bank will allow VCE to optimize borrowing costs and provide additional assurance of rate stabilization.

Discussion

VALLEY CLEAN ENERGY

Valley Clean Energy Board Meeting – February 10, 2022
via video/teleconference

Item 18 – Strategic Plan Report

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VALLEY CLEAN ENERGY

Item 18 – Strategic Plan Report

Overview

Inform the general manager and CAC of the summarized progress on the VCE Three-Year Strategic Plan goals ratified at the November 12, 2020.

Quarterly Report to VCE Management

- Staff will report quarterly to the Interim General Manager on the status of goals, objectives and metrics for which they are responsible.

- Annual Report to Board and CAC Staff
  - Staff will report annually to the Board and CAC on the status of goals, objectives and metrics, and will recommend any mitigations or amendments as may be necessary for Board approval.

VALLEY CLEAN ENERGY

Item 18 – Strategic Plan Report

GOAL 1 - FINANCIAL STRENGTH

Maintain a strong financial foundation and manage costs to achieve long-term organizational health.

1.1 - Maintain consistently healthy cash reserves to fund VCE's mission, vision, and goals
1.2 - Achieve an investment grade credit rating by end of 2024.
1.3 - Commit to fiscal efficiencies to build a program foundation from which to deliver customer and community value.
1.4 - Manage customer rates to optimize VCE's financial health while maintaining rate competitiveness with PG&E.

Obj.	2021 - Key Accomplishments & Developments	2022 Planned Activities
1.1	1. Developed collections policy for review by CAC & Board 2. Renewed credit line with RCB through calendar 2021. 3. Received preliminary CAPP approval for funding ~$800K of COVID related receivables	1. Collections policy approval Q1 2022 2. Renew and increase credit line(s)
1.2	1. Budgeted for a financial advisor to support the process of establishment of first credit rating	1. Issue RFP for financial advisor Q1 2022 2. Recover cash reserves ~80+ Days
1.3		1. Review financial reserve, dividend, and programs fund policy
1.4	1. Adopted cost-based rate policy 2. Implemented rate change to maintain cash reserve minimums	1. Develop an additional analytics model for cost study and long-term rates.

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GOAL 2 - PROCUREMENT & POWER SUPPLY

Manage power supply resources to consistently exceed California's Renewable Portfolio Standard (RPS) while working toward a resource portfolio that is 100% carbon neutral by 2030.

2.1 - Continue to identify and pursue cost effective local renewable energy resources.
2.2 - Acquire sufficient bundled energy and renewable resources to achieve VCE's greenhouse gas reduction targets.
2.3 - Deploy storage and other strategies to achieve renewable, carbon neutral, resource adequacy, and resiliency objectives.
2.4 - Identify and pursue cost effective, local distributed energy (e.g., behind the meter rooftop Solar + storage) resources to help meet reliability needs.
2.5 - Study and present options for achieving a 100% carbon neutral resource portfolio as well as 100% carbon free resource portfolio (carbon free hour by hour) by 2030.
2.6 - Optimize the hedging strategy to mitigate risk in accordance with the energy risk guidelines and procurement plan.

Obj.	2021 - Key Accomplishments & Developments	2022 - Planned Activities
2.2	1. Q1 2021, executed a 90MW PV +75MW BESS 20 yr. PPA with Resurgence. (COD – Q422) 2. Q4 2021, executed a 72MW PV + 36MW BESS 15 yr PPA with Willow Springs. (COD – Q423) Note: Both PPAs bring VCE stable, low-cost power, resource adequacy, and RPS compliance.	
2.3	1. Participation in RFPs with CC power (1) for (2-3) long-duration energy storage systems. (2) firm clean resources (e.g., geothermal, biomass, other new technologies.) Note: Both support CPUC mandate for additional resources – D.21-06-035	1. Finalize negotiations and bring them forward for Board approval. 2. Evaluate firm proposals and contract awards for Board approval.
2.5	1. Staff and Carbon neutrality task group – (1) Awarded RFP to Energeia to perform portfolio analysis for 100% carbon neutral and carbon-free hour-by-hour. (2) Provided input and reviewed results for final recommendations	1. Final report to be delivered in February 2022 to Board to begin
2.6	1. N/A for 2021	1. Comprehensive review planned to incorporate long-term PPAs (EROC participation)

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GOAL 3 - CUSTOMERS & COMMUNITY (3.1 - 3.4)

Prioritize VCE's community benefits and increase customer satisfaction and retention.

3.1 - Develop engagement strategies to increase awareness of, and participation in, local control of VCE's energy supply and programs with a particular focus on engaging disadvantaged and historically marginalized communities.
3.2 - Develop programs and initiatives to better support community goals, including supporting member agency achievement of energy-sector emissions reduction targets.
3.3 - Design and implement a strategy to more effectively engage local business and agricultural customers.
3.4 - Build awareness and trust of the VCE brand through direct engagement with customers, communities and organizations.

