Rulemaking **R.20-11-003**

Exhibit ____

Date **September 1, 2021**

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I. Introduction

Peninsula Clean Energy offers the following proposals to assist the Commission in its efforts to "to achieve energy stability" during the next several summers, as ordered by Governor Newsom's emergency proclamation of July 31, 2021 and as invited in this proceeding in the August 16, 2021 Administrative Law Judge Ruling.

Peninsula Clean Energy offers two primary proposals that may be implemented most feasibly and quickly, along with three other conceptual proposals which may be developed into full programs. First, Peninsula Clean Energy proposes a residential storage load modification program, which would leverage the existing residential storage fleet to reduce loads during the critical peak and net peak hours. This program is modeled on our existing storage load modification program launched this year. Second, Peninsula Clean Energy offers a proposal for a quickly scalable program to reduce EV charging loads during critical periods, which builds upon a previous pilot led by Peninsula Clean Energy.

Peninsula Clean Energy is committed to addressing the state's critical needs with both supply-side and demand-side programs to the greatest extent feasible. We look forward to working with the Commission to further develop details of any programs the Commission deems a useful contribution to the state's efforts to maintain energy stability in coming years.

II. Proposal 1: Net Peak Residential Storage Load Modification

a. General Program Design

Peninsula Clean Energy proposes to utilize existing behind-the-meter residential rooftop solar and storage installations to reduce net peak during critical summer hours. This would be accomplished through a collaboration with residential energy storage asset managers to dispatch energy storage assets during the California system peak and net peak hours each day during summer months to reduce load. This proposal is modeled on an existing Peninsula Clean Energy program in collaboration with Sunrun, and would expand this model to including other energy storage asset managers such as Tesla, Sunpower, Sonnen, and Swell. We provide illustrative estimates of load reduction and cost based on our experience in our own service territory, as well as estimates of statewide potentials if all LSEs were to similarly participate in a statewide program.

Our estimated potential for incremental capacity during the net peak could be up to 15MWac using assets located in Peninsula Clean Energy's service territory. Lawrence Berkeley Lab estimated that the total residential storage in California is 193MWac and much of this capacity could be deployed for more focused net peak shaving.

Our proposal would result in no change to customers' energy bills nor energy assets, but would use these assets to reduce loads specifically during peak and net peak hours during the summer months. This program improves the way existing residential distributed storage assets dispatch, and also creates an improved method of compensating distributed storage assets that is more in-line with their value to the grid. Accepting this proposal and creating a statewide load modification program would result in an increase in capacity available for Summer 2022 and would motivate new energy storage deployments in the future.

i. Program trigger

This program would contract for daily load reductions during key hours, based on system net peak forecasts provided by the CPUC or CAISO with sufficient lead time for the distributed storage asset manager to implement advanced schedules (e.g., at least a month ahead of the summer season.) This would result in storage discharging during set hours each day during summer months to reduce loads to forestall emergencies without participation in CAISO markets or specific dispatch orders. In subsequent iterations of the program, the program could move towards more real-time dispatch as necessary systems are put in place.

Storage asset managers maintain rights to adjust dispatch schedules on many of the storage systems they deploy. Load Modification Agreements would dictate how the distributed storage assets must operate, with the specific requirement to dispatch at a rate equal to their highest usable power capacity within a system net peak forecast window as established by CAISO or the CPUC. For the purposes of this proposal, this is assumed to be a two-hour window within the peak TOU period, running from 16:00 through 21:00 (HE17-HE21). Based on the forecast from CAISO or CPUC, the administering LSE will require the assets to dispatch every weekday (or potentially including weekend days) according to the required dispatch schedule during the forecasted system net peak window, resulting in a permanent load modification and reliable capacity during this window.

ii. Demonstration that program will deliver benefits during net peak

Currently, most energy storage assets located at residential sites are designed for time-of-use ("TOU") energy arbitrage, and typically dispatch beginning immediately at HE17, and cease to discharge during HE18. This means most distributed storage is not providing any capacity when California typically experiences its system net peak later in the evening. Storage assets contracted under this program would instead dispatch in a manner that aligns with the state net peak's principal time windows. Load reduction can be demonstrated quickly with data from contracting asset managers.

