BEFORE THE PUBLIC UTILITIES COMMISSION OF THE

STATE OF CALIFORNIA

Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future.	Rulemaking 21-06-017 (Filed June 24, 2021)

THE CLIMATE CENTER, CENTER FOR BIOLOGICAL DIVERSITY, CLEAN COALITION, MICROGRID RESOURCES COALITION, GREEN POWER INSTITUTE AND 350 BAY AREA (THE "JOINT PARTIES") OPENING COMMENTS ON THE FUTURE GRID STUDY

LORENZO KRISTOV
KURT JOHNSON
THE CLIMATE CENTER
1275 – 4th St. #191
Santa Rosa, CA 95404
Telephone: (970) 729-5051
kurt@theclimatecenter.org

ROGER LIN
CENTER FOR BIOLOGICAL DIVERSITY
1212 Broadway, St. #800
Oakland, CA 94612
Telephone: (510) 844-7100
rlin@biologicaldiversity.org

BEN SCHWARTZ
CLEAN COALITION
1800 Garden St.
Santa Barbara, CA 93101
Telephone: (626) 232-7573
ben@clean-coalition.org

KENNETH SAHM WHITE
Consultant
350 BAY AREA
Telephone: (831) 295-3734
sahmsahm@umich.edu

ALLIE DETRIO
Senior Advisor
MICROGRID RESOURCES COALITION
700 Pennsylvania Ave Suite 420
Washington, DC 20003
Telephone: (415) 825-0133
allie@reimagine-power.com

GREGG MORRIS, Executive Director
Tam Hunt, Legal Director
THE GREEN POWER INSTITUTE
a program of the Pacific Institute
2039 Shattuck Ave., Suite 402
Berkeley, CA 94704
Telephone: (510) 644-2700
tam@communityrenewables.biz

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Pursuant to the Administrative Law Judges' October 17, 2024 ruling seeking comments regarding the Future Grid Study report ("FGS"), The Climate Center, the Center for Biological Diversity, Clean Coalition, Microgrid Resources Coalition, Green Power Institute and 350 Bay Area (the "Joint Parties") provide the following opening comments.

A. Introduction

We are living in the era of catastrophic global climate change. The climate crisis is no longer just a future threat. It's an ongoing threat characterized by more and more frequent, destructive and hard to predict extreme weather events. These events typically disrupt the electricity system — "the grid" — causing immense harm and even loss of life for affected people and communities. Feeling the need for climate resilient electricity service, affluent customers are equipping their homes with solar+storage systems or fossil-fuel generators, while less affluent customers and communities remain at the mercy of the grid. This is the context for designing the High-DER Future Grid, the core piece of electric infrastructure needed to ensure equitable climate resilience and a rapid transition away from fossil fuels for all Californians. The Commission's decisions in this proceeding will affect the pace and spatial patterns of distributed energy resource (DER) growth, determining which communities have climate-resilient energy and which ones don't, and either accelerating or slowing achievement of California's clean energy goals.

1. What are the implications of catastrophic global climate change?

Global climate change is commonly described in terms of degrees Celsius warming of Earth's atmosphere and oceans, quantities of carbon dioxide being accumulated in the atmosphere, and disruption of global climate cycles resulting in extreme weather events now occurring with greater force and frequency than ever before. That's the global perspective.

In practical terms, people and communities around the world are being devastated by storms, floods, fires, droughts and accompanying social disruptions that keep getting worse year after year, destroying entire towns and portions of large cities. When these events occur, people lose everything, their homes, all their possessions, their health, their family members and often their lives. That's the local perspective.

The global and the local are intimately intertwined. The local activities of daily life— vehicle traffic, space conditioning in buildings, emissions by industries and farms — accumulate to cause global disruptions to Earth's life-sustaining systems, which in turn have local impacts. The locations of these disruptive events can have little or no correlation with the locations of the activities that produce the emissions that lead to the global climate disruptions. There's plenty of evidence that the people and communities who suffer the greatest impacts of climate change tend to be those who have contributed the least to climate change.[1] In particular, the people who have economically benefited the most from investing in activities that have disrupted the global climate over the past decades tend to be the least impacted by, or the most insulated from, the disruptions occurring today. It is fair to say that climate change is in fact a massive cost shift.