Obj.	2021 - Key Accomplishments & Developments	2022 - Planned Activities
3.1	1. Initiated a mini-campaign in partnership with Davis Food Co-op on UltraGreen opt-ups, including collateral for the campaign. 2. Rolled out an online platform for customers to easily opt up online without their PG&E account number	1. Launch, publicize, create awareness of programs for the low-income/at-risk 2. Expand opt-up campaigns for Woodland and Winters (w/Spanish) 3. Implement a program for opt-up sponsorship of low-income customers
3.2	1. Followed up on cost analysis for all member jurisdictions to opt up to UltraGreen re-initiated conversations about opting up. 2. Engaged the Woodland Sustainability Committee on VCE efforts and building electrification. 3. Engaged with the County of Yolo on the Climate Action Commission.	1. Upgrade analysis of impacts for enrollment of Member jurisdictions in support of targeted community goals. 2. Engage Key decision-makers in emission reduction programs.
3.3	1. AgFIT pilot (1) Approved by CPUC with launch in 2022 (2) outreach developed for key ag customers 2. Developed and Launched campaign for UltraGreen commercial customers to advertise efforts and engage additional key accounts.	1. Successful AgFIT Launch in May-22. 2. Include additional key commercial accounts to the UltraGreen campaign.
3.4	1. Directly engaged with Mutual Housing (MH) management staff and conducted three customer centered public meetings (1 in Spanish). This resulted in much more awareness of VCE's brand and activities. 2. Made significant improvements to the VCE website, including adding content on carbon-free vs. renewables, highlighting key UltraGreen customers on the homepage, updating FAQs, updating the financial resources page, and adding the VCE Power Contract map.	1. Continue to engage and continue conversations about partnering with MH on programs, e.g., multi-family EV 2. Engage with GRID Alternatives for multi-family, EV charging, and workforce development training. 3. Continue to seek out opportunities to make

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GOAL 3 - CUSTOMERS & COMMUNITY (3.5 – 3.7)

Prioritize VCE's community benefits and increase customer satisfaction and retention.

3.5 - Develop customer programs and initiatives that prioritize decarbonization, community resiliency and customer savings.
3.6 - Measure and increase customer satisfaction, using tools such as surveys and focus groups, while maintaining an overall participation rate of no less than 90%.
3.7 - Integrate and address the concerns and priorities of emerging and historically marginalized communities in the design and implementation of VCE's services and programs.

Obj.	2021 - Key Accomplishments & Developments	2022 - Planned Activities
3.5	1. Made significant progress on three programs in Q3-4 2021. Ag pilot approved by the CPUC; programs for both EV rebates and heat pump rebates/support are in progress. 2. Staff was invited to present on building decarbonization to the Woodland Sustainability Committee (WSC) in January 2022	1. Approve and launch heat pump and EV rebate program; program design for higher incentives for low-income customers. 2. Incentivize low-income community with programs (CARE/FERA, PIPP, and ELRP.)
3.6	1. Maintained customer participation rate of over 90% 2. Reviewed and modified Opt-out process for improvements such as live customer service representative engagement for better awareness and education prior to final customer decision.	1. Focused engagement and outreach with communities with low participation.
3.7	1. Participating in Arrearage Management Program (AMP) and Percentage Income Payment Plan (PiPP) with PG&E and other CCAs so that customers at high risk of disconnection can get support in paying arrearages and avoid disconnection.	1. Monitor AMP and PiPP implementation with PG&E and SMUD. 2. Continue posting in Spanish, measure success in Mar. 2022

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GOAL 4 - DECARBONIZATION & GRID INNOVATION

Promote and deploy local decarbonization and grid innovation programs to improve grid stability, reliability, community energy resilience, and safety.

4.1 - Working with a variety of local, regional and state partners, develop a grid innovation roadmap for VCE's service territory that supports community energy resilience and reliability.
4.2 - Develop a VCE decarbonization roadmap to guide near and long-term program decisions and offerings.
4.3 - Increase participation in VCE's UltraGreen 100% renewable product.
4.4 - Identify external funding sources to support decarbonization and grid-related programs and initiatives.

