



651 Commerce Drive
Roseville, CA 95678

phone (916) 781-3636
fax (916) 783-7693
web www.ncpa.com

Agenda – Revised

Date: Wednesday, September 2, 2020

Subject: Facilities Committee Meeting

Location: NCPA Headquarters, 651 Commerce Drive, Roseville, CA

Time: 9:00 am

This meeting is being held in accordance with the Brown Act as currently in effect under the State Emergency Act, Governor Gavin Newsom's Emergency Declaration related to COVID-19, and Governor Newsom's Executive Order N-29-20 issued March 17, 2020 that allows attendance by Committee Members, NCPA staff, and the public to participate and conduct the meeting by teleconference.

You may participate in the meeting via teleconference by:

Dial: 1-312-757-3121

Code: 600-474-613#

The Facilities (Committee) may take action on any of the items listed on this Agenda regardless of whether the matter is described as an Action Item, or an Informational Item. This agenda is often supplemented by various documents which are available to the public upon request. Pursuant to Government Code Section 54957.5, the following is the location at which the public can view agendas and other public writings: NCPA Offices, 651 Commerce Drive, Roseville, California, or www.ncpa.com.

Persons requiring accommodation in accordance with the Americans with Disabilities Act in order to attend or participate in this meeting are requested to contact the NCPA Secretary at 916.781.3636 in advance of the meeting to arrange for such accommodations.

REVIEW SAFETY PROCEDURES

1. Call Meeting to Order and Roll Call

PUBLIC FORUM

Any member of the public who wishes to address the Committee on matters not on the Agenda, but within the subject matter jurisdiction of the Committee, or any member of the public who desires to address the Committee on any item considered by the Committee at this meeting before or during the Committee's consideration of that item, shall so advise the Chair and shall thereupon be given an opportunity to do so.

OPEN SESSION

DISCUSSION / ACTION ITEMS

2. **Approval of Minutes** – Approve the August 5, 2020 Facilities Committee meeting minutes.
3. **All NCPA Facilities, Members, SCPPA – Northwest Industrial Engine and Compressor Company MTGSA** – Staff is seeking a recommendation for Commission approval of a Multi-Task General Services Agreement with Northwest Industrial Engine and Compressor Company, for engine, compressor, pump, and turbine inspections and maintenance services, with a not to exceed amount of \$500,000, for use at all facilities owned and/or operated by NCPA, NCPA Members, SCPPA, and SCPPA Members. All purchase orders will be issued following NCPA procurement policies and procedures. (*Commission Category: Consent; Sponsor: CTs*)
4. **Approval of Services Agreement with Sonoma Clean Power** – Staff will present and seek a recommendation for approval of a Services Agreement between NCPA and Sonoma Clean Power (SCP), under which NCPA will supply certain wholesale power supply services to SCP. (*Commission Category: Discussion/Action; Sponsor: Power Management*)
5. **Generation Services 2021 Outage Schedule** – Staff is seeking a recommendation for Facilities Committee approval of the 2021 Outage Schedule for NCPA's CT, Geo, and Hydro facilities. (*Sponsor: Generation Services*)

INFORMATIONAL ITEMS

6. **Status of Geothermal Facility Kincade Fire Insurance Claim** – Staff will provide an update on the Geothermal insurance claim regarding the Kincade Fire loss. (*Sponsor: Risk Management*)
7. **New Business Opportunities** – Staff will provide an update regarding new business opportunities. (*Sponsor: Power Management*)
8. **Resource Adequacy Commitment Impacts on Operations** – Staff will review and discuss impacts Resource Adequacy commitments have on joint project operations. (*Sponsor: Power Management*)
9. **Alameda CT1 BESS Study Presentation** – Staff to present an informational-only overview of the results of a combined hybrid battery energy storage system study conducted for Alameda CT1. (*Sponsor: CTs*)
10. **NCPA Generation Services Plant Updates** – Plant Staff will provide the Committee with an informational update on current plant activities and conditions. (*Sponsor: Generation Services*)
11. **Planning and Operations Update** – Staff will provide an update on issues related to planning and operations. (*Sponsor: Power Management*)
12. **Next Meeting** – The next Facilities Committee meeting is scheduled for October 7, 2020.

ADJOURNMENT

/cp



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Minutes – Draft

Date: August 17, 2020
To: NCPA Facilities Committee
From: Carrie Pollo
Subject: August 5, 2020, Facilities Committee Meeting Minutes

- 1. Call Meeting to Order & Roll Call** – The meeting was called to order by Committee Chair Brian Schinstock (Roseville) at 9:03 am. A sign-in sheet was passed around. Attending via teleconference and/or on-line presentation were Johnstone Kipyator (Alameda), Mark Sorensen (Biggs), Paul Eckert (Gridley), Jiayo Chiang (Lodi), Tikan Singh (Lompoc) Shiva Swaminathan (Palo Alto), Nick Rossow (Redding), Basil Wong, and Steve Hance (Santa Clara), and Willie Manual, and Owen Goldstrom (TID). Those attending in person are listed on the attached Attendee Sign-in Sheet. Committee Representatives from BART, Healdsburg, Plumas-Sierra, Port of Oakland, and Ukiah were absent. A quorum of the Committee was established.

PUBLIC FORUM

No public comment.

OPEN SESSION

DISCUSSION / ACTION ITEMS

- 2. Approval of Minutes** – Approve minutes from the July 1, 2020 Facilities Committee meeting.

Motion: A motion was made by Brian Schinstock and seconded by Tikan Singh recommending approval of the July 1, 2020, Facilities Committee meeting minutes. A vote was taken by roll call: YES = Alameda, Biggs, Gridley, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara and TID. The motion passed.

- 3. All NCPA Facilities, Members, SCPPA – NorCal Power Services, LLC MTGSA** – Staff presented background information and was seeking a recommendation for Commission approval of a Multi-Task General Services Agreement with NorCal Power Services, LLC, for electrical maintenance related services, with a not to exceed amount of \$500,000, for use at all facilities owned and/or operated by NCPA, NCPA Members, SCPPA, and SCPPA Members. All purchase orders will be issued following NCPA procurement policies and procedures.

This is a new agreement with a new vendor. It is an enabling agreement with no commitment of funds. NorCal Power Services, LLC, was the low bidder on a recent project, but due to timing, staff had to move forward with the next low bidder in which NCPA already had an agreement

with. NCPA desires to enter into a multi-task enabling agreement with NorCal Power Services, LLC, so established terms and conditions are in place should this vendor be the successful bidder on future projects. Execution of this agreement will also increase the pool of qualified and proven vendors for these types of services. NCPA currently has agreements in place with Electrical Maintenance Consultants, and Hart High Voltage for similar services. A draft Commission Staff Report and draft agreement were available for review. It is recommended to place this item on the consent calendar.

Motion: A motion was made by Steve Hance and seconded by Jiayo Chiang recommending Commission approval authorizing the General Manager or his designee to enter into a Multi-Task General Services Agreement with NorCal Power Services, LLC, for electrical maintenance related services, with any non-substantial changes recommended and approved by the NCPA General Counsel, which shall not exceed \$500,000 over five years, for use at all facilities owned and/or operated by NCPA, NCPA Members, by SCPPA, or by SCPPA Members. A vote was taken by roll call: YES = Alameda, Biggs, Gridley, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara and TID. The motion passed.

- 4. All NCPA Facilities, Members, SCPPA – Evoqua Water Technologies, LLC First Amendment to MTGSA –** Staff presented background information and was seeking a recommendation for Commission approval of a First Amendment to the Multi-Task General Services Agreement, extending the agreement expiration date from September 1, 2020 to November 1, 2020, with no change to the not to exceed amount, for continued use at all facilities owned and/or operated by NCPA, NCPA Members, SCPPA, and SCPPA Members. All purchase orders will be issued following NCPA procurement policies and procedures.

NCPA entered into a five year Multi-Task General Services Agreement with Evoqua Water Technologies, LLC, effective September 1, 2015. This agreement is expiring on September 1, 2020. NCPA requested competitive bids specifically for the water treatment services required for the CT facilities. Evoqua Water Technologies, LLC, was the winning bidder. The negotiation process for the new agreement is taking more time than anticipated. This First Amendment will extend the expiration date from September 1, 2020 to November 1, 2020 which will allow for finalizing negotiations. There is no change to the not to exceed amount. This Agreement is still available for use at any facility owned and/or operated by NCPA, NCPA Members, SCPPA, and SCPPA Members. A draft Commission Staff Report and draft First Amendment along with the original agreement were available for review. It is recommended to place this item on the consent calendar.

Motion: A motion was made by Tikan Singh and seconded by Brian Schinstock recommending Commission approval authorizing the General Manager or his designee to enter into a First Amendment to the Multi-Task General Services Agreement with Evoqua Water Technologies, LLC for water treatment related services, with any non-substantial changes recommended and approved by the NCPA General Counsel, extending the expiration date from September 1, 2020 to November 1, 2020, with no change to the not to exceed amount or other contract terms, for continued use at all facilities owned and/or operated by NCPA, NCPA Members, by SCPPA, or by SCPPA Members. A vote was taken by roll call: YES = Alameda, Biggs, Gridley, Lodi, Lompoc, Palo Alto, Redding, Roseville, and Santa Clara. The motion passed.

- 5. All NCPA Facilities, Members, SCPPA – First Global Gear Services, LLC dba FGGS, LLC MTGSA –** Staff presented background information and was seeking a recommendation for Commission approval of a Multi-Task General Services Agreement with First Global Gear Services, LLC dba FGGS, LLC, for turbo machinery maintenance services, with a not to exceed amount of \$500,000, for use at all facilities owned and/or operated by NCPA, NCPA Members, SCPPA, and SCPPA Members. All purchase orders will be issued following NCPA procurement policies and procedures.

NCPA had a previous agreement in place with First Global Gear Services, LLC, dba FGGS, LLC, which expired. This is an enabling agreement with no commitment of funds. Staff has utilized this vendor in the past, and has a good working relationship with the vendor. NCPA desires to enter into a multi-task enabling agreement with First Global Gear Services, LLC, dba FGGS, LLC, so established terms and conditions are in place should this vendor be the successful bidder on future projects. Execution of this enabling agreement will also increase the pool of qualified and proven vendors for these types of services. NCPA does not currently have any agreements in place with similar vendors at this time. A draft Commission Staff Report and draft agreement were available for review. It is recommended to place this item on the consent calendar.

Motion: A motion was made by Jiayo Chiang and seconded by Basil Wong recommending Commission approval authorizing the General Manager or his designee to enter into a Multi-Task General Services Agreement with First Global Gear Services, LLC dba FGGS, LLC, for turbo machinery related services, with any non-substantial changes recommended and approved by the NCPA General Counsel, which shall not exceed \$500,000 over five years, for use at all facilities owned and/or operated by NCPA, NCPA Members, by SCPPA, or by SCPPA Members. A vote was taken by roll call: YES = Alameda, Biggs, Gridley, Lodi, Lompoc, Palo Alto, Redding, Roseville, and Santa Clara. The motion passed.

- 6. CY 2021 NCPA Capacity Pool Rates** – Staff presented background information and was seeking a recommendation for approval of the Resource Adequacy capacity rates, to be used in the NCPA Capacity Pool during calendar year 2021. Each Pool Member has established a Resource Adequacy Program that works in conjunction with the CAISO Resource Adequacy Program. To enable efficient transfers of Resource Adequacy Capacity between the Pool Members, NCPA developed the Capacity Pool that is fully described in Pooling Agreement Schedule 4. Pursuant to Section 3.8 of Pooling Agreement Schedule 4, capacity pricing for both system and local area capacity will be developed annually, and will be established pursuant to Commission adoption and approval. Prices may be developed by one of the following methods, or a combination of these including, a negotiated price, a market price survey, or the CAISO backstop procurement proxy value.

Motion: A motion was made by Basil Wong and seconded by Tikan Singh recommending Commission approval, subject to an alternative recommendation as may be provided by the NCPA Pooling Committee, establishing the following as the Resource Adequacy Capacity rates to be used in the CY 2021 NCPA Capacity Pool:

- Local Capacity = \$6.00 / kW-Month (May 2021 – September 2021); and, \$5.50 / kW-Month (January 2021 – April 2021 and October 2021 – December 2021)
- System Capacity = \$5.50 / kW-Month (May 2021 – September 2021); and, \$5.00 / kW-Month (January 2021 – April 2021 and October 2021 – December 2021)
- Flexible Capacity Attribute = \$0.50 / kW-Month

A vote was taken by roll call: YES = Alameda, Biggs, Gridley, Lodi, Lompoc, Palo Alto, Redding, and Santa Clara. ABSTAIN = Roseville. The motion passed.

- 7. NCPA Hydroelectric Facility – Hydro Wildfire Risk Mitigation Project** – Staff presented background information and was seeking a recommendation for Commission approval to increase the not to exceed amount of the Hydroelectric Wildfire Risk Mitigation Project from \$3,000,000 to \$3,250,000, including approval for the additional funds to be paid from the Hydro Maintenance Reserve fund.

Design and construction of the first circuit of the Collierville-Bellota 230 kV line was completed in 1988. The second circuit was added around 1991. Both circuits utilized first-generation EPDM

polymer insulators. When the Collierville-Bellota 230 kV line was put into service, manufacturers did not typically recommend corona rings on 230 kV lines, as this was a practice normally reserved for extra high voltage (345 kV and above). Since then, operational experience, EPRI testing, and advanced product research laboratory testing has indicated a need for corona rings at the line end of 230 kV polymer insulators.

In September 2019, NCPA contracted with Power Engineers to prepare a Wildfire Risk Mitigation Report and Recommendations. Part of the Collierville-Bellota 230 kV line crosses through CAL FIRE Tier II Fire Hazard Severity Zone. In consideration of the age of the insulators, observed failures, and changing design standards, Power Engineers recommended that the approximately 30 year old EPDM polymer-type insulators be replaced with new silicon polymer insulators with corona rings, along with other hardware modifications.

In February 2020, the NCPA Commission approved Resolution 20-18 authorizing the Hydroelectric Wildfire Mitigation Project, and delegating \$3,000,000 authority to the General Manager. After competitive bidding, a contract was awarded to Wilson Construction for \$2,654,877.39, with construction starting in July 2020. Subsequent on-tower observations and design engineer recommendations have resulted in NCPA increasing the scope of work and issuing several corresponding change orders. As of July 28, 2020, a total of \$2,948,294.52 has been committed for the project, leaving authorized funds of \$51,705.48 as remaining contingency. The change orders do include estimated costs for the remainder of the project, scheduled to be completed the last week of August.

Motion: A motion was made by Brian Schinstock and seconded by Basil Wong recommending Commission approval of an Amendment to Resolution 20-18 authorizing additional funds for the NCPA Hydroelectric Wildfire Mitigation Project, increasing the total not to exceed amount of this project from \$3,000,000 to \$3,250,000, delegating authority to the General Manager or his designee to award bids, execute agreements, and to issue purchase orders for the updated project amount, authorizing use of up to \$250,000 from the Hydroelectric Maintenance Reserve Fund, and acknowledging that the Hydro Maintenance Reserve Fund will need to be replenished in future budget years. A vote was taken by roll call: YES = Alameda, Biggs, Gridley, Lodi, Lompoc, Palo Alto, Roseville, and Santa Clara. ABSTAIN = Redding. The motion passed.

INFORMATIONAL ITEMS

8. New Business Opportunities – Staff presented an update regarding new business opportunities.

Sonoma Clean Power (SCP) is currently reviewing an updated draft of the NCPA Power Management Services Agreement. Staff conducted a page turn review session of the draft agreement with SCP. A few outstanding items are being discussed between the two parties. Pending feedback, the agreement will be reviewed at the next Facilities Committee meeting. An All Resources Bill (ARB) review session is scheduled for August 7, 2020. The projected start date for services is January 1, 2021.

South Feather Water and Power Agency (SFWPA) contacted NCPA last week with a request to schedule a review session for the PPA within the next few weeks. SFWPA's counsel has completed their initial review of the draft PPA. Staff will provide an update to the Committee after that meeting.

MSR Public Power Agency recently contacted NCPA inquiring about scheduling services. Members include Modesto Irrigation District (MID), Silicon Valley Power (SVP), and Redding. Staff is working to provide a Statement of Qualifications to MSR for consideration. Pending

MSR's interest in discussing NCPA's ability to provide scheduling services, staff will discuss options further with MSR and Members.

9. NCPA Generation Services Plant Updates – Plant Staff provided the Committee with an informational update on current plant activities and conditions.

Geo – There were no safety recordables in July. However, a couple of near misses occurred with a slip on a turbine deck, and a pressurized steam line. No injuries occurred. A mountain lion, and bear were also seen during July near the plant. Average generation for July was 91.6 MW, which is up from 90.5 MW in June. The FY 2020 YTD generation is 419.9 GWh, 1.6% above forecast. Vegetation management continues, with firebreaks completed. Improvements for steam production continues to fix idle wells. The plan is to re-establish 10 underperforming wells, and convert into MWs. Staff continue to examine plant operations to maximize generation.

CTs – All CT Units continue to run. During the month of June, CT1 had 12 actual starts, out of 71 forecasted, with 4 ghost starts, and 8 in real time. The YTD total is 16. CT2 had 7 actual starts of 5 forecasted, bringing the YTD total to 7. CT2 was in a forced outage due to the hydraulic starter. There were no planned outages.

Hydro – Things are operating as “normal” for this time of year, given the hydrologic conditions. New Spicer Meadow storage is declining, and Collierville is operating at 11% capacity. Recreational facilities have been very busy this year. August priorities include Union Dam masonry repairs, Lake Alpine low level outlet gate and trash rack modifications, as well as continuation of the 230 kV insulator replacement.

10. Planning and Operations Update – Staff provided an update on issues related to planning and operations.

- NCPA Renewables RFP – Staff is seeking Member feedback regarding interest in projects. Current projects in which Members have expressed interest include: Glover Solar, Avangrid Stagecoach, Calpine Geysers, ORMAT Geo, and OCID. Review of additional proposals is also underway.
- STAR Process Update – An initial Star Process meeting is scheduled for August 4, 2020. NCPA has identified a number of projects in which it appears PG&E has incorrectly recovered the project cost via TAC, which may result in savings. Staff is coordinating its review with the CPUC, BAMx, and other stakeholders. The CPUC identified a \$500 million mistake. The TO20 rate case may be revisited.
- COVID-19 Update – Dual operations continue for the NCPA dispatch and scheduling functions.

11. Next Meeting – The next Facilities Committee meeting is scheduled for September 2, 2020.

ADJOURNMENT

The meeting was adjourned at 10:17 am.

Teleconference call only due to Covid19.

Northern California Power Agency August 5, 2020 Facilities Committee Meeting Attendance List

NCPA Facilities Committee Members are requested to sign, but signature by members of the public is voluntary.

<u>MEMBER</u>	<u>NAME</u>
ALAMEDA	✓
BART	
BIGGS	✓
GRIDLEY	✓
HEALDSBURG	
LODI	✓
LOMPOC	✓
PALO ALTO	✓
PLUMAS-SIERRA REC	
PORT OF OAKLAND	
REDDING	✓
ROSEVILLE	✓
SANTA CLARA	✓
TID	✓
UKIAH	

NCPA Facilities Committee Members, Alternates & Staff are requested to sign, but signature by members of the public is voluntary.

[illegible]



Commission Staff Report – *DRAFT*

Date: September 2, 2020

COMMISSION MEETING DATE: September 25, 2020

SUBJECT: Northwest Industrial Engine and Compressor Company – Five Year Multi-Task General Services Agreement for Inspection and Maintenance Related Services; Applicable to the following projects: All Northern California Power Agency (NCPA) Facilities, NCPA Members, Southern California Public Power Authority (SCPPA), and SCPPA Members

AGENDA CATEGORY: Consent

FROM:	Joel Ledesma	METHOD OF SELECTION:
	Assistant General Manager	N/A
Division:	Generation Services	<i>If other, please describe:</i>
Department:	Combustion Turbines	

IMPACTED MEMBERS:		
All Members <input checked="" type="checkbox"/>	City of Lodi <input type="checkbox"/>	City of Shasta Lake <input type="checkbox"/>
Alameda Municipal Power <input type="checkbox"/>	City of Lompoc <input type="checkbox"/>	City of Ukiah <input type="checkbox"/>
San Francisco Bay Area Rapid Transit <input type="checkbox"/>	City of Palo Alto <input type="checkbox"/>	Plumas-Sierra REC <input type="checkbox"/>
City of Biggs <input type="checkbox"/>	City of Redding <input type="checkbox"/>	Port of Oakland <input type="checkbox"/>
City of Gridley <input type="checkbox"/>	City of Roseville <input type="checkbox"/>	Truckee Donner PUD <input type="checkbox"/>
City of Healdsburg <input type="checkbox"/>	City of Santa Clara <input type="checkbox"/>	Other <input type="checkbox"/>
<i>If other, please specify</i>		
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RECOMMENDATION:

Approve Resolution XX-XX authorizing the General Manager or his designee to enter into a Multi-Task General Services Agreement with Northwest Industrial Engine and Compressor Company for inspection and maintenance related services, with any non-substantial changes recommended and approved by the NCPA General Counsel, which shall not exceed \$500,000 over five years, for use at all facilities owned and/or operated by NCPA, NCPA Members, by SCPA, or by SCPA Members.

It is recommended that this item be placed on the Commission Consent calendar.

BACKGROUND:

Inspection and maintenance services are required from time to time for the operation and maintenance of facilities owned and/or operated by NCPA, NCPA Members, by SCPA, or by SCPA Members. NCPA had a previous agreement in place with Northwest Industrial Engine and Compressor Company, which is expiring. NCPA has utilized this vendor in the past, and has a good working relationship with the vendor. NCPA desires to enter into this agreement so established terms and conditions are in place should this vendor be the successful bidder on future projects. NCPA has existing agreements in place with Cisco Air Systems, EthosEnergy, KSB, Inc. and Sulzer Turbo Services Houston, Inc. for similar services.

FISCAL IMPACT:

Upon execution, the total cost of the agreement is not to exceed \$500,000 over five years. Purchase orders referencing the terms and conditions of the agreement will be issued following NCPA procurement policies and procedures.

SELECTION PROCESS:

This enabling agreement does not commit NCPA to any expenditure of funds. At the time services are required, NCPA will bid the specific scope of work consistent with NCPA procurement policies and procedures. NCPA seeks bids from as many qualified providers as possible. Bids are awarded to the vendor providing the best overall value to NCPA. NCPA will issue purchase orders based on cost and availability of the services needed at the time the service is required.

ENVIRONMENTAL ANALYSIS:

This activity would not result in a direct or reasonably foreseeable indirect change in the physical environment and is therefore not a “project” for purposes of Section 21065 the California Environmental Quality Act. No environmental review is necessary.

COMMITTEE REVIEW:

Pending Committee review.

Respectfully submitted,

RANDY S. HOWARD
General Manager

Attachments (2):

- Resolution
- Multi-Task General Services Agreement with Northwest Industrial Engine and Compressor Company

RESOLUTION XX-XX

RESOLUTION OF THE NORTHERN CALIFORNIA POWER AGENCY APPROVING A MULTI-TASK GENERAL SERVICES AGREEMENT WITH NORTHWEST INDUSTRIAL ENGINE AND COMPRESSOR COMPANY

(reference Staff Report #XXX:XX)

WHEREAS, inspection and maintenance related services are required from time to time for the operation and maintenance of facilities owned and/or operated by the Northern California Power Agency (NCPA), NCPA Members, the Southern California Public Power Authority (SCPPA), and SCPPA Members; and

WHEREAS, Northwest Industrial Engine and Compressor Company is a provider of these services; and

WHEREAS, NCPA seeks to enter into a Multi-Task General Services Agreement with Northwest Industrial Engine and Compressor Company to provide such services as needed at all NCPA facilities, NCPA Members, SCPPA, and SCPPA Member facilities in an amount not to exceed \$500,000 over five years; and

WHEREAS, this activity would not result in a direct or reasonably foreseeable indirect change in the physical environment and is therefore not a "project" for purposes of Section 21065 the California Environmental Quality Act. No environmental review is necessary; and

NOW, THEREFORE BE IT RESOLVED, that the Commission of the Northern California Power Agency authorizes the General Manager or his designee to enter into a Multi-Task General Services Agreement with Northwest Industrial Engine and Compressor Company, with any non-substantial changes as approved by the NCPA General Counsel, which shall not exceed \$500,000 over five years, for inspection and maintenance related services, for use at all facilities owned and/or operated by NCPA, NCPA Members, by SCPPA, or by SCPPA Members.

PASSED, ADOPTED and APPROVED this ____ day of _____, 2020 by the following vote on roll call:

	<u>Vote</u>	<u>Abstained</u>	<u>Absent</u>
Alameda	_____	_____	_____
San Francisco BART	_____	_____	_____
Biggs	_____	_____	_____
Gridley	_____	_____	_____
Healdsburg	_____	_____	_____
Lodi	_____	_____	_____
Lompoc	_____	_____	_____
Palo Alto	_____	_____	_____
Port of Oakland	_____	_____	_____
Redding	_____	_____	_____
Roseville	_____	_____	_____
Santa Clara	_____	_____	_____
Shasta Lake	_____	_____	_____
Truckee Donner	_____	_____	_____
Ukiah	_____	_____	_____
Plumas-Sierra	_____	_____	_____

ROGER FRITH
CHAIR

ATTEST:

CARY A. PADGETT
ASSISTANT SECRETARY



**MULTI-TASK
GENERAL SERVICES AGREEMENT BETWEEN
THE NORTHERN CALIFORNIA POWER AGENCY AND
NORTHWEST INDUSTRIAL ENGINE AND COMPRESSOR COMPANY**

This Multi-Task General Services Agreement ("Agreement") is made by and between the Northern California Power Agency, a joint powers agency with its main office located at 651 Commerce Drive, Roseville, CA 95678-6420 ("Agency") and Northwest Industrial Engine and Compressor Company, a sole proprietorship with its office located at 525 Delano Drive, Oakdale, CA 95361 ("Contractor") (together sometimes referred to as the "Parties") as of _____, 2020 ("Effective Date") in Roseville, California.

Section 1. SCOPE OF WORK. Subject to the terms and conditions set forth in this Agreement, Contractor is willing to provide to Agency the range of services and/or goods described in the Scope of Work attached hereto as Exhibit A and incorporated herein ("Work").

- 1.1 Term of Agreement.** The term of this Agreement shall begin on the Effective Date and shall end when Contractor completes the Work, or no later than five (5) years from the date this Agreement was signed by Agency, whichever is shorter.
- 1.2 Standard of Performance.** Contractor shall perform the Work in the manner and according to the standards observed by a competent practitioner of the profession in which Contractor is engaged and for which Contractor is providing the Work. Contractor represents that it is licensed, qualified and experienced to provide the Work set forth herein.
- 1.3 Assignment of Personnel.** Contractor shall assign only competent personnel to perform the Work. In the event that Agency, in its sole discretion, at any time during the term of this Agreement, requests the reassignment of any such personnel, Contractor shall, immediately upon receiving written notice from Agency of such request, reassign such personnel.
- 1.4 Work Provided.** Work provided under this Agreement by Contractor may include Work directly to the Agency or, as requested by the Agency and consistent with the terms of this Agreement, to Agency members, Southern California Public Power Authority ("SCPPA") or SCPPA members.
- 1.5 Request for Work to be Performed.** At such time that Agency determines to have Contractor perform Work under this Agreement, Agency shall issue a Purchase Order. The Purchase Order shall identify the specific Work to be performed ("Requested Work"), may include a not-to-exceed cap on monetary cap on Requested Work and all related expenditures authorized by that Purchase Order, and shall include a time by which the Requested Work shall be completed. Contractor shall have seven calendar days from the date of the Agency's issuance of the Purchase Order in which to respond in writing that Contractor chooses not to perform the Requested Work. If Contractor agrees to perform the Requested Work, begins to perform the Requested Work, or does not respond within the seven day period specified, then Contractor will have

agreed to perform the Requested Work on the terms set forth in the Purchase Order, this Agreement and its Exhibits.

Section 2. COMPENSATION. Agency hereby agrees to pay Contractor an amount **NOT TO EXCEED** FIVE HUNDRED THOUSAND dollars (\$500,000.00) for the Work, which shall include all fees, costs, expenses and other reimbursables, as set forth in Contractor's fee schedule, attached hereto and incorporated herein as Exhibit B. This dollar amount is not a guarantee that Agency will pay that full amount to the Contractor, but is merely a limit of potential Agency expenditures under this Agreement.

2.1 Invoices. Contractor shall submit invoices, not more often than once a month during the term of this Agreement, based on the cost for services performed and reimbursable costs incurred prior to the invoice date. Invoices shall contain the following information:

- The beginning and ending dates of the billing period;
- Work performed;
- The Purchase Order number authorizing the Requested Work;
- At Agency's option, for each work item in each task, a copy of the applicable time entries or time sheets shall be submitted showing the name of the person doing the work, the hours spent by each person, a brief description of the work, and each reimbursable expense, with supporting documentation, to Agency's reasonable satisfaction;
- At Agency's option, the total number of hours of work performed under the Agreement by Contractor and each employee, agent, and subcontractor of Contractor performing work hereunder.

Invoices shall be sent to:

Northern California Power Agency
651 Commerce Drive
Roseville, California 95678
Attn: Accounts Payable
AcctsPayable@ncpa.com

2.2 Monthly Payment. Agency shall make monthly payments, based on invoices received, for Work satisfactorily performed, and for authorized reimbursable costs incurred. Agency shall have thirty (30) days from the receipt of an invoice that complies with all of the requirements above to pay Contractor.

2.3 Payment of Taxes. Contractor is solely responsible for the payment of all federal, state and local taxes, including employment taxes, incurred under this Agreement.

2.4 Authorization to Perform Work. The Contractor is not authorized to perform any Work or incur any costs whatsoever under the terms of this Agreement until receipt of a Purchase Order from the Contract Administrator.

- 2.5 Timing for Submittal of Final Invoice.** Contractor shall have ninety (90) days after completion of the Requested Work to submit its final invoice for the Requested Work. In the event Contractor fails to submit an invoice to Agency for any amounts due within the ninety (90) day period, Contractor is deemed to have waived its right to collect its final payment for the Requested Work from Agency.

Section 3. FACILITIES AND EQUIPMENT. Except as set forth herein, Contractor shall, at its sole cost and expense, provide all facilities and equipment that may be necessary to perform the Work.

Section 4. INSURANCE REQUIREMENTS. Before beginning any Work under this Agreement, Contractor, at its own cost and expense, shall procure the types and amounts of insurance listed below and shall maintain the types and amounts of insurance listed below for the period covered by this Agreement.

- 4.1 Workers' Compensation.** If Contractor employs any person, Contractor shall maintain Statutory Workers' Compensation Insurance and Employer's Liability Insurance for any and all persons employed directly or indirectly by Contractor with limits of not less than one million dollars (\$1,000,000.00) per accident.

4.2 Commercial General and Automobile Liability Insurance.

4.2.1 Commercial General Insurance. Contractor shall maintain commercial general liability insurance for the term of this Agreement, including products liability, covering any loss or liability, including the cost of defense of any action, for bodily injury, death, personal injury and broad form property damage which may arise out of the operations of Contractor. The policy shall provide a minimum limit of \$2,000,000 per occurrence/\$2,000,000 aggregate. Commercial general coverage shall be at least as broad as ISO Commercial General Liability form CG 0001 (current edition) on "an occurrence" basis covering comprehensive General Liability, with a self-insured retention or deductible of no more than \$100,000. No endorsement shall be attached limiting the coverage.

