BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking To Investigate and Design Clean Energy Financing Options for Electricity and Natural Gas Customers	Rulemaking 20-08-022 Filed August 27, 2020

CLEAN COALITION OPENING COMMENTS ON ORDER INSTITUTING RULEMAKING TO INVESTIGATE AND DESIGN CLEAN ENERGY FINANCING OPTIONS FOR ELECTRICITY AND NATURAL GAS CUSTOMERS

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I. INTRODUCTION

Pursuant to Rule 6.1 of the Rules of Practice and Procedure of the California Public Utilities Commission ("Commission") the Clean Coalition respectfully submits these opening comments in response to Order Instituting Rulemaking ("OIR") to Investigate and Design Clean Energy Financing Options for Electricity and Natural Gas Customers, issued at the Commission on August 17, 2020. In accordance with the timelines for Senate Bill (SB) 100, which requires 100% carbon free retail energy by 2035, it is important for the Commission to offer incentives in support of customer electrification. While there are definite advantages to electrification and the decarbonization of buildings, the ambitious goals pose a great challenge — a lack of capital — that needs to be overcome, especially in low-income and disadvantaged communities. As a result, bundling financing options through combinations of public subsidies, third-party capital, and public-private partnerships, maximizes the options consumers have to choose from, elevating the likelihood that change will occur.

It is worth noting that while much of the focus of electrification is on decarbonization and updating infrastructure, an equally important consideration must be the renewable resources replacing older inefficient and polluting sources of energy. Incentivizing electrification inherently requires the promotion of renewable resources, primarily solar + storage assets, that can be deployed on built environments: rooftops, parking lots, and parking structures. Thus, electrification has the added benefit of providing an extra layer of local resilience by increasing the penetration of renewable resources while reducing societal reliance on natural gas pipelines.

Clean Coalition opening comments will focus on the importance of resilience as a mechanism to promote the deployment of Distributed Energy Resources ("DER"). Properly valuing resilience provides consumers with an extra value stream, creating an opportunity to make residences and commercial interests more energy efficient. In addition to personal benefits, DER also increases the amount of community resilience, a facet that is especially important at a point in California history where Public Safety Power Shutoffs ("PSPS") and the possibility of rolling blackouts make outages an ever present reality and the COVID-19 pandemic means people are spending the majority of time at home.

II. DESCRIPTION OF PARTY

The Clean Coalition is a nonprofit organization whose mission is to accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise. The Clean Coalition drives policy innovation to remove barriers to procurement and interconnection of distributed energy resources ("DER") — such as local renewables, demand response, and energy storage — and we establish market mechanisms that realize the full potential of integrating these solutions for optimized economic, environmental, and resilience benefits. The Clean Coalition also collaborates with utilities, municipalities, property owners, and other stakeholders to create near-term deployment opportunities that prove the unparalleled benefits of local renewables and other DER.

III. COMMENTS

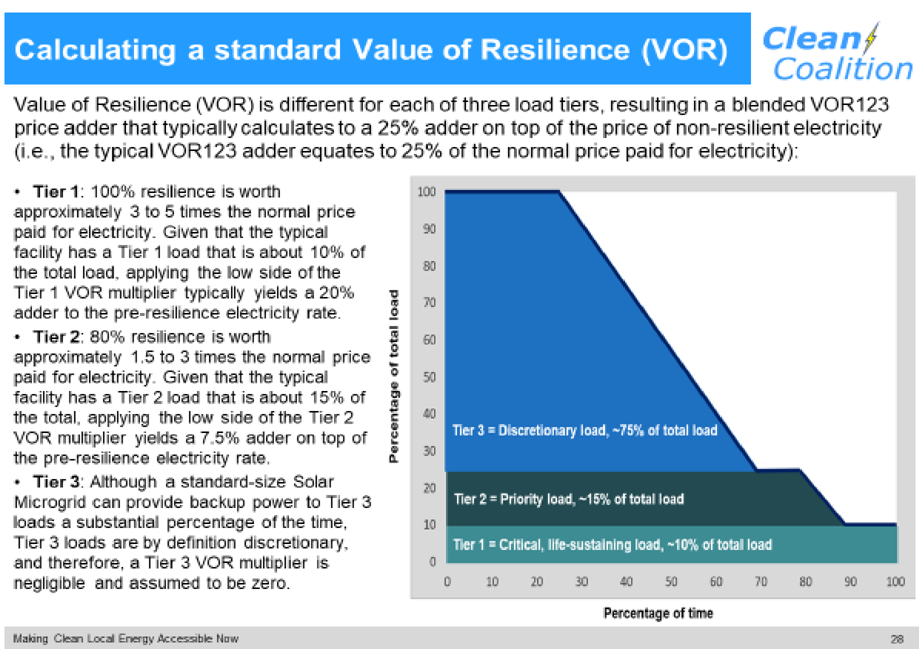
a. The Goleta Load Pocket underscores the need for financing options that properly realize a standard value of resilience.