Obj.	2021 - Key Accomplishments & Developments	2022 - Planned Activities
4.1	1. Worked w/ the CAC on a building electrification statement. The Board adopted a statement supporting and encouraging the electrification of new buildings.	1. Engage with the County of Yolo planning commission on decarbonization efforts.
4.2	1. Completed draft Carbon Neutral by 2030 Report (CNx2030).	1. Present final CNx2030 Report to Board Q1; Q3 return to Board with recom. based on CNx2030 Report. 2. Energy Resilience Task Group to contribute to building local energy resilience for essential community needs.
4.3	1. Followed up with member jurisdiction staff for UltraGreen Analysis & adoption 2. Initiated a mini-campaign in partnership with Davis Food Co-op on UltraGreen opt-ups, including collateral for the campaign. 3. Rolled out online platform for customers to easily opt up online without their PG&E account number	1. Continue to identify opt-up solutions for member jurisdictions 2. Analyze VCE opt-up numbers in Q2 2022
4.4	1. Applied for County of Yolo American Rescue Plan funding for downtown Winters reliability upgrade. 2. Applied for funding to CPUC under the Reliability OIR to develop and deploy an	1. Continue to identify ARP and other funding sources with member districts, state, and federal agencies. 2. Tier 2 advice letter to be filed Jan 5, 2022.

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GOAL 5 - REGULATORY & LEGISLATIVE AFFAIRS

Strongly advocate for public policies that support VCE's Vision/Mission.

5.1 - Work with CalCCA and other partners to proactively engage State regulators, legislators, and other State authorities in developing policy that furthers VCE's mission and facilitates our contributions to decarbonization, grid reliability, energy resiliency, affordability, local programs and social equity.
5.2 - Develop relationships with community stakeholder organizations that foster support for VCE's mission and vision.
5.3 - Optimize regulatory compliance activities.

Obj.	2021 - Key Accomplishments & Developments	2022 - Planned Activities
5.1	1. Actively engaged in CalCCA sponsored legislation on PCIA – SB 612 (Portantino) 2. Active support of AB 843 (Aguiar-Curry) – access for CCA's to BioMat resources 3. CAC Leg/Reg Task Group – bi-weekly meeting	1. Ongoing engagement in support legislation related to CCAs
5.2	1. Identify key stakeholder groups within VCE service territory – in process, 2. Attended Winters Chamber of Commerce on 4.12.21 3. Met with Cool Davis to explore formalizing a relationship to work on shared decarbonization and electrification goals.	1. Decision around a structure to formalize relationships with community orgs (e.g., MOU Template)
5.3	1. Engaged with CalCCA PCIA forecasting team to make more informed forecasts of PCIA and PG&E rates.	1. Recruitment of Regulatory Staffing

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GOAL 6 - ORGANIZATION, WORKPLACE & TECHNOLOGY (6.1 – 6.4)

Analyze and implement optimal long-term organizational, management, and information technology structure at VCE.

6.1 - Develop a roadmap to evaluate and guide future steps toward formation of a local Publicly Owned Utility (POU).
6.2 - Evaluate and pursue opportunities for shared services with other CCAs for certain functions.
6.3 - Develop an evaluation framework to guide future expansion opportunities beyond the existing service territory.
6.4 - Identify optimal management, staffing and contracting structure of VCE in the near and long term; factors include balance of internal staff vs. consultant support services, transition of leadership positions to permanent internal employees.

Obj.	2021 - Key Accomplishments & Developments	Planned Activities
6.1	1. Continuing to monitor POU formation activities in PG&E service territory.	1. Outreach to CMUA 2. Evaluate funding options for transitioning to a POU.
6.2	1. Continued Board and staff level engagement with CC Power for joint CCA procurement	1. Continued Board and staff level engagement with CC Power for joint CCA procurement.
6.3	1. Ongoing investigation of other CCA expansion evaluation methods used in the process. 2. Participation with the City of Stockton regarding the City's CCA feasibility study	1. Continued Board and staff level support for expansion opportunities.
6.4	1. Budgeted (1) half time regulatory Analyst and (1) Intern for Marketing and Support	1. Recruitment for Analyst & Intern for 2022.

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GOAL 6 - ORGANIZATION, WORKPLACE & TECHNOLOGY (6.5 – 6.8)

Analyze and implement optimal long-term organizational, management, and information technology structure at VCE.

6.5 - Promote diversity, equity and inclusion in leadership, hiring, promotion, and contracting policies.
6.6 - Support health, wellness and a productive workplace.
6.7 - Create an innovation-focused culture that rewards proactive participation, problem solving, new ideas, and creative use of partnerships.
6.8 - Deploy a modernized IT infrastructure that enables knowledge management, analytics and collaboration through robust use of data and information resources.

Obj.	2021 - Key Accomplishments & Developments	Planned Activities
6.5	1. Completed annual diversity report (GO 156) for CPUC 2. Actively recruited for new hire Analyst position on multiple platforms, including women in science and engineering associations.	1. Will complete annual diversity report (GO 156) for CPUC
6.6	1. Continued remote work option to address on-going pandemic issues.	1. Will continue remote work option as necessary to address on-going pandemic issues.
6.8	1. Working with County of Yolo GIS team on VCE platform for Dashboard and GIS mapping 2. Adopted Datto as an organizational network drive	1. Implement Dashboard and GIS Mapping Q222

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