4.2.2 Automobile Liability. Contractor shall maintain automobile liability insurance form CA 0001 (current edition) for the term of this Agreement covering any loss or liability, including the cost of defense of any action, arising from the operation, maintenance or use of any vehicle (symbol 1), whether or not owned by the Contractor, on or off Agency premises. The policy shall provide a minimum limit of \$2,000,000 per each accident, with a self-insured retention or deductible of no more than \$100,000. This insurance shall provide contractual liability covering all motor vehicles and mobile equipment to the extent coverage may be excluded from general liability insurance.

4.2.3 General Liability/Umbrella Insurance. The coverage amounts set forth above may be met by a combination of underlying and umbrella policies as long as in combination the limits equal or exceed those stated.

4.3 Professional Liability Insurance. Not Applicable.

4.4 Pollution Insurance. Not Applicable.

4.5 All Policies Requirements.

4.5.1 Verification of coverage. Prior to beginning any work under this Agreement, Contractor shall provide Agency with (1) a Certificate of Insurance that demonstrates compliance with all applicable insurance provisions contained herein and (2) policy endorsements to the policies referenced in Section 4.2 and in Section 4.4, if applicable, adding the Agency as an additional insured and declaring such insurance primary in regard to work performed pursuant to this Agreement.

4.5.2 Notice of Reduction in or Cancellation of Coverage. Contractor shall provide at least thirty (30) days prior written notice to Agency of any reduction in scope or amount, cancellation, or modification adverse to Agency of the policies referenced in Section 4.

4.5.3 Higher Limits. If Contractor maintains higher limits than the minimums specified herein, the Agency shall be entitled to coverage for the higher limits maintained by the Contractor.

4.5.4 Additional Certificates and Endorsements. If Contractor performs Work for Agency members, SCPPA and/or SCPPA members pursuant to this Agreement, Contractor shall provide the certificates of insurance and policy endorsements, as referenced in Section 4.5.1, naming the specific Agency member, SCPPA and/or SCPPA member for which the Work is to be performed.

4.5.5 Waiver of Subrogation. Contractor agrees to waive subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. In addition, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of Agency for all work performed by Contractor, its employees, agents and subcontractors.

4.6 Contractor's Obligation. Contractor shall be solely responsible for ensuring that all equipment, vehicles and other items utilized in the performance of Work are operated, provided or otherwise utilized in a manner that ensures they are and remain covered by the policies referenced in Section 4 during this Agreement. Contractor shall also ensure that all workers involved in the provision of Work are properly classified as employees, agents or independent contractors and are and remain covered by any and all workers' compensation insurance required by applicable law during this Agreement.

Section 5. INDEMNIFICATION AND CONTRACTOR'S RESPONSIBILITIES.

- 5.1 Effect of Insurance.** Agency's acceptance of insurance certificates and endorsements required under this Agreement does not relieve Contractor from liability under this indemnification and hold harmless clause. This indemnification and hold harmless clause shall apply to any damages or claims for damages whether or not such insurance policies shall have been determined to apply. By execution of this Agreement, Contractor acknowledges and agrees to the provisions of this section and that it is a material element of consideration.
- 5.2 Scope.** Contractor shall indemnify, defend with counsel reasonably acceptable to the Agency, and hold harmless the Agency, and its officials, commissioners, officers, employees, agents and volunteers from and against all losses, liabilities, claims, demands, suits, actions, damages, expenses, penalties, fines, costs (including without limitation costs and fees of litigation), judgments and causes of action of every nature arising out of or in connection with any acts or omissions by Contractor, its officers, officials, agents, and employees, except as caused by the sole or gross negligence of Agency. Notwithstanding, should this Agreement be construed as a construction agreement under Civil Code section 2783, then the exception referenced above shall also be for the active negligence of Agency.
- 5.3 Transfer of Title.** Not Applicable.

Section 6. STATUS OF CONTRACTOR.

- 6.1 Independent Contractor.** Contractor is an independent contractor and not an employee of Agency. Agency shall have the right to control Contractor only insofar as the results of Contractor's Work and assignment of personnel pursuant to Section 1; otherwise, Agency shall not have the right to control the means by which Contractor accomplishes Work rendered pursuant to this Agreement. Notwithstanding any other Agency, state, or federal policy, rule, regulation, law, or ordinance to the contrary, Contractor and any of its employees, agents, and subcontractors providing services under this Agreement shall not qualify for or become entitled to, and hereby agree to waive any and all claims to, any compensation, benefit, or any incident of employment by Agency, including but not limited to eligibility to enroll in the California Public Employees Retirement System (PERS) as an employee of Agency and entitlement to any contribution to be paid by Agency for employer contributions and/or employee contributions for PERS benefits.

Contractor shall indemnify, defend, and hold harmless Agency for the payment of any employee and/or employer contributions for PERS benefits on behalf of Contractor or its employees, agents, or subcontractors, as well as for the payment of any penalties and interest on such contributions, which would otherwise be the responsibility of Agency. Contractor and Agency acknowledge and agree that compensation paid by Agency to Contractor under this Agreement is based upon Contractor's estimated costs of providing the Work, including salaries and benefits of employees, agents and subcontractors of Contractor.

Contractor shall indemnify, defend, and hold harmless Agency from any lawsuit, administrative action, or other claim for penalties, losses, costs, damages, expense and liability of every kind, nature and description that arise out of, pertain to, or relate to such claims, whether directly or indirectly, due to Contractor's failure to secure workers' compensation insurance for its employees, agents, or subcontractors.

Contractor agrees that it is responsible for the provision of group healthcare benefits to its fulltime employees under 26 U.S.C. § 4980H of the Affordable Care Act. To the extent permitted by law, Contractor shall indemnify, defend and hold harmless Agency from any penalty issued to Agency under the Affordable Care Act resulting from the performance of the Services by any employee, agent, or subcontractor of Contractor.

- 6.2 Contractor Not Agent.** Except as Agency may specify in writing, Contractor shall have no authority, express or implied, to act on behalf of Agency in any capacity whatsoever as an agent. Contractor shall have no authority, express or implied, pursuant to this Agreement to bind Agency to any obligation whatsoever.
- 6.3 Assignment and Subcontracting.** This Agreement contemplates personal performance by Contractor and is based upon a determination of Contractor's unique professional competence, experience, and specialized professional knowledge. A substantial inducement to Agency for entering into this Agreement was and is the personal reputation and competence of Contractor. Contractor may not assign this Agreement or any interest therein without the prior written approval of the Agency. Contractor shall not subcontract any portion of the performance contemplated and provided for herein, other than to the subcontractors identified in Exhibit A, without prior written approval of the Agency. Where written approval is granted by the Agency, Contractor shall supervise all work subcontracted by Contractor in performing the Work and shall be responsible for all work performed by a subcontractor as if Contractor itself had performed such work. The subcontracting of any work to subcontractors shall not relieve Contractor from any of its obligations under this Agreement with respect to the Work and Contractor is obligated to ensure that any and all subcontractors performing any Work shall be fully insured in all respects and to the same extent as set forth under Section 4, to Agency's satisfaction.
- 6.4 Certification as to California Energy Commission.** If requested by the Agency, Contractor shall, at the same time it executes this Agreement, execute Exhibit C.
- 6.5 Certification as to California Energy Commission Regarding Hazardous Materials Transport Vendors.** If requested by the Agency, Contractor shall, at the same time it executes this Agreement, execute Exhibit D.
- 6.6 Maintenance Labor Agreement.** If the Work is subject to the terms of one or more Maintenance Labor Agreements, which are applicable only to certain types

of construction, repair and/or maintenance projects, then Contractor shall execute Exhibit E and/or similar documentation as to compliance.

Section 7. LEGAL REQUIREMENTS.

- 7.1 Governing Law.** The laws of the State of California shall govern this Agreement.
- 7.2 Compliance with Applicable Laws.** Contractor and its subcontractors and agents, if any, shall comply with all laws applicable to the performance of the work hereunder.
- 7.3 Licenses and Permits.** Contractor represents and warrants to Agency that Contractor and its employees, agents, and subcontractors (if any) have and will maintain at their sole expense during the term of this Agreement all licenses, permits, qualifications, and approvals of whatever nature that are legally required to practice their respective professions.
- 7.4 Monitoring by DIR.** The Work is subject to compliance monitoring and enforcement by the Department of Industrial Relations.
- 7.5 Registration with DIR.** During the term of this Agreement, Contractor warrants that it is registered with the Department of Industrial Relations and qualified to perform Work consistent with Labor Code section 1725.5.
- 7.6 Prevailing Wage Rates.** In accordance with California Labor Code Section 1771, not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the Work is to be performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work as provided in the California Labor Code must be paid to all workers engaged in performing the Work. In accordance with California Labor Code Section 1770 and following, the Director of Industrial Relations has determined the general prevailing wage per diem rates for the locality in which the Work is to be performed; the Agency has obtained the general prevailing rate of per diem wages and the general rate for holiday and overtime work in the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the project; and copies of the prevailing rate of per diem wages are on file at the Agency and will be made available on request. Throughout the performance of the Work, Contractor must comply with all applicable laws and regulations that apply to wages earned in performance of the Work. Contractor assumes all responsibility for such payments and shall defend, indemnify and hold the Agency harmless from any and all claims made by the State of California, the Department of Industrial Relations, any subcontractor, any worker or any other third party with regard thereto.

Additionally, in accordance with the California Administrative Code, Title 8, Group 3, Article 2, Section 16000, Publication of Prevailing Wage Rates by Awarding

Bodies, copies of the applicable determination of the Director can be found on the web at: <http://www.dir.ca.gov/DLSR/PWD/> and may be reviewed at any time.

Contractor shall provide a certified copy of its payroll, on forms to be determined by the Agency and consistent with the Labor Code, within ten (10) days of the Contractor's receipt of Agency's written request therefor. Contractor's failure to timely comply with this provision may subject the Contractor to penalties pursuant to state law.

Contractor shall comply with applicable law, including Labor Code Sections 1774 and 1775. In accordance with Section 1775, Contractor shall forfeit as a penalty to Agency \$200.00 for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for such work or craft in which such worker is employed for any Work done under the Agreement by Contractor or by any subcontractor under Contractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 *et seq.* In addition to the penalty and pursuant to Section 1775, the difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor.

Section 8. TERMINATION AND MODIFICATION.

- 8.1 Termination.** Agency may cancel this Agreement at any time and without cause upon ten (10) days prior written notice to Contractor.

In the event of termination, Contractor shall be entitled to compensation for Work satisfactorily completed as of the effective date of termination; Agency, however, may condition payment of such compensation upon Contractor delivering to Agency any or all records or documents (as referenced in Section 9.1 hereof).

- 8.2 Amendments.** The Parties may amend this Agreement only by a writing signed by both of the Parties.

- 8.3 Survival.** All obligations arising prior to the termination of this Agreement and all provisions of this Agreement allocating liability between Agency and Contractor shall survive the termination of this Agreement.

- 8.4 Options upon Breach by Contractor.** If Contractor materially breaches any of the terms of this Agreement, including but not limited to those set forth in Section 4, Agency's remedies shall include, but not be limited to, the following:

8.4.1 Immediately terminate the Agreement;

8.4.2 Retain the plans, specifications, drawings, reports, design documents, and any other work product prepared by Contractor pursuant to this Agreement;

- 8.4.3** Retain a different Contractor to complete the Work not finished by Contractor; and/or
- 8.4.4** Charge Contractor the difference between the costs to complete the Work that is unfinished at the time of breach and the amount that Agency would have paid Contractor pursuant hereto if Contractor had completed the Work.

Section 9. KEEPING AND STATUS OF RECORDS.

- 9.1 Records Created as Part of Contractor's Performance.** All reports, data, maps, models, charts, studies, surveys, photographs, memoranda, plans, studies, specifications, records, files, or any other documents or materials, in electronic or any other form, that Contractor prepares or obtains pursuant to this Agreement and that relate to the matters covered hereunder shall be the property of the Agency. Contractor hereby agrees to deliver those documents to the Agency upon termination of the Agreement. Agency and Contractor agree that, unless approved by Agency in writing, Contractor shall not release to any non-parties to this Agreement any data, plans, specifications, reports and other documents.
- 9.2 Contractor's Books and Records.** Contractor shall maintain any and all records or other documents evidencing or relating to charges for Work or expenditures and disbursements charged to the Agency under this Agreement for a minimum of three (3) years, or for any longer period required by law, from the date of final payment to the Contractor under this Agreement.
- 9.3 Inspection and Audit of Records.** Any records or documents that this Agreement requires Contractor to maintain shall be made available for inspection, audit, and/or copying at any time during regular business hours, upon oral or written request of the Agency. Under California Government Code Section 8546.7, if the amount of public funds expended under this Agreement exceeds ten thousand dollars (\$10,000.00), the Agreement shall be subject to the examination and audit of the State Auditor, at the request of Agency or as part of any audit of the Agency, for a period of three (3) years after final payment under this Agreement.
- 9.4 Confidential Information and Disclosure.**
- 9.4.1 Confidential Information.** The term "Confidential Information", as used herein, shall mean any and all confidential, proprietary, or trade secret information, whether written, recorded, electronic, oral or otherwise, where the Confidential Information is made available in a tangible medium of expression and marked in a prominent location as confidential, proprietary and/or trade secret information. Confidential Information shall not include information that: (a) was already known to the Receiving Party or is otherwise a matter of public knowledge, (b) was disclosed to

Receiving Party by a third party without violating any confidentiality agreement, (c) was independently developed by Receiving Party without reverse engineering, as evidenced by written records thereof, or (d) was not marked as Confidential Information in accordance with this section.

9.4.2 Non-Disclosure of Confidential Information. During the term of this Agreement, either party may disclose (the "Disclosing Party") Confidential Information to the other party (the "Receiving Party"). The Receiving Party: (a) shall hold the Disclosing Party's Confidential Information in confidence; and (b) shall take all reasonable steps to prevent any unauthorized possession, use, copying, transfer or disclosure of such Confidential Information.

9.4.3 Permitted Disclosure. Notwithstanding the foregoing, the following disclosures of Confidential Information are allowed. Receiving Party shall endeavor to provide prior written notice to Disclosing Party of any permitted disclosure made pursuant to Section 9.4.3.2 or 9.4.3.3. Disclosing Party may seek a protective order, including without limitation, a temporary restraining order to prevent or contest such permitted disclosure; provided, however, that Disclosing Party shall seek such remedies at its sole expense. Neither party shall have any liability for such permitted disclosures:

9.4.3.1 Disclosure to employees, agents, contractors, subcontractors or other representatives of Receiving Party that have a need to know in connection with this Agreement.

9.4.3.2 Disclosure in response to a valid order of a court, government or regulatory agency or as may otherwise be required by law; and

9.4.3.3 Disclosure by Agency in response to a request pursuant to the California Public Records Act.

9.4.4 Handling of Confidential Information. Upon conclusion or termination of the Agreement, Receiving Party shall return to Disclosing Party or destroy Confidential Information (including all copies thereof), if requested by Disclosing Party in writing. Notwithstanding the foregoing, the Receiving Party may retain copies of such Confidential Information, subject to the confidentiality provisions of this Agreement: (a) for archival purposes in its computer system; (b) in its legal department files; and (c) in files of Receiving Party's representatives where such copies are necessary to comply with applicable law. Party shall not disclose the Disclosing Party's Information to any person other than those of the Receiving Party's employees, agents, consultants, contractors and subcontractors who have a need to know in connection with this Agreement.

Section 10. PROJECT SITE.

- 10.1 Operations at the Project Site.** Each Project site may include the power plant areas, all buildings, offices, and other locations where Work is to be performed, including any access roads. Contractor shall perform the Work in such a manner as to cause a minimum of interference with the operations of the Agency; if applicable, the entity for which Contractor is performing the Work, as referenced in Section 1.4; and other contractors at the Project site and to protect all persons and property thereon from damage or injury. Upon completion of the Work at a Project site, Contractor shall leave such Project site clean and free of all tools, equipment, waste materials and rubbish, stemming from or relating to Contractor's Work.
- 10.2 Contractor's Equipment, Tools, Supplies and Materials.** Contractor shall be solely responsible for the transportation, loading and unloading, and storage of any equipment, tools, supplies or materials required for performing the Work, whether owned, leased or rented. Neither Agency nor, if applicable, the entity for which Contractor is performing the Work, as referenced in Section 1.4, will be responsible for any such equipment, supplies or materials which may be lost, stolen or damaged or for any additional rental charges for such. Equipment, tools, supplies and materials left or stored at a Project site, with or without permission, is at Contractor's sole risk. Anything left on the Project site an unreasonable length of time after the Work is completed shall be presumed to have been abandoned by the Contractor. Any transportation furnished by Agency or, if applicable, the entity for which Contractor is performing the Work, as referenced in Section 1.4, shall be solely as an accommodation and neither Agency nor, if applicable, the entity for which Contractor is performing the Work, as referenced in Section 1.4, shall have liability therefor. Contractor shall assume the risk and is solely responsible for its owned, non-owned and hired automobiles, trucks or other motorized vehicles as well as any equipment, tools, supplies, materials or other property which is utilized by Contractor on the Project site. All materials and supplies used by Contractor in the Work shall be new and in good condition.
- 10.3 Use of Agency Equipment.** Contractor shall assume the risk and is solely responsible for its use of any equipment owned and property provided by Agency and, if applicable, the entity for which Contractor is performing the Work, as referenced in Section 1.4, for the performance of Work.

Section 11. WARRANTY.

- 11.1 Nature of Work.** In addition to any and all warranties provided or implied by law or public policy, Contractor warrants that all Work shall be free from defects in design and workmanship, and that Contractor shall perform all Work in accordance with applicable federal, state, and local laws, rules and regulations including engineering, construction and other codes and standards and prudent electrical utility standards, and in accordance with the terms of this Agreement.

11.2 Deficiencies in Work. In addition to all other rights and remedies which Agency may have, Agency shall have the right to require, and Contractor shall be obligated at its own expense to perform, all further Work which may be required to correct any deficiencies which result from Contractor's failure to perform any Work in accordance with the standards required by this Agreement. If during the term of this Agreement or the one (1) year period following completion of the Work, any equipment, supplies or other materials or Work used or provided by Contractor under this Agreement fails due to defects in material and/or workmanship or other breach of this Agreement, Contractor shall, upon any reasonable written notice from Agency, replace or repair the same to Agency's satisfaction.

11.3 Assignment of Warranties. Contractor hereby assigns to Agency all additional warranties, extended warranties, or benefits like warranties, such as insurance, provided by or reasonably obtainable from suppliers of equipment and material used in the Work.

Section 12. HEALTH AND SAFETY PROGRAMS. The Contractor shall establish, maintain, and enforce safe work practices, and implement an accident/incident prevention program intended to ensure safe and healthful operations under their direction. The program shall include all requisite components of such a program under Federal, State and local regulations and shall comply with all site programs established by Agency and, if applicable, the entity for which Contractor is performing the Work, as referenced in Section 1.4.

12.1 Contractor is responsible for acquiring job hazard assessments as necessary to safely perform the Work and provide a copy to Agency upon request.

12.2 Contractor is responsible for providing all employee health and safety training and personal protective equipment in accordance with potential hazards that may be encountered in performance of the Work and provide copies of the certified training records upon request by Agency. Contractor shall be responsible for proper maintenance and/or disposal of their personal protective equipment and material handling equipment.

12.3 Contractor is responsible for ensuring that its lower-tier subcontractors are aware of and will comply with the requirements set forth herein.

12.4 Agency, or its representatives, may periodically monitor the safety performance of the Contractor performing the Work. Contractors and its subcontractors shall be required to comply with the safety and health obligations as established in the Agreement. Non-compliance with safety, health, or fire requirements may result in cessation of work activities, until items in non-compliance are corrected. It is also expressly acknowledged, understood and agreed that no payment shall be due from Agency to Contractor under this Agreement at any time when, or for any Work performed when, Contractor is not in full compliance with this Section 12.

- 12.5** Contractor shall immediately report any injuries to the Agency site safety representative. Additionally, the Contractor shall investigate and submit to the Agency site safety representative copies of all written accident reports, and coordinate with Agency if further investigation is requested.
- 12.6** Contractor shall take all reasonable steps and precautions to protect the health of its employees and other site personnel with regard to the Work. Contractor shall conduct occupational health monitoring and/or sampling to determine levels of exposure of its employees to hazardous or toxic substances or environmental conditions. Copies of any sampling results will be forwarded to the Agency site safety representative upon request.
- 12.7** Contractor shall develop a plan to properly handle and dispose of any hazardous wastes, if any, Contractor generates in performing the Work.
- 12.8** Contractor shall advise its employees and subcontractors that any employee who jeopardizes his/her safety and health, or the safety and health of others, may be subject to actions including removal from Work.
- 12.9** Contractor shall, at the sole option of the Agency, develop and provide to the Agency a Hazardous Material Spill Response Plan that includes provisions for spill containment and clean-up, emergency contact information including regulatory agencies and spill sampling and analysis procedures. Hazardous Materials shall include diesel fuel used for trucks owned or leased by the Contractor.
- 12.10** If Contractor is providing Work to an Agency Member, SCPPA or SCPPA member (collectively "Member" solely for the purpose of this section) pursuant to Section 1.4 hereof, then that Member shall have the same rights as the Agency under Sections 12.1, 12.2, 12.4, 12.5, and 12.6 hereof.

Section 13. MISCELLANEOUS PROVISIONS.

- 13.1 Attorneys' Fees.** If a party to this Agreement brings any action, including an action for declaratory relief, to enforce or interpret the provision of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees in addition to any other relief to which that party may be entitled. The court may set such fees in the same action or in a separate action brought for that purpose.
- 13.2 Venue.** In the event that either party brings any action against the other under this Agreement, the Parties agree that trial of such action shall be vested exclusively in the state courts of California in the County of Placer or in the United States District Court for the Eastern District of California.
- 13.3 Severability.** If a court of competent jurisdiction finds or rules that any provision of this Agreement is invalid, void, or unenforceable, the provisions of this Agreement not so adjudged shall remain in full force and effect. The invalidity in

whole or in part of any provision of this Agreement shall not void or affect the validity of any other provision of this Agreement.

13.4 No Implied Waiver of Breach. The waiver of any breach of a specific provision of this Agreement does not constitute a waiver of any other breach of that term or any other term of this Agreement.

13.5 Successors and Assigns. The provisions of this Agreement shall inure to the benefit of and shall apply to and bind the successors and assigns of the Parties.

13.6 Conflict of Interest. Contractor may serve other clients, but none whose activities within the corporate limits of Agency or whose business, regardless of location, would place Contractor in a "conflict of interest," as that term is defined in the Political Reform Act, codified at California Government Code Section 81000 *et seq.*

Contractor shall not employ any Agency official in the work performed pursuant to this Agreement. No officer or employee of Agency shall have any financial interest in this Agreement that would violate California Government Code Sections 1090 *et seq.*

13.7 Contract Administrator. This Agreement shall be administered by Joel Ledesma, Assistant General Manager, or his/her designee, who shall act as the Agency's representative. All correspondence shall be directed to or through the representative.

13.8 Notices. Any written notice to Contractor shall be sent to:

Northwest Industrial Engine and Compressor Company
Attention: Gavin "Deon" Yates
P.O. Box 737
Riverbank, CA 95367

Any written notice to Agency shall be sent to:

Randy S. Howard
General Manager
Northern California Power Agency
651 Commerce Drive
Roseville, CA 95678

With a copy to:

Jane E. Luckhardt
General Counsel
Northern California Power Agency
651 Commerce Drive
Roseville, CA 95678

- 13.9 Professional Seal.** Where applicable in the determination of the Agency, the first page of a technical report, first page of design specifications, and each page of construction drawings shall be stamped/sealed and signed by the licensed professional responsible for the report/design preparation.
- 13.10 Integration; Incorporation.** This Agreement, including all the exhibits attached hereto, represents the entire and integrated agreement between Agency and Contractor and supersedes all prior negotiations, representations, or agreements, either written or oral. All exhibits attached hereto are incorporated by reference herein.
- 13.11 Alternative Dispute Resolution.** If any dispute arises between the Parties that cannot be settled after engaging in good faith negotiations, Agency and Contractor agree to resolve the dispute in accordance with the following:
- 13.11.1** Each party shall designate a senior management or executive level representative to negotiate any dispute;
 - 13.11.2** The representatives shall attempt, through good faith negotiations, to resolve the dispute by any means within their authority.
 - 13.11.3** If the issue remains unresolved after fifteen (15) days of good faith negotiations, the Parties shall attempt to resolve the disagreement by negotiation between legal counsel. If the above process fails, the Parties shall resolve any remaining disputes through mediation to expedite the resolution of the dispute.
 - 13.11.4** The mediation process shall provide for the selection within fifteen (15) days by both Parties of a disinterested third person as mediator, shall be commenced within thirty (30) days and shall be concluded within fifteen (15) days from the commencement of the mediation.
 - 13.11.5** The Parties shall equally bear the costs of any third party in any alternative dispute resolution process.
 - 13.11.6** The alternative dispute resolution process is a material condition to this Agreement and must be exhausted as an administrative remedy prior to either Party initiating legal action. This alternative dispute resolution process is not intended to nor shall be construed to change the time periods for filing a claim or action specified by Government Code §§ 900 *et seq.*
- 13.12 Controlling Provisions.** In the case of any conflict between the terms of this Agreement and the Exhibits hereto, a Purchase Order, or Contractor's Proposal (if any), the Agreement shall control. In the case of any conflict between the Exhibits hereto and a Purchase Order or the Contractor's Proposal, the Exhibits shall control. In the case of any conflict between the terms of a Purchase Order and the Contractor's Proposal, the Purchase Order shall control.

13.13 Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be an original and all of which together shall constitute one agreement.

13.14 Construction of Agreement. Each party hereto has had an equivalent opportunity to participate in the drafting of the Agreement and/or to consult with legal counsel. Therefore, the usual construction of an agreement against the drafting party shall not apply hereto.

13.15 No Third Party Beneficiaries. This Agreement is made solely for the benefit of the parties hereto, with no intent to benefit any non-signator third parties. However, should Contractor provide Work to an Agency member, SCPPA or SCPPA member (collectively for the purpose of this section only "Member") pursuant to Section 1.4, the parties recognize that such Member may be a third party beneficiary solely as to the Purchase Order and Requested Work relating to such Member.

The Parties have executed this Agreement as of the date signed by the Agency.

NORTHERN CALIFORNIA POWER AGENCY

NORTHWEST INDUSTRIAL ENGINE AND
COMPRESSOR COMPANY

Date_____

Date_____

RANDY S. HOWARD,
General Manager

GAVIN D. YATES,
Owner

Attest:

Assistant Secretary of the Commission

Approved as to Form:

Jane E. Luckhardt, General Counsel

EXHIBIT A
SCOPE OF WORK

Northwest Industrial Engine and Compressor Company ("Contractor") shall provide engine, compressor, pump and turbine maintenance and inspection related services as requested by the Northern California Power Agency ("Agency") at any facilities owned or operated by Agency, NCPA Members, Southern California Public Power Authority (SCPPA) or SCPPA Members.

Services to include, but not be limited to the following:

- Inspections and maintenance on engines, compressors, pumps and turbines

EXHIBIT B

COMPENSATION SCHEDULE AND HOURLY FEES

Compensation for all work, including hourly fees and expenses, shall not exceed the amount set forth in Section 2 hereof. The hourly rates and or compensation break down and an estimated amount of expenses is as follows:

<u>PREVAILING WAGE RATES</u>	<u>Straight Time</u>	<u>Overtime</u>	<u>Double Time</u>	<u>Travel Time</u>
Foreman	\$140.00	\$210.00	\$280.00	\$140.00
Journeyman	\$135.00	\$202.00	\$270.00	\$135.00
Apprentice	\$110.00	\$165.00	\$210.00	\$110.00
General Foreman/Sup	\$150.00	\$225.00	\$300.00	\$150.00
Truck & Tool	\$25.00	\$25.00	\$25.00	
Subsistence - Per Day	\$160.00	Per Person		
Mileage Fuel Surcharge	\$ 0.75	Per Mile		
Laser Alignment Tooling	\$250.00	Per Day		

Pricing for services to be performed at NCPA Member or SCPPA locations will be quoted at the time services are requested.

NOTE: As a public agency, NCPA shall not reimburse Contractor for travel, food and related costs in excess of those permitted by the Internal Revenue Service.

EXHIBIT C

CERTIFICATION

Affidavit of Compliance for Contractors

I,

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

Northwest Industrial Engine and Compressor Company

(Company name)

for contract work at:

LODI ENERGY CENTER, 12745 N. THORNTON ROAD, LODI, CA 95242

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

NOT APPLICABLE

EXHIBIT D

CERTIFICATION

Affidavit of Compliance for Hazardous Materials Transport Vendors

I, _____,

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172, subpart I and has conducted employee background investigations in conformity with 49 CFR 172.802(a), as the same may be amended from time to time,

(Company name)

for hazardous materials delivery to:

LODI ENERGY CENTER, 12745 N. THORNTON ROAD, LODI, CA 95242

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

(Signature of officer or agent)

Dated this _____ day of _____, 20 ____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

EXHIBIT E

**ATTACHMENT A [from MLA]
AGREEMENT TO BE BOUND**

**MAINTENANCE LABOR AGREEMENT ATTACHMENT
LODI ENERGY CENTER PROJECT**

The undersigned hereby certifies and agrees that:

- 1) It is an Employer as that term is defined in Section 1.4 of the Lodi Energy Center Project Maintenance Labor Agreement ("Agreement" solely for the purposes of this Exhibit E) because it has been, or will be, awarded a contract or subcontract to assign, award or subcontract Covered Work on the Project (as defined in Section 1.2 and 2.1 of the Agreement), or to authorize another party to assign, award or subcontract Covered Work, or to perform Covered Work.
- 2) In consideration of the award of such contract or subcontract, and in further consideration of the promises made in the Agreement and all attachments thereto (a copy of which was received and is hereby acknowledged), it accepts and agrees to be bound by the terms and condition of the Agreement, together with any and all amendments and supplements now existing or which are later made thereto.
- 3) If it performs Covered Work, it will be bound by the legally established trust agreements designated in local master collective bargaining agreements, and hereby authorizes the parties to such local trust agreements to appoint trustees and successor trustee to administer the trust funds, and hereby ratifies and accepts the trustees so appointed as if made by the undersigned.
- 4) It has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of the Agreement.
- 5) It will secure a duly executed Agreement to be Bound, in form identical to this documents, from any Employer(s) at any tier or tiers with which it contracts to assign, award, or subcontract Covered Work, or to authorize another party to assign, award or subcontract Covered Work, or to perform Covered Work.

DATED: _____ Name of Employer _____

(Authorized Officer & Title)

(Address)

SERVICES AGREEMENT

BETWEEN

NORTHERN CALIFORNIA POWER AGENCY

AND

SONOMA CLEAN POWER

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This SERVICES AGREEMENT (“Agreement”) is made by and between the Northern California Power Agency, a joint powers agency of the State of California (“NCPA”), and Sonoma Clean Power Authority, a California joint powers authority (“Customer”). NCPA and Customer are together sometimes referred to herein individually as a “Party” and collectively as the “Parties”.

This Agreement is made as of _____, 2020 (the “Effective Date”).

Section 1. RECITALS

This Agreement is entered into based on the following facts, among others:

1.1 NCPA has heretofore been duly established as a joint powers agency pursuant to the Joint Exercise of Powers Act of the Government Code of the State of California and, among other things, is authorized to acquire, construct, finance, and operate buildings, works, facilities and improvements for the generation and transmission of electric capacity and energy for resale.

1.2 Customer is a public agency located within Sonoma County and Mendocino County, and was formed for the purpose of implementing a community choice aggregation program, which has been named Sonoma Clean Power (or “SCP”).