2. What's the role of electricity service?

All human activity requires energy. And during emergencies and extreme conditions, having electricity service for essential functions like warmth, cooling, shelter, food, rescue and medical care can be a matter of life or death. The electricity industry structure that evolved over the past century frames it as a commodity, but from the human and community perspective electricity service is better thought of as a social determinant of health, a necessity of life and well-being comparable to clean water, clean air, nutritious food, health care, and education. That's the relevant perspective for the era of climate disruption.

As the impacts of climate disruption continue to worsen, as they are sure to do over the coming years and decades,[2] people and communities are likely to lose electricity service during climate-related emergencies with greater frequency and for longer time periods. The term "energy resilience" refers to the ability to maintain electricity service to people and communities during disruptive events, at least for some critical functions to protect people's health and safety. Continuity of electricity service during severe climate events, including things like extreme cold and extreme heat that may not destroy community infrastructure in the way storms and fires do, will be a matter of life or death for vulnerable people and communities.

3. How do distributed energy resources figure into this?

Distributed energy resources (DERs) are a large, diverse class of electricity generation and storage devices and control technologies that are revolutionizing the provision of electricity

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[1] See Environmental Protection Agency, "EPA Report Shows Disproportionate Impacts of Climate Change on Socially Vulnerable Populations in the United States"; September 2, 2021; https://www.epa.gov/newsreleases/epa-report-shows-disproportionate-impacts-climate-change-socially-vulnerable

[2] Even if California accomplishes the SB 100 mandate of 100 percent carbon-free electricity by 2045, the statewide electricity consumption will continue to be a net emitter of long-lived carbon dioxide between now and 2045, thus exacerbating the global warming effects of atmospheric carbon for another 20 years.

service. DER technologies are scalable and customizable to most any application, including new loads, new housing developments and local electrification and decarbonization projects. DERs have been continuously improving in performance while decreasing in cost and are deployable more quickly and with less controversy than transmission infrastructure and transmission-connected generation and storage.

These facts have five potent implications. First, the legacy 20th century electricity system known as the grid is no longer a natural monopoly; in economists' terms it is contestable. Customers who need electricity service can choose between deploying a versatile, cost-effective array of on-site DER technologies and procuring energy from the grid, or some combination of the two. As a result, the monopoly mindset in the arena of electricity policy and regulation is out of step with technical and commercial reality. DER technologies present a growing competitive force for the grid, and attempts to sustain the monopoly through laws and regulations are going against the economic and technological trends and the urgent needs of today.

Second, DER technologies offer the possibility of achieving statewide climate and clean energy goals faster and less expensively than relying on building new transmission-scale facilities. Electricity system resource and infrastructure planning in California thus far seem committed to building transmission lines and transmission-connected renewable generation and storage to achieve the 2045 mandate of SB 100.[3] The Joint Agencies' study methodology does not consider distribution-connected generation as a major potential source of renewable generation required by the SB 100 mandate,[4] even though an NREL study estimated that California could meet 74 percent of its annual electricity demand from solar PV deployed on all sizes and types of buildings.[5] Such deployments could avoid land-use conflicts and the need for transmission investments and interconnections, if California had a policy and planning framework to facilitate such resources.

Third, DER technologies are better suited than the grid to provide climate resilient electricity service. Strategies that rely entirely on making the grid more resilient are not attuned to the needs of vulnerable customers and local communities for sustained electricity service during grid outages. Rather, grid resilience strategies focus exclusively on trying to reduce the likelihood of grid outages and the restoration times when outages occur, but do not provide for continuous energy *during* grid outages. Equitable provision of climate-resilient electric service requires a policy framework that will deploy carbon-free DER-based microgrids throughout the state.