The Goleta Load Pocket[1] (GLP) spans a 70-mile stretch of California coastline from Point Conception to Lake Casitas, encompassing the cities of Goleta, Santa Barbara (including Montecito), and Carpinteria. The GLP is served by only two transmission lines, which both run on the exact same transmission towers through tens of miles of mountainous terrain that is rated at the highest fire risk level — resulting in the GLP being extremely vulnerable to transmission outages, including during PSPS. The GLP's single point of interconnection to the transmission system exists at the Goleta Substation, and if one of the transmission lines goes out, the second and only other transmission line will go out too — and the GLP will completely lose the source of the vast majority of the energy that serves it.

[1] Clean Coalition Goleta Load Pocket Community Microgrid web page, https://clean-coalition.org/community-microgrids/goleta-load-pocket/

Map of the Goleta Load Pocket

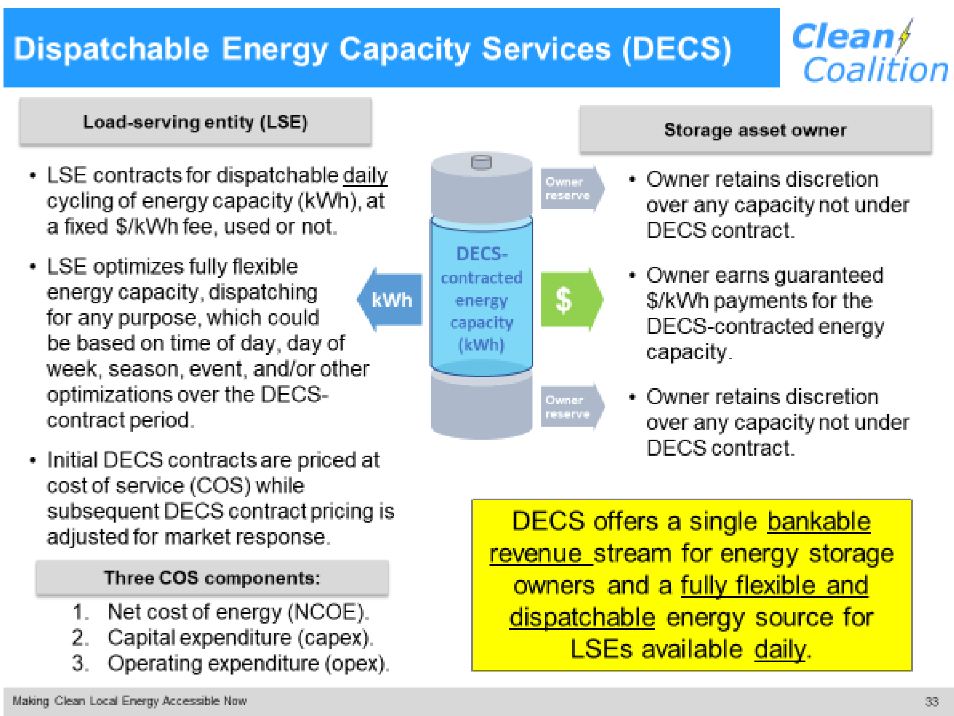
Because the GLP is a highly transmission-vulnerable, disaster-prone region, the GLP Community Microgrid is being designed to deliver an unparalleled trifecta of economic, environmental, and resilience benefits to the area. To achieve indefinite renewables-driven backup power that provides 100% protection to the GLP against a complete transmission outage ("N-2 event"), 200 MW of solar and 400 megawatt-hours (MWh) of energy storage needs to be sited within the GLP. Achieving that level of resilience would only require the solar installations on 7% of the built environments in the region, meaning installations on rooftops, parking lots, and parking structures. In the GLP and outage prone areas around California, personal and community resilience is extremely valuable to critical community facilities, but also to the average ratepayer due to the amount of time consumers are spending at home during the COVID-19 pandemic. The diagram below represents the Clean Coalition's value of resilience methodology, called VOR123