1.3 NCPA is a certified Scheduling Coordinator in accordance with the CAISO Tariff.

1.4 NCPA has established facilities, staff and the capability for the provision of Services to Customer.

1.5 Customer desires NCPA to provide Services to Customer.

1.6 NCPA is willing to provide Customer with Services pursuant to the terms and conditions of this Agreement.

NOW THEREFORE, in consideration of the mutual covenants and promises set forth herein, NCPA and Customer agree as follows:

Section 2. DEFINITIONS

2.1 Definitions. Whenever used in this Agreement (including the Recitals hereto), the following terms shall have the following respective meanings, provided, capitalized terms used in this Agreement (including the Recitals hereto) that are not defined in Section 2 of this Agreement shall have the meaning indicated in Appendix A Master Definition Supplement of the CAISO Tariff:

2.1.1 “All Resources Bill” means the single, combined monthly bill from NCPA to Customer with respect to the provision of Services to Customer.

2.1.2 “All Resources Bill Payment Calendar” means the schedule that lists the date on which each monthly All Resources Bill will be issued to Customer, and identifies each of the applicable adjustments that will be included in each monthly All Resources Bill. The All Resources Bill Payment Calendar will be posted on the NCPA electronic data portal.

2.1.3 “Agreement” means this Services Agreement, including all Appendices, attached hereto.

2.1.4 “Business Day” means any day except a Saturday, Sunday, or a Federal Reserve Bank holiday. A Business Day shall open at 8:00 a.m. and close at 5:00 p.m. local time.

2.1.5 “Calendar Day” means all days, including Saturdays, Sundays or Federal Reserve Bank holidays.

2.1.6 “California Independent System Operator Corporation” or “CAISO” means the non-profit public benefit corporation responsible for the provision of fair and open transmission access, and maintaining reliable and efficient operation of that portion of the electric grid contained within its defined balancing authority area, pursuant to the California Public Utilities Code, or its successor entity.

2.1.7 “CAISO Tariff” means the CAISO FERC Electric Tariff.

2.1.8 “Commission” means the NCPA Commission established by the Joint Powers Agreement.

2.1.9 “Customer” has the meaning set forth in the preamble hereto.

2.1.10 “Effective Date” has the meaning set forth in the preamble hereto.

2.1.11 “Event of Default” has the meaning set forth in Section 10.1 of this Agreement.

2.1.12 “FERC” means the Federal Energy Regulatory Commission, or its regulatory successor.

2.1.13 “General Manager” means the General Manager of NCPA.

2.1.14 “Good Utility Practice” means any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry within the United States of America during the relevant time period, which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at the lowest reasonable cost consistent with NERC or WECC approved business practices, reliability and safety. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the electric utility industry within the United States of America.

2.1.15 “Joint Powers Agreement” means the Amended and Restated Northern California Power Agency Joint Exercise of Powers Agreement dated as of January 31, 2008.

2.1.16 “Member” means any member of NCPA or associate member of NCPA who is a signatory to the Joint Powers Agreement.

2.1.17 “NCPA” has the meaning set forth in the preamble hereto.

2.1.18 “NERC” means the North American Electric Reliability Corporation, or its successor.

2.1.19 “Party” or “Parties” has the meaning set forth in the recitals hereto; provided that “Third Parties” are entities that are not party to this Agreement.

2.1.20 “Reliability Standards” means requirements approved by FERC under Section 215 of the Federal Power Act to provide for reliable operation of the bulk power system.

2.1.21 “Scheduling Agent” means an entity authorized to act as agent on behalf of a Scheduling Coordinator, and shall perform certain Scheduling Coordinator duties and requirements on behalf of a Scheduling Coordinator.

2.1.22 “Scheduling Coordinator” means an entity certified by the CAISO for the purposes of undertaking the functions of a Scheduling Coordinator specified in the CAISO Tariff, including, but not limited to, submitting and settling bids, self-schedules, and trades in the CAISO markets.

2.1.23 “Security Account” means an account established by NCPA pursuant to this Agreement. The Security Account is established to: (1) make timely payments to the CAISO under the CAISO Tariff, (2) provide working capital for NCPA’s provision of Services and to bridge timing differences between the receipt of payments from Customer and the date payments are due to the CAISO, and (3) protect NCPA from potential Customer default by providing funds and time to cure.

2.1.24 “Services” shall have the meaning as set forth in Section 4.1 of this Agreement.

2.1.25 “Services Fee” means the amount Customer shall pay NCPA, as set forth in Section 7.1 of this Agreement, in consideration for NCPA’s provision of all Services, other than Supplemental Services, to Customer, in accordance with the terms and conditions of this Agreement.

2.1.26 “Significant Operational Change” shall have the meaning as set forth in Section 15.19 of this Agreement.

2.1.27 “Significant Regulatory Change” shall have the meaning as set forth in Section 15.19 of this Agreement.

2.1.28 “Supplemental Services” shall have the meaning as set forth in Section 4 of Appendix A of this Agreement.

2.1.29 “Third Party” means an entity that is not a Party to this Agreement.

2.1.30 “Uncontrollable Force” means an act or event that delays or prevents a Party from timely performing all or a portion of its obligations under this Agreement, or from complying with all or a portion of the conditions under this Agreement, if such act or event, despite the exercise of reasonable efforts, cannot be avoided by and is beyond the reasonable control (whether direct or indirect) of and without the fault or negligence of the Party relying thereon as justification for such delay, nonperformance, or noncompliance. Subject to the foregoing requirements, “Uncontrollable Forces” may include, without limitation, storm, flood, lightning, earthquake, tsunami, fire, explosion, failure of facilities not due to lack of proper care or maintenance, civil disturbance, labor dispute, sabotage, war, national emergency, epidemic or pandemic (including COVID-19) and governmental efforts to mitigate the spread thereof, restraint by court or public authority, any curtailment, order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or other causes beyond the control of the affected Party which such Party could not reasonably have been expected to avoid by exercise of Good Utility Practice, due diligence and foresight.

2.1.31 “WECC” means the Western Electricity Coordinating Council, or its successor(s).

2.2 Rules of Interpretation. As used in this Agreement (including the Recitals hereto), unless in any such case the context requires otherwise: The terms “herein,” “hereto,” “herewith” and “hereof” are references to this Agreement taken as a whole and not to any particular provision; the term “include,” “includes” or “including” shall mean “including, for example and without limitation;” and references to a “Section,” “subsection,” “clause,” “Appendix,” “Schedule”, or “Exhibit” shall mean a Section, subsection, clause, Appendix, Schedule or Exhibit of this Agreement, as the case may be. All references to a given agreement, instrument, tariff or other document, or law, regulation or ordinance shall be a reference to

that agreement, instrument, tariff or other document, or law, regulation or ordinance as such now exists and as may be amended from time to time, or its successor. A reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having a separate legal personality and includes its successors and permitted assigns. A reference to a “day” shall mean a Calendar Day unless otherwise specified. The singular shall include the plural and the masculine shall include the feminine, and vice versa.

Section 3. PURPOSE OF AGREEMENT

The purpose of this Agreement is to set forth the terms and conditions under which NCPA will supply Customer with Services.

Section 4. SERVICES TO BE PROVIDED AND STANDARDS OF PERFORMANCE

4.1 NCPA Duties. NCPA agrees under the terms and conditions of this Agreement to provide services to Customer as fully described in Appendix A hereto (“Services”).

4.2 Customer Duties. In connection with NCPA’s performance of the Services, Customer agrees under the terms and conditions of this Agreement to:

4.2.1 Timely provide certain information to NCPA that is required for NCPA to perform Services, as fully described in and in accordance with Appendix A hereto.

4.2.2 Make timely payments to NCPA for all CAISO charges and credits for services invoiced by NCPA to Customer in accordance with Section 8 of this Agreement.

4.2.3 Provide staff and other assistance as may be required from time to time to the extent necessary for NCPA to fulfill its duties as described in and in accordance with Section 4.1 of this Agreement.

4.2.4 Comply with all requirements of the CAISO Tariff, set forth herein, as applicable.

4.2.5 Provide security or other deposits required by the CAISO, if any, to NCPA in accordance with Section 11 of this Agreement.

4.2.6 Initially fund and maintain sufficient deposits in its Security Account in accordance with Section 12 of this Agreement.

4.2.7 Make timely payment of all costs associated with NCPA's provision of Services, as set forth in this Agreement.

4.3 Standard of Performance. NCPA will perform Services using the level of skill and attention reasonably required to complete the Services in a competent and timely manner, in accordance with Good Utility Practices.

4.4 Assignment of Personnel. NCPA shall assign only competent personnel to perform Services pursuant to this Agreement.

4.5 Time. NCPA shall devote such time to the performance of Services pursuant to this Agreement as may be reasonably necessary to meet the standard of performance provided in Section 4.3, and to satisfy NCPA's obligations hereunder.

Section 5. TERM AND TERMINATION

5.1 Term. This Agreement shall become effective on the Effective Date. The initial term for NCPA's performance of the Services shall begin on January 1, 2021 and continue uninterrupted through December 31, 2024 (the "Initial Term"). At the end of the Initial Term of this Agreement, or any subsequent term of this Agreement, the term of this Agreement shall automatically extend for an additional one (1) year period unless a Party provides written Notice of Termination pursuant to Section 5.2, of its election not to automatically extend the term of the Agreement.

5.2 Termination. This Agreement may be terminated by either Party at the end of the Initial Term, or at the end of any subsequent one (1) year extension, by providing written notice to the other Party at least ninety (90) Calendar Days prior to the end of the current term of the Agreement ("Notice of Termination").

5.3 No Effect on Prior Liabilities. Termination of this Agreement will not terminate any ongoing or un-discharged liabilities, credits or obligations of either Party, including any contingent liabilities, credits or obligations, resulting from this Agreement until they are

satisfied in full, or for which the Party owing the liability has provided a mechanism acceptable to the other Party, for the satisfaction in full thereof.

Section 6. INDEMNITY

6.1 Limitation of Liability.

6.1.1 Except as provided in this Section 6.1, neither NCPA nor Customer shall at any time be liable for any injury or damage occurring to the other or any third person or property from any cause whatsoever arising out of this Agreement, provided, however that each Party (the "Indemnifying Party") agrees to indemnify, defend and hold harmless the other Party, including such Party's respective directors, officers, agents, attorneys, employees and representatives (each an "Indemnified Party" and collectively, the "Indemnified Group"), from and against any and all third party claims, suits, losses, costs, damages, expenses and liability of any kind or nature, including reasonable attorneys' fees and the costs of litigation, including experts, to the extent caused by any acts, omissions, breach of contract, negligence (active or passive), gross negligence, recklessness, or willful misconduct of the Indemnifying Party, directors, officers, agents, employees and representatives, to the maximum extent permitted by law. Neither Party shall be indemnified for its damages resulting from its sole negligence, intentional acts, or willful misconduct. These indemnity provisions shall not be construed to relieve any insurer of its obligations to pay claims consistent with the provisions of a valid insurance policy.

6.1.2 The provisions of Section 6.1.1 shall not apply where the injury or damage occurring to Customer is due to NCPA's failure to perform the Services set forth in Section 1.1.2 of Appendix A, and which failure is caused by the active negligence, willful misconduct or breach of this Agreement by NCPA; provided, however, that any liability under this subsection for NCPA's negligence shall be limited to the total amount of annual compensation paid by Customer to NCPA for a calendar year period in which the injury or damages is incurred, as set forth in Section 7.1.

6.2 Notice. The Parties shall give each other prompt notice of the making of any claim or the commencement of any action, suit or proceeding covered by or giving rise to the

provisions of this Section 6 (a “Claim”). Such notice will specify, in reasonable detail, the facts known to Indemnified Party regarding the Claim.

Section 7. COMPENSATION

7.1 Compensation for Services. Customer shall pay NCPA the amounts set forth in Appendix B for NCPA’s provision of Services and Supplemental Services to Customer in accordance with the terms and conditions of this Agreement. Such amount shall be billed to Customer in accordance with Section 8 of this Agreement.

7.2 CAISO Charges and Credits. All charges and credits invoiced by the CAISO to NCPA associated with Services provided under this Agreement will be charged or credited to Customer, and shall be paid to NCPA by Customer, or by NCPA to Customer, as applicable, in addition to the compensation stated in Section 7.1. Such CAISO charges and credits shall be billed to Customer in accordance with Section 8 of this Agreement.

Section 8. BILLING AND PAYMENT

8.1 Invoices. NCPA will issue a monthly invoice to Customer in accordance with the All Resources Bill Payment Calendar for estimated and actual costs, including, but not limited to, CAISO charges and credits, costs associated with NCPA’s provision of Services, and all other costs for Services provided in accordance with this Agreement. Such invoices will be made pursuant to the requirements and procedures provided for in this Agreement. NCPA will issue invoices to Customer using electronic media or physical distribution.

8.2 Payment of Invoices. All non-emergency invoices delivered by NCPA to Customer are due and payable thirty (30) Calendar Days after the date that the invoice is received; provided, however, that any amount due on a day other than a Business Day may be paid on the next following Business Day. NCPA may apply Customer’s Security Account to the payment of all or any portion of an invoice to Customer if payment is not received by the applicable due date, provided that application of such funds from the Security Account shall not relieve Customer from any late payment charges pursuant to Section 8.3. To the extent that NCPA applies funds from the Security Account to pay an amount due under an invoice, following receipt of payment of such invoice by Customer, NCPA shall deposit the relevant

portion of the payment into the Security Account and credit such deposit to Customer. Emergency invoices issued and delivered by NCPA pursuant to Section 12.5 shall be due and payable on the date indicated on such invoice, or as indicated in Section 12.5, whichever is later.

8.3 Late Payments. Any amount due and not paid by Customer in accordance with Sections 8.2, Section 11 and Section 12 shall be considered late and bear interest computed on a daily basis until paid at the lesser of (i) the per annum prime rate (or reference rate) of the Bank of America N.A. then in effect, plus two percentage points (2%) or (ii) the maximum rate permitted by law in the State of California.

8.4 Billing Disputes. Customer may dispute the accuracy of any invoice, or any adjustment to an invoice, issued by NCPA under this Agreement by submitting a written dispute to NCPA, within twelve (12) months of the date of such invoice. Notwithstanding the foregoing, Customer shall pay the full amount billed when due for all costs other than amounts invoiced for the Services Fee, and Customer shall pay the full undisputed amount billed when due for the Services Fee. If Customer does not timely question or dispute the accuracy of any invoice in writing, and if NCPA does not identify a discrepancy in the invoice that requires a correction, the invoice shall be deemed to be correct. Upon review of a submitted dispute, if an invoice is determined by NCPA to be incorrect, NCPA shall issue a corrected invoice and refund any amounts that may be due to Customer. If NCPA and Customer fail to agree on the accuracy of an invoice within thirty (30) Calendar Days after Customer has disputed it, the General Manager shall promptly submit the dispute to the Commission for resolution. If the Commission and Customer fail to agree on the accuracy of a disputed invoice within sixty (60) Calendar Days of its submission to the Commission, the dispute may then be resolved under the dispute resolution procedures set forth in Section 13 of this Agreement. Provided, however, that prior to resorting to alternative dispute resolution procedures, the full amount of the disputed invoice for all costs other than amounts invoiced for the Services Fee must have been paid. Upon resolution of a dispute, the disputed amount shall be paid within five (5) Business days.

8.5 Billing/Settlement Data. NCPA shall make billing and settlement data available to Customer, or its designee, as part of the invoice delivered by NCPA, or upon request. NCPA

shall make billing and settlement support information available to Customer using electronic media (e.g. electronic data portal). Procedures and formats for the provision of such electronic data submission may be as established by the NCPA Commission from time to time. Without limiting the generality of the foregoing, NCPA may, in its reasonable discretion, require Customer to execute a non-disclosure agreement prior to providing access to the NCPA electronic data portal for the purpose of protecting confidential information, consistent with the provisions contained in Section 15.1 of this Agreement.

8.6 Examination of Books and Records. Customer shall have the right to examine the books and records created and maintained by NCPA pursuant to this Agreement at any reasonable, mutually agreed upon time.

All reports, data, maps, models, charts, studies, surveys, photographs, memoranda, plans, studies, specifications, records, files or other documents or material, in electronic or any other form, that NCPA prepares or obtains pursuant to this Agreement and that relate to the Services provided hereunder, shall be stored and maintained by NCPA in accordance with NCPA's records retention policies and procedures, as such may be modified from time to time.

Section 9. COOPERATION AND FURTHER ASSURANCES

Each of the Parties agree to provide such information, execute and deliver any instruments and documents and to take such other actions as may be necessary or reasonably requested by the other Party which are consistent with the provisions of this Agreement and which do not involve the assumption of obligations other than those provided for in this Agreement, in order to give full effect to this Agreement and to carry out the intent of this Agreement. The Parties agree to cooperate and act in good faith in connection with obtaining any credit support required in order to satisfy the requirements of this Agreement.

Section 10. DEFAULTS

10.1 Events of Default. An Event of Default under this Agreement shall exist upon the occurrence of any one or more of the following by a Party (the "Defaulting Party"):

(i) the failure of Customer to make any payment (other than an emergency addition to the Security Account pursuant to Section 12.5) in full to NCPA when due, where such failure is not cured within ten (10) Business Days following receipt of written notice from NCPA demanding cure;

(ii) the failure of Customer to make any payment of an emergency addition to the Security Account pursuant to, and following applicable notice periods under, Section 12.5;

(iii) the failure of a Party to perform any covenant or obligation of this Agreement, including the requirements of each Party set forth in Section 4, where such failure is not cured within thirty (30) Calendar Days following receipt of a notice from the other Party demanding cure. Provided, that this subsection shall not apply to any failure to make payments specified by subsection 10.1 (i) or (ii); or

(iv) if any representation or warranty of a Party material to the Services provided hereunder shall prove to have been incorrect in any material respect when made and the Party does not cure the facts underlying such incorrect representation or warranty so that the representation or warranty becomes true and correct within thirty (30) Calendar Days of the date of receipt of notice from a Party demanding cure.

10.2 Uncontrollable Forces. A Party shall not be considered to be in default in respect of any obligation hereunder if prevented from fulfilling such obligation by reason of Uncontrollable Forces. Provided, that in order to be relieved of an Event of Default due to Uncontrollable Forces, a Party affected by an Uncontrollable Force shall:

(i) first provide oral notice to the General Manager, or in the case of Customer, to the representative selected by Customer, using telephone communication within two (2) Business Days of the onset of the Uncontrollable Force, and subsequently provide written notice to the Party's representative within ten (10) Business Days of the onset of the Uncontrollable Force, describing its nature and extent, the obligations which the Party is unable to fulfill, the anticipated duration of the Uncontrollable Force, and the actions which the Party will undertake so as to remove such disability and be able to fulfill its obligations hereunder; and

(ii) use due diligence to place itself in a position to fulfill its obligations hereunder and if unable to fulfill any obligation by reason of an Uncontrollable Force such Party shall exercise due diligence to remove such disability with reasonable dispatch. Provided, that nothing in this subsection shall require a Party to settle or compromise a labor dispute.

10.3 Cure of an Event of Default. An Event of Default shall be deemed cured only if such default shall be remedied or cured within the time periods specified in Section 10.1 above, as may be applicable.

10.4 Remedies in the Event of Uncured Default. Upon the occurrence of an Event of Default which is not cured within the time limits specified in Section 10.1, without limiting other rights or remedies available under this Agreement, at law or in equity, and without constituting or resulting in a waiver, release or estoppel of any right, action or cause of action a non-defaulting Party may have against the defaulting Party, a non-defaulting Party may take any or all of the following actions:

(i) NCPA may suspend the provision of Services under this Agreement to Customer;

(ii) NCPA may demand that Customer provide further assurances to guarantee the correction of the default;

(iii) The non-defaulting Party may terminate this Agreement as to the defaulting Party, on ten (10) Calendar Days prior written notice to the Defaulting Party;

(iv) NCPA may utilize the funds available in Customer's Security Account to cure a default under Section 10.1(i) and thereafter demand replenishment of the Security Account.

10.5 Effect of Termination or Suspension.

10.5.1 Generally. The termination or suspension of this Agreement will not terminate, waive, or otherwise discharge any ongoing or undischarged liabilities, credits or obligations arising from this Agreement until such liabilities, credits or obligations are satisfied in full.

10.5.2 Suspension. If performance of all or any portion of this Agreement is suspended by NCPA in accordance with Section 10.4 (i), Customer shall pay all reasonable and necessary costs incurred by NCPA as a result of such suspension.

10.5.3 Termination. If this Agreement is terminated by a Party in accordance with Section 10.4 (iii), the Defaulting Party shall pay all reasonable and necessary costs incurred by the other Party as a result of such termination.

Section 11. CAISO SECURITY DEPOSIT AND CREDIT REQUIREMENTS

Except as may otherwise be provided herein, any credit requirements required by the CAISO, including, but not limited to, security, collateral, unsecured credit, or other deposits required by the CAISO, shall be provided by Customer prior to NCPA providing Services under this Agreement, and shall be maintained as may be required thereafter pursuant to the CAISO Tariff. Failure to maintain sufficient credit, security, collateral, unsecured credit, or other deposits may impact NCPA's ability to perform certain Services under this Agreement. NCPA shall maintain a detailed accounting of Customer's credit, security, collateral, unsecured credit or other deposits. Any changes in credit, security, unsecured credit or other deposits required by the CAISO Tariff may be provided by NCPA from Customer's Security Account, and NCPA shall invoice Customer within two (2) Business Days for such required amounts, and will use the funds collected from Customer to fund the Security Account.

Section 12. SECURITY ACCOUNT

Any Customer deposits into the Security Account pursuant to this Agreement shall be separate from and in addition to any security accounts maintained pursuant to any other agreements between NCPA and the Customer, NCPA and any Third Person, or any other such security account required of Customer.

12.1 Applicability. The requirement for Customer to initially deposit and maintain a Security Account pursuant to Section 12.2 and Section 12.3 is only applicable if NCPA, acting for or on behalf of Customer, is directly responsible for making payments to the CAISO and processing charges and credits invoiced by the CAISO to NCPA, associated with Services provided under this Agreement, including all charges and credits associated with security

deposits, if any, as may be required pursuant to the CAISO Tariff. For the purpose of clarity, when NCPA provides Services as Customer's Scheduling Coordinator, Section 12.2 and Section 12.3 shall apply; provided, however, if NCPA provides Services as Customer's Scheduling Agent, Customer shall not be required to initially deposit and maintain a Security Account pursuant to Section 12.2 and Section 12.3 if Customer retains the direct responsibility for making payments to the CAISO and processing charges and credits invoiced by the CAISO to Customer, associated with Services provided under this Agreement, including all charges and credits associated with security deposits as may be required pursuant to the CAISO Tariff.

12.2 Initial Amounts. Prior to NCPA providing Services, Customer shall deposit into a Security Account held by NCPA an amount equal to the lesser of (i) the highest three (3) months of estimated CAISO invoices (including, but not limited to, costs and/or credits for energy, Grid Management Charge fees, operating reserves costs, and regulation capacity costs) for the succeeding twelve (12) months, or (i) One Million Dollars (\$1,000,000.00); provided, however, that such deposit may be satisfied in whole or in part either in cash or through a clean, irrevocable letter of credit satisfactory to the General Manager. NCPA shall maintain a detailed accounting of Customer's deposit in the Security Account. For the purpose of clarity, the estimated CAISO invoice amount, if any, as referred to herein, shall be equal to Customer's Estimated Aggregate Liability (EAL), as defined in the CAISO Tariff.

12.3 Subsequent Deposits. NCPA shall review and revise its estimate of all costs Customer shall be obligated to pay under this Agreement annually, concurrent with the anniversary of the Effective Date of this Agreement. Following such review, NCPA shall determine whether Customer has a sufficient balance in the Security Account. To the extent that Customer's balance in the Security Account is greater than one hundred percent (100%) of the amount required by Section 12.2, NCPA shall credit such amount as soon as practicable to Customer's next monthly invoice. To the extent that Customer's balance in the Security Account is less than one hundred percent (100%) of the amount required by Section 12.2, NCPA shall add such amount as soon as practicable to Customer's next monthly invoice. Credits or additions shall not be made to the extent Customer satisfies these Security Account requirements through the use of a letter of credit, provided that if Customer funds the entire

Security Account with a letter of credit, the amount of the letter of credit shall be adjusted by Customer as necessary in a like manner to assure an amount equal to the amount required by Section 12.2 is available to NCPA.

12.4 Use of Security Account Funds.

12.4.1 NCPA may use any and all funds deposited into the Security Account (or utilize a letter of credit provided in lieu thereof) to pay CAISO charges and credits it incurs hereunder associated with the Services provided to Customer, irrespective of whether NCPA has issued an invoice for such costs to Customer or whether Customer has made timely payments of invoices. Should Customer satisfy its Security Account requirements in whole or part through a letter of credit, NCPA shall have the right to draw on such letter of credit to satisfy obligations hereunder.

12.4.2 If funds deposited into the Security Account, or provided through a letter of credit, are used by NCPA to pay any costs it incurs hereunder, NCPA, pursuant to Section 8.5, will maintain a detailed accounting of Customer's shares of funds withdrawn from the Security Account or letter of credit.

12.5 Emergency Additions. In the event that the funds are withdrawn pursuant to Section 12.4 of this Agreement, or if the Security Account is insufficient to allow payment of Customer's CAISO invoice, NCPA shall notify Customer and then prepare and send a special or emergency assessment to Customer. Customer shall pay to NCPA such assessment when and if assessed by NCPA within five (5) Business Days of the invoice date of the assessment or consent to and direct NCPA to draw on any existing letter of credit Customer has established for such purposes.

12.6 Accounting and Interest. NCPA shall maintain a detailed accounting of Customer's deposits into and withdrawals from the Security Account. Interest, if any, earned on the Security Account shall be credited to Customer's Security Account. NCPA makes no representation that the Security Account will earn any particular amount of interest or any interest.

12.7 Return of Funds. On the earlier of (a) termination of this Agreement or (b) the date upon which NCPA subsequently begins providing Services as Customer's Scheduling Agent, and Customer retains the direct responsibility for making payments to the CAISO and processing charges and credits invoiced by the CAISO to Customer associated with Services provided under this Agreement, Customer's Security Account funds shall be paid to Customer thirty (30) Calendar Days after the effective date of such termination or change in NCPA's role from Customer Scheduling Coordinator to Customer Scheduling Agent. NCPA shall estimate the then reasonable outstanding liabilities of Customer, including any reasonably estimated contingent liabilities, and shall retain all such funds until all such liabilities have been fully paid or otherwise satisfied in full. After such determination by the General Manager, the balance of Customer's Security Account will be refunded to Customer within thirty (30) Calendar Days. The methodology used by NCPA to calculate the amounts retained will be provided to Customer. Any disputes regarding amounts retained by NCPA will be subject to Section 13 of this Agreement.

Section 13. SETTLEMENT OF DISPUTES

13.1 Settlement of Disputes. If any dispute arises between the Parties that cannot be settled after engaging in good faith negotiations, Customer and NCPA agree to resolve the dispute in accordance with the following:

13.1.1 Each Party shall designate a senior management or executive level representative to negotiate any dispute.

13.1.2 The representative shall attempt, through good faith negotiations, to resolve the dispute by any means within their authority.

13.1.3 If the issue remains unresolved after sixty (60) Calendar Days of good faith negotiations, despite having used their best efforts to do so, either Party may pursue whatever other remedies may be available to it.

13.1.4 This informal resolution process is not intended to nor shall be construed to change the time periods for filing a claim or action specified by Government Code § 900, *et seq.*

Section 14. STATUS OF NCPA

At all times during the term of this Agreement, NCPA shall be an independent contractor and shall not be an employee of Customer. Customer shall have the right to control NCPA only insofar as the results of NCPA's Services rendered pursuant to this Agreement; however, otherwise Customer shall not have the right to control the means by which NCPA accomplishes Services rendered pursuant to this Agreement. Notwithstanding any other agency, state, local or federal policy, rule, regulation, law, or ordinance to the contrary, NCPA and any of its employees, agents, and subcontractors providing Services under this Agreement shall not qualify for or become entitled to, and hereby agree to waive any and all claims to, any compensation, benefit, or any incident of employment by Customer, including but not limited to eligibility to enroll in the California Public Employees Retirement System (PERS) as an employee of Customer and entitlement to any contribution to be paid by Customer for employer contributions and/or employee contributions for PERS benefits.

Section 15. MISCELLANEOUS

15.1 Confidentiality. The Parties acknowledge that they are subject to the requirements of the California Public Records Act (Government Code Section 6250 et seq.). To the maximum extent allowed by law, the Parties will keep confidential all confidential or trade secret information made available to them in connection with this Agreement. Confidential or trade secret information must be marked or expressly identified as such.

If a Party ("Receiving Party") receives a request from a Third Party for access to, or inspection, disclosure or copying of, any of the other Party's (the "Supplying Party") confidential data or information ("Disclosure Request"), then the Receiving Party shall provide notice and a copy of the Disclosure Request to the Supplying Party within three (3) Business Days of receipt of the Disclosure Request. Within three (3) Business Days of receipt of such notice, the Supplying Party shall provide notice to the Receiving Party either:

(i) that the Supplying Party believes there are reasonable legal grounds for denying or objecting to the Disclosure Request and will seek a protective order or other judicial determination to protect the confidential information. In such case, the Supplying Party will

cover all of its own costs and further agrees to indemnify and pay any and all costs incurred by Receiving Party as a result of the Supplying Party's attempts to protect from disclosure the information, or

(ii) that the Receiving Party may disclose the information.

15.2 No Recourse Against Customer and/or NCPA Members. Both Customer and NCPA are organized as a joint powers agency/authority in accordance with the Joint Powers Act of the State of California (Government Code Section 6500 et seq.), pursuant to the Joint Powers Agreement in the case of NCPA, and pursuant to the Third Amended and Restated Joint Powers Agreement, effective as of October 13, 2016, as such agreement may be further amended or amended and restated, in the case of Customer, and each are a public entity separate from its constituent members. Customer and NCPA shall each be solely responsible for its own debts, obligations and liabilities accruing and arising out of this Agreement. NCPA and Customer each acknowledge that it shall have no rights and shall not make any claims, take any actions or assert any remedies against the other Party's constituent members in connection with this Agreement.

15.3 Survival of Obligations. The defense and indemnity obligations of Section 6.1.1 shall survive the termination of this Agreement.

15.4 No Consequential Damages. FOR ANY BREACH OF ANY PROVISION OF THIS AGREEMENT FOR WHICH AN EXPRESS REMEDY OR MEASURE OF DAMAGES IS PROVIDED IN THIS AGREEMENT, THE LIABILITY OF THE DEFAULTING PARTY SHALL BE LIMITED AS SET FORTH IN SUCH PROVISION, AND ALL OTHER DAMAGES OR REMEDIES ARE HEREBY WAIVED. IF NO REMEDY OR MEASURE OF DAMAGE IS EXPRESSLY PROVIDED, THE LIABILITY OF THE DEFAULTING PARTY SHALL BE LIMITED TO ACTUAL DAMAGES ONLY AND ALL OTHER DAMAGES AND REMEDIES ARE HEREBY WAIVED. IN NO EVENT SHALL A PARTY OR SUCH PARTY'S RESPECTIVE SUCCESSORS, ASSIGNS, REPRESENTATIVES, DIRECTORS, OFFICERS, AGENTS, OR EMPLOYEES BE LIABLE FOR ANY LOST PROFITS, CONSEQUENTIAL, SPECIAL, EXEMPLARY, INDIRECT, PUNITIVE OR INCIDENTAL LOSSES OR DAMAGES, INCLUDING LOSS OF USE, LOSS OF GOODWILL, LOST REVENUES, LOSS OF PROFIT OR LOSS OF CONTRACTS EVEN IF SUCH PARTY

HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND EACH PARTY HEREBY WAIVES SUCH CLAIMS AND RELEASES EACH OTHER AND EACH OF SUCH PERSONS FROM ANY SUCH LIABILITY.

