Clean Coalition
Making Clean Local Energy Accessible Now

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VIA CEC COMMENT WEBPAGE

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Project Title: EPIC Idea Exchange

Comment Title: Community Microgrids and overcoming barriers to this new approach to designing and operating the electricity grid

Re: Roadmap to Commercialize Microgrids in California

Dear California Energy Commission:

The Clean Coalition hereby submits for filing these comments on the Joint Energy Agency Workshop for the Development of a Roadmap to Commercialize Microgrids in California, hosted by the California Energy Commission, the California Public Utilities Commission, and the California Independent System Operator on April 25, 2017.

Respectfully submitted,

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I. Introduction

The Clean Coalition respectfully submits these comments describing Community Microgrids, a new approach to designing and operating the electricity grid with substantial levels of local renewables and other Distributed Energy Resources (DER). Community Microgrids are intended to serve an entire substation grid area, covering thousands of utility customers, and delivering a trifecta of unparalleled economic, environmental, and resilience benefits. These comments attempt to match the tremendous opportunities represented by Community Microgrids with the key barriers that currently cripple their commercial potential.

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 DER—such as local renewables, advanced inverters, demand response, and energy storage—and we establish market mechanisms that realize the full potential of integrating these solutions. The Clean Coalition also collaborates with utilities and municipalities to create near-term deployment opportunities that prove the technical and financial viability of local renewables and other DER.

III. Comments

a. Community Microgrids

A Community Microgrid is a coordinated local grid area ideally served by an entire distribution substation and supported by high penetrations of local renewables and other DER. Community Microgrids reflect a new approach for designing and operating the microgrid and achieves a more sustainable, secure, and cost-effective energy system, while providing long-term power backup for prioritized loads. Community Microgrids exhibit a number of valuable features and establish scalable solutions that span entire

substation grid areas, the basic building block of the electricity grid. This scale and the use of existing distribution grid assets allows Community Microgrids to leverage high penetrations of local renewables and other DER to achieve a cost-effective level of desired grid reliability, power quality, and resilience. A focus on efficient load-centered design—including local balancing and load flattening—also creates an opportunity to reduce costly peaks and transmission expenses. Community Microgrids also include the ability to island critical loads.

In contrast to a standard microgrid focused on a single customer, Community Microgrids focus on providing indefinite backup to critical loads within an entire substation grid area, covering thousands of customers. In contrast to standard microgrids, Community Microgrids provide the gamut of grid services, including balancing the three vital dimensions of the electricity grid: power, voltage, and frequency. Community Microgrids surpass the behind-the-meter model of microgrids in terms of value to CAISO, the utility, and the ratepayer by performing all three vital grid services at scale. Community Microgrids are a new approach to designing and operating the electric grid in a manner that delivers a trifecta of unparalleled economic, environmental, and resilience benefits.

The California Energy Commission should consider making funding available to stage, design and plan Community Microgrids in each utility service territory that would pilot the successful German wholesale distributed generation model of DER in California. While the April 25th workshop highlighted the diversity of microgrid systems in operation and planned for California, many of the systems discussed were either behind the meter, utility scale, or owned and operated by a utility. There is a need to explore a novel microgrid design, the Community Microgrid, to ensure that they are not excluded from policies and regulation that develops as a result of the Roadmap to Commercialize Microgrids. A CEC version of the Community Microgrid Initiative will:

- Comprehensively assess the benefits and costs of a DER-driven electricity system.
- Showcase that at least 25% of the total energy consumed within a distribution substation grid area can be sourced from

local renewables.