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[3] The Joint Agency methodology for developing "pathways" to achieve the SB-100 targets is described in the February 16, 2024 "Presentation for SB100 Inputs and Assumptions Workshop"; file:///Users/LPersonne/Downloads/TN254504_20240216T082207_Presentation%20for%20SB100%20Inputs%20and%20Assumptions%20Workshop.pdf

[4] The critique of that methodology along lines discussed in the present comments by The Climate Center and other parties is available here: file:///Users/LPersonne/Downloads/TN253118_20231114T154126_Joint%20Parties%20SB%20100%20Workshop%20Comments.pdf

[5] The NREL study was for the United States as a whole, with assessments for all individual states. The national level finding was that the U.S. could meet 39 percent of its annual electricity consumption from rooftop solar. See NREL, "Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment"; 2016. https://www.nrel.gov/docs/fy16osti/65298.pdf

Fourth, policies and regulations that attempt to preserve the grid monopoly by disincentivizing and actively suppressing DER technologies have the perverse effect of making DERs a private or luxury good, accessible only for customers with financial resources like energy-intensive businesses and affluent homeowners. DER-suppressing policies will therefore worsen energy inequities and injustices that have been harming lower-income customers and communities for decades. What's needed instead are policies and regulations that encourage DER deployment for all the benefits just described, and then maximize the total societal benefits and distribute those benefits equitably to all Californians.

Fifth, the potential of DER technologies goes well beyond decentralizing the technologies and hardware of electricity supply; DERs allow for decentralizing and thus democratizing the ownership of electricity supply assets. With today's DER technologies, electricity can be supplied by locally owned and operated enterprises that are integrated into local economies, even at a neighborhood level, and generate revenues that build community economic health and wealth. Such community-level wealth building may be the most direct and impactful way to advance energy justice for frontline and disadvantaged communities. What's needed are policy and regulatory frameworks that enable such local enterprises in a manner that supports whole-system performance and that direct distribution utilities to provide open-access distribution services at just and reasonable rates.

4. What does this mean for Track 2 and a High-DER Future Grid?

Summarizing the above observations, DER technologies can meet local needs for community climate resilience and energy justice in ways the grid is simply not designed for. They can also help achieve clean energy and climate goals faster, less expensively and without triggering land-use concerns compared to relying entirely on transmission-level investment. This future could be achieved by a forward-looking policy and regulatory framework designed to incentivize private DER investment and compensate DER participation in local distribution-level markets to their full performance capabilities. This may seem like an ambitious advance beyond the current industry structure in California, but it should be clear from the above that the current structure will be too slow and costly in achieving state policy goals and will come up short in addressing community-level needs for climate resilience and energy justice.

Unfortunately, California's vision of a High-DER Future Grid, as described in the Administrative Law Judge's (ALJ) Amended Scoping Memo and Ruling and the Future Grid Study, takes a much narrower view of the need for and the potential benefits of wider deployment of DER technologies. The perspective of the Future Grid Study, exemplified by the "Three Stage Evolution" graphic (Figure 1, p 11), conceives of DERs as mainly behind-the-meter assets deployed by exogenous decisions of customers for their private benefits. These DERs will then be utilized to provide load management services such as peak reduction and operational flexibility, and will eventually participate in virtual power plants (VPPs) as the grid achieves its ultimate evolutionary destination in Stage 3. The words "front-of-meter DERs" and "community microgrids" and "localized distribution-level markets" appear in the discussion of Stage 3 (p 12), but the Future Grid Study offers no discussion of community climate resilience, energy justice, or the potential discussed above of deploying distributed solar+storage as supply resources close to load centers. In short, there appears to be no vision of the benefits of a High-DER Future; it's framed entirely as customers installing DERs for their own reasons and the grid having to adapt and accommodate them.

Moreover, Track 2 of the current proceeding and the Future Grid Study continue to conceive of electricity service as a natural monopoly through which an exogenous "demand side" consumes a kWh commodity produced and delivered by a "supply side" that is centrally controlled, planned, and owned. In other words, the High-DER Future Grid envisioned here looks pretty much like the 20th century grid with a few enhanced types of aggregated demand response under a new name: virtual power plants.