The Parties acknowledge that California Civil Code section 1542 provides that: “A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement with the debtor.” The Parties waive the provisions of section 1542, or other similar provisions of law, and intend that the waiver and release provided by this Section of this Agreement shall be fully enforceable despite its reference to future or unknown claims.

15.5 Waiver. No waiver of the performance by a Party of any obligation under this Agreement with respect to any default or any other matter arising in connection with this Agreement shall be effective unless given by the other Party. Any such waiver by the other Party in any particular instance shall not be deemed a waiver with respect to any subsequent performance, default or matter.

15.6 Amendments. Unless otherwise provided for in this Agreement, this Agreement may be amended only by written instrument executed by the Parties with the same formality as this Agreement.

15.6.1 Amendments of Appendices. The Appendices that are attached to and made part of this Agreement include detailed principles, descriptions and procedures for NCPA’s provision of Services to Customer. Upon mutual written consent of the Designated Representative of each Party, the Appendices of this Agreement may be amended from time to time, without the requirement of an approval as required pursuant to Section 15.6; provided, however, Appendix A and Appendix B may be amended only by written instrument executed by the Parties with the same formality as this Agreement.

15.7 Assignment of Agreement.

15.7.1 Binding Upon Successors. This Agreement, including the Appendices attached hereto, shall inure to the benefit of and shall be binding upon the respective successors and assignees of the Parties to this Agreement.

15.7.2 No Assignment. This Agreement, nor any interest herein, shall be transferred or assigned by a Party hereto except with the consent in writing of the other Parties hereto, where such consent shall not be unreasonably withheld.

15.8 Severability. In the event that any of the terms, covenants or conditions of this Agreement or the application of any such term, covenant or condition, shall be held invalid as to any person or circumstance by any court having jurisdiction, all other terms, covenants or conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect unless the court holds that such provisions are not severable from all other provisions of this Agreement.

15.9 Governing Law. This Agreement shall be interpreted, governed by, and construed under the laws of the State of California.

15.10 Headings. All indices, titles, subject headings, section titles and similar items are provided for the purpose of convenience and are not intended to be inclusive, definitive, or affect the meaning of the contents of this Agreement or the scope thereof.

15.11 Notices. Any notice, demand or request provided for in this Agreement, or served, given or made shall become effective when delivered to the person specified below (the “Designated Representative”):

NCPA:
Tony Zimmer
Assistant General Manager, Power Management
Northern California Power Agency
651 Commerce Drive
Roseville, CA 95678

Customer: Sonoma Clean Power Authority
Deb Emerson
Director of Power Services
50 Santa Rosa Avenue, Fifth Floor

Santa Rosa, CA 95404
demerson@sonomacleanpower.org

All notices shall be deemed delivered when personally delivered, two (2) Business Days after deposit in the United States mail first class postage prepaid, or on the first Business Day following delivery through electronic communication. All notices sent to Customer by United States mail shall include a courtesy copy sent by email. A Party may change its Designated Representative by providing notice to the other Party, and such change shall not constitute an amendment to this Agreement.

15.12 Warranty of Authority. Each Party represents and warrants that it has been duly authorized by all requisite approval and action to execute and deliver this Agreement and that this Agreement is a binding, legal, and valid agreement enforceable in accordance with its terms.

15.13 Counterparts. This Agreement may be executed in any number of counterparts, and each executed counterpart shall have the same force and effect as an original instrument and as if all the signatories to all of the counterparts had signed the same instrument. Any signature page of this Agreement may be detached from any counterpart of this Agreement without impairing the legal effect of any signatures thereon, and may be attached to another counterpart of this Agreement identical in form hereto but having attached to it one or more signature pages.

15.14 Venue. In the event that a Party brings any action under this Agreement, the Parties agree that trial of such action shall be vested exclusively in the state courts of California in the County of San Francisco or in the United States District Court for the Northern District of California.

15.15 Attorneys' Fees. If a Party to this Agreement brings any action, including an action for declaratory relief, to enforce or interpret the provisions of this Agreement, each Party shall bear its own fees and costs, including attorneys' fees, associated with the action.

15.16 Counsel Representation. Pursuant to the provisions of California Civil Code Section 1717 (a), each of the Parties was represented by counsel in the negotiation and

execution of this Agreement and no one Party is the author of this Agreement or any of its subparts. Those terms of this Agreement which dictate the responsibility for bearing any attorney's fees incurred in arbitration, litigation or settlement in a manner inconsistent with the provisions of Section 6.1.1 were intentionally so drafted by the Parties, and any ambiguities in this Agreement shall not be interpreted for or against a Party by reason of that Party being the author of the provision.

15.17 No Third Party Beneficiaries. Nothing contained in this Agreement is intended by the Parties, nor shall any provision of this Agreement be deemed or construed by the Parties, by any third person or any Third Parties, to be for the benefit of any Third Party, nor shall any Third Party have any right to enforce any provision of this Agreement or be entitled to damages for any breach by the Parties of any of the provisions of this Agreement.

15.18 Integration; Incorporation. This Agreement, including all the appendices attached hereto, represents the entire and integrated agreement between Customer and NCPA relating to the subject matter of this Agreement, and supersedes all prior negotiations, representations, or agreements, either written or oral. All appendixes attached hereto are incorporated by reference herein.

15.19 Reliability Requirements. Unless otherwise specifically provided for herein, the Parties acknowledge that Customer and NCPA may be both individually responsible for compliance with the WECC and NERC Reliability Standards and criteria applicable to the functions for which each Party are respectively registered with NERC. The references to WECC and NERC Reliability Standards, if any, throughout this Agreement do not make any alteration or enlargement of the requirements or standards applicable to each Party beyond their individual registrations with NERC.

15.20 Significant Regulatory Change or Operational Change.

15.20.1 A "Significant Regulatory Change" shall be deemed to occur if FERC, the CPUC, the CAISO or any other court, public authority, governmental, or other lawfully established civilian authorities having jurisdiction, issues an order or decision or adopts or

modifies a tariff or filed contract, or enacts a law that materially interferes with the ability of any Party to perform any of its obligations under this Agreement.

15.20.2 A “Significant Operational Change” shall be deemed to occur due to (i) material amendments and/or revisions to any tariffs, contracts or other applicable documents referenced in this Agreement that directly affect a Party’s obligations under this Agreement, (ii) an action taken by the Balancing Authority that directly affects a Party’s obligations under this Agreement, or (iii) a significant and material change in Customer’s supply and demand portfolio that may result in a significant and material change in the scale and scope of services contemplated at the Effective Date of this Agreement.

15.20.3 Notification of Significant Regulatory Change or Operational Change. At any time during the term of this Agreement, if any Party anticipates the occurrence of a Significant Regulatory Change or Significant Operational Change that may reasonably be expected to materially interfere with the ability of any Party to perform any of its obligations under this Agreement, or such Significant Regulatory Change or Significant Operational Change occurs, such Party shall provide written notice to the other Party as soon as practicable. The notice shall contain a description of the Significant Regulatory Change or Significant Operational Change, including expected time schedules, and of the effect of the significant change to the Parties. If the Party giving notice believes that it will be necessary to amend this Agreement to address the anticipated change or change when it has occurred, then the notice to the other Party may include a proposal that the Parties meet to negotiate an appropriate amendment to this Agreement. The Parties shall promptly enter into good faith negotiations and attempt to achieve a mutually agreeable modification to this Agreement to address any such Significant Regulatory Change or Significant Operational Change.

15.20.4 Amendment of Agreement. If the Parties agree that an amendment to this Agreement is necessary to address a Significant Regulatory Change or Significant Operational Change, the Parties will proceed to negotiate such amendment in good faith. If the Parties have not reached agreement within one hundred and twenty (120) Calendar

Days of the date of the first meeting, either Party may terminate this Agreement upon ninety (90) Calendar Days prior written notice provided to the other Party.

IN WITNESS WHEREOF, NCPA and Customer have, by the signature of its duly authorized representative shown below, executed and delivered a counterpart of this Agreement.

Northern California Power Agency

Sonoma Clean Power Authority

RANDY S. HOWARD, General Manager

Attest:

Assistant Secretary of the Commission

Approved as to Form:

Approved as to Form:

General Counsel

APPENDIX A

SCOPE OF SERVICES

All Services provided by NCPA to Customer pursuant to this Agreement are described in this Appendix A.

Section 1. SCHEDULING COORDINATOR SERVICES

1.1 Description of Service. NCPA shall provide scheduling coordinator services ("Scheduling Coordinator Services") to Customer, acting as Customer's Scheduling Coordinator or Scheduling Agent, as further set forth herein, in accordance with this Agreement, the CAISO Tariff, and other rules and requirements, as applicable. Scheduling Coordinator Services include the following duties, and are furthermore described in Appendix C of this Agreement:

1.1.1 NCPA will assist Customer with the process of transferring Customer's load and resources from the Scheduling Coordinator account in which they currently reside, if any, to either NCPA's Scheduling Coordinator account, or Customer's Scheduling Coordinator account.

1.1.2 Development and submission of schedules and Bids for Customer's loads, resources, trades, ancillary services and/or other CAISO products in the CAISO energy and ancillary services markets, or other markets, as applicable. All schedules and Bids will be made and submitted to the CAISO in accordance with Appendix C and the CAISO Tariff, or other balancing authority areas in accordance with the applicable rules and requirements. Customer's owned and operated generation facilities, if any, for which NCPA supplies Scheduling Coordinator Services on behalf of are listed in Appendix D.

1.1.3 NCPA shall perform outage coordination and management for Customer's generating resource planned and unplanned outages in accordance with applicable rules and requirements, including, but not limited to, the CAISO Tariff and associated operational procedures.

1.1.4 Obtain and maintain settlement quality meter data in accordance with the CAISO Tariff, the MSA CAISO ME or MSA SC, as applicable, to be used for multiple

purposes, including, but not limited to forecasting and settlement validation. For the purpose of clarity, Customer intends to acquire, or has acquired, the services of a Third Party supplier to provide and/or perform meter data management services on behalf of Customer. Meter data management services include, but are not limited to, collection of meter data, validation of meter data, profiling and formatting of meter data, and development and submission of Settlement Quality Meter Data to the CAISO in accordance with the requirements of the CAISO Tariff. Metering services provided by NCPA, as contemplated herein, are limited to collecting the processed Settlement Quality Meter Data from and/or through applicable access, as provided by the CAISO (e.g., querying data from the CAISO MRI-S software application), storing such data, and using the data for the purpose of forecasting and validating CAISO settlement charges and credits attributed to Customer's activities. In addition to SQMD quality data, NCPA will store and make available additional meter data, including aggregated data and/or advanced metering infrastructure interval data, to the extent such data is available to NCPA via Customer or Customer's Third Party meter data manager agent.

1.1.5 Submit Resource Adequacy supply plans and compliance filings to appropriate Balancing Authorities and regulatory authorities by defined deadlines.

1.1.6 Develop, submit and management of E-Tags for Customer interchange transactions.

1.1.7 Review, validate, and reconcile CAISO settlement charges and credits for services, file timely disputes and pursuant dispute resolution.

1.1.8 Monitoring and dispatching of Customer generation facilities.

1.1.9 Management of unplanned outages and system emergencies.

1.1.10 Operational coordination, communication, and monitoring in coordination with Customer's suppliers.

1.1.11 Monitor alarms and operate Customer generation facilities in accordance with any applicable Operating Procedures and requirements, as may be set forth in Appendix C, including regulatory and/or environmental requirements.

1.1.12 Providing pre-scheduling and real-time optimization services (including development of bidding strategies) for Customer's loads and resources, including prompt adjustments to existing bidding strategies to changing circumstances such as PSPS events, natural disasters, weather events, pandemics, epidemics, etc. to optimize load bidding and maximize resource value.

1.1.13 Coordination of daily and intra-daily operational communications with Customer's operational counterparts, including coordination with Customer's energy supplier counterparties and meter data management agent.

1.1.14 Perform short term load and resource forecasting activities, and provide monthly forecast reconciliation reports comparing forecast to actual energy usage, and update forecasting models in direct coordination with Customer, as required to reduce systematic forecasting errors. For the avoidance of doubt, short term load and resource forecasting activities shall reflect reasonably anticipated circumstances such as PSPS events, natural disasters, weather events, pandemics, epidemics, etc.

1.1.15 Submit Congestion Revenue Rights nominations and bids, acting as Customer's agent, and provide quarterly effectiveness reports.

1.1.16 Develop and provide performance reports and operational reports to Customer, and provision of interval and summary data through use of web based portal interface. Data management and reporting, using a comprehensive suite of software tools, and data interfaces, whereby Customer will receive training from time to time on and have direct access to use certain systems, including, but not limited to, a deal capture and management system, data portal and other data management tools, risk management and credit tools, and other bid-to-bill support applications.

1.1.17 NCPA and Customer will engage in regularly scheduled in person meetings to review the Services provided herein on a frequency that both Parties agree to be reasonable.

Section 2. INFORMATION REQUIREMENTS

2.1 Information Requirements. To enable NCPA to perform the duties associated with Services provided to Customer in accordance with this Agreement, Customer shall timely provide the following information, instructions, and communications to NCPA (as applicable):

2.1.1 Meter Data. Customer shall provide NCPA access to settlement quality meter data from loads and resources scheduled and Bid by NCPA for Customer under this Agreement, and to maintain such meters and metering equipment in accordance with the standards and requirements as set forth in the CAISO Tariff, as such may be applicable.

2.1.2 Operational Data. Customer shall provide NCPA access to certain real-time operational systems and information if applicable and available (as mutually determined by NCPA and Customer) including, but not limited to: (i) Supervisory Control and Data Acquisition (“SCADA”) systems, (ii) Programmable Logic Controllers (“PLC”), and (iii) Real-time telemetry and recording devices.

2.1.3 Scheduling and Operating Procedures. NCPA shall prepare, and Customer shall approve, written scheduling procedures (“Scheduling Procedures”) and operating procedures (“Operating Procedures”) related to Customer loads and generation resources that convey Customer’s guidelines for how NCPA is to perform certain Scheduling Coordinator Services under this Agreement, and included at such time as Appendix C, respectively. Such Scheduling Procedures and Operating Procedures shall be agreed to sufficiently in advance of their application so as to reasonably enable NCPA to perform such activities, and shall include Scheduling Procedures and Operating Procedures to be used during PSPS events, natural disasters, weather events, pandemics, epidemics, and other Uncontrollable Forces.

Section 3. SERVICE TRANSITION

3.1 The Parties acknowledge that prior to the date on which specific Services shall be supplied by NCPA for a specific Customer load and/or generating resource, the Parties may be required to perform certain work and other activities to establish and enable the systems and processes that are required to perform Services as of the date on which Services for a specific Customer load and/or generating resource is to commence. Such activities may include establishing common business practices, developing business requirements, establishing connectivity of systems and equipment, coordinated training of staff, and other activities, including pursuant to Section 1.1.1. above, that may be required to enable NCPA to provide, and Customer to receive, Services. During this transition period (the "Transition Period"), the Parties agree to cooperate in good faith to establish and enable the systems and processes that are required to perform Services. All activities to be performed by NCPA during the Transition Period are included as part of the comprehensive Services provided to Customer, pursuant to this Agreement, even though such work and activities may be performed by NCPA prior to the date on which specific Services shall be supplied by NCPA for a specific Customer generating resource.

Section 4. SUPPLEMENTAL SERVICES IN ACCORDANCE WITH TASK ORDER PROCESS

4.1 Description of Service. NCPA may, at its sole discretion, provide certain technical support services, or other advisory services, to Customer upon mutual written agreement between the Parties ("Supplemental Services"). All requests for Supplemental Services shall be submitted by Customer to NCPA in accordance with the task order process described in Appendix E ("Task Order Process").

4.2 Compensation for Supplemental Services. Costs for NCPA's provision of Supplemental Services shall be charged to Customer on a time and materials basis. Pursuant to Section 7.1 of this Agreement, in consideration of NCPA's provision of Supplemental Services, Customer shall pay NCPA the sum of: (i) an amount equal to the number of hours required to complete each respective task, multiplied by the applicable hourly rate listed in the Supplemental Services Rate Schedule contained in Appendix B, and (ii) out of pocket expenses and the cost of materials. The scope of each Supplemental Service shall be specified in each

respective task order (“Task Order Request”) developed by the Parties pursuant to the Task Order Process.

APPENDIX B

COMPENSATION SCHEDULE

Pursuant to Section 7.1 of this Agreement, Customer shall pay NCPA the amounts listed in this Appendix B (the "Compensation Schedule") in consideration for Services provided under this Agreement.

Section 1. COMPENSATION SCHEDULE

1.1 In consideration for NCPA's provision of all Services, except Supplemental Services, Customer shall pay NCPA an annual amount equal to Two Hundred Five Thousand Dollars (\$205,000.00) for Services ("Services Fee") for each one (1) year period of January 1st through December 31st (a "Service Year"). If the date on which NCPA begins supplying Scheduling Coordinator Services to Customer occurs after January 1, 2021, the compensation amount listed herein for the first Service Year shall be prorated based on the actual date on which NCPA begins supplying Scheduling Coordinator Services to Customer. Furthermore, if the date on which NCPA begins supplying Scheduling Coordinator Services to Customer occurs after the first (1st) day of a monthly period during the first Service Year, the monthly payment made from Customer to NCPA shall be prorated based on the number of Calendar Days during such month.

1.2 The Services Fee for each Service Year shall be billed to Customer in twelve (12) equal monthly installments, in accordance with Section 8 of this Agreement, except as provided in Section 1.1 of this Appendix B.

Section 2. SUPPLEMENTAL SERVICES

2.1 Pursuant to Section 4 of Appendix A, NCPA may provide Supplemental Services to Customer. All costs charged to Customer for Supplemental Services ("Supplemental Services Fee") are separate from and in addition to the compensation paid for all other Services, as set forth in Section 1 of this Appendix B. The following is the hourly rate schedule applicable to Supplemental Services ("Supplemental Services Rate Schedule"):

SUPPLEMENTAL SERVICES RATE SCHEDULE

Job Classification	Hourly Rate (\$/Hr.)
Accountant/Analyst I-III	\$ 150.00
Administrative Assistant I-III	\$ 90.00
Assistant General Manager	\$ 300.00
Computer Tech Analyst I-IV	\$ 170.00
Sr. Computer Tech Analyst	\$ 180.00
Risk Manager	\$ 180.00
Compliance Manager	\$ 230.00
Engineer/Energy Resource Analyst I-IV	\$ 180.00
Mgr. Information Svcs. and Power Settlements	\$ 240.00
Power Settlements Analyst	\$ 160.00
Power Settlements Manager	\$ 210.00
Scheduler/Planner	\$ 180.00
Supervisor I-III	\$ 230.00

2.2 This rate schedule may be amended from time to time by NCPA as its costs of labor increase, and may add, subtract or amend job classification titles (and their respective hourly rates) as its job classification schedule is amended. NCPA shall provide written notice to Customer of any such amendment prior to charging any increased rate.

APPENDIX C

SCHEDULING AND OPERATING PROCEDURES

The Scheduling Procedures and Operating Procedures are separately attached to this Agreement as Appendix C.

SCPA-PM-001 (Forecasting, Scheduling and Bidding)

SCPA-PM-002 (Settlements)

SCPA-PM-003 (Regulatory and Compliance)

APPENDIX D

CUSTOMER RESOURCES

The following is a list of Customer's resource for which NCPA provides Services pursuant to this Agreement.

RESERVED

APPENDIX E

TASK ORDER PROCESS

Pursuant to Section 4 of Appendix A, the Parties may agree to certain Supplemental Services. All requests for Supplemental Services shall be submitted by Customer to NCPA in accordance with the Task Order Process described in this Appendix E.

Section 1. Task Order Process

1.1 Submission of a Task Order. Customer may submit a Task Order Request for Supplemental Services to NCPA in accordance with the terms and conditions of this Agreement. All Supplemental Services requests shall be submitted to NCPA in writing using the task order request form attached to this Appendix E ("Task Order Request Form"). In the Task Order Request Form, Customer shall provide a description of the desired Supplemental Services, a time frame on which Customer is seeking such Supplemental Services to be completed, and all other relevant details that may assist NCPA's review and consideration of the Task Order Request.

1.2 Review of Task Order Request. Once NCPA receives a Task Order Request from Customer, NCPA will review the Customer's request to determine if NCPA can perform the desired work. Once NCPA has completed its review of the Task Order Request, NCPA will provide a written response to Customer to confirm that NCPA is either: (i) able and willing to perform the Supplemental Services as requested, or (ii) not able or not willing to perform the Supplement Services as requested. If NCPA is able and willing to perform the Supplemental Services as requested, NCPA will provide a written proposal for NCPA's provision of the requested Supplemental Services to Customer, including a detailed project scope and estimated cost for performing the desired work ("Supplemental Services Task Order").

1.3 Task Order Confirmation. Upon receipt of the Supplemental Services Task Order, if any, Customer may agree to accept or not accept NCPA's proposal to supply Supplemental Services. If Customer agrees to accept NCPA's proposal to supply Supplemental Services, upon mutual written consent of the Designated Representatives of each Party, the Parties shall

confirm the terms and conditions of the Supplemental Services by executing the Supplemental Services Task Order. NCPA shall invoice Customer for the full estimated cost of the Supplemental Services, as set forth in the Supplemental Services Task Order, prior to NCPA's provision of the Supplemental Services to Customer. Such amounts shall be billed to Customer in accordance with Section 8 of this Agreement.

1.4 Billing Adjustments. Upon completion of the Supplemental Services, NCPA shall provide a final written accounting for all actual costs associated with NCPA's provision of the Supplemental Services to Customer, and shall either: (i) refund any positive difference between estimated costs and actual costs, or (ii) invoice Customer for the amount of actual costs that are greater than the amount of estimated costs collected from Customer ("Adjustment Amount"). Any Adjustment Amount shall be billed to Customer in accordance with Section 8 of this Agreement.

1.5 Disputes. Any disputes associated with NCPA's provision of Supplemental Services to Customer shall be resolved under the dispute resolution procedures set forth in Section 13 of this Agreement.

Northern California Power Agency

Task Order Request Form

Attention: Contract Administration
651 Commerce Drive
Roseville, CA 95678
Phone: 916-781-4229
Email: tony.zimmer@ncpa.com

Dated As: _____
Date of Completion: _____

Customer Information:

Customer Name: _____
Designated Representative: _____
Address: _____
Phone: _____
Email: _____

Task Details

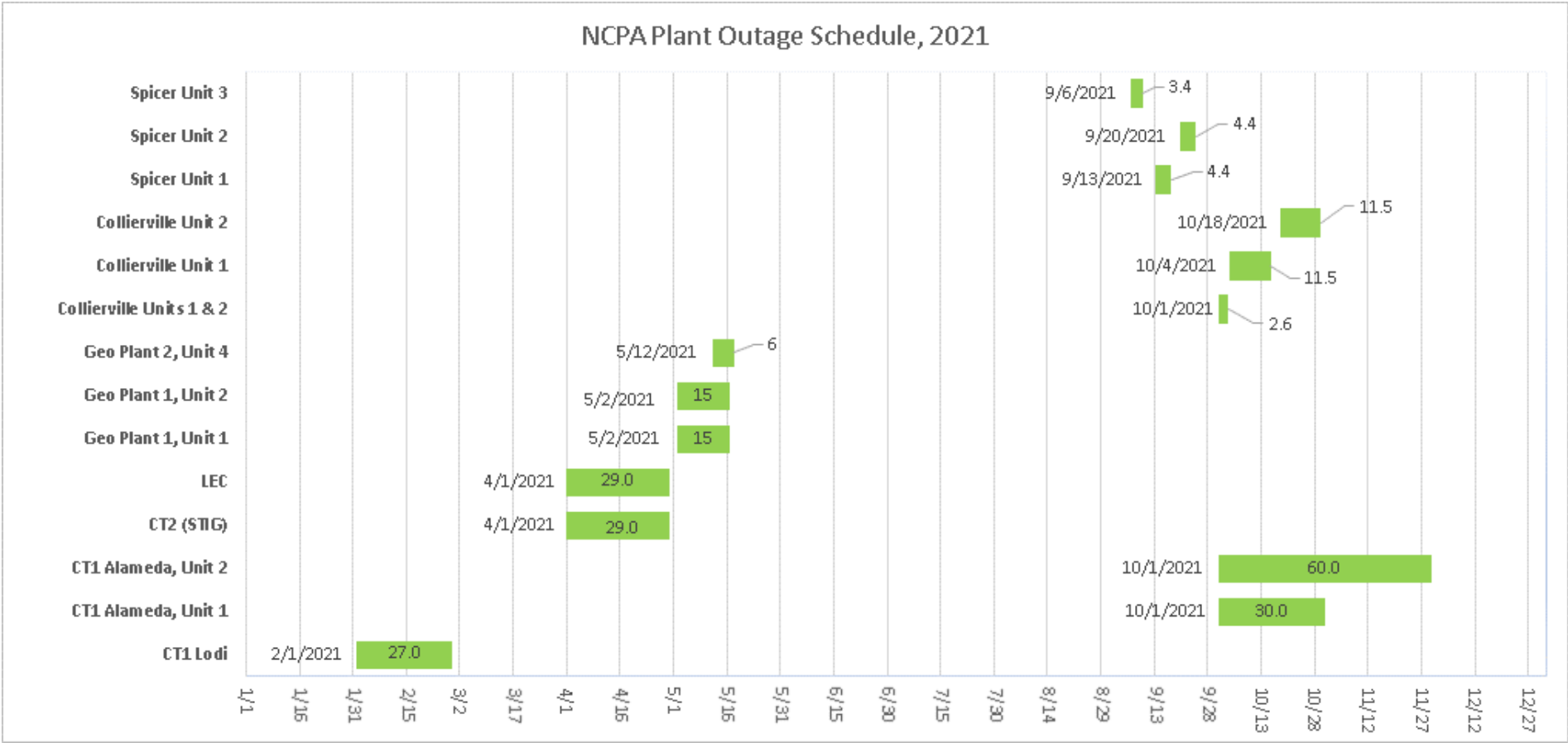
Additional Notes:

[Customer Designated Representative]

2021 Outage Schedule Detail

UNIT NAME	START DATE/TIME	DURATION (DAYS)	END DATE/TIME	WORK TO BE PERFORMED
CT1 Lodi	2/1/2021	27.0	2/28/2021	Annual Maintenance
CT1 Alameda, Unit 1	10/1/2021	30.0	10/31/2021	Annual Maintenance / Starting Motor
CT1 Alameda, Unit 2	10/1/2021	60.0	11/30/2021	Major / Starting Motor
CT2 (STIG)	4/1/2021	29.0	4/30/2021	Annual Maintenance
LEC	4/1/2021	29.0	4/30/2021	Annual Maintenance
Geo Plant 1, Unit 1	5/2/2021	15	5/14/2021	Annual Maintenance, 230 inspection, HVAC install
Geo Plant 1, Unit 2	5/2/2021	15	5/14/2021	Annual Maintenance, 230 inspection, HVAC install
Geo Plant 2, Unit 4	5/12/2021	6	5/17/2021	Annual Maintenance, 230 inspection
Collierville Units 1 & 2	10/1/21 5:00	2.6	10/3/21 19:00	Collierville dual unit trip tests, fire system maintenance & and McKays intake trash rack cleaning
Collierville Unit 1	10/4/21 7:00	11.5	10/15/21 18:00	CV1 Annual Maintenance
Collierville Unit 2	10/18/21 7:00	11.5	10/29/21 18:00	CV2 Annual Maintenance
Spicer Unit 1	9/13/21 8:00	4.4	9/17/21 17:00	NSM1 Annual Maintenance
Spicer Unit 2	9/20/21 8:00	4.4	9/24/21 17:00	NSM2 Annual Maintenance
Spicer Unit 3	9/6/21 8:00	3.4	9/9/21 18:00	NSM3 & Intake Annual Maintenance

2021 Outage Schedule Bar Chart



March 2020

CT1 ALAMEDA HYBRID PLANT BESS VALUATION STUDY



Prepared by

acelerex

Prepared for:



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1. Executive Summary

The report presents a study of the valuation of the CT1 Alameda plant as a hybrid system with the Combustion Turbine (CT) generators and Energy Storage (ES). The study involves a review and analysis of the feasibility and benefits of ES for the NCPA grid system along with the identification of any potential advantages. For the feasibility of ES at the location of the CT1 Project 1 Alameda plant in CAISO, a detailed valuation analysis of storage use cases and storage technologies is conducted. The process involves backcasting and forecasting revenues that could be generated with existing CTs and a hybrid system involving ES.

The study analyzes the hybrid system providing energy arbitrage, spinning reserve, and regulation services as stacked services. A co-optimization model of energy and ancillary services is simulated to determine the revenue and cycling. Econometric methodology is used for forecasting of future energy and ancillary prices. Based on the study, recommendations will be provided, if applicable, for storage adoption in the context of storage sizing, components, financial feasibility, and life cycle management. The results of this study will help to develop recommendations for business and use cases, along with identifying key issues in the development, ownership, operations, and management of Energy Storage projects for NCPA.

For the analysis, NCPA has provided data like historical 5-min interval net generation of each unit, historical daily revenues as total of both units, historical daily gas rates, and specific values of each unit such as minimum and maximum load, heat rates, fuel burn rates, ramp rates, emission rates, minimum up-times and down-times, start times, and VOM costs. Besides, data like historical hourly energy prices and ancillary prices were downloaded from the CAISO Oasis data portal. All the data inputs used for the analysis are compiled in Section 6. In this report, hourly forecasts of the fuel prices, energy prices, ancillary prices are presented in Section 0.

Sizing of energy storage depends on the adopted dispatch strategy. The strategy proposed involved charging energy storage to its maximum capacity at the off-peak prices and discharging during the peak prices. Spinning reserve is to be provided during the off-peak price duration, and Regulation is to be provided during the peak price duration.

Based on the calculation presented in this report, to dispatch one CT with energy storage for spinning reserve, a storage of 8 MW and 1 MWh should be sufficient. For two CTs, the energy storage requirement would be 16 MW and 2 MWh. For energy arbitrage, the requirement of additional capacity is determined with economic justification. Energy Storage can also provide

regulation up and regulation down. As observed from the historical ancillary prices, NP26 only receives regulation up signals, so the ES will be paid only for the regulation up services. According to the proposed strategy, regulation will be provided during the peak price hours. So, additional capacity of ES is not required for regulation.

As observed in the calculation results on the historical values with different SOC limits, the results with 20-80% SOC limits are similar to the preliminary calculation performed based on the recommended dispatch strategy. So, using the same SOC limits of 20-80%, SSE calculations are performed on the forecasted energy and ancillary prices.

The valuation results show that the minimum size of Energy Storage (16MW and 2MWh) providing energy arbitrage, spinning reserve, regulation, and resource adequacy will not be sufficient to have a positive NPV. So economic valuation of energy storage with different duration is performed. The results show that with COD of 2021, the 1C storage of 16MW and 16MWh providing energy arbitrage, spinning reserve, resource adequacy, and regulation will also be not sufficient to have a positive NPV. However, with the declining costs of energy storage, 1C Storage could result in a positive NPV if COD year is 2026 or later. Figure 1 shows a comparison of NPV (in \$ million) for Energy Storage of 16MW with a duration of 0.125 hr, 0.25hr, 0.5hr, 1hr, 2hr, and 4hr. Also, an estimated NPV forecast for future COD years is shown to check the economic feasibility of each Energy Storage. Energy Storage with a C-rate of 1C, 0.5C, and 0.25C could be economically feasible in 2025.