iii. Program performance requirements

Storage asset managers must dispatch the assets under contract within the Load Modification Agreement during the agreed-upon net peak window every weekday (or potentially during weekend days, depending on final program design) for at least one hour at the assets' maximum discharge capacity, although contracting for longer or different discharge schedules is also a possibility.

iv. Compensation structure

Under this program, LSEs would contract with asset managers for the right to dispatch residential storage according to the forecast peak/net peak hours as determined by CAISO or the CPUC. Program compensation structure includes LSE administration and marketing costs, as well as incremental incentives for the storage asset managers and customers.

v. Program eligibility and enrollment

All dispatchable residential distributed energy storage assets could be eligible for participation, although the program could also include non-residential or commercial and industrial sited storage as well, as appropriate. (Many commercial and industrial storage assets may be dedicated to demand charge management or back up storage, and so may not be responsive to the incentive structure of this program).

vi. Measurement and verification, if needed

Distributed storage asset managers would provide M&V as needed.

b. Program Administration (including who would administer the program)

This program may be administered either as a state-wide program open to LSEs to administer among their customers with whom they have contact.

c. Program marketing, outreach and education

Additional ME&O can be utilized to enroll additional customers, educate customers on the individual and state level benefits of storage systems, and gather feedback from customers on satisfaction and concerns that the battery dispatch schedules continue to meet their needs even as they support grid needs (or schedules require adjustment).

d. Program budget, including breakouts for administrative costs, marketing, evaluation, and breakouts for startup costs, incentive payments (if applicable), and ongoing program administration.

The following budget illustration is based on the Peninsula Clean Energy program for a territory with 295,000 customers, approximately 1800 customer enrollments, and roughly 15 MWac installed storage capacity.

Budget Item	Budget	Detail
Peninsula Clean Energy administration	$50,000	Program administration and legal fees for developing a revised version of our Load Modification Agreement
Marketing, education, and outreach	$80,000	Facilitate new deployments, with focus on retrofitting existing solar installations with new energy storage. Educate customers about their participation in the "Virtual Power Plant" and benefits for the state and themselves.
Capacity compensation	$1,872,200	Provide compensation at a comparable RA capacity rate such as $10/kW-month for assets that dispatch for 1h/week-day within a 2h forecasted net peak window. Based on 15.6MWac capacity.
Customer participation incentive	$378,600	$200/year for customers who remain opted in to the program. Based on 1,893 enrollments.
Total	**$2,380,800**	

e. Implementation timeline (must demonstrate program can be designed and fully implemented such that it can deliver demand reduction or increase supply at net peak for June 2022, and if not on this timeline, why the proposed timeline still provides benefit in addressing the summer net peak reliability need)

If the proposal outlined here is approved and funded, LSEs could work with Sunrun, Tesla, and other storage asset managers and begin affecting the dispatch behavior of distributed storage assets before June 2022. We have confidence in this quick implementation timeframe because the proposed approach is an expansion to the existing program underway between Peninsula Clean Energy and Sunrun, so at a minimum Sunrun has experience with this program model. In that program, the current Load Modification Agreement between PCE and Sunrun requires distributed storage assets to dispatch storage capacity during HE18-HE21. This demonstrates that load modification is already achievable. The implementation timeframe is largely dependent on the incentive level being strong enough to attract storage asset managers.

f. Program duration

This program would run throughout 2022 and 2023, but could potentially be extended if needed.

g. Estimated megawatt contribution/load impact (including whether load impact will reduce the demand at net peak hours, and whether and how much the load impact may reduce the impact of any existing programs)

This program could deliver up to 15.6MWac of incremental storage capacity during the California system net peak using assets within Peninsula Clean Energy's service territory. If the Commission sought to replicate this program throughout the state, we estimate there may be up to 193MWac of incremental storage capacity using assets throughout California.

The volume of peak load affected would be directly tied to: 1) total power and energy capacity deployed in any given California LSE's service territory, 2) the maximum usable power capacity (discharge) for each storage device, and 3) willingness for storage asset owners and LSEs to enter into Load Modification Agreements.