- Ensure that the CEC's investments will allow for rapid and cost-effective proliferation and replication by focusing on the basic building block of the electricity system: the distribution substation grid area.
- Test the real-world capability of DER and the Monitoring, Communications, and Control (MC2) systems that are required to operate the electricity system of the future.
- Research how DER can provide community resilience by utilizing local renewables, energy storage, Monitoring, Communications, and Control (MC^2) and other DER to offer indefinite renewables-driven power backup to critical community facilities like hospitals and emergency response operations.
- Stage for the Distribution System Operator (DSO) future where DER-rich distribution grids have clear transactional interfaces with the traditional transmission grid: at the transmission-distribution interface, which occurs at the substations that bridge the transmission and distribution grids, operated by CAISO and DSOs respectively with clean demarcations that have no overlap.

The Community Microgrid Initiative will help overcome technical and market barriers. Technical barriers to overcome include using Monitoring, Communications, and Control (MC2) solutions for DER-driven grid operations and incorporating customer shedding equipment to achieving real-time isolation of feeder segments that ensure Community Microgrid resources are dedicated to critical loads for provisioning indefinite renewables-driven power backup to critical facilities. Finally, tools for planning, designing, simulating, and developing Community Microgrids will need to be developed. Market barriers include establishing opportunities for distribution grid operators, and potentially third parties, to monetize the benefits of Community Microgrids, including indefinite renewables-driven power backup to critical and prioritized loads. The comprehensive Distribution System Operator (DSO) model that allows clear transactions of the vital grid services between the DSO and the Transmission Systems Operator (CAISO in California) at the transmission-distribution interface will

need to be tested. The transactions will be based on real and reactive power transfers between the DSO and TSO and valued based on capacity, location, and speed.

All ratepayers will benefit from Community Microgrids with DER, which Germany has already shown is less expensive that central generation when considering the exorbitant cost of transmission infrastructure. All residents will benefit from clean local energy and the opportunity for more resilient communities through indefinite renewables-driven backup power. The Clean Coalition encourages the CEC to invest in Community Microgrid projects to allow California to meet its renewable energy goals while avoiding unnecessary grid infrastructure upgrades.

b. Community Microgrid pilot projects

    i. Community Microgrids to replace peaker plants and synchronous condensers at the utility distribution level

Community Microgrids can replace natural gas power plants that are used to supply energy during peak demand hours at a lower cost that traditional peaker plants resulting in long term ratepayer benefits. Additionally Community Microgrids can replace the need for synchronous condensers by providing voltage regulation services. Replacing fossil generating resources with DER and energy storage within a Community Microgrid can also reduce local environmental health impacts related to air quality (eliminate criteria pollutants) and noise pollution.

A Community Microgrid could be employed by Southern California Edison (SCE) in Goleta, CA to replace the Ellwood natural gas peaker plant and meet local capacity requirements. SCE submitted a project proposal to the California Public Utilities Commision to refurbish and re-power the Ellwood natural gas plant to provide additional generation as well as resilience and short circuit duty to the grid. There are several issues with the proposed solution. Firstly, Ellwood is limited to 380 hours of operation and therefore cannot guarantee provision of any needed services beyond those hours. SCE claims that the Ellwood project will provide grid resilience to the local community, but because of the run time limitations and reliance on pumped fuels, Ellwood fails to be the best solution to the novel resiliency

standard suggested by the project proponents. While resilience is not yet a formal standard in California, Ellwood fails to meet grid resilience needs, let alone represent the best, most reliable, or cost-effective technology to meet any such need.

The Clean Coalition believes that if SCE wishes to provide peak generation, resilience, and short circuit duty to the grid in Goleta, then Community Microgrids should be deployed. For example, a Community Microgrid system comprised of local renewables, energy storage, demand response, and advanced inverter functionality represents a technically superior and more cost-effective solution than upgrading the Ellwood peaker plant. In summary, identified generation and resilience needs can almost certainly be better met with a Community Microgrid with distributed energy resources at lower cost and with greater reliability, while avoiding serious environmental health impacts to the local community.