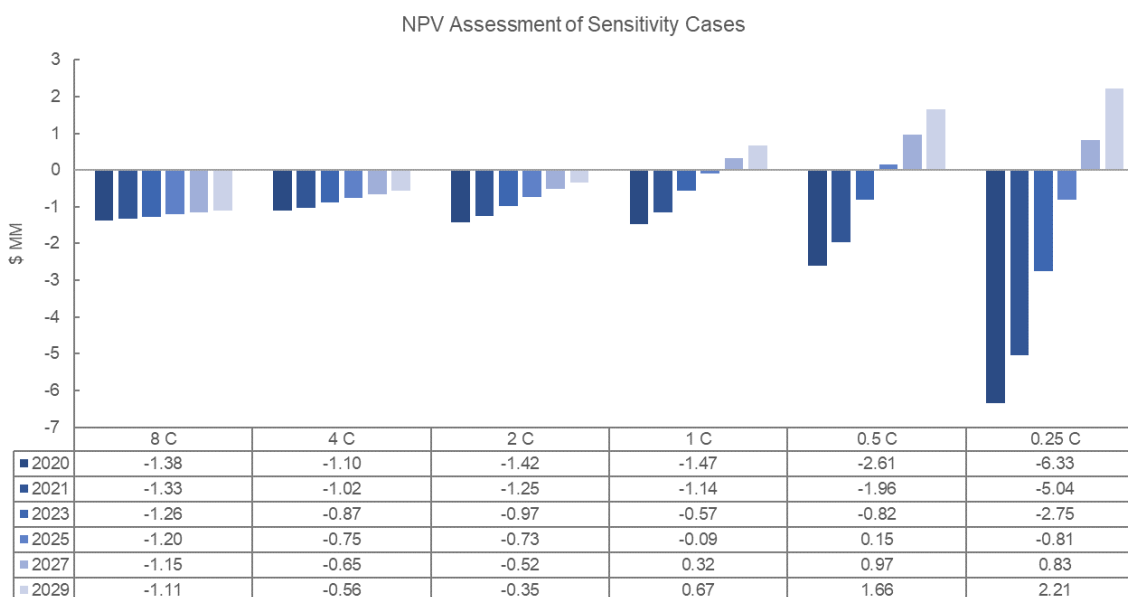


Figure 1 NPV Comparison with COD Years and C-Rates of Energy Storage

The main economic drag on the project is the land cost and connection cost involved with the energy storage; otherwise, batteries could be economically feasible by 2023. However, with the land cost and connection cost, it takes until 2026 to achieve an economic project assuming the four services of spin, regulation, energy arbitrage, and resource adequacy. If other services could be added, such as the black start or reliability of the city, it could have an impact on the economics.

Since energy storage with 1C is showing some economic potential, the 1C Storage case is considered as a base case for further analysis. Figure 2 shows the calculated NPV values for the 1C Storage case with high and low energy and ancillary price forecasts. As observed, 1C Storage is demonstrating economic feasibility from the year 2022 with high price forecasts.

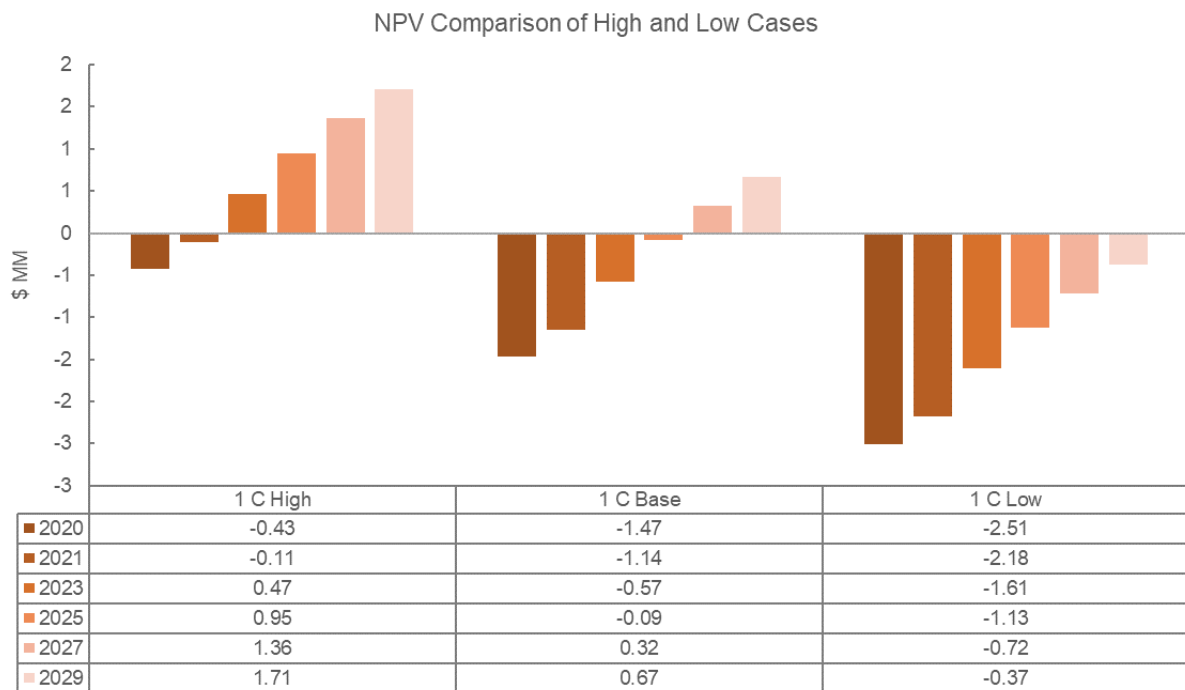


Figure 2 NPV Comparison of 1C Storage Case with High and Low Price Forecast

2. Introduction

The study presented in this report evaluates the feasibility and overall advantages of battery energy storage for NCPA's CT1 Project 1, located in the City of Alameda. The study is performed based on a data-driven process of reviewing and analyzing the feasibility and benefits of energy storage for the grid system of NCPA, along with identifying any potential advantages. The report delivers overall analysis with tables and charts along with an attached spreadsheet model, which includes battery duty, battery costs, battery revenue, and discount cash flow. Acelerex Software will be used to perform calculations for valuation, planning, design, and operations with conventional technologies, renewable technologies, and energy storage.

2.1 Study Objective

The objective of this study is to perform an Energy Storage Valuation Study for NCPA focused on the CT1 Project 1 located in the City of Alameda and provide insight and advice to advance the understanding and knowledge of energy storage for NCPA executive teams. The study evaluates energy storage benefits for NCPA along with assessing location, size, timing, and impact on emissions.

2.2 Scope of Work

In this study, the feasibility of storage use cases and storage technologies at the CT1 Project 1 will be conducted. Based on the study, recommendations will be provided, if applicable, for storage adoption in the context of storage sizing, components, financial feasibility, and life cycle management. The study will help to develop recommendations for business and use cases, along with identifying key issues in the development, ownership, operations, and management of Energy Storage projects for NCPA.

The analysis will cover the following two exercises to achieve the objective of the study.

1. Conduct Energy Storage valuation study at the power plant node of California network
2. Evaluate Energy Storage for two use cases as defined by NCPA.

The valuation exercise will include the sizing in MW and MWh of the battery to optimize costs and revenue. An econometric price forecast of electricity and ancillary services prices will be derived

at CT1 Project 1 power station located in the city of Alameda, and the battery project will be valued for high price forecasts, as baseline forecast, and a low price forecast.

A co-optimization model of energy and ancillary services will be run, determining battery revenue and cycling. Based on these calculations, a detailed spreadsheet will be provided for the use cases for the battery potential with the following information:

1. Battery Costs (EPC, Scheduling, Capital Costs, FOM, VOM, End of Life, others)
2. Battery Revenue (energy arbitrage, ancillary services, capacity, plant optimization savings)
3. Discount Cashflow model pre-tax with no gearing
4. Sources of assumptions

3. NCPA Overview / CT1 Alameda Overview

3.1 Power System Overview

NCPA plants provide a stable and reliable energy supply to public power communities throughout Northern and Central California. NCPA manages seven power plant sites with a capacity of over 600 megawatts – including geothermal steam, hydroelectric, and natural gas-fired facilities – that, taken together, amount to a 96% emission-free generation portfolio.

NCPA is growing renewable energy investments through the establishment of a new Green Pool, where NCPA member utilities collectively contract for a diverse mix of renewable resources.

NCPA's 16 members include municipalities, a rural electric cooperative, and other publicly owned entities for which the not-for-profit agency provides such services as the purchase, aggregation, scheduling, and management of electrical energy.

3.2 CT1 Project 1 Overview [1]

The CT1 Project 1 includes three combustion turbines, each with a capacity of approximately 25 megawatts. Two units are located in the City of Alameda, and one is in the City of Lodi. NCPA's Central Dispatch Center in Lodi can remotely start or stop each turbine and bring these units fully online within ten minutes. These facilities possess the dual-fuel capability, with natural gas as the primary fuel and diesel fuel is available in the event of a natural gas curtailment. This project has played an instrumental role as an important source of peak load and reserve capacity for NCPA's

local communities and districts. In fact, due to the location and quickstart attributes of these facilities, NCPA was able to provide crucial power supply to the California Independent System Operator during the height of the electricity crisis.

3.3 Renewable Policy Review

NCPA's 775 MW portfolio of power plants is approximately 50% greenhouse gas emission-free. NCPA's mix of geothermal, hydroelectric, and natural gas resources is well positioned to help its members achieve California's goal of a 60% Renewable Portfolio Standard (RPS) by 2030. The agency's members collectively have spent more than \$100 million on energy efficiency since 2006, reducing demand for electricity by more than 350 GWh during that time.

Similarly, NCPA's 259 MW hydroelectric project in Calaveras County is also uniquely positioned to facilitate the integration of renewables into California's electricity grid, further helping the state to achieve RPS and carbon reduction goals.

3.4 CAISO Market

The CAISO wholesale energy market comprises of day-ahead and real-time markets. The energy products and services traded in the market allows CAISO to meet its reliability needs and serve load. The CAISO market also offers services in which qualified entities can buy and sell congestion revenue rights and engage in convergence bidding activities and ancillary services with energy storage.

3.4.1 Day-ahead market

The day-ahead market is made up of three market processes that run sequentially. First, the ISO runs a market power mitigation test. Bids that fail the test are revised to predetermined limits. Then the integrated forward market establishes the generation needed to meet forecast demand. And last, the residual unit commitment process designates additional power plants that will be needed for the next day and must be ready to generate electricity. Market prices set are based on bids.

A major component of the market is the full network model, which analyzes the active transmission and generation resources to find the least cost energy to serve demand. The model produces prices that show the cost of producing and delivering energy from individual nodes, or locations on the grid where transmission lines and generation interconnect.

Scheduling coordinators (SCs) are pre-qualified entities authorized to transact in the ISO market. The day-ahead market opens for bids and schedules seven days before and closes the day prior to the trade date.

3.4.2 Real-time market

The real-time market is a spot market in which utilities can buy power to meet the last few increments of demand not covered in their day-ahead schedules. It is also the market that secures energy reserves, held ready and available for ISO use if needed, and the energy needed to regulate transmission line stability.

The real-time market system dispatches power plants every 15 and 5 minutes, although under certain grid conditions, the ISO can dispatch for a single 1-minute interval.

3.4.3 Ancillary services

Ancillary services are energy products used to help maintain grid stability and reliability. There are four types of ancillary services products: regulation up, regulation down, spinning reserve and non-spinning reserve.

Regulation energy is used to control system frequency, which must be maintained very narrowly around 60 hertz, and varies as generators change their energy output. Resources providing regulation are certified by the ISO and must respond to automatic control signals to increase or decrease their operating levels depending upon the need. The resource should be capable of providing regulation for 2 hours. Regulation Up and Down resource must be synchronized and able to receive AGC signals, and be able to deliver the AS Award within 10 minutes based on the regulating ramp rate of the resource.

Spinning reserve is standby capacity from generation units already connected or synchronized to the grid and that can deliver their energy in 10 minutes when dispatched. Non-spinning reserve is capacity that can be synchronized to the grid and ramped to a specified load within 10 minutes. Both types of reserves should be capable of providing energy for a minimum of 2 hours.

According to Ancillary Service cascading, Regulation Up can be used as Spinning Reserve after the Regulation Up requirement is met.

4. Energy Storage Use Cases

Energy Storage can provide several grid services in a more economical fashion than the large generation assets historically used. These services could add further benefits if provided as Stacked Services. The following sections explain several services that could be provided by the CT1 Alameda plant using Energy Storage.

4.1 Energy Arbitrage

Energy arbitrage is the ability to purchase lower-cost energy to charge the storage device and re-sell the stored energy during higher cost periods. This maximizes profit for the ES owner while also potentially increasing asset utilization of both the ES system and base-load generation [2]. This can be applied for day-ahead and real-time markets. Energy arbitrage can also reduce fossil fuel burn when lower or zero marginal costs are used to charge the energy storage and when energy storage discharges to displace fuel burn of fossil fuel peaking resources.

4.2 Spinning Reserve

Spinning reserve, typically required to maintain grid stability during emergency operating conditions (e.g., generator disruption or load swings), can be provided by ES technology enabling a conventional generation to operate at optimal economic dispatch capacity rather than keeping some capacity in reserve. Depending on the ES application, the system can be made available in seconds to minutes to respond to the outage event. Spinning reserve also provides a reduction in unserved energy for network events providing significant revenue benefit.

4.3 Regulation

To maintain reliable power system operations, the generation must exactly match electricity demand at all times. Depending on the increase and decrease in load, the frequency of the system becomes low and high. The generators have to respond to these changes to keep the frequency stable at 60Hz. BESS can rapidly charge or discharge in a fraction of a second, faster than conventional thermal plants, making them a suitable resource for short-term reliability services such as Regulation.

4.4 Ancillary Services with Hybrid Power Plant

Hybrid power plant combines the instantaneous response of BESS with extended duration of a CT to have lower costs than conventional peaking capacity to enter the energy segment. Hybridization allows for greater flexibility and additional revenue streams for peaker power plants. The most significant of which is the ability to collect payments against full CT capacity.

As shown in Figure 3, whenever the plant is dispatched, BESS can respond immediately while the CT starts. Besides, during dispatch, BESS can also absorb fluctuations in demand working, reducing wear and tear from CT cycling. In the end, BESS is charged from the utility supply after the CT is turned off.

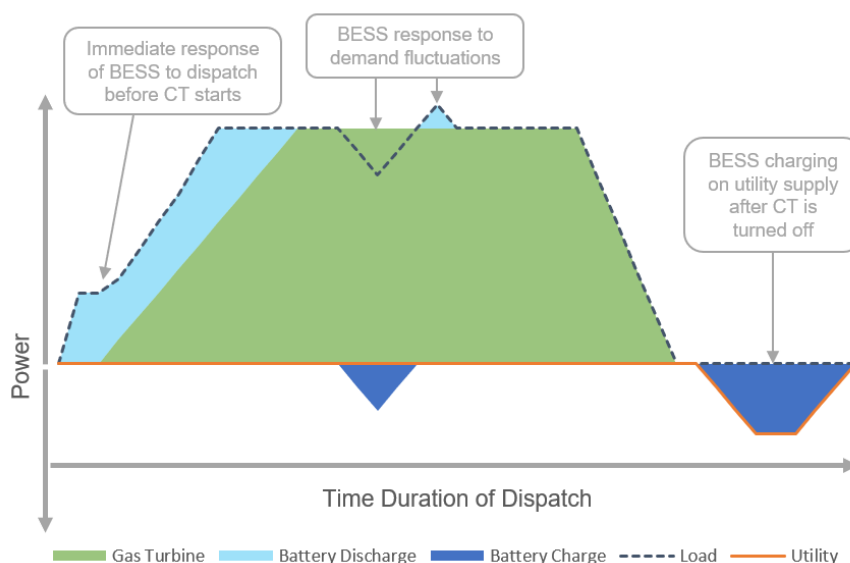


Figure 3 Profile of Hybrid Power Plant with BESS

Source: GE Battery Energy storage systems (BESS): ancillary services and beyond

Additional services available through the hybridization are the black start and voltage support. As shown in Table 1, a hybrid power plant can provide additional ancillary services with more reliability and increases the number of revenue streams.

Table 1 Key Services Provided by Hybrid Power Plant

	Combustion Turbine (CT)	BESS	Hybrid
Energy	✓		✓
Energy Arbitrage		✓	✓
Spinning Reserve		✓	✓
Non-spinning Reserve	✓		✓
Regulation		✓	✓

5. Methodology

A project valuation framework will be utilized for assessing market conditions and operational feasibility of grid-scale energy storage deployment by defining two scenarios for deployment. Acelerex has data services for the California electricity market and maintains a data warehouse of data for running valuation models using electricity market data.

5.1 Acelerex Analytics Software

The Acelerex Analytics Software is used to perform valuation analysis for BESS at the nodes of the NCPA system using the stacked services model. The Acelerex Stacked Services Emulator maximizes hourly profits from energy storage services. The Stacked Services Emulator module uses an objective function to maximize potential hourly profits from energy storage services.

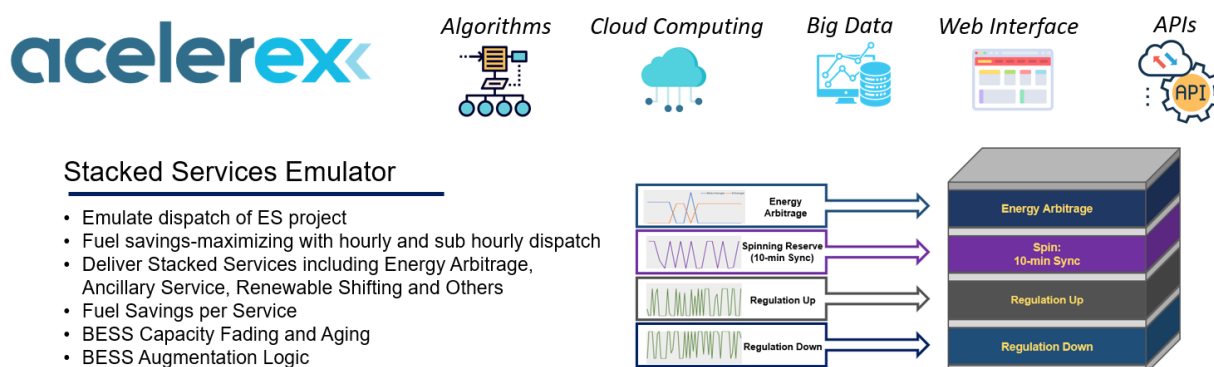


Figure 4: Acelerex Analytics Software

Source: Acelerex, Inc.

For this project, SSE considers two main applications of energy storage: energy arbitrage and ancillary services, which include reserves and other services. SSE gives hourly dispatch of energy storage with multiple use cases while considering the energy storage project's characteristics such as efficiency, size, duration, capacity fade curve, and state of charge (SOC). The emulator will return the optimal hourly charge and discharge dispatch data and charts and calculate revenues and profits for all the services at the project level.

The Stacked Services Emulator is used to simulate dispatch profiles for energy storage, using energy and ancillary services prices to determine energy arbitrage and ancillary services revenue potential at multiple nodes. Also, the stacked service emulator is used to simulate hourly and sub-

hourly dispatch profiles of energy storage for day-ahead and real-time market historical prices from the Acelerex database as well as with production cost model prices.

The Acelerex software is also used for econometric forecasting. It can evaluate monthly, daily, hourly, and sub-hourly econometric forecasts of energy prices, ancillary prices, fuel prices, and demand using the historical data.

5.2 Metrics

For the project-level energy storage metrics, Acelerex software computes sales, purchases, profit, cycling, fade, charging, discharging, losses, size in MW, size in MWh, and other metrics.

5.3 Dispatch Description

As observed in Figure 5 and Figure 6, energy prices are at peak and off-peak during a certain duration of time in a day. Ancillary requirements, mostly regulation, during the whole day. Based on these observations, a dispatch strategy is proposed, which will be used for the sizing and valuation analysis. Figure 5 shows a typical day in May of 2019.

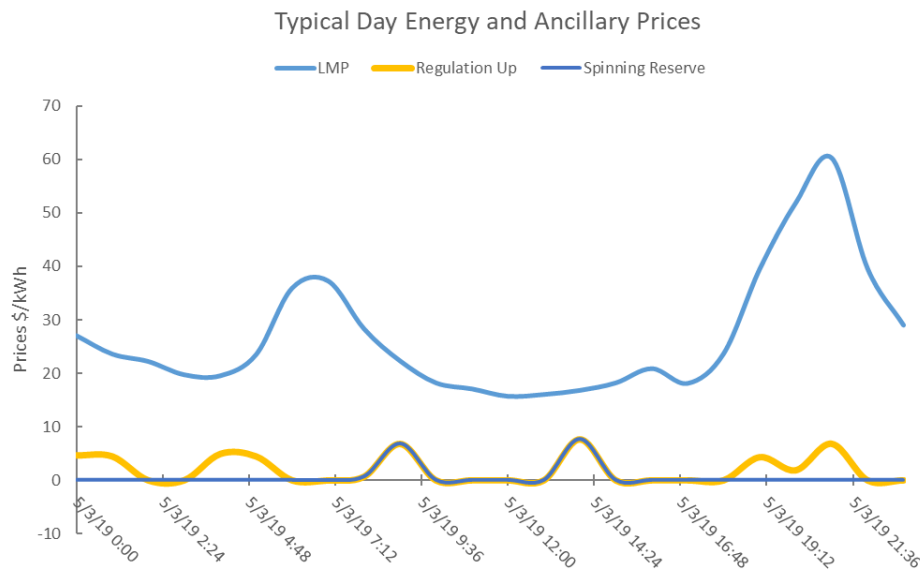


Figure 5 Typical Day-1 Energy and Ancillary Prices in 2019

Figure 6 shows energy and ancillary prices on a typical day of May 2019.

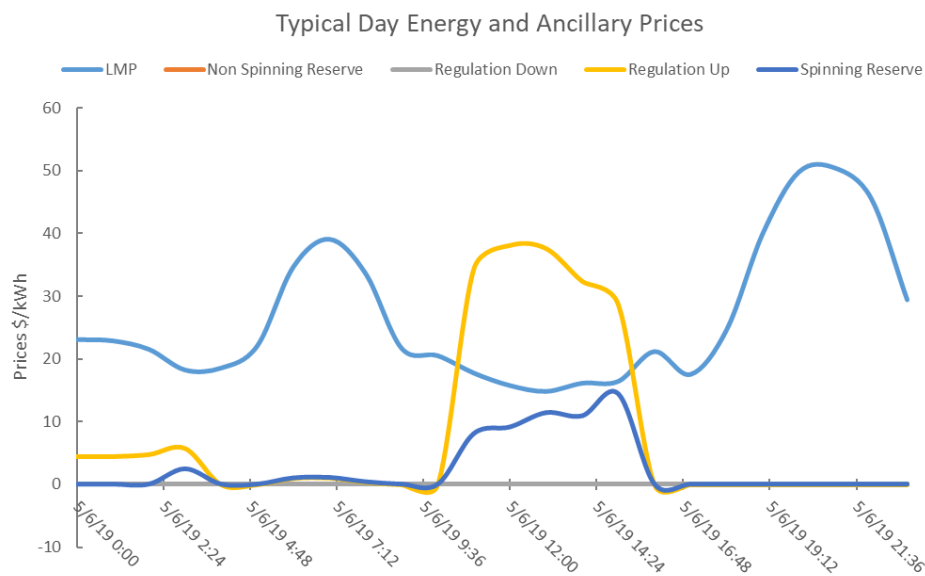


Figure 6 Typical Day-2 Energy and Ancillary Prices in 2019

Following dispatch strategy is proposed for the sizing and valuation analysis:

- Charging the BESS during the off-peak hours and discharging during the peak hours providing energy arbitrage services.
- BESS will provide spinning reserve during off-peak hours. However, BESS has to be charged to a sufficient level before committing to spinning reserve service.
- BESS will provide regulation up service, which is discharging the BESS, during both off-peak and peak hours. For this, BESS will be allowed to discharge up to a certain level during energy arbitrage and spinning reserve to have capacity left for regulation.

6. Input Data

This section covers all the data used for the analysis that NCPA provided or collected from online sources. Table 2 includes all the characteristics of CT units of Alameda that are used for modeling and analysis presented in this report.

Table 2 Characteristics of Alameda CT Units

CT Unit Characteristic	Unit	CT Unit 1	CT Unit 2
Min Load, Pmin	MW	20	20
Max Load Pmax	MW	25	25
Pmin Heat Rate	BTU/kWh	17,059	17,136
Pmax Heat Rate	BTU/kWh	13,885	14,389
Min Stable = Pmin	MW	20	20
Fuel Burn Rate @ Pmin	MMBTU	341,180,000	342,720,000
Fuel Burn Rate @ Pmax	MMBTU	347,125,000	359,725,000
Ramp Up Rate (best)	MW/min	6	6
Ramp Down Rate (best)	MW/min	6	6
Worst Operational Ramp Rate	MW/min	1	1
CO2 Emissions Rate	MTCO2e/MMBTU	0.05302	0.05302
CO2 Emissions @ Pmin	MTCO2e	18,089,364	18,171,014
CO2 Emissions @ Pmax	MTCO2e	18,404,568	19,072,620
NOx Emissions Rate @ Pmin Load	lbsNOx/MWh	1.43	1.43
NOx Emissions Rate @ Pmax Load	lbsNOx/MWh	1.14	1.14
Min Down Time	Hrs	2	2
Min Up Time	Hrs	1	1
Start Time (Start to Full Load)	mins	14	14
VOM Cost	\$/MWh	\$3.43	\$3.43

Source: NCPA

Note: The CT units never run on no-load. They are started and ramped to load for every start.

6.1 Production Data

The production data received from NCPA is from 1-Jan 2017 to 31-Dec 2019 with a 5-min interval. This power generation data will be used for benchmarking the model used for detailed analysis. The net power generation of both the Alameda units for the year 2017 is shown in Figure 7.

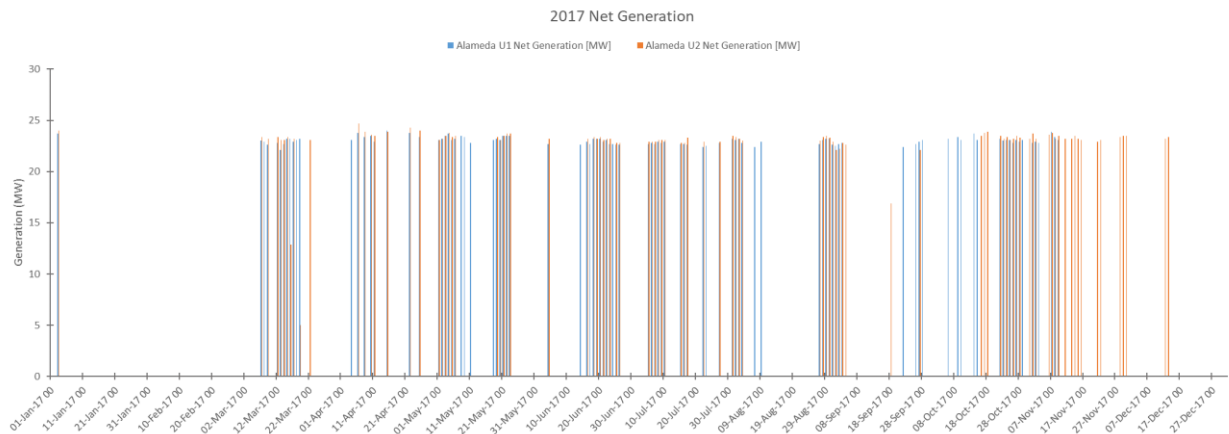


Figure 7 Net Generation of Alameda CT Units in 2017

Source: NCPA

The net power generation of both the Alameda units for the year 2018 is shown in Figure 8.

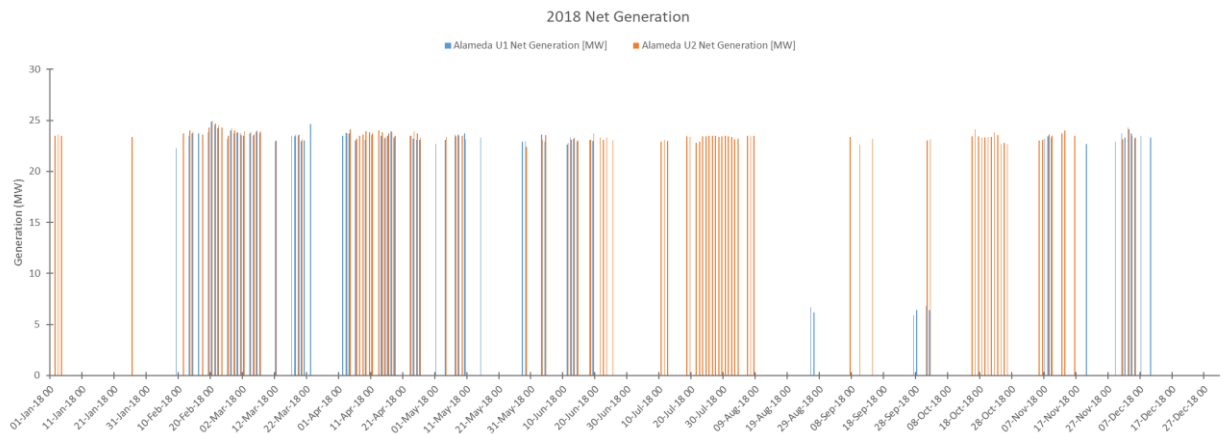


Figure 8 Net Generation of Alameda CT Units in 2018

Source: NCPA

The net power generation of both the Alameda units for the year 2019 is shown in Figure 9.

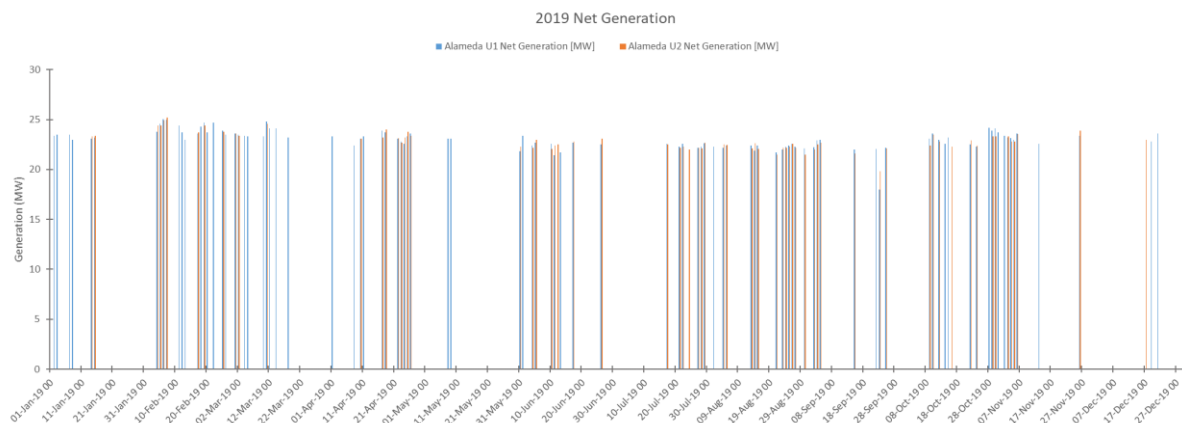


Figure 9 Net Generation of Alameda CT Units in 2019

Source: NCPA

Figure 10 shows the total generation of Alameda units per month.