The Clean Coalition differentiates three tiers of loads: critical (life-sustaining) loads that must be kept on all of the time, priority loads that can be kept on most of the time, and discretionary loads that would ideally be energized, but are not essential. Since many facilities are willing to pay a premium for resilience, especially to sustain critical loads, there is an opportunity for financing mechanisms that improve the economics of renewable resources deployed for resilience.

b. Dispatchable Energy Capacity Services (DECS) is a flexible market mechanism that optimizes the deployment of energy storage.

As demonstrated in the diagram below, the Clean Coalition's DECS market mechanism creates an additional revenue stream that the owner of an energy storage device can use to make the economics for the deployment of a device pencil out.



DECS is a fixed contract an energy storage owner can use to contract a small portion of the battery's state of charge for a resilience purpose. In combination with other incentives (and financing structures) such as SGIP, the ITC, or a PPA, DECS makes owning an energy storage system more affordable, especially as energy storage prices continue to fall. This is exactly the type of bundling necessary to promote the deployment of renewable resources for all customers, not just wealthy commercial interests.

c. The Clean Coalition's Electrification Community Microgrid Ready (ECMR) guidelines are an example of how making the costs of electrification clear can streamline the process.

Attachment A includes the Clean Coalition's ECMR guidelines, which outlines recommendations for adding facilities to a Community Microgrid, including electrifying buildings, deploying DER, and installing the necessary equipment for maximum resilience. It would benefit consumers if, in addition to considering financing options, the proceeding also created basic outlines of the costs associated with electrification process like the ECMR guidelines. The process of electrification and decarbonization will be much less daunting if there is a definite roadmap that makes it clear not only what financing options are available, but also the costs involved with the process.

IV. CONCLUSION

The Clean Coalition respectfully submits these opening comments and looks forward to the progress this proceeding can make on electrifying California.

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ATTACHMENT A

Clean Coalition
Making Clean Local Energy Accessible Now

Electrification & Community Microgrid Ready (ECMR) design standard and economic analysis

Every community can benefit from resilience, and microgrids are a key part of a comprehensive resilience solution. Whether facing a wildfire, earthquake, or coordinated threat, microgrids enable continued access to energy by islanding from the utility grid during a grid outage.

Below are site definitions to support applying the recommendations in the next section to various buildings and communities. Both microgrid types defined below electrify all on-site energy loads; incorporate high levels of local distributed energy resources (DER) such as solar, energy storage, and load management; and provide resilience. Additionally, these solutions are cost-effective and can provide benefits to the grid and to other grid users by reducing the cost of grid operations and obviating the need for new grid infrastructure investments.