Community Microgrids could be employed in Oxnard, CA to replace the proposed Puente natural gas peaker plant in a disadvantaged community already dealing with environmental health impacts from existing fossil-fuel based generating assets. A Community Microgrid can be deployed locally and will provide superior value to the ratepayers for the reasons described above, and will continue to provide local jobs and other economic stimulation to the local community.

ii. Valencia Gardens Energy Storage project

The Clean Coalition was selected to receive a grant from the California Energy Commission (CEC) for the Valencia Gardens Energy Storage (VGES) project. The Clean Coalition will lead the VGES project, which adds 750 kW / 750 kWh of energy storage to the roughly 800 kW of rooftop solar that is already interconnected to the distribution grid within the Valencia Gardens Apartments. The VGES project has three fundamental objectives, all of which will inform Community Microgrid projects going forward:

- Increase solar hosting capacity of the feeder line segment by at least 50% (i.e. enable at least 400 kW of additional solar to be

interconnected to the local distribution grid that currently has no additional solar hosting capacity).

- Provide a comprehensive case study on the economics of utilizing energy storage for provisioning grid services through wholesale markets; via the California Independent System Operator (CAISO) and potentially the local utility, which is PG&E.
- Investigate the full set of costs and benefits for the VGES projects to provide Community Microgrid resilience to priority loads within the neighborhood, including those at the Valencia Gardens Apartments and other nearby PG&E customers. This objective will require comprehensive assessment of technical requirements, prospective solutions, costs, benefits, and potential compensation mechanisms.

  Added benefits of the VGES community microgrid project include:

  - Cost savings due to limited load backup
  - Resilience in emergency situations when the grid goes down
  - Voltage regulation provided by the energy storage system
  - Reducing system wide peaks and reducing the need for costly peak generation through energy storage
  - Demand response: reduced load as a generation asset

  The Valencia Gardens Energy Storage project is an example of a pilot project with repeatable market opportunities for multifamily housing. The lessons learned from this project will inform larger scale and full-scale Community Microgrid projects going forward. The Clean Coalition encourages the continued support of CEC in funding and developing pilot projects that will lead to the development of a full-scale Community Microgrid in the future.

c. Policy Initiatives to support commercialization of microgrids

During the workshop, several barriers to microgrid commercialization were identified and discussed. The Clean Coalition identified three key barriers to commercialization related to the financial and business case for microgrids, and is working to overcome these barriers through internal policy initiatives. The key barriers are described below, and are followed by

Clean Coalition's understanding of the root causes and our plan to address and overcome the barriers.

First, with existing tariffs, owners cannot fully operate their microgrids to provide the whole suite of grid services they are designed to provide and therefore cannot be fully monetized. As a result, many microgrid systems are limited to behind the meter operation, do not provide the value of grid services, and reasonable payback periods cannot be established.

Clean Coalition intends to overcome the issue of not being able to fully operate a microgrid to provide grid services through its Wholesale Distributed Generation Streamlining and Procurement Initiatives. Wholesale Distributed Generation (WDG) of clean local energy interconnected to the distribution grid adds tremendous value by providing cost-effective power to ratepayers, utilities, and communities. WDG procurement is wilting because existing feed-in-tariffs (ReMAT) have design flaws and the ReMAT program is under threat of closure. Additionally, the full value and benefits of WDG are not recognized and compensated in the procurement processes. By 2018, in California, WDG procurement will be unleashed like in Germany. This will require that WDG procurement will be widely available via standard offer contracts such as improved ReMAT and CCA feed-in-tarriff programs that compensate WDG owners for power and grid services. Additionally, the value of location, avoided transmission costs, environmental benefits, and resilience will all be recognized and compensated. Finally, barriers to procurement must be identified and resolved quickly. These steps will allow microgrids to be interconnected on the distribution grid and allow their full functionality to be employed and compensated.