The Joint Parties are concerned that the perspective offered by Track 2 and the Future Grid Study does not offer a path or even indicate a desire to realize the full potential of the revolution in DER technologies. We believe that DERs offer vast potential benefits for the state's climate goals, for the grid as a whole system, for community climate resilience and energy justice, and for customers and other DER investors who could offer the capabilities of their assets into a distribution-level energy and grid services market if one existed. Instead, the future we see emerging in Track 2, by not seriously reassessing the 20th century monopoly utility architecture as the original OIR indicated it would,[6] will exclude many of the potential benefits of the DER revolution.

In the next section the Joint Parties provide our responses to specific questions posed in the ALJ ruling.

B. Responses to ALJ Questions

The comments in the following sections are intended to support what the Joint Parties believe should be the central objective of this entire proceeding and Track 2 in particular: to create a regulatory framework that will unlock the greatest benefits of DER technologies for California's climate and energy goals, for the grid as a whole system, for ratepayers in general, for people and communities vulnerable to energy disruptions, and for the owners of DER assets. As discussed in

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[6] The original OIR, R.21-06-017, indicated a more expansive scope of questions to be considered in its DSO inquiry than has materialized in the present FGS. Specifically, "The current cost recovery and investment structures for electric distribution systems focuses on large capital investments. A high-penetration DER structure could reduce overall IOU rates of return. For an IOU-administered DSO to be successful, performance incentives not tied to capital investments may be needed, or there may be a need for a third-party DSO administrator." (OIR, pp 11-12) And also, "Track 1 [the DSO inquiry was originally designated Track 1 and subsequently changed to Track 2] broadly focuses on high-level policy issues involving distribution system operator roles and responsibilities as well as IOU and aggregator business models. … A central Track 1 activity will be the completion of a consultant technical report that provides an in-depth review of DSO models, distribution operator roles and responsibilities, and implementation feasibility. … Activities in Track 1 are expected to include an En Banc to present study findings and gather feedback from national and international experts on electric grid models and architectures (both existing and conceptual) and the state-of-the-art on approaches to DER integration." (OIR, p 14) When the Commission issued its Amended Scoping Memo and Ruling in August 2023 after a lengthy hiatus in Track 2 activity, these elements were dropped from the proceeding for reasons which the Commission has never explained.

the introduction, we are concerned that Track 2's concept of the high-DER future mostly views DERs as a problem to be managed in order to preserve the 20th century top-down monopoly utility architecture and business construct, and in so doing it creates an inhospitable environment for DER investment. This approach essentially makes DER technologies "private goods" to be enjoyed by customers who are motivated and resourced to invest in them, leaving behind customers and communities who have greatest need for the climate resilience, health and local economic benefits DERs could offer. In responding to the ALJ questions below we try to offer a more expansive perspective on the questions with the objective of maximizing the benefits of DERs for all Californians.

One additional important point. The Joint Parties recognize that Track 2 and the FGS have attempted to focus narrowly on operational requirements for the high-DER distribution system. We believe that operational requirements should be grounded in expectations about DER growth and participation over the coming years. If the expectational context is that DERs will mostly grow through exogenous decisions by customers to deploy them for private benefits, that DER value to the grid is mainly to provide a few types of load management and flexibility, and that DERs primarily represent an operational problem to be managed rather than a crucial key to California's energy future, then the operational gap assessments and prescriptions will aim to address these limited expectations. We therefore believe it is essential to expand the vision and expectations at this time so that recommendations for operational enhancements can be based on a more expansive and broadly beneficial vision of DER growth and participation.