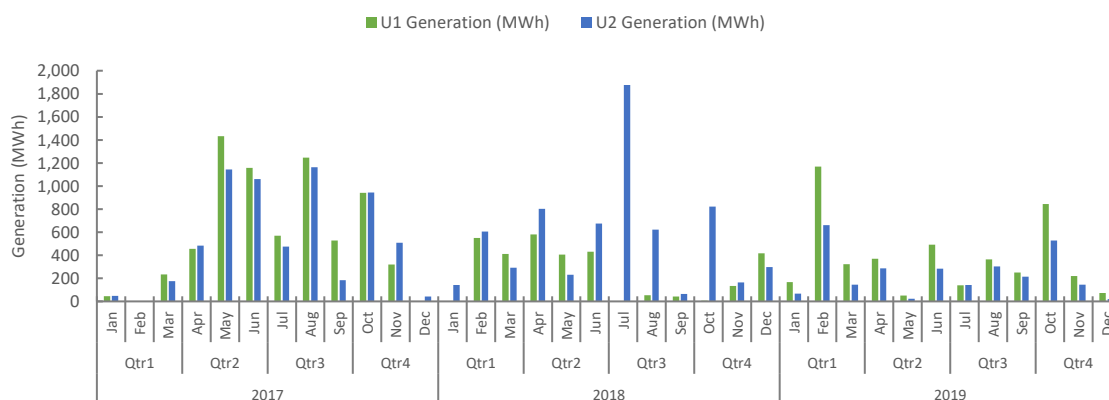


Figure 10 Total Generation of Alameda Units per Month

Source: NCPA

Figure 11 shows the total generation of Alameda units per year.

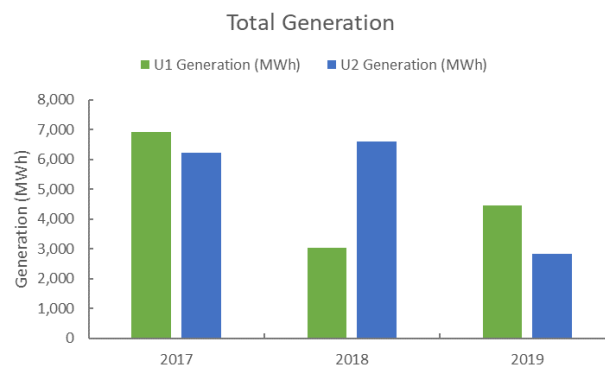


Figure 11 Total Generation of Alameda Units per Year

Source: NCPA

Based on the production data of Alameda CT units, the evaluated capacity factors for years 2017, 2018, and 2019 are shown in Table 3. It is observed that the usage of both units has decreased since 2017.

Table 3 Capacity Factor of Alameda CT Units

Capacity Factor	2017	2018	2019
Alameda U1	3.6%	1.7%	2.3%
Alameda U2	3.2%	5.0%	1.5%

6.2 Fuel Prices

Both the CT of Alameda plant runs on natural gas. The daily natural gas price for the year 2017, 2018, and 2019 as provided by NCPA, are shown in Figure 12. For detailed analysis, it is assumed that fuel prices will remain the same during the day. For forecasting fuel prices, EIA AEO 2019 annual forecasts are used. The daily and hourly fuel price forecasts are evaluated using the historical fuel price data and annual forecast values.

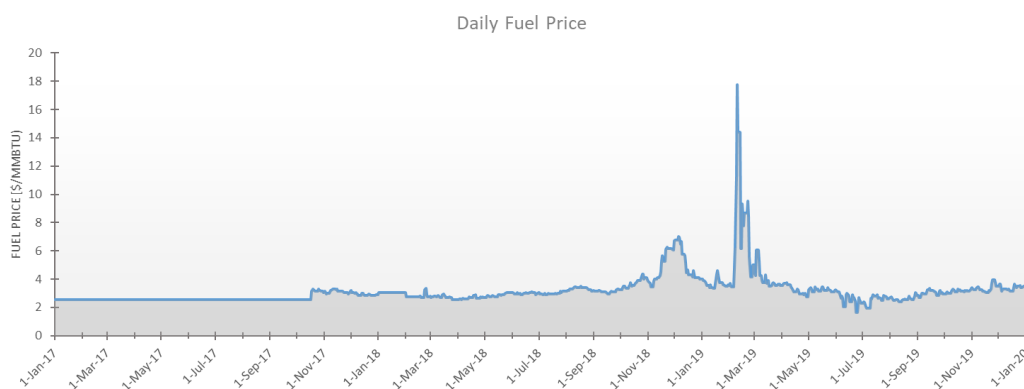


Figure 12 Daily Fuel Price for Years 2017, 2018, and 2019

Source: NCPA

Figure 13 shows the natural gas price forecast, as given in the AEO 2019 released by EIA.

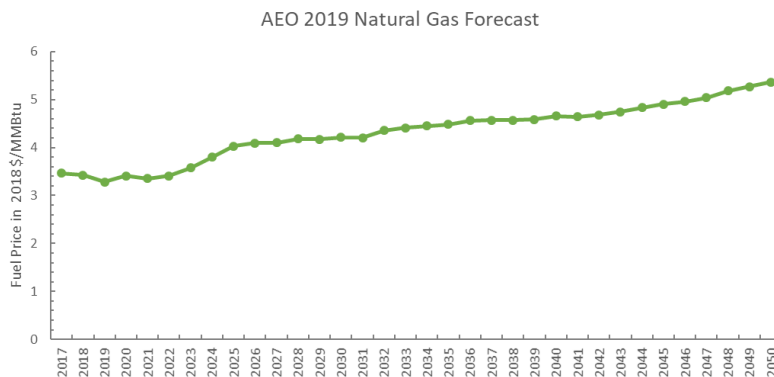


Figure 13 Natural Gas Price Annual Forecast

Source: EIA AEO 2019

6.3 Energy Prices

Alameda CT units are located in the CAISO regulated region and participate in the CAISO market. Energy prices are obtained from the CAISO database for the Alameda nodes shown in Table 4. Both the nodes have the same energy prices as observed in the historical data.

Table 4 CAISO Nodes for Alameda CT Units

Name	Node Name	Bus ID	Node ID
ALAMEDA GT UNIT 1	ALMDACT1_7_B1	38118_ALMDACT1_13.8_GU1	142
ALAMEDA GT UNIT 2	ALMDACT2_7_B1	38119_ALMDACT2_13.8_GU2	143

Source: CAISO

Figure 14 shows the historical hourly values of energy prices for the year 2017.

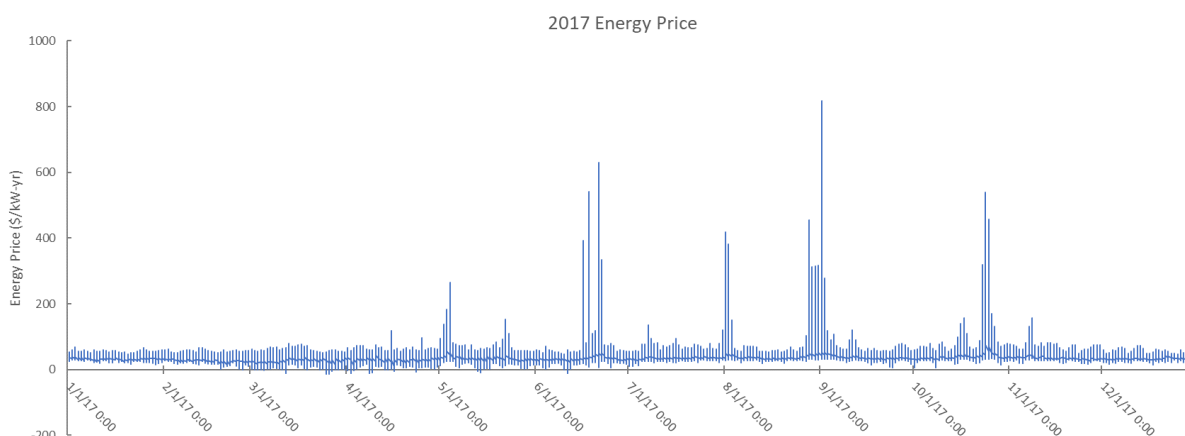


Figure 14 Hourly Energy Prices of 2017

Source: CAISO

Figure 15 shows the historical hourly values of energy prices for the year 2018.

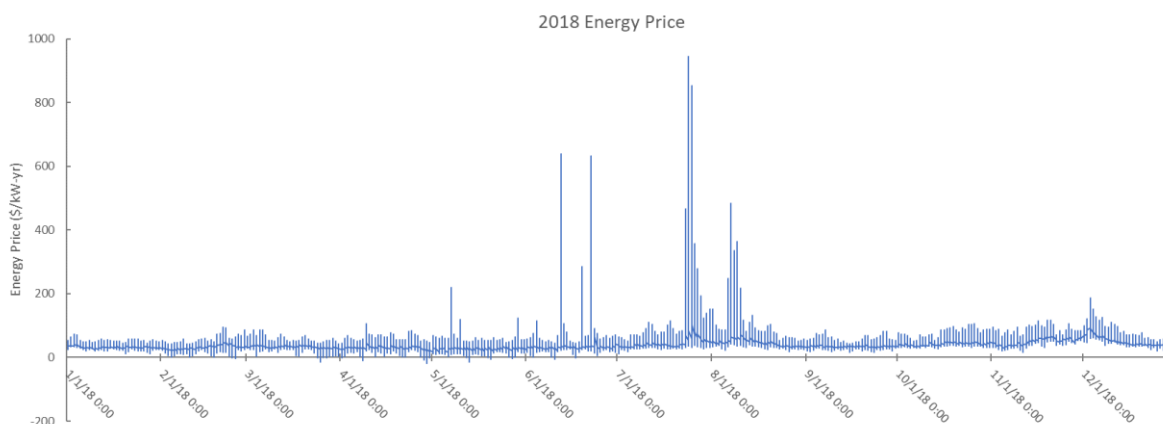


Figure 15 Hourly Energy Prices of 2018

Source: CAISO

Figure 16 shows the historical hourly values of energy prices for the year 2019.

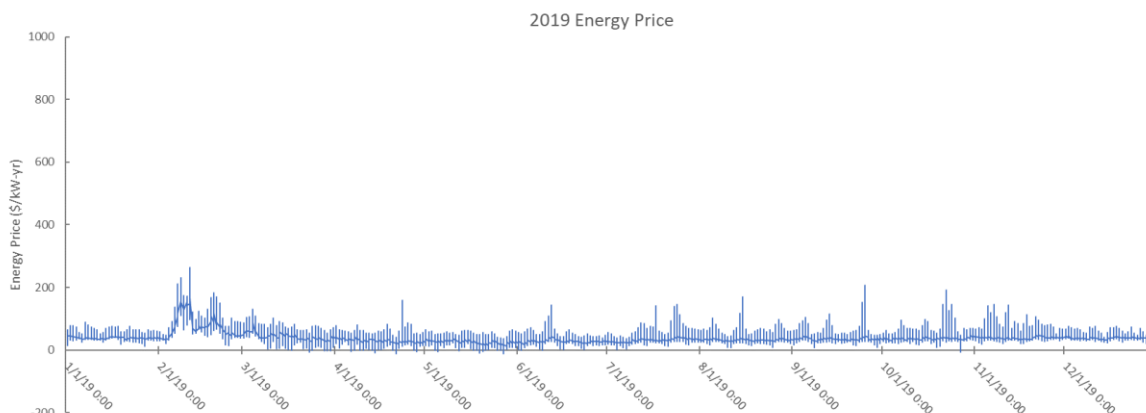


Figure 16 Hourly Energy Prices of 2019

Source: CAISO

6.4 Ancillary Prices

Alameda CT units are located in the NP15 ancillary service region of CAISO. Since historical ancillary prices of NP15 were not available, prices of NP26 are used. Figure 17 shows the historical ancillary prices from December 14, 2017, to December 31, 2019. It is observed that Regulation Down and Non-spinning reserve prices remain zero over the period for the NP26 region. It is also observed that the spinning reserve and regulation up prices while volatile have low averages when considering the valuation of battery.

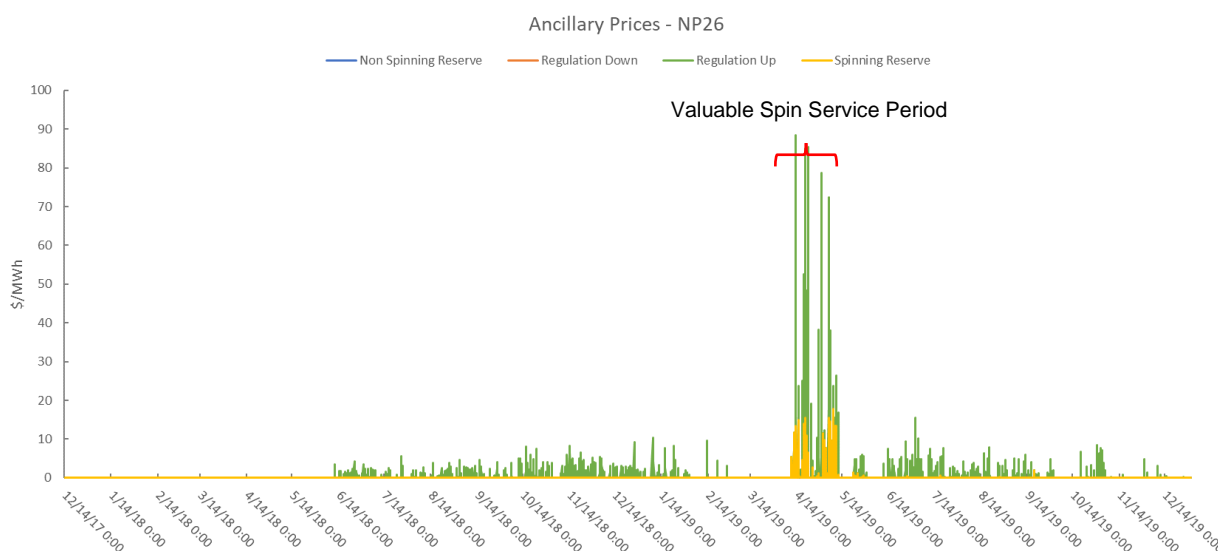


Figure 17 Historical Hourly Ancillary Prices for region NP26

Source: CAISO

6.5 Capacity Prices

Figure 18 shows the average capacity price for the compliance year 2018-2022 as per the price data submitted by the LSEs.

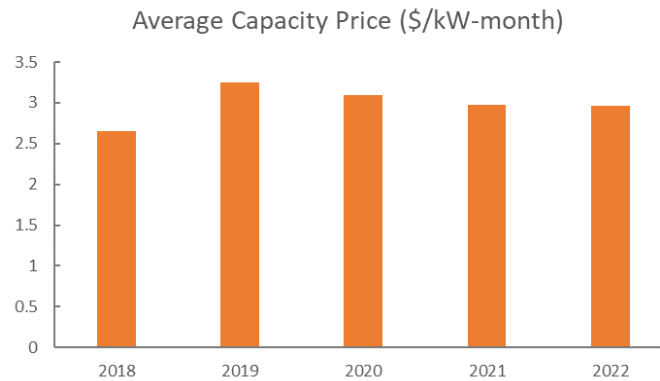


Figure 18 Average Capacity Price For Compliance Year 2018-2022

6.6 Historical CT1 Project 1 Revenue

The total daily revenue of both the units of Alameda for years 2017, 2018, and 2019 is shown in Figure 19. The data received from NCPA is from 14-Aug 2017 to 31-Dec 2019 with a 1-hour interval. The revenue data will be used for benchmarking the model used for detailed analysis and financial analysis.

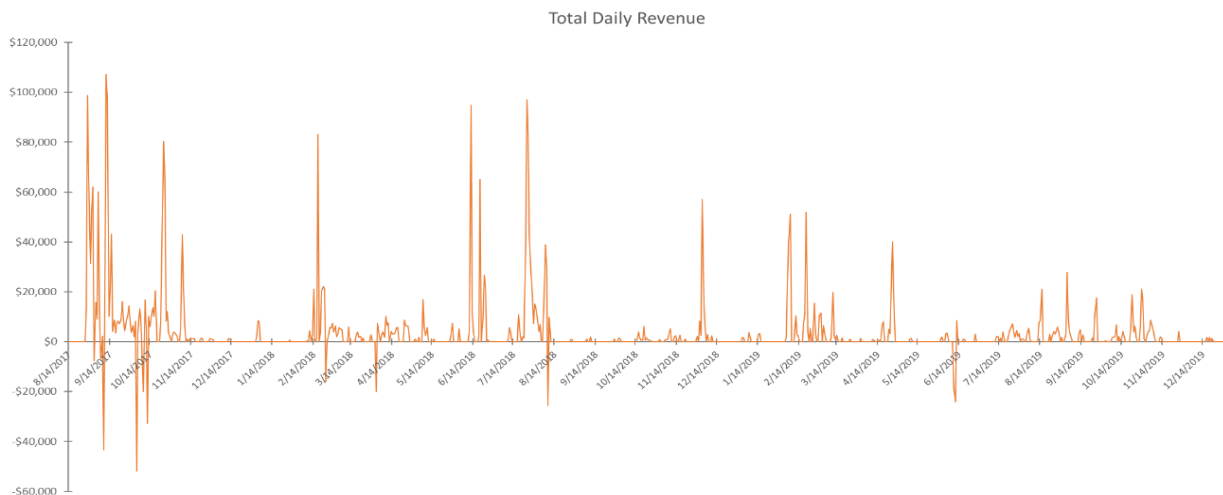


Figure 19 Total Daily Revenue of Alameda Units

Source: NCPA

Figure 20 shows the total daily revenues per month, as given by NCPA.

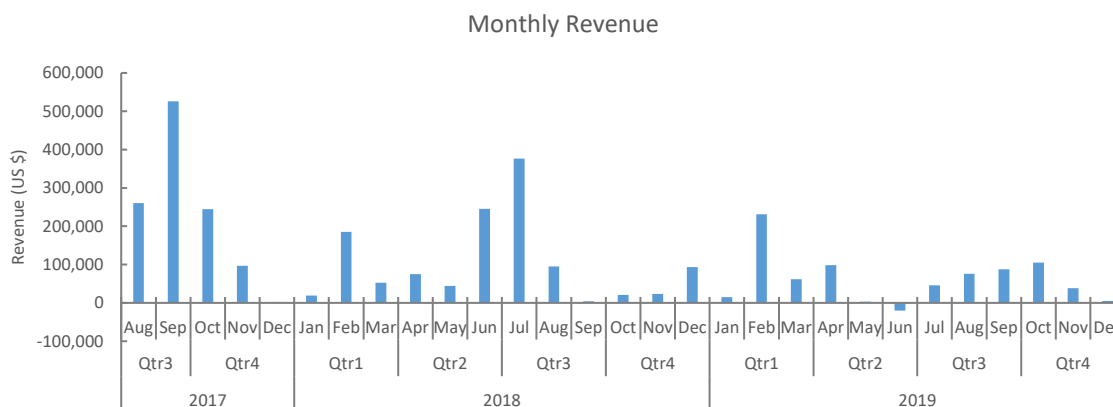


Figure 20 Total Monthly Revenue of Alameda Units

Source: NCPA

Figure 21 shows the total daily revenues per year, as given by NCPA.

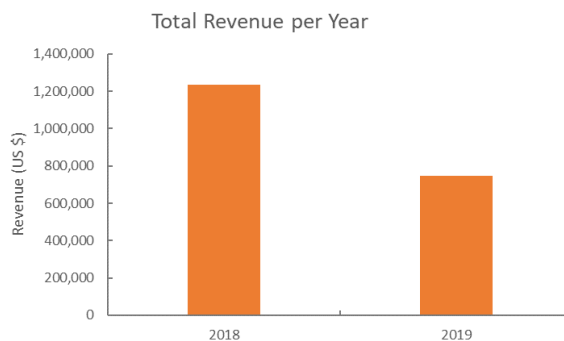


Figure 21 Total Yearly Revenue of Alameda Units

Source: NCPA

7. Acelerex Forecasting Software

7.1 Fuel Price Forecast

The econometric forecast of hourly fuel prices is obtained using the historical hourly fuel prices of 2019 and projecting them to the year 2030 using the yearly average forecast from AEO 2019. The forecasted hourly fuel prices are shown in Figure 22.

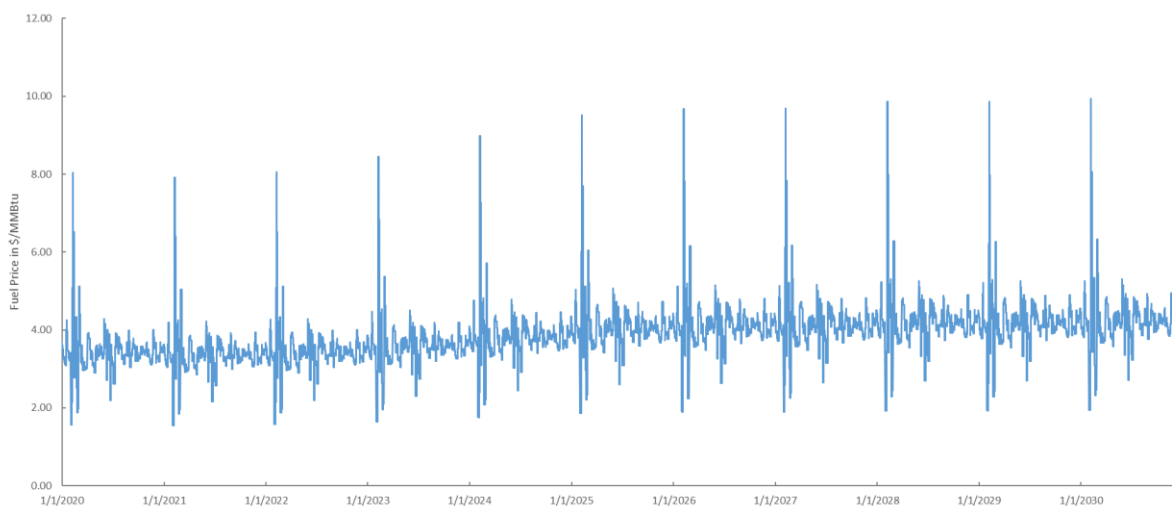


Figure 22 Natural Gas Price Hourly Forecast

7.2 Energy Price Forecast

The econometric forecast of hourly energy prices is evaluated using the forecasts of fuel prices. The ratio of the monthly average of historical fuel prices and monthly average of historical energy prices is calculated to obtain implied heat rates. Using this ratio and a monthly average forecast of fuel prices determined using the EIA AEO 2019 forecasts, a monthly forecast of energy prices is evaluated. Now, using the forecasted monthly average values, hourly values of the energy price forecasts are calculated using the hourly values of the year 2018 and 2019. Figure 23 shows the forecasted energy prices from the year 2020 to 2030 using the historical values of the year 2018.

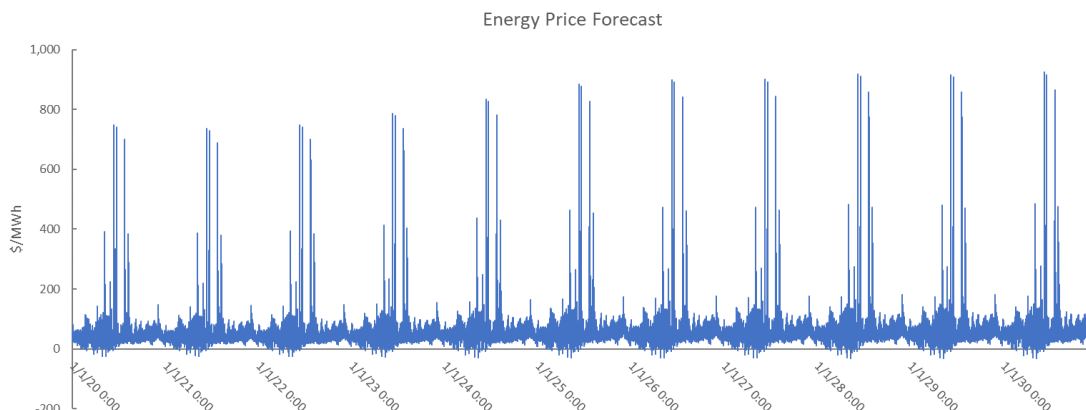


Figure 23 Forecasted Energy Prices based on 2018 Energy Prices

Figure 24 shows the monthly average value of high, base, and low forecasts of energy prices based on 2018.

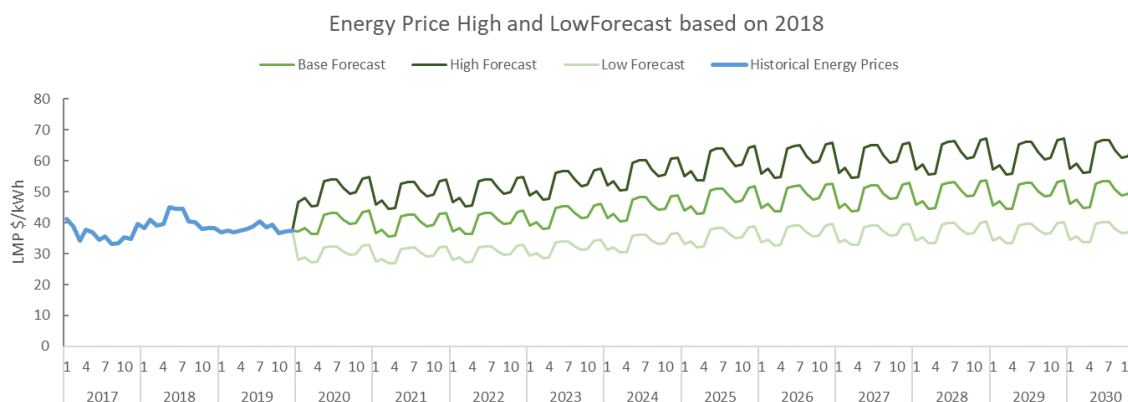


Figure 24 High, Base, and Low Forecasts based on 2018

Figure 25 shows the forecasted energy prices from the year 2020 to 2030 using the historical values of the year 2019.

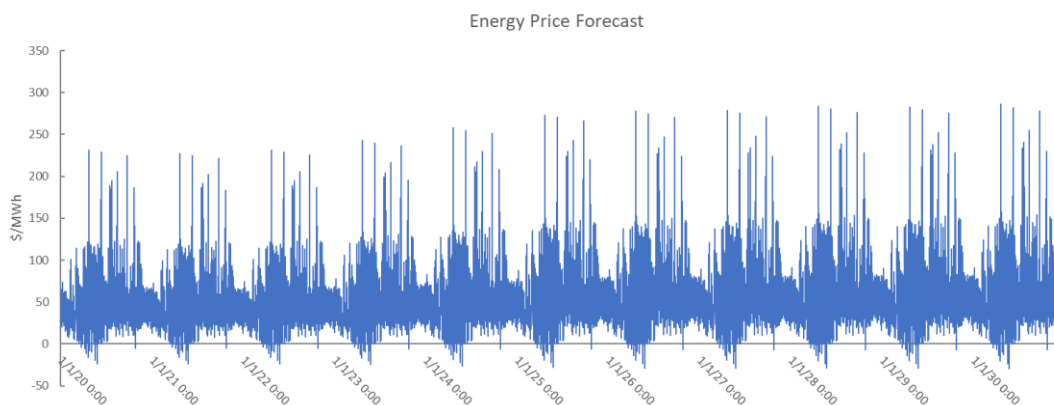


Figure 25 Forecasted Energy Prices based on 2019 Energy Prices

Figure 26 shows the monthly average value of high, base, and low forecasts of energy prices based on 2019.

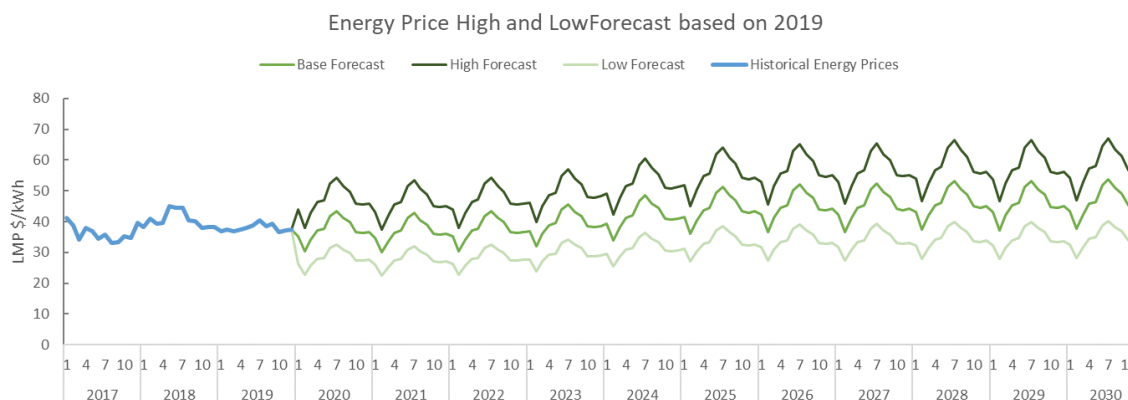


Figure 26 High, Base, and Low Forecasts based on 2019

7.3 Ancillary Price Forecast

The econometric forecast of hourly ancillary prices is evaluated using the forecasts of energy prices. The ratio of the monthly average of historical energy prices and monthly average of historical ancillary prices is calculated. Now, using this ratio, and a monthly average forecast of energy prices, the monthly forecasts of ancillary prices are evaluated. Now, using the forecasted monthly average values, hourly values of the ancillary price forecasts are calculated using the hourly values of the year 2019. Figure 27 shows the forecasted regulation up prices from the year 2020 to 2030 using the historical values of the year 2019.

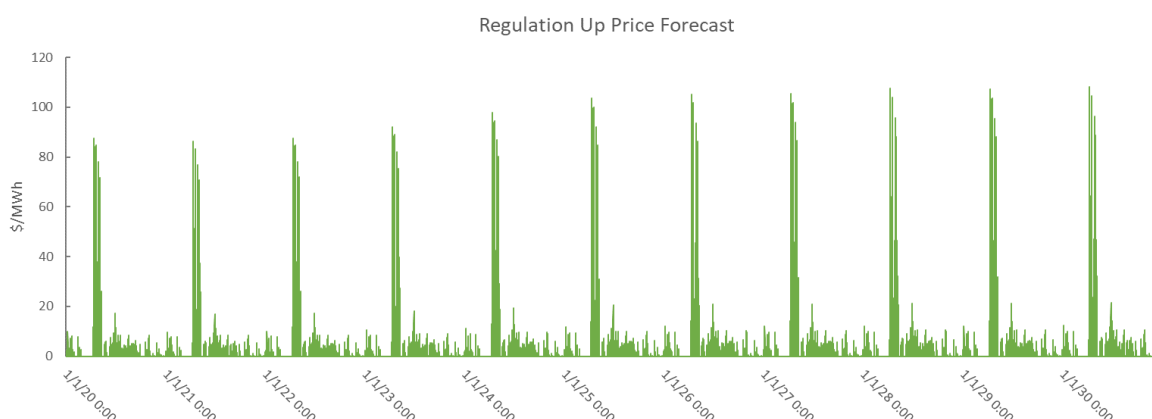


Figure 27 Forecast of Hourly Regulation Up Prices

Figure 28 shows the monthly average value of high, base, and low forecasts of regulation up prices based on 2019.