Secondly, complex and expensive to comply with interconnection regulations prevent proposed projects from being designed and built to fully provide grid services. Interconnection processes in Investor Owned Utility (IOU) service territories cost significantly more and take much longer even for identically sized and similarly sited projects. Wholesale Distributed Generation (WDG) interconnections are not allowed on existing line drops, which adds substantial costs and complexity to developing these types of projects. By 2018, Clean Coalition will ensure that in California, WDG interconnection processes in IOU service territories will be 100%

deterministic from publically available information. This will require the following minimum characteristics:

- Deterministic fixed cost for interconnection with utility directly paying for all required upgrades and project developer avoiding any ownership responsibility and transfer requirements for any facilities.
- Deterministic streamlined schedule to avoid time delays.
- Output modification, via energy storage and other approaches, can be used to minimize interconnection costs.
- Allow Combined Interconnection Applications for electrically related DER Aggregations.
- Automated interconnection approval to avoid time delays.

Third, the lack of clarity on the value of reliability and the value of grid support services provided by microgrids is a barrier to adoption. The lack of valuation techniques that capture all of the additional value provided by DER, which traditional energy resources do not provide, makes developing a business case challenging, if not impossible. The valuation methodologies used are outdated, incomplete and are not designed for DER capabilities. For example, the value of bypassing the need for transmission infrastructure when employing local renewables is not recognized as evidenced by the transmission access charges that are levied by certain utilities regardless of where the energy is produced. Additionally distribution benefits and costs such as reliability, resilience, voltage conservation and management, reactive power, and other value from forthcoming grid services from are not yet recognized and compensated. Finally, societal benefits and costs including reduced environmental and health impacts and local employment and other economic factors are not yet formally valued.

The Clean Coalition intends to overcome this barrier through its Distributed Energy Resources Valuation Initiative. Clean Coalition will incorporate full accounting of all benefits & costs to determine the true value of distributed energy resources (DER.) The analysis will ensure that all factors are recognized, considered and calculated using common metrics for all resources. The Distributed Energy Resources Avoided Cost (DERAC) calculator will be updated or replaced, and benefits beyond avoided costs will be included in the valuation method. The Locational Net Benefits

Assessment (LNBA) will be adopted to reflect the locational value of DER. Finally the full valuation will be applied in both procurement (tariffs, compensation, and solicitation processes) and distributed resources planning to support the adoption of DER in California and beyond.

There has fundamentally been no change in any of the key barriers since the last workshop, so funding needs to be provided to research and overcome these barriers. Clean Coalition is already actively pursuing solutions to some of these barriers with the initiatives described above, but could use the financial support of CEC to ensure that these solutions are developed in a thorough and timely manner.

Key next steps should include identifying locations on the transmission and distribution grid where microgrids can provide maximum benefits for the ratepayer and the grid, thereby maximizing economic benefits. Another key next step is to develop a model to describe the financial value of reliability and grid services for various microgrid configurations including front of the meter systems, behind the meter systems and Community Microgrid applications including campuses and peaker plant deferral. The model should also consider the impacts of various ownership and operation models.

IV. Conclusion

The Clean Coalition appreciates this opportunity to comment on the Joint Energy Agency Workshop to Develop a Roadmap to Commercialize Microgrids in California. The workshop highlighted the diversity of microgrid systems in operation and planned for California, but there is a need to explore Community Microgrids to ensure that they are not excluded from policies and regulation. Community Microgrids are a new approach to designing and operating the electric grid in a manner that delivers the trifecta of economic, environmental, and resilience benefits. Community Microgrids can be used to increase the penetration of renewable energy into California's energy mix, and can also be used to defer transmission upgrade investments. Using Community Microgrids to replace natural gas peaker plants is a repeatable market opportunity and will bring added resilience and environmental health benefits to communities already exposed to fossil fuel based generating plants. More information on Community Microgrids can be found on Clean Coalition's website at http://www.clean-coalition.org/our-

work/communitymicrogrids/.

The workshop provided a venue to brainstorm and discuss barriers to microgrid commercialization, but there has fundamentally been no change in any of the key barriers since the last workshop. It is clear that funding needs to be provided to research and develop solutions to overcome these barriers to ensure timely adoption of microgrid technologies.

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