<table>
<tr><th colspan="2">Microgrid-ready site definitions</th></tr>
<tr><td colspan="2">Microgrids are capable of disconnecting from the grid in the event of a grid disruption; this functionality is known as “islanding.” Renewable energy microgrids must be equipped with on-site renewable generation (e.g., solar), energy storage (e.g., batteries), and a microgrid controller. Microgrids may include smart electric appliances and smart electric vehicle (EV) chargers, which provide additional functionality. The microgrid controller monitors, communicates with, and controls the DER and smart appliances; the microgrid controller must also be able to communicate with the grid operator, if demand response enabled.
Microgrid Type 1: Single customer — Loads and generation are behind a single customer’s utility meter. Islanding occurs behind the customer’s utility meter. Single homes are also called “nanogrids.”
Facility examples: Single-family home, apartment or office building, hospital, or campus.
Microgrid Type 2: Community Microgrid — Loads and generation are behind or in front of multiple customers’ utility meters but are all downstream of a distribution substation. Islanding occurs in front of the customers’ utility meters (such as at the distribution feeder) and includes multiple utility customers, including Type 1 microgrids.
Facility examples: Multi-family housing with separate metering, housing subdivision, civic center with multiple buildings, or retail complex.
Critical loads: When a microgrid is operating in island mode, load shedding can extend throughout an outage, through which a microgrid can maintain power continuity. Tier 1 loads are life-saving critical loads, Tier 2 loads are priority but not critical, and Tier 3 loads are the remainder of the load.</td></tr>
<tr><th>Normal operations</th><th>Emergency operations</th></tr>
<tr><td>On-site DER deliver energy to all loads and may export excess energy generation to the grid, depending on interconnection and tariff. Smart electric appliances and smart EV chargers can perform demand response by turning on or off according to grid needs; resources are dispatched based on signals from grid operators. Energy storage enables self-powering and/or load shifting to off-peak times. Utilities, Community Choice Aggregators (CCAs), or Type 1 on-site users maintain control over site operations in accordance with operations contracts.
Benefits:
Reduced customer utility bills during peak times, with both energy and demand charges reduced
Renewable energy for the broader grid
GHG reductions of up to 69% or more*
Revenue from aggregation of resources</td><td>During a grid outage, the microgrid disconnects from the grid and operates in island mode. At minimum, DER serve predefined Tier 1 critical loads. Tier 2 and 3 non-critical loads are powered based on real-time energy generation and storage availability. Increasing energy storage duration increases backup power capabilities.

Type 1: On-site resources serve on-site loads only.
Type 2: On-site resources may be used to power off-site loads, and vice versa. Community-wide Tier 1 loads are prioritized.

Benefits:
Increased resilience
Energy and transportation security</td></tr>
<tr><td colspan="2">*Electricity, residential, commercial, and transportation comprise 69% of state GHG emissions, according to the 2018 C-ARB report</td></tr>
</table>

ECMR recommendations

The ECMR recommendations apply to residential structures. The Clean Coalition is working with industry experts to develop similar guidelines for commercial facilities.

Residential properties participating in a microgrid and/or responding to emissions reduction targets should ideally be all-electric. All-electric appliances provide increased value for homes because, unlike appliances that rely on gas, they can all be powered by a solar+storage microgrid. If all-electric design is not currently possible for any reason, designs should at minimum include the electrical service features described below to facilitate future full electrification and on-site solar generation.

These recommendations vary by building; consult your electrician and/or engineer for site-specific recommendations. This is designed to be a living document that is adaptable and changeable as technologies advance and new technologies arise.

Wiring:
Install dedicated circuits and receptacles for all-electric appliances in single-family dwellings (SFDs):

- Grid-connected heat pump water heater (15-30 amp, 240V)
- Heat pump clothes dryer (30 amp, 240V)
- Induction electric range (50 amp, 240V)
- Grid-connected heat pump space conditioner (heater and air conditioner) (30-60 amp, 240V)
- Grid-connected EV charger (40-80 amp, 240V)

Solar-ready electrical service for future solar array:

- Main service panel (MSP) rated 225 amps (allows for a 200-amp main breaker plus bus bar capacity for a solar array of up to 70 amps)
- Double-pole circuit breaker
- Metallic conduit for future solar installation (from roof to inverter location/panelboard)

Energy Storage System (ESS) ready:

- Designated area for ESS; size of this area will depend on required/desired loads to be served by system (i.e., critical loads for backup only vs. full operability in grid outage)
- Main electrical main line “loop” to battery location, between electrical service meter and main panel or subpanel
- Main electrical panel sized for all existing and future loads, including solar and ESS
- Loop main subpanel power lead to designated ESS location
- Separate subpanel for loads that require backup (can be added during remodel) **OR** “smart” main panel with programmable breakers (e.g., Eaton or Leviton)
- Capacity in subpanel for emergency circuits to serve critical loads (e.g., refrigerator, HVAC, water heating, microwave) and outlets with battery power during grid outages
- Ethernet line from main router to ESS location
- Conduit for communication from solar inverter(s) to ESS location

Additional recommended features for interconnection:

- Communications conduit for demand response–capable electric appliances
- Connectivity; Open ADR, CTA 2045 for appliances, IEEE 2030.5 for energy storage

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Estimated costs for prewiring electric-ready homes

(Community Microgrid Ready costs are on following page)

Below is a rough cost estimate for the parts and labor required to prewire typical floor plans offered by Santa Rosa contractors in the North Bay, California, rebuild area.

The prewiring costs for appliances vary depending on the architect's design. A primary 200-amp electrical panel is typically positioned where power reaches the home, often on the outside of the garage nearest the street. In small homes, runs of wire may go directly to receptacles to serve major appliances. In larger homes, 100-amp subpanels are often installed in easily accessible indoor locations, such as the laundry room, to serve large nearby appliances such as the dryer, water heater, electric stove, or spa.

Wiring may not be placed in walls but may go more directly to appliances through crawl spaces, attics, floor joists, and other spaces deemed non-occupied areas. The largest expense for a dedicated circuit is for the electric stove wire (AWG 6/3 Romex), at about $2.25/ft. Other wire sizes for each appliance are indicated.

Item	Wire size	Length***	$/ft	Total
Stove	6/3 Romex	50 ft	2.25	$113
Water heater	6/10 Romex*	35 ft	0.80	$28
Dryer	6/10 Romex	35 ft	0.80	$28
Heat pump	6/4 Romex**	35 ft	1.50	$53
Receptacles (4 @ $5 ea)				$20
Subtotal for materials				**$242**
2-3 hours labor for installation******				**$250**
ESTIMATED TYPICAL TOTAL COST				**$500**

* Water heater circuit will be required by 2019 title 24 code.
** Heat pump circuit can replace air conditioner unit circuit, which is often offered in new homes.
*** Typical distance from the garage (where the main electrical panel is typically placed) to the appliance
**** Some labor may be unnecessary due to changing code requirements for pre-wiring.

Costs will vary by $250–$700 depending on the position of the electrical panel, appliance locations, home size, etc. Water heaters, dryers, and external heat pump compressors are typically located in or near the garage.

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Estimated costs for additional features to make homes Community Microgrid Ready

ITEM	APPX COST
Energy Storage System (ESS) ready:	
• Designated area for ESS; size of this area will depend on required/desired loads to be served by system (i.e., critical loads for backup only vs. full operability in grid outage); keep near "smart" main and/or backup loads subpanel	$0
• Main electrical main line "extra loop" (8 feet) to ESS location, between electrical service meter and main panel or subpanel; keep ESS near main and subpanel (This is unnecessary is ESS is placed next to main electrical panel	$0 - 50
• Separate subpanel for loads that require backup (can be added during remodel); keep next to main panel and ESS	$200
- OR -	
Capacity in subpanel or "smart" main panel (Eaton, Leviton, or similar) for emergency circuits to serve critical loads (e.g., refrigerator, HVAC, water heating, microwave, lights and outlets with ESS battery power during grid outages, including EV-ready)	Incl. above
• Ethernet communications line from main router to ESS location (60')	$60
• Ethernet line for communication from solar inverter(s) to ESS location	$100
• Upgrade to certified smart inverter for islanding, plus ESS export to grid (optional); (this is often included in the ESS package price and user interface)	$0 - 300
V2B bi-directional EV charge/inverter ready	
• No additional costs required; same electrical cable as for EV charging	$0
COMMUNITY MICROGRID READY TOTAL	**$360 – $710**