1. Animate distribution-level markets

DER technologies could yield major benefits under a policy and regulatory framework that unlocks these benefits. A crucial element for unlocking DER benefits is to enable distribution-level economic transactions for energy and grid services. Distribution-level markets that fairly compensate DERs for their performance capabilities, that have reasonable costs of entry and preclude any exercise of market power the utilities would have as grid operators and regulated monopolies, can incentivize private investment in DERs, which is key to reducing costs related both to the grid and to achieving state climate goals. It is important to keep in mind the following DER benefits:

- Private investment in DERs does not go into the utility rate base to be recovered from ratepayers.
- DERs as renewable energy supply located close to load centers do not require transmission upgrades or go through CAISO's interconnection queue, thus can be deployed faster and less expensively than transmission-connected supply.
- DERs deployed on the built environment — roofs of warehouses, schools, shopping malls, parking lots, etc. — do not raise land-use conflicts.
- Distribution-connected front-of-meter (FOM) solar + storage hybrid resources can act as grid-forming resources to power their local circuits in the event of upstream grid

outages, providing a benefit to the grid by limiting the propagation of outages as well as to the customers who are able to have continuous electric service.

The key to incentivizing DER growth in this manner is to provide transaction opportunities that make such projects economically viable. Customers who invest in DERs for private resilience benefits and who are tempted to defect from the grid are more likely to stay connected if they have opportunities to recover a portion of their investment through economic transactions.

Conceptually there are a few types of markets and transactions that would advance a more broadly beneficial high-DER distribution system:

- DERs that include energy storage in circuit-level aggregations should be compensated for flattening a circuit's net load profile and thereby increasing hosting capacity without having to upgrade the circuit.
- Customers who install solar generation on-site should be allowed to maximize their systems to take full advantage of solar irradiation and export excess energy to serve customers in their neighborhoods, rather than be restricted in size to the energy needs of their buildings.
- Developers of front-of-meter generation + storage systems on built structures should be allowed enter a power purchase agreement with a load-serving entity or directly with customers within the same local distribution area without going through the CAISO system and markets.[7]

These are a few examples of the kinds of market transactions a DSO could facilitate toward the objective of maximizing DER benefits by incentivizing private DER investment, stimulating the provision of renewable energy and grid services, and reducing the incentives for customers with DERs to defect from the grid,

2. Open access to the distribution system

The attribute "open access" applied to the distribution system is meant to convey an analogy to the open-access transmission framework FERC implemented in regulatory orders in the 1990s to enable wholesale power markets. In view of the above comments on animating distribution-side markets, an open-access framework for the distribution system and the DSO should be designed to:

- Implement a transparent and non-discriminatory DSO tariff for the distribution system and market services the DSO provides to network users and market participants that is sufficient to recover the costs of the network and the DSO services;

[7] In his April 11, 2024 letter to CPUC President Reynolds regarding the Proposed Decision in A.22-05-022, former FERC chairman Neil Chatterjee pointed out that such transactions would not be FERC jurisdictional: "Typically, where distributed energy resources interconnect at the distribution system level, there is no intent for the projects to engage in a sale in the wholesale markets, such as the CAISO market. If there is a wholesale sale, it exists at the retail level and not in interstate commerce."

- Establish just and reasonable costs of entry and transaction costs for participating DERs;
- Establish transparent procedures, with fair and predictable costs and timeframes, for interconnecting DERs and energizing new loads; utilize innovative methods such as flexible interconnections and DER grid services to reduce costs and timelines;
- Establish a data and information sharing framework that is uniform across the IOUs, with effective access provisions and standards, to enable all participants and potential participants to have timely access to information they need for their investment decisions and operating functions; and
- Ensure that the DSO cannot exercise market power or competitive advantage by also operating as or being affiliated with a user of the network or a participant in the markets it operates.

The last item is especially important in the rapidly evolving DER technology arena of today to encourage the best new technologies to be brought to market and be able to compete fairly based on their performance capabilities. If the DSO engages in competitive activities, it will have anti-competitive advantages based on its control of the network. Even worse, if it is allowed to put competitive technology investments into its rate base, then ratepayers will bear the full risks of obsolescence and inadequate performance that can occur in rapidly evolving technology sectors. Open access to distribution is thus a foundational requirement for creating a robust participatory distribution side that incentivizes customer and third-party investment in DERs and provides for efficient market competition.