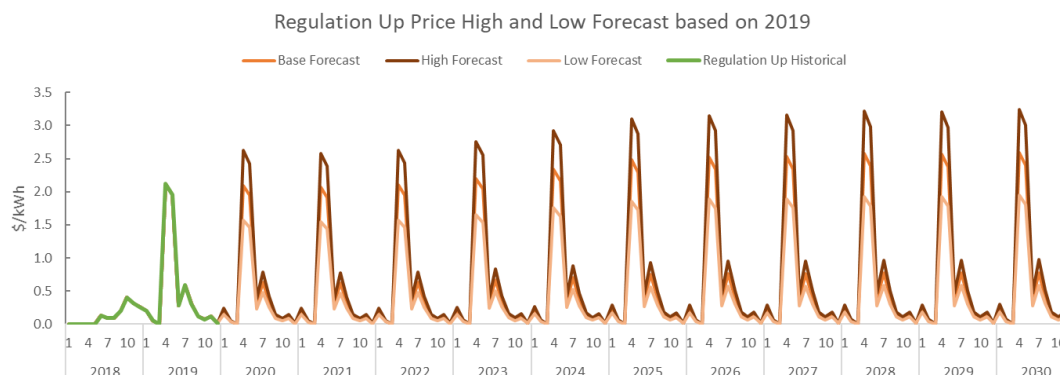


Figure 28 High, Base, and Low Forecast of Regulation Up Prices

Figure 29 shows spinning reserve prices from the year 2020 to 2030 using the historical values of the year 2019.

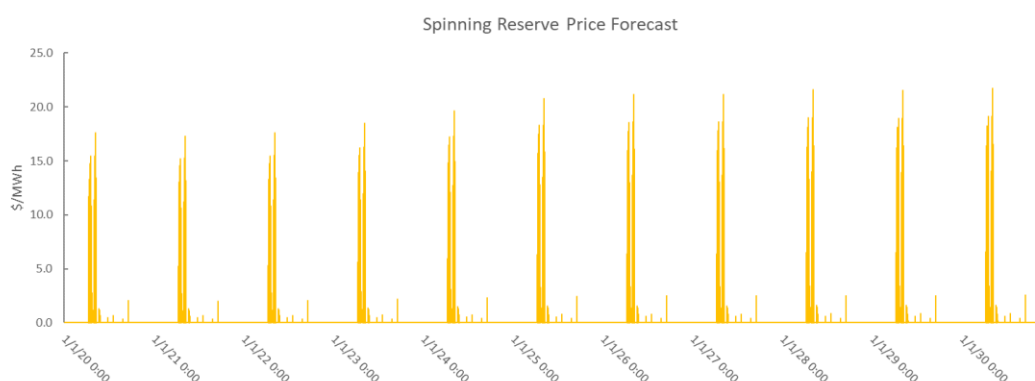


Figure 29 Forecast of Hourly Spinning Reserve Prices

Figure 30 shows the monthly average value of high, base, and low forecasts of spinning reserve prices based on 2019.

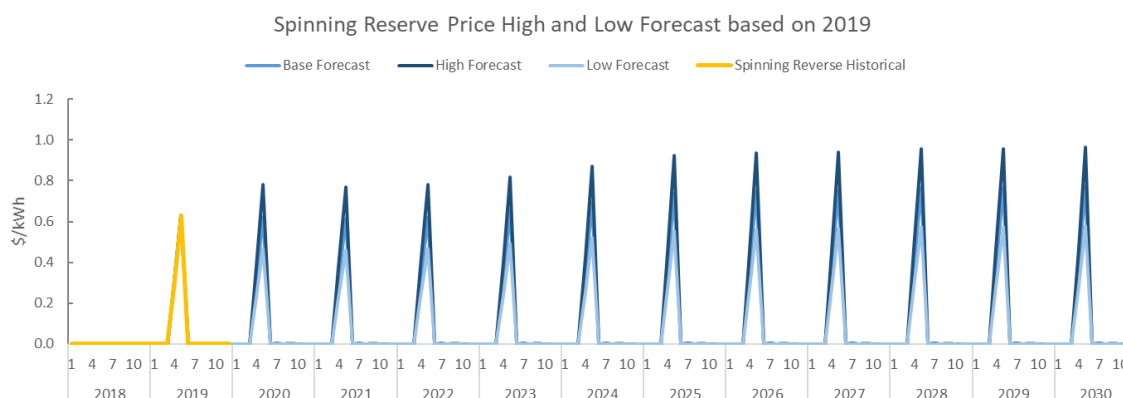


Figure 30 High, Base, and Low Forecast of Spinning Reserve Prices

7.4 Capacity Price Forecast

Figure 31 shows the average capacity price forecast from year 2023 to 2031. These prices are used to evaluate the resource adequacy benefit.

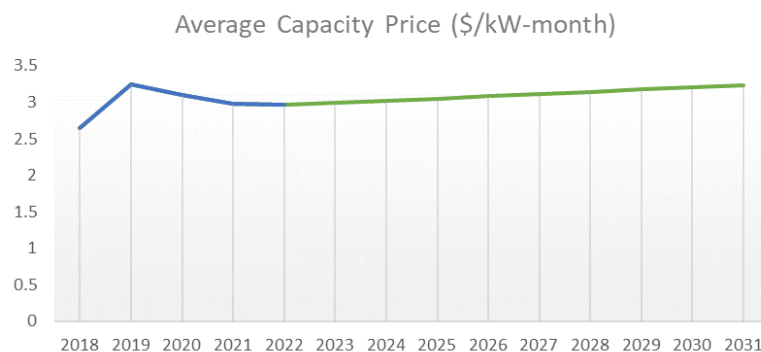


Figure 31 Capacity Price Forecast

8. Results and Analysis

8.1 Sizing Analysis

When the plant receives the dispatch signal, BESS should be sized such that it can dispatch immediately before the CT ramps up to its capacity. The hybrid system with BESS and CT is to be sized to work as a spinning reserve. The starting time of CT is 14 mins, and according to Spinning Reserve requirements, the resource should dispatch in 10 minutes. So BESS should provide these requirements as CT ramps up to its Pmax rating. This scenario is presented in Figure 32. Considering the linear profile, the calculation suggests a minimum size of 7 MW. If BESS and CT are both required to reach 25 MW sooner than 10 min, the size of BESS would be greater than 7 MW. Calculating the area of battery discharge, BESS should have a minimum capacity of 0.83 MWh. The CT starting profile is non-linear, so the required BESS capacity would be higher than calculated.

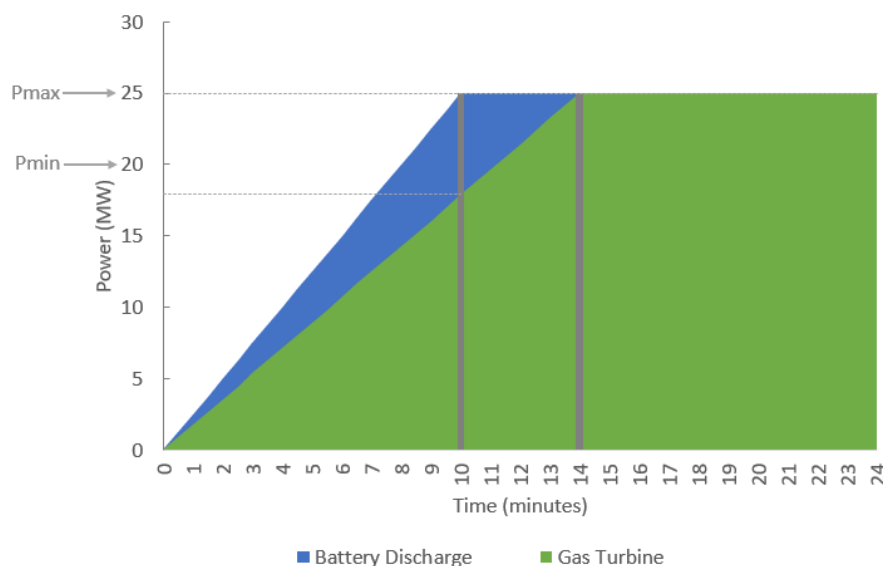


Figure 32 BESS and CT Dispatch for Spinning Reserve

Hence, to dispatch one CT with BESS for spinning reserve, a BESS of 8 MW and 1 MWh should be sufficient. For two CTs, the BESS requirement would be 16 MW and 2 MWh. For energy arbitrage, the requirement of additional capacity needs to be checked with economic justification.

Sizing also depends on the adopted dispatch strategy. The strategy proposed involved charging BESS to its maximum capacity at the off-peak prices and discharging during the peak prices.

Spinning reserve is to be provided during the off-peak price duration, and Regulation is to be provided during the peak price duration.

BESS can also provide regulation up and regulation down. As observed from the historical ancillary prices, NP26 only receives regulation up signals, so the BESS will be paid only for the regulation up services. According to the proposed strategy, regulation will be provided during the peak price hours. So, additional capacity of BESS is not required for providing regulation.

8.2 Cases and Sensitivities

The energy storage industry uses standard nomenclature of “C-rates” which is defined as power to energy ratios, for example a storage of 0.25 C-rate will have 0.25MW for 4 hours. A power storage of shorter duration with a C-rate of 2 (i.e. 2MW for 0.5hr) is useful for applications such as sudden drops of solar power due to cloud flyovers. An energy storage of longer duration with a C-rate of 0.25 is more beneficial for applications like energy arbitrage and renewable shifting. To determine economically justified size for the CT1 Alameda Hybrid system, a sensitivity calculation is performed on the storage with different C-rates like 8C, 4C, 2C, 1C, 0.5C, and 0.25C. Table 5 shows the sensitivity cases simulated to perform comparative valuation to determine economically viable energy storage. In addition to the sensitivity based on the C-rate, valuation of each size is also determined based on different COD years. As the energy storage costs are declining, the valuation of the project is determined for COD years from 2020 to 2029. Results with COD years 2020, 2021, 2023, 2025, 2027, and 2029 are presented in this report.

Table 5 Sensitivity Cases with Different Energy Storage Size

Sensitivity	ES Size	Description
8C Storage	16 MW and 2 MWh	Base case with 8C storage providing energy arbitrage, spinning reserve, regulation, and resource adequacy
4C Storage	16 MW and 4 MWh	Base case with 4C storage providing energy arbitrage, spinning reserve, regulation, and resource adequacy
2C Storage	16 MW and 8 MWh	Base case with 2C storage providing energy arbitrage, spinning reserve, regulation, and resource adequacy
1C Storage	16 MW and 16 MWh	Base case with 1C storage providing energy arbitrage, spinning reserve, regulation, and resource adequacy
0.5C Storage	16 MW and 32 MWh	Base case with 0.5C storage providing energy arbitrage, spinning reserve, regulation, and resource adequacy
0.25C Storage	16 MW and 64 MWh	Base case with 0.25C storage providing energy arbitrage, spinning reserve, regulation, and resource adequacy

Table 6 shows the cases that are modeled to perform the analysis capturing the valuation of the project over high and low sensitivities of the forecasts. Based on the results of the sensitivity performed on the C-rates of the energy storage, a Base case is selected. A High and Low cases are evaluated with high and low energy and ancillary price forecasts on the selected Base case.

Table 6 Modeled cases with description

Case	Description
Base Case	Base case is modeled with base forecasts of energy and ancillary prices where ES is providing Energy Arbitrage, Spinning Reserve, and Regulation
High Case	High case is modeled with high forecasts of energy and ancillary prices where ES is providing Energy Arbitrage, Spinning Reserve, and Regulation
Low Case	Low case is modeled with low forecasts of energy and ancillary prices where ES is providing Energy Arbitrage, Spinning Reserve, and Regulation

8.3 Preliminary Calculation Results

Figure 33 shows the average values calculated for each hour during a day in the year 2017, 2018, and 2019. It is observed that, during the midnight hours at 3:00 AM and 4:00 AM, the LMP values are low, which are ideal for charging the ES. From 5:00 AM, the LMP value starts increasing. During the night at 9:00 PM and 10:00 PM, the LMP values are high, which are ideal for discharging the ES.

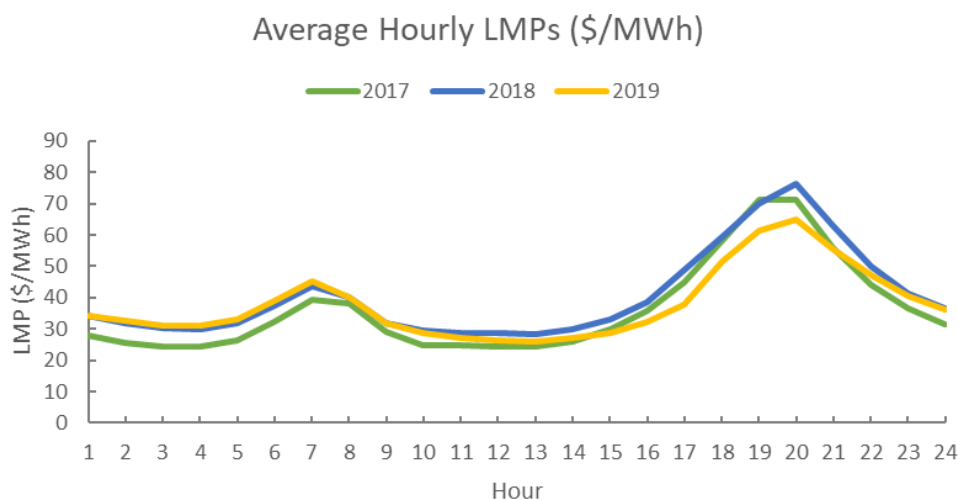


Figure 33 Average Hourly LMP for 2017, 2018, and 2019

Based on these observations, a dispatch logic for combined ES and CT providing Energy Arbitrage and Spinning Reserve is prepared, as shown in Figure 34. During the early hours at 3:00 AM and 4:00 AM, ES charges to its maximum, and at 9:00 PM and 10:00 PM, ES discharges to its minimum, providing Energy Arbitrage. During the day from 5:00 AM to 8:00 PM, ES combined with CT provides spinning reserve services. When a signal is received to dispatch, CT is assumed to start at 12:00 PM for 2 hours.

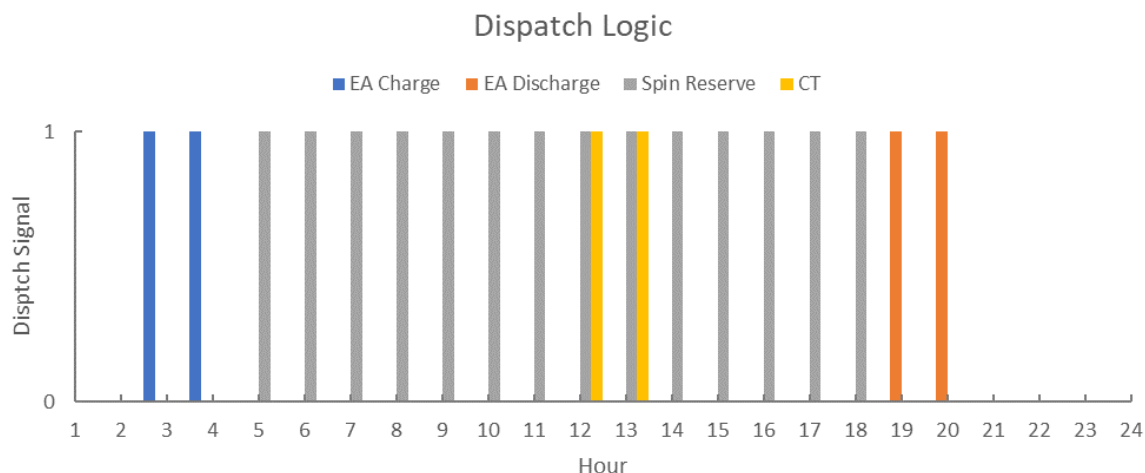


Figure 34 Dispatch Logic for EA, Spin Reserve, and CT

For the calculations, a battery ES of 8MW and 1MWh is assumed to accompany the 25MW CT unit. There are two such units so the total ES capacity would be 16MW and 2MWh. System assumptions are shown in Table 7.

Table 7 System Assumptions

Assumed Parameter	Value
CT Unit Size (MW)	25
Battery Size (MW)	8
Battery Capacity (MWh)	1
Number of Units	2

Based on the assumptions and average daily hour values of 2019, sales and purchases are calculated for providing energy arbitrage and spinning reserve. The calculations are shown in Table 8.

Table 8 Calculation Sheet

Hour	Average 2019 LMP (\$/MWh)	Spinning Reserve Average (\$/MW)		Dispatch Logic				Spinning Reserve Avg Sales (\$)		EA Sales and Purchases (\$)	CT Cost (\$)	
		Apr '19	May '19	EA Charge	EA Discharge	Spin Reserve	CT	SR Apr '19	SR Sales		SRMC	CT Purchases
1	34.3	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0
2	32.5	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0
3	31.2	0.1	1.5	1.0	0.0	0.0	0.0	0.0	0.0	-31.2	63.1	0.0
4	31.0	0.2	0.4	1.0	0.0	0.0	0.0	0.0	0.0	-31.0	63.1	0.0
5	33.0	0.7	0.0	0.0	0.0	1.0	0.0	33.0	0.0	0.0	63.1	0.0
6	38.8	0.0	1.4	0.0	0.0	1.0	0.0	0.5	68.2	0.0	63.1	0.0
7	45.2	0.1	1.2	0.0	0.0	1.0	0.0	5.8	58.8	0.0	63.1	0.0
8	40.1	1.3	0.7	0.0	0.0	1.0	0.0	62.6	37.3	0.0	63.1	0.0
9	31.7	0.7	0.9	0.0	0.0	1.0	0.0	33.3	43.0	0.0	63.1	0.0
10	28.7	0.4	0.0	0.0	0.0	1.0	0.0	22.4	2.0	0.0	63.1	0.0
11	27.1	0.4	0.8	0.0	0.0	1.0	0.0	19.6	38.4	0.0	63.1	0.0
12	26.2	0.2	0.8	0.0	0.0	1.0	1.0	8.3	41.0	0.0	63.1	-36.9
13	26.0	0.3	0.6	0.0	0.0	1.0	1.0	15.7	29.4	0.0	63.1	-37.1
14	27.0	0.5	1.5	0.0	0.0	1.0	0.0	26.0	73.9	0.0	63.1	0.0
15	28.7	0.1	0.5	0.0	0.0	1.0	0.0	5.1	25.5	0.0	63.1	0.0
16	32.3	0.1	0.3	0.0	0.0	1.0	0.0	5.3	12.9	0.0	63.1	0.0
17	37.9	0.2	0.4	0.0	0.0	1.0	0.0	8.9	19.5	0.0	63.1	0.0
18	51.4	0.4	0.2	0.0	0.0	1.0	0.0	18.2	10.4	0.0	63.1	0.0
19	61.3	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	61.3	63.1	0.0
20	64.9	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	64.9	63.1	0.0
21	55.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0
22	47.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0
23	40.3	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0
24	36.4	1.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0
Daily Total	-	-	-	-	-	-	-	264.8	460.3	64.1	-	-74.1

As observed in Figure 17 spinning reserve prices in 2019 are non-zero for only two months, i.e., April and May. So, it is assumed that spinning reserve is provided only for 60 days, and energy arbitrage is provided for the whole year i.e. 365 days. SRMC for CT is calculated based on daily fuel prices, heat rates, and VOM. An average value is used for calculating CT dispatch costs for a day. The spinning reserve is calculated based on spinning reserve prices for April and May and 50MW plant capacity. Based on these calculations, average-day cash flow is shown in Figure 35.

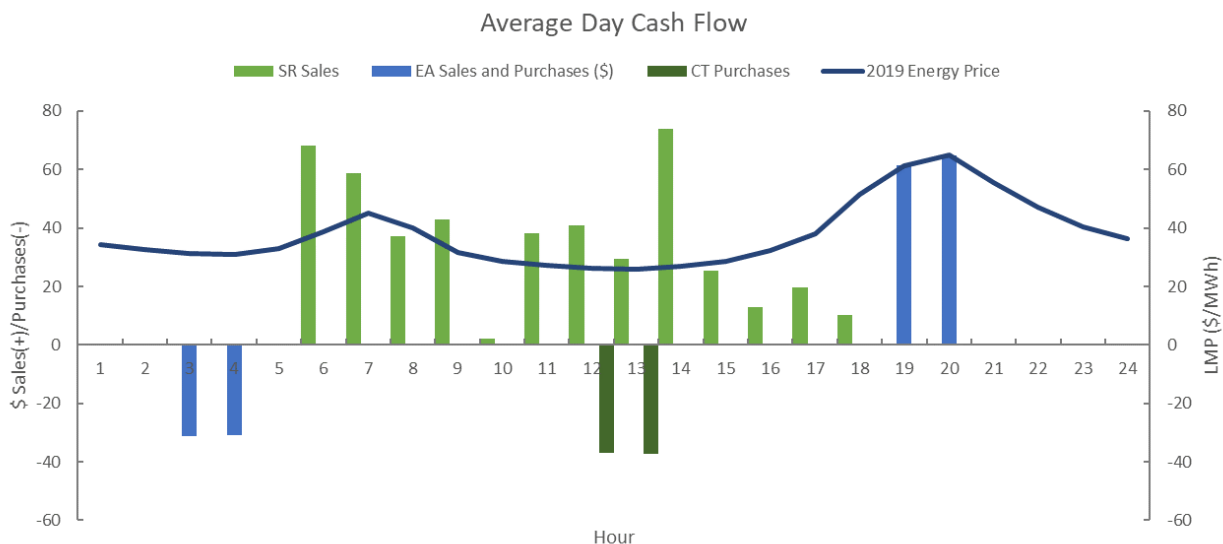


Figure 35 Average Day Cash Flow

Using the daily total values calculated in Table 8, annual total values are evaluated. Total spin reserve sales are sum of sales in April and May. Total CT dispatch cost is a total of both the units. Total Energy Arbitrage sales are total for 365 days with a 2MWh battery.

Table 9 Calculation Results

	1 Year	10 Years	15 Years
Total Spin Reserve Sales for April	7,943	79,428	119,142
Total Spin Reserve Sales for May	13,808	138,081	207,122
Total Spin Reserve Sales for 2019	21,751	217,509	326,264
CT-1 Running Cost (for 5 times in 60 Days)	(370)	(3,704)	(5,556)
CT-2 Running Cost (for 5 times in 60 Days)	(370)	(3,704)	(5,556)
Total CT Running Cost	(741)	(7,408)	(11,113)
ES Energy Arbitrage Sales and Purchases for 365 Days	23,388	233,882	350,823
Total Energy Arbitrage P&L for 365 Days	23,388	233,882	350,823
Total Value	44,398	443,983	665,975

8.4 SSE Results

The Acelerex Stacked Services Emulator (SSE) is used to calculate the hourly dispatch of the energy storage. Table 10 shows the input parameters used for the calculations. The dispatch calculation results presented are for a battery with 16MW and 2MWh capacity providing Energy Arbitrage and Spinning Reserve services simultaneously. The SSE is run with two different SOC limits, to understand the effects on the overall valuation and match the benchmark values calculated in the preliminary calculations.

Table 10 SSE Calculation Input Parameters

Parameter	Value					
Energy Storage Size	16 MW					
Energy Storage Capacity	2 MWh	4 MWh	8 MWh	16 MWh	32 MWh	64 MWh
Duration	0.125 hr	0.25 hr	0.5 hr	1 hr	2 hr	4 hr
Efficiency	80%					
Initial SOC	50%					
SOC Low	20% or 0%					
SOC High	80% or 100%					
Fade Curve	Lithium-Ion with degradation of 3.4% per year					
Services	1. Energy Arbitrage with manual power nomination 2. Spinning Reserve with manual capacity allocation 3. Regulation Up with manual capacity allocation					

8.4.1 Capacity Allocation

For Non-Generator Resources (NGR) to provide multiple services like regulation, spin/non-spin reserve, and energy, they should be classified as Non-REM (Regulation Energy Management). CAISO procures 100% of the Ancillary Service requirement on an hourly basis in the Day-ahead market. The minimum continuous energy Ancillary Service procurement requirement for Non-REM NGR are as follows [3]:

- Day-Ahead Regulation Up/Down: 60 minutes
- Real-Time Regulation Up/Down: 30 minutes
- Spin and Non-Spin: 30 minutes

As per CAISO, for energy storage to qualify for resource adequacy, energy storage discharge should be capable of providing qualified power capacity for four consecutive hours [4].

Based on these requirements, the different sizes of energy storage are allocated power and energy capacity for each service that energy storage can provide are shown in Table 11.

Table 11 Capacity Allocation

Case	Sensitivity Case	Power Capacity	Energy Capacity	Duration
8C Storage	ES Size	16 MW	2 MWh	0.125 hr
	Energy Arbitrage	16 MW	2 MWh	0.125 hr
	Spinning Reserve	4 MW	2 MWh	0.5 hr
	Regulation	2 MW	2 MWh	1 hr
	Resource Adequacy	0.5 MW	2 MWh	4 hr
4C Storage	ES Size	16 MW	4 MWh	0.25 hr
	Energy Arbitrage	16 MW	4 MWh	0.25 hr
	Spinning Reserve	8 MW	4 MWh	0.5 hr
	Regulation	4 MW	4 MWh	1 hr
	Resource Adequacy	1 MW	4 MWh	4 hr
2C Storage	ES Size	16 MW	8 MWh	0.5 hr
	Energy Arbitrage	16 MW	8 MWh	0.5 hr
	Spinning Reserve	16 MW	8 MWh	0.5 hr
	Regulation	8 MW	8 MWh	1 hr
	Resource Adequacy	2 MW	8 MWh	4 hr
1C Storage	ES Size	16 MW	16 MWh	1 hr
	Energy Arbitrage	16 MW	16 MWh	1 hr
	Spinning Reserve	16 MW	16 MWh	1 hr
	Regulation	16 MW	16 MWh	1 hr
	Resource Adequacy	4 MW	16 MWh	4 hr
0.5C Storage	ES Size	16 MW	32 MWh	2 hr
	Energy Arbitrage	16 MW	32 MWh	2 hr
	Spinning Reserve	16 MW	32 MWh	2 hr
	Regulation	16 MW	32 MWh	2 hr
	Resource Adequacy	8 MW	32 MWh	4 hr
0.25C Storage	ES Size	16 MW	64 MWh	4 hr
	Energy Arbitrage	16 MW	64 MWh	4 hr
	Spinning Reserve	16 MW	64 MWh	4 hr
	Regulation	16 MW	64 MWh	4 hr
	Resource Adequacy	16 MW	64 MWh	4 hr

8.4.2 Historical Values with Conservative SOC Limits

The SSE is run for 8C Storage with conservative SOC limits of 20% to 80% using the historical energy and ancillary prices of the year 2018 and 2019. In these calculations, storage is allowed to provide energy arbitrage during the whole day to evaluate the maximum potential. The average values of storage charge, discharge, and energy prices for every hour in 2018 are presented in Figure 36. It shows that the storage is charging mostly at midnight at 3:00 AM and 4:00 AM. Storage is also charging during the day as energy prices are lower. Storage is discharging during morning 7:00 AM and mostly during night 8:00 PM.

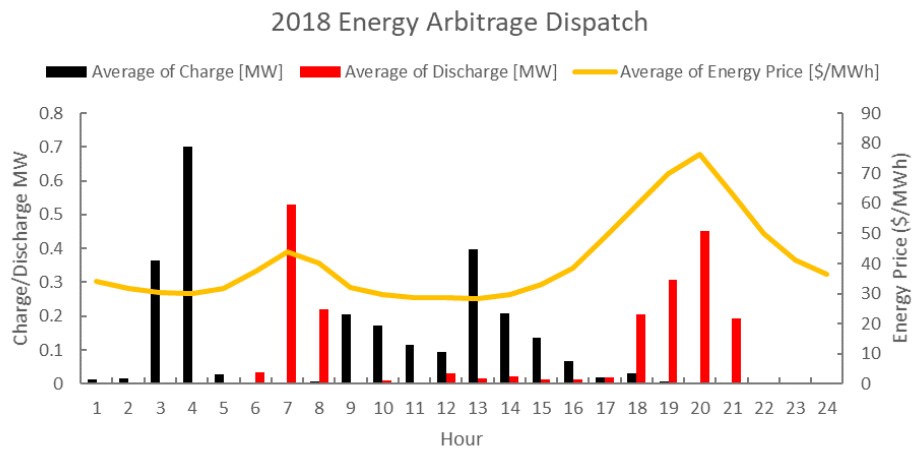


Figure 36 EA Average Dispatch Profile with 20-80% SOC Limits in 2018

The average values of storage charge, discharge, and energy prices for every hour in 2019 are presented in Figure 37. It shows similar results, as observed in 2018.

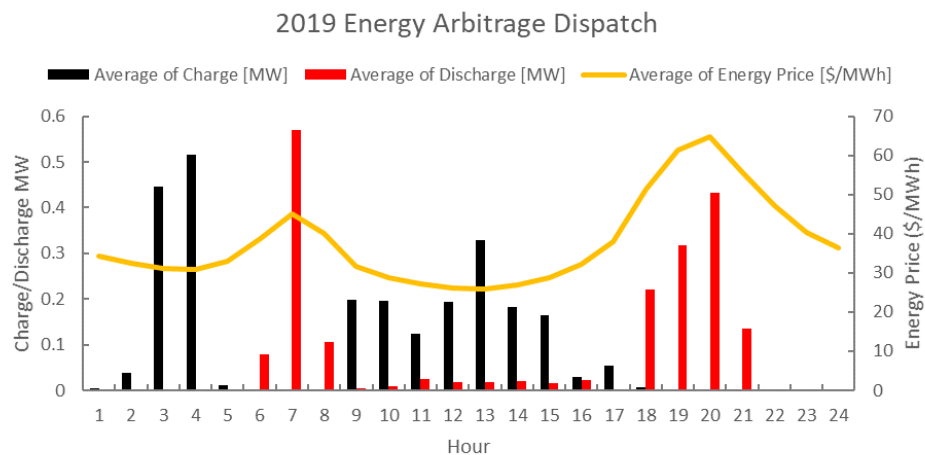


Figure 37 EA Average Dispatch Profile with 20-80% SOC Limits in 2019

Table 12 shows the overall calculation summary of SSE with 20-80% SOC limits. As observed, the calculation results are similar to estimated values in the preliminary calculations.

Table 12 SSE Calculation Summary with 20-80% SOC Limits

Year	Total Sales (\$)	EA Purchases (\$)	EA Sales (\$)	Spinning Reserve Sales (\$)	Total P&L (\$)
2018	51,668	23,804	51,668	0	27,863
2019	55,574	22,519	44,592	10,982	33,056

8.4.3 Historical Values with Non-conservative SOC Limits

The SSE is run for 8C Storage with non-conservative SOC limits of 0% to 100% using the historical energy and ancillary prices of the year 2018 and 2019. In these calculations, storage is allowed to provide energy arbitrage during the whole day to evaluate the maximum potential. The average values of storage charge, discharge, and energy prices for every hour in 2018 are presented in Figure 38. It shows that the storage is charging mostly at midnight at 3:00 AM and 4:00 AM. Storage is also charging during the day as energy prices are lower. Storage is discharging during morning 7:00 AM and mostly during night 8:00 PM.

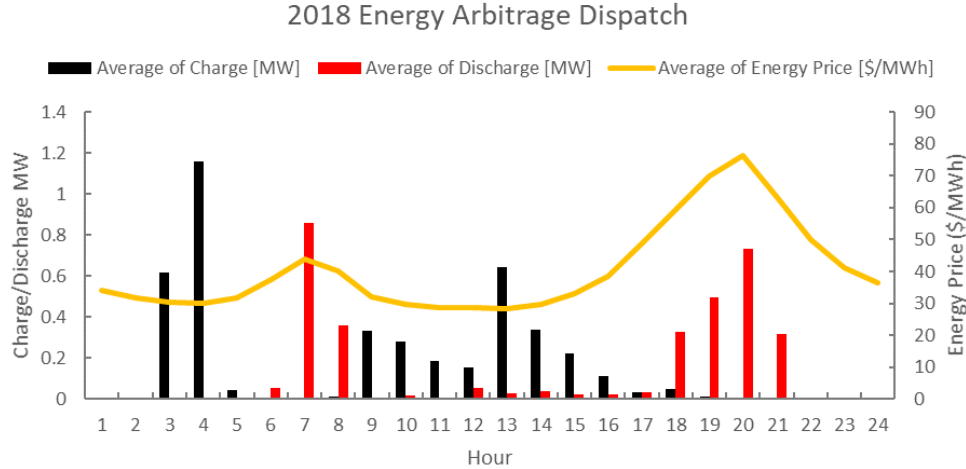


Figure 38 EA Average Dispatch Profile with 0-100% SOC Limits in 2018

The average values of storage charge, discharge, and energy prices for every hour in 2019 are presented in Figure 39. It shows similar results as observed in 2018.