Under Peninsula Clean Energy's current Load Modification program, contracted storage is dispatched to reduce Peninsula Clean Energy's peak load specifically. Sunrun is enrolling the following battery storage products under this program: LG Chem RESU 10h Prime, LG Chem RESU 10h SEG, and Tesla Powerwall 2. A significant (~30%) portion of each battery device is left untouched to provide backup power for the customer in case of an unplanned power outage. These assets dispatch evenly for four hours within the HE17-HE21 window, which provides more capacity later in the evening compared with their standard dispatch behavior (as referenced in a.ii.). As a result, each battery storage asset will provide, on average, 2kWh in each of those four hours.

We propose that an alternative use of these distributed storage assets would be to concentrate their dispatch during the CAISO net system peak, such as during HE20, which is when CAISO expects the largest capacity shortfalls for summer 2022. Below is a comparison of how distributed storage assets currently typically dispatch[1] (A), how they dispatch in the current Peninsula Clean Energy Load Modification program (B), and how a net peak targeted program could dispatch them (C).

Table 1 - Residential Storage Product Specifications				
	Power Capacity (kW)	Energy Capacity (kWh)	Unplanned Outage Reserves	Usable Energy Capacity (kWh)
Tesla Powerwall	5	13.5	30%	9.45
LG Chem Resu 10h Prime	5	9.6	30%	6.72
LG Chem Resu 10h SEG	5	9.3	30%	6.51

[1] Batteries not managed under a load modification program typically dispatch for Time of Use arbitrage, reserving capacity for unplanned outages.

Table 2 – Examples of possible modified dispatch plans					
	Peak TOU Period				
Dispatch plan using one Tesla Powerwall (kWh)	HE17	HE18	HE19	HE20	HE21
A: Standard dispatch/TOU arbitrage	5.0	4.5			
B: Current Load Modification dispatch plan		2.4	2.4	2.4	2.4
C: Potential proposed dispatch, Net Peak at HE20				5.0	4.5
Dispatch plan using one LG Chem Reus 10h SEG (kWh)	HE17	HE18	HE19	HE20	HE21
A: Standard dispatch/TOU arbitrage	5.0	1.5			
B: Current Load Modification dispatch plan		1.6	1.6	1.6	1.6
C: Potential proposed dispatch, Net Peak at HE20				5.0	1.5

Under the typical unmanaged energy storage installation in plan A – the status quo – results in 0kW of storage dispatch in the evening hours when CAISO expects capacity shortfalls for 2022 and 2023. Peninsula Clean Energy's current program results in 1.6-2.5kWac of storage dispatch per hour, depending on the storage product. A program to target statewide net peak load could result in the dispatch of 5.0kWac per unit of battery storage during one possible net peak hour.

If this program were implemented to include all existing residential storage, this program could result in 15 MW of load reduction in the Peninsula Clean Energy Territory and an estimated potential 193 MW throughout California.

Table 3 – For Illustrative Purposes only Estimated Customer number and power and energy capacities for Peninsula Clean Energy (PCE) and California.						
	PCE Interconnection Data			**CA Interconnection Data[2]**		
	Estimated total Power Capacity (kWac)	Estimated total Energy Capacity (kWh)	Count of Energy Storage Installations	Estimated total Power Capacity (kWac)	Estimated total AC Energy Capacity (kWh)	Estimated total Energy Storage Installations
Residential Storage	15,685	25,368	1,893	193,973	313,714	34,513

Table 4 – Potential total dispatch profiles for PCE territory and California					
	Peak TOU Period				
Dispatch plan enrolling all PCE residential storage assets	HE17	HE18	HE19	HE20	HE21
A: Standard dispatch/TOU arbitrage	15,685	9,683			
B: Current Load Modification dispatch plan		6,342	6,342	6,342	6,342
C: Net Peak Program proposed dispatch, Net Peak at HE20				15,685	9,683
Dispatch plan enrolling all CA residential storage assets	HE17	HE18	HE19	HE20	HE21
A: Standard dispatch/TOU arbitrage	193,973	119,741			
B: Current Load Modification dispatch plan		78,429	78,429	78,429	78,429
C: PCE proposed dispatch, Net Peak at HE20				193,973	119,741

[2] According to Lawrence Berkeley National Laboratory's "Behind-the-Meter Solar+Storage Market Data and Trends" report, available at https://emp.lbl.gov/publications/behind-meter-solarstorage-market-data.

h. Potential interaction with other existing programs (i.e., dual participation issues)