3. Top-down versus bottom-up visions of the High-DER Future Grid

The ALJ Ruling requests comments on "long-term visions for a High-DER future between the IOUs' top-down "grid orchestration" approach where DSOs are central in coordinating DERs and the bottom-up, open-access vision recommended by other stakeholders."

The Joint Parties believe this framing of the question requires some adjustment and clarification. Although the question is framed in terms of distribution system operation, the tension between top-down and bottom-up is a more pervasive one in the context of the energy transition, and how it plays out in system operation should rightfully be founded on other structural considerations in the electricity system.

For roughly a century electricity service has evolved in a top-down framework, with system assets centrally planned, owned and operated. That framework served a structure in which generating resources were capital intensive and mostly connected to high-voltage transmission, consumers consumed energy with little or no regard for the system that provided it, and the distribution wires provided one-way transport of energy from the bulk system to consumers. The advent and rapid advances of DER technologies overturns that framework. It should be clear to all participants in this proceeding that energy supply can now be anywhere in the system, and that the distribution system must do much more than one-way energy delivery. This observation presumably drives the narrow focus on operational needs in this Track 2.

Unfortunately, the top-down framework obscures the fact that the grid begins with the energy needs of end-use customers, that the customer is the foundation and the raison d'être of the grid. Grid infrastructure starts at the bottom from this foundation and builds upward or outward solely to serve this foundational layer. Grid operation starts at the point of demand which, according to the laws of physics, is inherently met by the nearest supply. As such, it is crucial to be mindful of this "bottom-up" purpose and native architecture.

Increasingly, the distribution system is no longer a one-way flow from a substation to loads, but a multidirectional scalable interaction between DERs and intermingled loads. At any location we may find potentially flexible loads, generation, storage, communication and control equipment capable of meeting on-site or nearby loads in a local, miniature version of the larger grid.

What the legacy top-down framework also obscures and may not yet be clear to all is how the DER revolution requires system planning to change, starting with resource planning. Track 2 claims to be about operations. As we argued earlier, however, the need to upgrade distribution operations should be based to a large extent on our expectations about DER growth and participation. The Joint Parties believe that to unlock the greatest benefits from DERs, including but not limited to all the participation modes identified in the section on animating distribution-level markets, it is necessary to shift from a top-down to a bottom-up resource planning approach. With the creation of markets for DER transactions for energy and grid services, and an open-access distribution framework, DER deployments can and need to be planned at the local level to meet the needs and priorities of communities and towns for climate resilience, local economic benefits, and local supply to power load growth including electrification demand and major new loads like energy-intensive data centers. Bottom-up resource planning, engaging city planners and diverse citizens and community groups, is the crucial missing piece that will enable the transition to high-DER to unfold in ways that maximize the benefits of DERs for all communities. Bottom-up resource planning then becomes a key input for more cost-effective grid infrastructure planning. This is the appropriate starting focus for the top-down versus bottom-up discussion.

To summarize, the growth of DER deployment and participation along the lines we described in the section on animating distribution-level markets, will most certainly exceed the levels this proceeding would anticipate from its implicit assumptions that DERs are mostly private goods for customers, mostly problematic for the grid, and will serve the grid only by managing load for things like peak reduction and flexibility. The much greater participatory arena we anticipate and advocate should provide the context for considering alternative operational paradigms.

The FGS frames the top-down versus bottom-up question as "Diverging approaches to enabling the High DER Future" and discusses it entirely in operational terms. The Joint Parties believe that the FGS and the ALJ Ruling exaggerate the operational implications of the distinction and the latitude for any meaningful choice. First, there's no question that the DSO will need "grid modernization" operational enhancements to manage a high-DER system: things like situational awareness, visibility to conditions on their system facilities, and control-room capability to issue instructions or initiate actions to maintain reliable and safe system operation. Second, the IOUs seem to be already moving ahead with their top-down "grid orchestration" capabilities, so the question as posed may be largely moot by the time Track 2 results in a Commission decision.