2019 Energy Arbitrage Dispatch

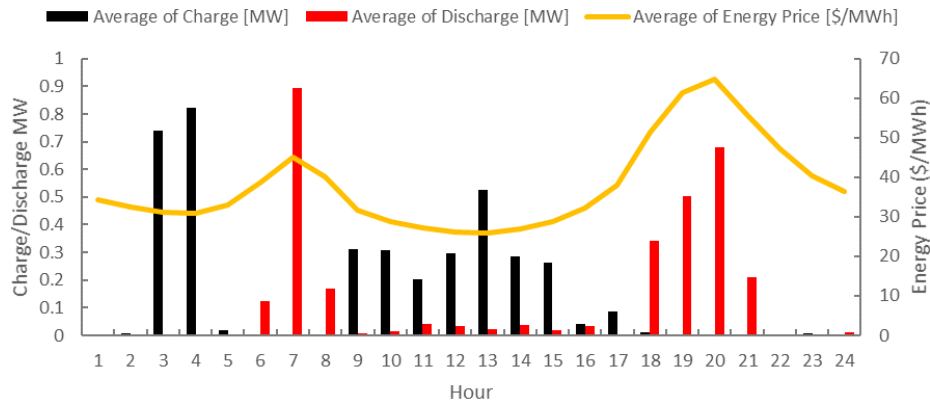


Figure 39 EA Average Dispatch Profile with 0-100% SOC Limits in 2019

Table 13 shows the overall calculation summary of SSE with 0-100% SOC limits. As observed, the calculation results are higher compared to the estimated values of the preliminary calculations.

Table 13 SSE Calculation Summary with 0-100% SOC Limits

Year	Total Sales (\$)	EA Purchases (\$)	EA Sales (\$)	Spinning Reserve Sales (\$)	Total P&L (\$)
2018	83,627	38,529	83,627	0	45,098
2019	82,756	35,501	70,060	12,696	47,255

8.4.4 Forecasted Values

As observed in the calculation results on the historical values with different SOC limits, the results with 20-80% SOC limits are more similar to the preliminary calculation performed based on the recommended dispatch strategy. So, using the same SOC limits of 20-80%, SSE calculations are performed on the forecasted energy and ancillary prices. The results of SSE calculation for 8C Storage from the year 2020 to 2040 are shown in Table 14. These values are further used for the valuation of the recommended energy storage size and dispatch strategy.

Table 14 SSE Forecast Summary for 8C Storage with 20-80% SOC Limits

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2020	48,110	2,753	8,594	59,457	22,546
2021	46,203	2,709	8,457	57,369	21,642
2022	46,107	2,754	8,598	57,459	21,581
2023	47,689	2,890	9,023	59,602	22,339
2024	49,954	3,071	9,587	62,612	23,386
2025	52,336	3,253	10,156	65,746	24,514
2026	52,563	3,307	10,325	66,195	24,611
2027	52,155	3,314	10,345	65,814	24,429

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2028	52,583	3,377	10,541	66,500	24,621
2029	52,022	3,372	10,526	65,919	24,366
2030	52,007	3,402	10,621	66,031	24,354
2031	51,439	3,395	10,598	65,431	24,091
2032	52,826	3,517	10,979	67,323	24,739
2033	53,039	3,562	11,119	67,719	24,839
2034	53,100	3,595	11,222	67,916	24,870
2035	53,102	3,625	11,316	68,042	24,865
2036	53,559	3,685	11,503	68,746	25,086
2037	53,281	3,693	11,529	68,503	24,967
2038	52,873	3,693	11,527	68,093	24,785
2039	52,629	3,707	11,574	67,910	24,663
2040	53,035	3,764	11,750	68,548	24,857

To further evaluate economically feasible size of Energy Storage, SSE is run on cases with different duration of energy storage. Table 15 shows the results of SSE for an energy storage of 16MW and 4MWh.

Table 15 SSE Results of 4C Storage

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2020	96,220	5,506	17,188	118,915	45,092
2021	92,406	5,418	16,914	114,738	43,284
2022	92,214	5,508	17,196	114,918	43,163
2023	95,378	5,781	18,045	119,204	44,678
2024	99,908	6,142	19,175	125,225	46,772
2025	104,673	6,507	20,312	131,492	49,028
2026	105,126	6,615	20,650	132,390	49,221
2027	104,311	6,628	20,690	131,629	48,858
2028	105,166	6,753	21,081	133,000	49,241
2029	104,044	6,743	21,051	131,838	48,732
2030	104,014	6,805	21,242	132,061	48,707
2031	102,877	6,789	21,196	130,862	48,182
2032	105,652	7,034	21,959	134,645	49,478
2033	106,077	7,123	22,238	135,438	49,677
2034	106,199	7,189	22,444	135,833	49,740
2035	106,203	7,249	22,632	136,085	49,730
2036	107,117	7,369	23,006	137,492	50,171
2037	106,562	7,386	23,057	137,005	49,934
2038	105,746	7,385	23,054	136,186	49,569
2039	105,257	7,415	23,148	135,821	49,325
2040	106,069	7,528	23,500	137,097	49,715

Table 16 shows the results of SSE for an energy storage of 16MW and 8MWh.

Table 16 SSE Results of 2C Storage

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2020	192,876	8,764	32,097	233,736	91,002
2021	185,182	8,617	31,567	225,365	87,326
2022	184,729	8,757	32,082	225,567	87,060
2023	191,132	9,183	33,653	233,968	90,127
2024	200,229	9,756	35,753	245,737	94,370
2025	209,746	10,329	37,862	257,937	98,908
2026	210,711	10,499	38,485	259,695	99,334
2027	208,984	10,515	38,550	258,050	98,545
2028	210,780	10,712	39,274	260,766	99,380
2029	208,464	10,692	39,209	258,365	98,285
2030	208,442	10,786	39,557	258,785	98,278
2031	206,089	10,759	39,464	256,312	97,152
2032	211,682	11,144	40,877	263,702	99,812
2033	212,429	11,284	41,391	265,104	100,138
2034	212,718	11,385	41,767	265,871	100,302
2035	212,663	11,478	42,113	266,254	100,250
2036	214,524	11,665	42,800	268,989	101,151
2037	213,430	11,690	42,893	268,012	100,699
2038	211,734	11,685	42,879	266,299	99,916
2039	210,868	11,731	43,050	225,034	80,428
2040	212,373	11,906	43,695	228,420	81,629

Table 17 shows the results of SSE for an energy storage of 16MW and 16MWh.

Table 17 SSE Results of 1C Storage

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2020	382,943	6,421	62,813	452,177	179,236
2021	367,748	6,305	61,808	435,861	172,017
2022	367,406	6,403	62,835	436,644	171,798
2023	379,900	6,711	65,940	452,552	177,694
2024	398,348	7,126	70,065	475,539	186,272
2025	417,110	7,541	74,223	498,875	195,104
2026	419,278	7,662	75,454	502,394	196,081
2027	415,836	7,671	75,604	499,111	194,499
2028	419,495	7,811	77,032	504,338	196,171
2029	414,964	7,794	76,925	499,683	194,088
2030	414,926	7,861	77,619	500,406	194,038
2031	410,430	7,838	77,451	495,719	191,969
2032	421,511	8,117	80,237	509,866	197,121
2033	423,328	8,216	81,259	512,804	198,002
2034	423,780	8,288	82,011	514,079	198,200
2035	423,954	8,354	82,702	515,010	198,295
2036	427,566	8,487	84,063	520,115	199,965
2037	425,501	8,503	84,257	518,261	199,176
2038	422,312	8,497	84,241	515,050	197,673
2039	420,752	8,529	84,590	513,871	196,962
2040	423,638	8,653	85,867	518,158	198,296

Table 18 shows the results of SSE for an energy storage of 16MW and 32MWh.

Table 18 SSE Results of 0.5C Storage

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2020	739,054	6,751	62,411	808,216	351,841
2021	712,728	6,632	61,439	780,800	338,403
2022	714,647	6,735	62,478	783,860	338,738
2023	740,960	7,062	65,590	813,612	350,802
2024	779,165	7,495	69,704	856,364	368,470
2025	817,484	7,936	73,861	899,280	386,165
2026	823,863	8,060	75,095	907,018	388,876
2027	818,599	8,072	75,259	901,930	385,966
2028	827,855	8,218	76,692	912,764	390,097
2029	820,178	8,203	76,598	904,979	385,998
2030	822,071	8,271	77,301	907,643	386,729
2031	814,463	8,249	77,143	899,855	382,695
2032	838,271	8,541	79,932	926,743	393,735
2033	843,083	8,646	80,956	932,685	395,516
2034	845,470	8,721	81,721	935,912	396,575
2035	845,744	8,790	82,415	936,949	396,484
2036	853,347	8,929	83,791	946,067	400,141
2037	849,145	8,946	83,986	942,078	398,376
2038	843,216	8,939	83,990	936,145	395,654
2039	840,243	8,972	84,340	933,555	394,174
2040	846,219	9,102	85,635	940,957	396,978

Table 19 shows the results of SSE for an energy storage of 16MW and 64MWh.

Table 19 SSE Results of 0.25C Storage

Year	EA Sales (\$)	Spin Reserve Sales (\$)	Regulation Sales (\$)	Total Sales (\$)	Total Purchases
2020	1,296,342	7,403	60,978	1,364,723	654,220
2021	1,259,073	7,250	60,040	1,326,363	634,140
2022	1,267,553	7,355	61,069	1,335,977	637,201
2023	1,319,337	7,703	64,113	1,391,153	662,465
2024	1,391,811	8,170	68,153	1,468,133	698,139
2025	1,464,505	8,640	72,222	1,545,367	734,025
2026	1,478,027	8,770	73,459	1,560,256	740,132
2027	1,472,853	8,775	73,626	1,555,255	737,085
2028	1,492,371	8,918	75,042	1,576,330	746,293
2029	1,482,698	8,894	74,951	1,566,544	740,998
2030	1,488,736	8,964	75,649	1,573,349	743,533
2031	1,478,866	8,934	75,500	1,563,300	738,181
2032	1,524,992	9,246	78,236	1,612,474	760,670
2033	1,537,525	9,354	79,247	1,626,126	766,457
2034	1,545,326	9,431	80,000	1,634,758	769,805
2035	1,551,661	9,501	80,686	1,641,847	772,424
2036	1,570,550	9,649	82,035	1,662,234	781,222
2037	1,568,540	9,661	82,236	1,660,437	780,350
2038	1,562,293	9,651	82,241	1,654,185	776,794
2039	1,562,703	9,681	82,592	1,654,977	776,546
2040	1,577,708	9,820	83,872	1,671,400	783,479

9. Valuation

9.1 Assumptions

This section summarizes all the assumptions used for the calculation of energy storage project valuation.

9.1.1 System Assumptions

Table 20 shows the basic system assumptions defining the properties of the energy storage system.

Table 20 System Assumptions for Valuation

Energy Storage Size	16 MW
Energy Storage Capacity	Based on Sensitivity Case 16 MWh for 1C
Efficiency	80%
SOC Limits	20% - 80%

9.1.2 Financial Assumptions

Table 21 shows the financial assumptions defining the WACC, horizon, gearing and debt parameters.

Table 21 Financial Assumptions for Valuation

WACC	5%
Valuation Study Horizon	20 years
COD year	2021
Gearing	
Debt	100%
Equity	0%
Parameters of Debt	
Debt Payback Time	20 years
Cost of Debt	5%
Cost of Equity	N/A

9.1.3 Capital Costs Assumptions

Table 22 shows the energy storage capital cost assumptions used to calculate the valuation of the project. For this case, land cost, interconnection cost, and substation costs are assumed to be zero.

Table 22 Capital Cost Assumptions for Valuation

Energy Storage System Cost	\$202/kWh (if COD is 2021)
EPC Cost	15% of ESS cost
Land Cost for 50MW (1 Acre)	\$2,000,000
Project Land Cost	\$640,000
Interconnection and Substation Cost	\$1,000,000

Figure 40 shows the energy cost predications made by Lazard's, Bloomberg, and Rocky Mountain Institute. Forecasts by Bloomberg and Rocky Mountain Institute does not consider costs additional costs of battery energy storage systems like inverter and transformers. It is observed that a cost decline of approximately 8% is predicted annually.

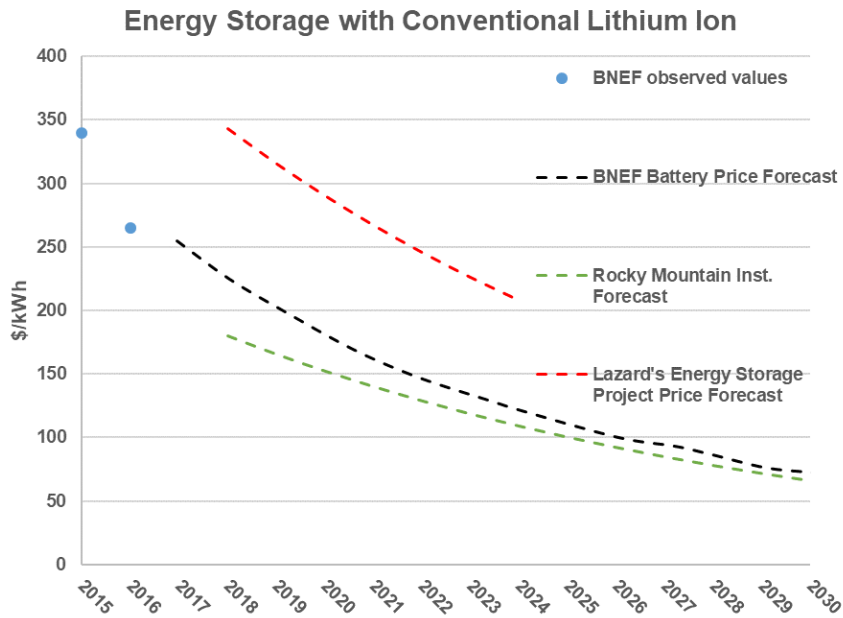


Figure 40 Li-Ion Energy Storage Capital Cost Forecasts

Based on 8% cost decline prediction, a forecast of energy storage cost is made to evaluate potential benefit of selecting COD after 2021. Figure 41 shows the capital cost forecast starting with \$220/kWh in year 2020.

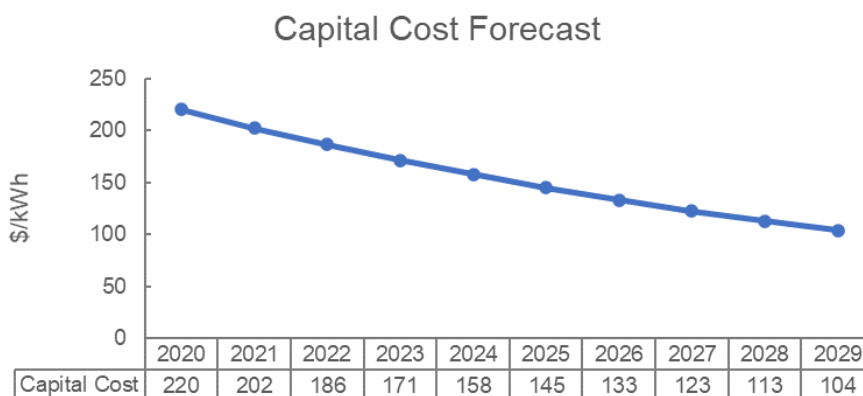


Figure 41 Capital Cost Forecast for Future COD Years

9.1.4 Operational Costs Assumptions

Table 23 shows the operation costs assumptions for operating energy storage for 20 years.

Table 23 Operational Cost Assumptions for Valuation

ESS Fixed O&M Cost (for 0.25C Battery)	\$6/kW-year
ESS Fixed O&M Cost	\$1.5/kWh
ESS Variable O&M Cost	\$0.0003/kWh
Charging Cost	Based on Sensitivity Case Figure 42 for 1C
ESS Scheduling Cost	\$ 20,000 / year

Figure 42 shows the energy purchases forecasted for providing energy arbitrage using the SSE simulations for 1C Storage.

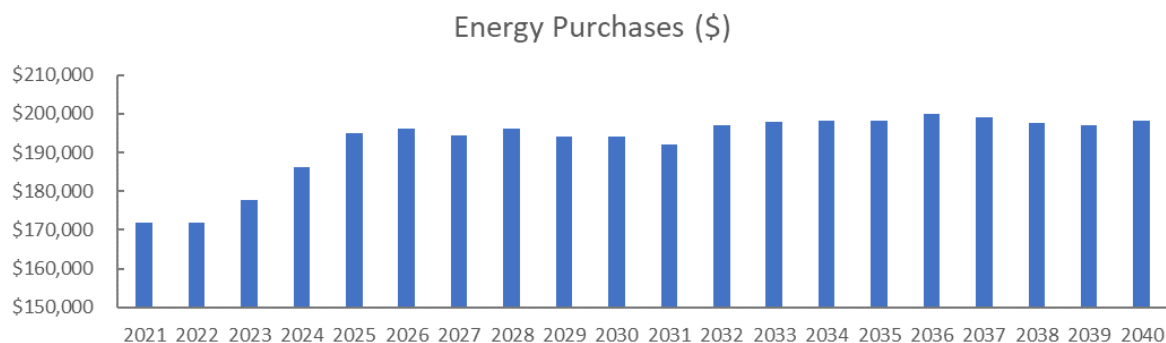


Figure 42 Energy Purchases Forecast

9.1.5 Project Life Assumptions

Table 24 shows the energy storage life assumptions used for calculating the valuation of the project.

Table 24 Project Life Assumptions for Valuation

End Year	20 Years
Recycling Cost	\$37/kWh
End of Life Cost	Base on Sensitivity Case \$221,671 for 1C

9.2 Total Benefits and Sales

The sales from Energy Arbitrage, Spinning Reserve, Regulation, and Resource Adequacy are evaluated for 20 years and discounted to determine the NPV. Figure 43 shows all the benefits and sales over 20 years for 1C Storage.

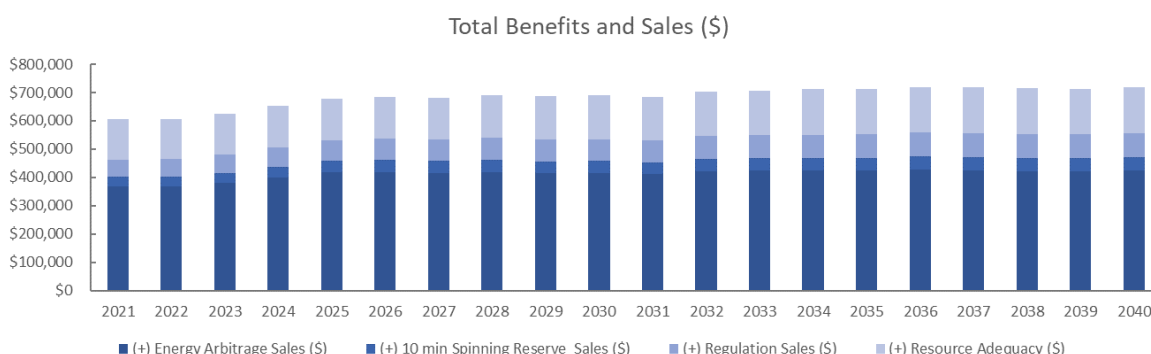


Figure 43 Total Benefits and Sales Over 11 Years

Table 25 shows the 2020 Present Value of all the sales and benefits over 20 years for 1C Storage.

Table 25 NPV of Sales and Benefits at Year 2020

PV Sales and Benefits	Present Value
Energy Arbitrage Sales	\$5,081,059
10 Min Spin Reserve Sales	\$514,147
Regulation	\$938,436
Resource Adequacy	\$1,891,875
Total	\$8,425,516

9.3 Total Purchases

The costs and purchases of capital, scheduling, FOM, energy, debt payments, end of life are evaluated for 20 years and discounted to determine the NPV. Figure 44 shows all the costs and purchases over 20 years for 1C Storage.

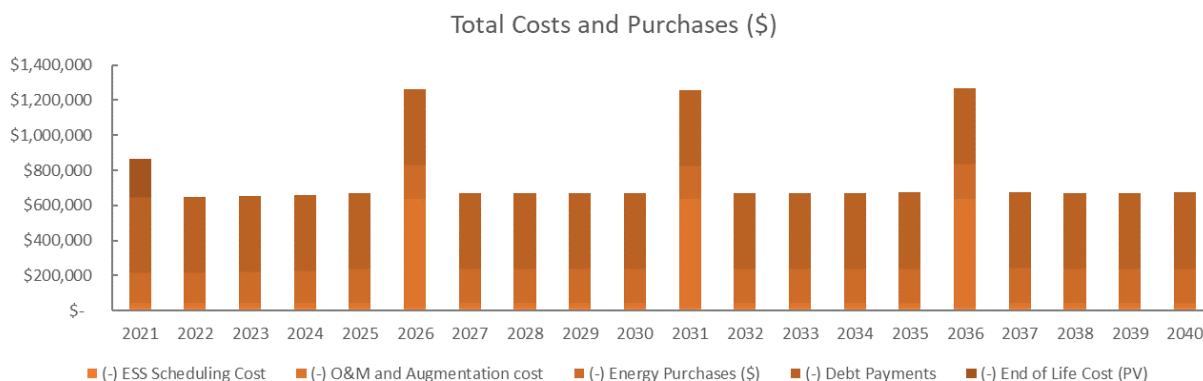


Figure 44 Total Costs and Purchases Over 11 Years

Table 26 shows the 2020 Net Present Value of all the costs and purchases over 20 years for 1C Storage.

Table 26 NPV of Purchases and Costs at Year 2020

PV Purchases and Costs	Present Value
Battery + EPC Capital Cost (debt)	(\$3,716,800)
Land+Interconnection+Substation (debt)	(\$1,640,000)
O&M and Augmentation Cost	(\$1,358,245)
ESS Scheduling Cost	(\$249,244)
Debt Payments	(\$5,356,800)
Energy Purchases	(\$2,376,642)
Terminal Value of the Project	(\$221,671)
Total	(\$9,562,602)

9.4 Discounted Cashflow Model

Figure 45 shows the operating cash flow over 20 years, determined by equating total sales and purchases of each year with 1C Storage.

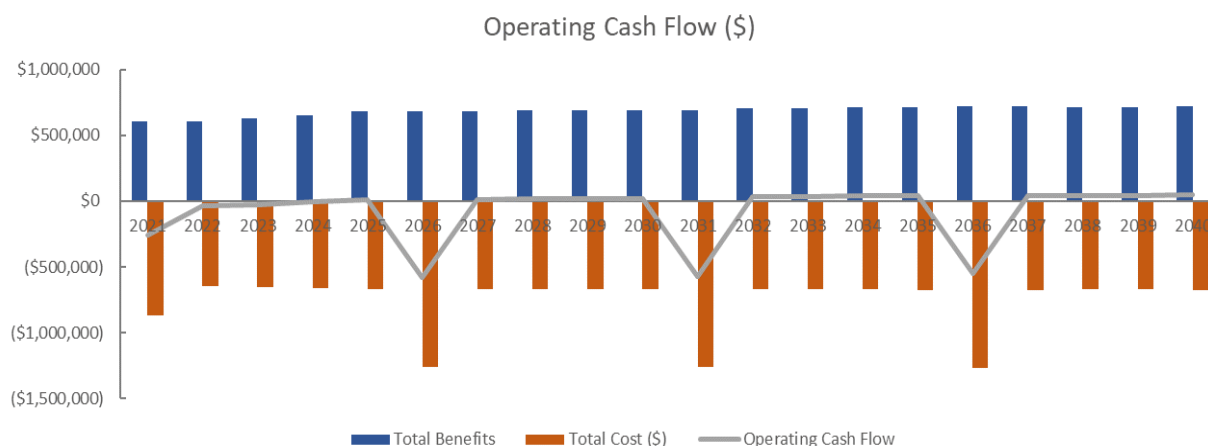


Figure 45 Operating Cash Flow Over 11 Years

Table 27 shows the calculation of Net NPV calculated at the year 2020 for 1C Storage.

Table 27 Net NPV Calculation

Total PV Sales and Benefits	\$8,425,516
Total PV Purchases and Costs	(\$9,562,602)
Net NPV	(\$1,137,085)

The results show that the 1C storage of 16MW and 16MWh with 2021 COD providing energy arbitrage, spinning reserve, resource adequacy, and regulation will not be sufficient to have a positive NPV. However, with the declining costs of energy storage, 1C Storage could result in a positive NPV if COD year is 2026 or later.

9.5 NPV Sensitivity

NPV with multiple energy storage sizes is calculated to evaluate the economic feasibility of energy storage for the Alameda Hybrid system. Also for each energy storage size, NPV is calculated considering declining capital costs of energy storage with future COD years. Table 28 shows the calculated NPV values. Energy Storage with a C-rate of 1C, 0.5C, and 0.25C could be economically feasible in 2025.

Table 28 Calculated NPV with Future COD Years for Each Sensitivity Case

Battery Size			NPV					
MW	MWh	C-Rate	2020	2021	2023	2025	2027	2029
Capitla Cost			220	202	171	145	123	104
16	2	8	-1,375,033	-1,334,553	-1,263,049	-1,202,528	-1,151,304	-1,107,947
16	4	4	-1,097,235	-1,016,275	-873,267	-752,226	-649,776	-563,062
16	8	2	-1,416,767	-1,254,847	-968,832	-726,748	-521,849	-348,422
16	16	1	-1,468,285	-1,144,445	-572,414	-88,247	321,552	668,405
16	32	0.5	-2,609,048	-1,961,368	-817,306	151,028	970,626	1,664,334
16	64	0.25	-6,333,879	-5,038,519	-2,750,395	-813,727	825,469	2,212,884

Figure 46 shows a comparison of NPV (in \$ million) for Energy Storage of 16MW with a duration of 0.125 hr, 0.25hr, 0.5hr, 1hr, 2hr, and 4hr. Also, an estimated NPV forecast for future COD years is shown to check the economic feasibility of each Energy Storage.

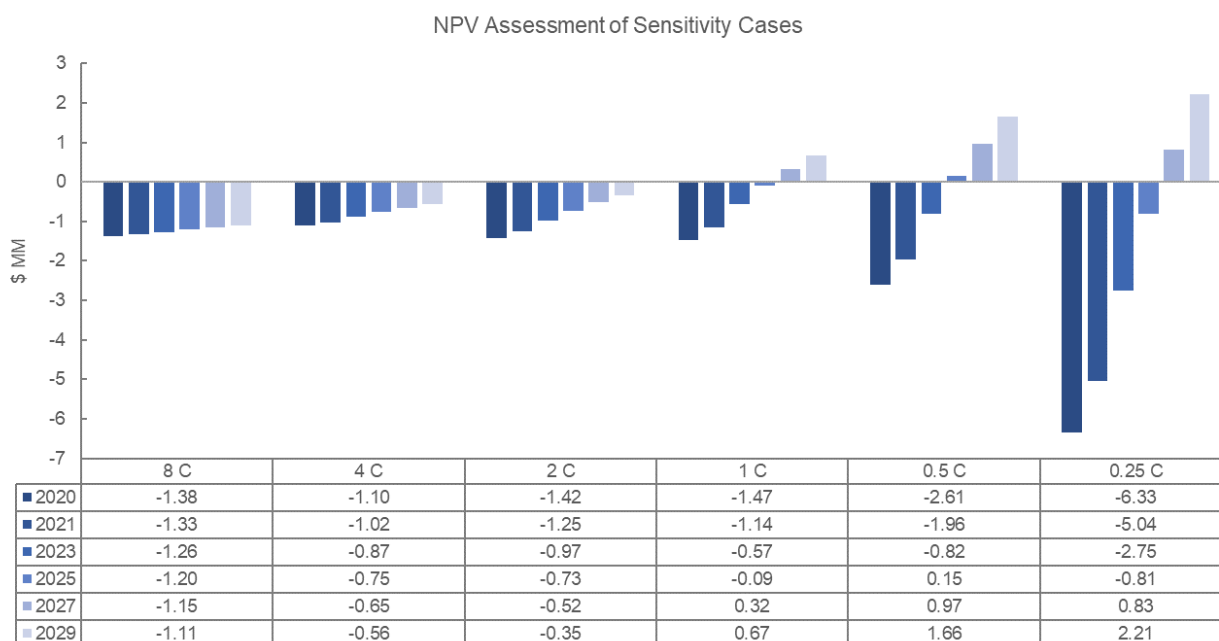


Figure 46 NPV Comparison with COD Years and C-Rates of Energy Storage

9.6 NPV of High and Low Cases

Since energy storage with 1C is showing economic potential, the 1C Storage case is considered as a base case. Figure 47 shows the calculated NPV values for the 1C Storage case with high and low energy and ancillary price forecasts. As observed, 1C Storage is showing economic feasibility from the year 2022 with high price forecasts.

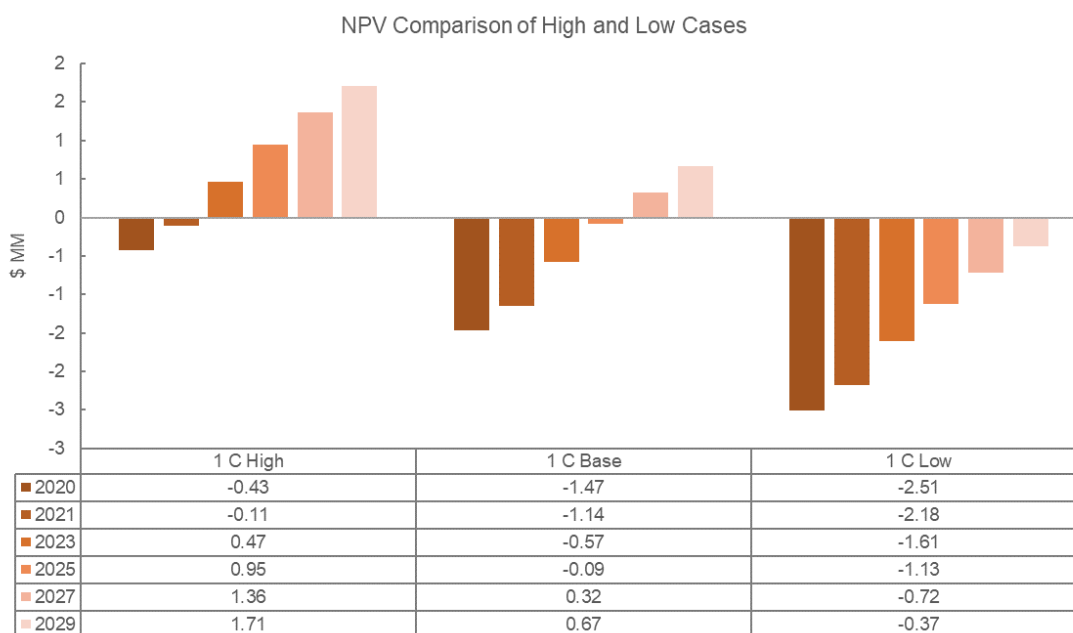


Figure 47 NPV Comparison of 1C Storage Case with High and Low Price Forecast

10. References

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