Storage asset managers participating in this program would not able to participate in other CPUC capacity programs such as the Base Interruptible Program, Proxy Demand Response, Emergency Load Reduction Program, Demand Response Auction Mechanism, and the Capacity Bidding Program. Generally, as a program outside of the RA program, the contractual obligations of this program would be inconsistent with requirements of other programs.

i. Prior similar program experience in California or elsewhere

As discussed above, Peninsula Clean Energy and Sunrun, Inc. are currently implementing Dispatch Plan B for the battery storage assets within Peninsula Clean Energy's service territory.

j. Program funding and cost recovery mechanisms

Currently, the Peninsula Clean Energy Program is funded out of our own program funds, but an expanded program within our service territory and a statewide program would require ratepayer funds for cost recovery of program costs.

k. Potential risks of proposal (e.g., delay, lack of participation, low megawatt contribution, etc.) with discussion of each potential risk

Based on our experience with Sunrun we believe this program could be implemented expeditiously by LSEs that seek to participate, but delays could result from development of LSE programs. However, the simple design of the program should reduce this risk. Since this program works with asset managers for participation of existing systems, rather than customers directly, the acquisition costs and risks of low participation should be lower than with direct-to-customer enrollment programs.

III. Proposal 2: Residential EV Managed Charging through Vehicle-Grid Integration

a. General Program Design:

This program targets load reductions from EV charging during peak or net peak hours, building upon Peninsula Clean Energy's experience with an earlier phase pilot to implement telematics-based electric vehicle (EV) managed charging with residential customers at scale. By utilizing in-vehicle telematics, the program can quickly scale up and deliver load reduction from EV charging without hardware. Residential EV charging will be targeted in this program, which most overlaps with critical hours needed for load reduction. The program also includes a collaboration with the University of California, Davis, which will include an innovative experiment with a subset of residents in the program to test how various customer incentive structures impact load management.

PCE will be able to select a managed-charging platform (via open RFP), recruit customers, and begin early charge management by April 2022. Using the platform, all enrolled vehicles will be capable of charging load reductions.

i. Program trigger:

This program will deliver load reductions on all days (or Monday through Saturday as required) to deliver peak and net peak load reductions across the summer months, and so would not require a specific trigger.

ii. Demonstration that program will deliver benefits during net peak:

All enrolled vehicles will transmit data through vehicle telematics, which will document load reduction. A prior pilot demonstrated that load reduction was roughly 1 MW per 10,000 vehicles enrolled and this figure will be further evaluated in this program. Additional testing with different incentives may deliver greater performance.

iii. Program performance requirements:

Enrolled vehicles will have their day-to-day charging moved from on-peak to off-peak hours as much as possible, across various rate structures, and subject to customer inputs (e.g. expected departure time) and battery state of charge, by the platform.

iv. Compensation structure:

The program is a collaboration with the UC Davis, who will test multiple compensation structures and enable PCE to quickly roll out lessons learned. These include participation incentives, such as a one-time signup bonus and enrollment with no incentive, and performance incentives that will include a monthly bill credit, a discounted bill that is based on the amount of EV charging off peak, and no incentive.

v. Program eligibility and enrollment:

Vehicles in the program must have compatible telematics systems. (A majority of on-road EVs are compatible). Customers will download an App, which will allow for Peninsula Clean Energy to load shift their vehicle charging, subject to customer inputs. There are an estimated 30,000 personally owned electric vehicles within the Peninsula Clean Energy territory and over 600,000 in California, a majority of which are eligible to participate right away.

vi. Measurement and verification:

For the Peninsula Clean Energy program, UC Davis will provide independent measurement and verification, including how various incentive impact charge management and load management potential among various vehicle types, home charging setups, rate enrollment, etc. Analysis and lessons learned will be compiled in a report that will be made widely available.

Other participating LSEs would use their own platforms to provide additional measurement and verification.

b. Program Administration:

For the Peninsula Clean Energy Program, PCE will administer the program with a TBD telematics charge management platform as technical partner and UC Davis as third-party measurement and verification party. Other LSEs may participate under similar models or based on lessons learned from the PCE program, which will publish its results and findings.

c. Program marketing, outreach and education:

Marketing and enrollment will be conducted by PCE. As public agencies, CCAs generally have access to DMV registration data and customer energy data to target customers with EVs for participation. LSEs without such data would potentially rely on traditional outreach methods to enroll customers.

d. Program budget: Target: 10,000+ vehicles enrolled

This budget for startup costs is based on a target of 10,000 vehicles from among Peninsula Clean Energy customers but could be scaled up to larger programs for other LSEs.

Budget Item	Budget
PCE administration	$0
Marketing and Enrollment (startup costs)	$20,000
Telematics platform (startup costs)	$30,000
Telematics platform (1 year, ongoing costs)	$1,440,000
Enrollment incentive (subset, startup costs)	$100,000
Participation incentive (subset, startup costs)	$200,000
Evaluation & Analysis (UC Davis, startup costs)	$220,000
Total	**$2,010,000**

Note: any participation incentive needed beyond initial startup would be determined based on customer response during the initial period of the program.

e. Implementation timeline

This implementation timeline is indicative of the time needed to bring a program online but would be delayed for other LSEs that would need to way for a final decision from the CPUC. Nevertheless, a nimble LSE could follow a similar timeline with lessons learned from the PCE program to begin delivering load reductions by Summer 2022.

Milestone	Date
Telematics platform selected	October 2021
Customer recruitment begins	January 2022
Program launch	April 2022

f. Program duration: Minimum of 2 years. Program likely to be made permanent.

g. Estimated megawatt contribution/load impact:

Preliminary estimates in an earlier phase showed a potential of 1 MW per 10,000 EVs enrolled, though this will be further verified, and the program will seek to increase load reduction potential. Load reduction will be focused on net peak hours, moving charging to off-peak hours whenever possible. This program is uniquely focused on residential EV charging and will complement other DR programs. The program can also scale, as needed, to achieve targeted peak reductions.

h. Potential interaction with other existing programs:

Participation in this program would likely not be compatible with participation in other similar programs. The platform will interact with customers' vehicles via onboard telematics. Dual participation in a similar system will cause interference. However, PG&E is not currently planning a telematics-based VGI program, therefore there is no current risk of interference. If LSE programs were to target only each LSE's own customers, there would be limited risk of interaction or interference.

i. Prior similar program experience in California or elsewhere:

PCE has direct experience, having conducted a phase 1 telematics pilot with FlexCharging.

j. Program funding and cost recovery mechanisms:

This program could be implemented as a statewide, multi-LSE program or potentially as a PCE specific pilot on behalf of all customers to demonstrate the concept and technology and share detailed findings with LSEs across the state. If funded as a statewide program, most startup costs would be fixed per LSE, except marketing, enrollments, and incentives. The platform costs and participation incentives would scale with participation and require annual funding. If funded solely as a pilot through Peninsula Clean Energy, PCE is requesting that this proposal cover startup and year 1 costs. Ongoing costs would then be covered entirely by PCE, if the Commission seeks to fund only the PCE pilot.

Budget Item	**CPUC (startup and year 1 costs)**	**PCE (ongoing costs after year 1)**
Startup costs (marketing, platform startup, enrollment incentive tests, and M&V)	$570,000	As needed
Telematics platform	$1,440,000	$1,440,000+
Total	**$2,010,000**	**$1,440,000+**

k. Potential risks of proposal: The following risks will all be tested and evaluated as part of the experimental component with UC Davis in this program.

a. **Customer acceptance**. Customer comfort level with third-party charge management of their vehicle, enrollment and retention rates, customer satisfaction, etc.

b. **Technical limitations**. Vehicles without telematics functionality will need alternative strategies to participate, challenges with network subscriptions (e.g. OnStar), potential vehicle communications issues, etc.

c. **Poor performance.** Customer overrides of managed charging platform settings that begin charging during on-peak hours, charging behavior (e.g. infrequent home charging that results in longer charge sessions needed, which are more difficult to load manage), and other factors leading to diminished ability to move charging out of on-peak hours.

IV. Additional concepts

In addition to the above primary proposals, Peninsula Clean energy offers a series of supplementary concepts which could be developed into additional proposals to reduce load at peak and net peak hours.

A. Public and Community Facility resilience and peak/net peak load reduction

Commission funding for resilience resources (solar and storage) for public buildings and non-profit community centers could both provide resilience benefits for public infrastructure, while also providing load reduction or energy discharge during peak periods using a similar discharge model to the Net Peak Residential Storage Load Modification program described above. Although such facilities represent a smaller total load statewide than existing deployed residential storage units, the resilience services from back-up power for public buildings could provide additional community benefits beyond the load reduction energy stability benefits. Such a program could follow an allocation of capacity to LSEs framework similar to the DAC-GT program, which assigns each LSE a maximum capacity but also allows trading and sharing of allocations to ensure critical local resources are deployed.

B. Commercial load evening peak reduction

Commercial buildings in IOU service territories consume more than 65,000 MWH per year,[3] creating a significant potential opportunity to reduce evening loads by shifting commercial energy use. Buildings with primarily daytime occupancy represent a load shifting opportunity by precooling or simply not cooling during evening load hours. A ratepayer-funded load shifting program in which commercial building operators contract to reduce or eliminate evening loads below a set limit for all summer evenings could potentially deliver significant load reductions. Since LSEs would have hourly usage data for most commercial customers, verification that

[3] See California Energy Commission, Energy use by entity, for all IOUs in 2019 for Commercial buildings, http://www.ecdms.energy.ca.gov/elecbyutil.aspx

usage falls below contracted usage levels. Contracted evening usage limits would be based on reductions from historical usage from meter data. Ratepayer funding would primarily cover contract payments for usage reductions.

C. EV Vehicle-to-Building Pilot expansions

Peninsula Clean Energy recommends that the Staff-proposed Vehicle to Building pilot include eligibility for CCA participation in pilots, since CCAs have a wide variety of experience and approaches which would significantly increase the value of any pilot beyond having a smaller number of entities participate. Also, all data from all pilots should be openly available to all LSEs to facilitate future V2B program design by all LSEs. In addition, these pilots should explore additional program pathways beyond participation in ELRP programs. Two additional program concepts are described below.

Option 1: Residential V2B Pilot

This pilot will conduct a demonstration of a residential vehicle to building (V2B) emergency scenario and test the feasibility of utilizing personally owned light-duty vehicles to provide grid services such as peak reduction. OEM participation would be required for vehicle or control system modification. Tasks include third-party design, engineering, and M&V, and will include vehicle acquisition (including a rebate) for vehicles such as the Nissan Leaf or Ford F-150 Lightning, purchase and installation of bi-directional capable EV charging station, and a demonstration and analysis of the pilot, including cost/benefit, barriers encountered and overall feasibility, demonstrated load modification, and opportunities and challenges to scaling. This pilot could be scaled up as needed to demonstrate net peak load reductions, as needed. Budget (all are one-time costs) for one location:

Budget Item	Cost
Vehicle rebate	**$10,000**
EV charging station purchase and installation	**$25,000**
Design and M&V	**$100,000**
Total	**$135,000**

Option 2: Heavy-Duty Commercial V2B Pilot

This pilot will further knowledge of electric vehicles in fleet applications and their potential to both reduce grid pressure and provide emergency power in a vehicle to building (V2B) deployment. Tasks include recruitment of a local agency (likely a school), technical assistance in designing a V2B EV charging system, purchase and installation of a bi-directional EV charger and necessary ancillary equipment, and a demonstration and analysis of the pilot, including cost/benefit, barriers encountered and overall feasibility, demonstrated load modification, and opportunities and challenges to scaling. Budget (all are one-time costs) for one location:

Budget Item	Cost
EV charging station purchase and installation, including ancillary equipment	**$50,000**
Design and M&V	**$200,000**
Total	**$250,000**

Note: budget assumes use of existing vehicle rebates for the acquisition of an electric vehicle, such as a school bus.

V. Conclusion

Peninsula Clean Energy greatly appreciates the effort and attention of the Commission to demand side programs. Peninsula Clean Energy in particular here focuses on programs which require as little additional hardware installation and customer contract, in part by seeking load reductions or shifting across all peak and net peak hours, rather than more elaborate approaches targeting only specific days through particular event triggers. Peninsula Clean Energy remains dedicated to helping address the state's energy needs and looks forward to further collaborations with the Commission to ensure our joint success.

Dated: September 1, 2021

(*Original signed by*)

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