We believe that this question as posed by the ALJ Ruling and the FGS is the wrong question. The question of top-down versus bottom-up really needs to be first about resource planning, which in turn must inform distribution and transmission planning. The appropriate question for system operation, however, is about layered versus centralized operational architecture.

Think of the whole system in three layers: the CAISO controlled grid, the distribution system served from a single transmission-distribution (T-D) substation with the CAISO, and the customer premises (or a front-of-meter DER or a private microgrid like a university campus — essentially any electrical entity that is directly connected to the utility distribution system). The entity at each layer — CAISO, DSO and customer — is responsible for the operation of its own layer.

Consider first the relationship between the CAISO and the DSO. With a centralized operational architecture, CAISO would dispatch and have visibility to all the DERs and DER aggregations that participate in its markets, while the DSO would facilitate such participation to ensure that it does not adversely affect distribution operation. Under a layered architecture, the DSO would aggregate all the DER participation in the local area, present CAISO with a consolidated bid, receive the CAISO's dispatch as a point on the consolidated bid curve, and then dispatch the participating DERs in the most efficient manner given current distribution system conditions. As long as the DSO performs its required functions to maintain a reliable interface with CAISO, the layered architecture eliminates the need for CAISO to have visibility to individual DERs. Under the layered architecture, the relationship between CAISO and DSO is entirely about the net energy flows and possibly provision of ancillary services across the T-D interface substation.[8] The same operational relationship would apply between the DSO and an individual customer, a private microgrid, or a front-of-meter DER including a hybrid DER that combines multiple technologies, such as solar PV and battery storage, at a single point of interconnection to the utility system.

It is important to note that the question of centralized versus layered architecture need not be addressed as a binary decision for the entire electric system. Hybrid approaches can apply. The DSO may adopt the layered architecture for its relationship with customers, while having a more centralized model for its facilitation of DER participation in the CAISO market. A layered architecture between the DSO and customers would mean that the utility or DSO does not control or monitor specific devices within a customer's premises, but deals only with the energy flow and other operational parameters at the point of interconnection, leaving the customer to manage energy devices internal to the customer's premises. There are many applications in operation today where the utility or an external party controls specific devices inside customer premises, and it may seem to be a foregone conclusion that external control of customer assets is the preferred path to the future. But at the same time there are advocates and good technical

[8] This is the relationship that functions today in the CAISO system for "metered subsystems" (MSS), which are small municipal utilities that are embedded within, and hence transmission dependent on the CAISO controlled grid.

reasons for a layered relationship between utility and customer. For example, if the customer-utility relationship is defined entirely by what transpires across the point of interconnection, customers can be free to adopt new devices and technologies and integrate them into their building operation without causing any concern for the distribution utility as long as the required interface parameters are maintained. The Joint Parties are disappointed that this topic has not been thoroughly debated in Track 2.

C. Conclusion

The Joint Parties thank the Commission for the opportunity to comment on the Future Grid Study and this crucial Track 2 to consider changes to distribution system performance needed to unlock the greatest benefits for all Californians from the ongoing rapid revolution in DER technologies. Our highest priority recommendation is that the Commission shift its orientation towards the high-DER future from a focus on what the grid and the utilities need to a focus on what people and communities need.

Although these needs can vary in their specific details across the state, there are some core observations and general principles we urge the Commission to acknowledge and incorporate immediately into its frames of inquiry and decision making. The first is that catastrophic climate change is happening now, with devastating consequences, and will only worsen in the coming years and decades. The second is that the greatest impacts are felt by people and communities who have contributed the least to climate disruption and have the least resources to protect themselves against the worst harms. In other words, there's a massive cost shift inherent in the climate crisis. We draw two clear imperatives from these observations. First, that a much greater sense of urgency should infuse Commission DER proceedings, and second, that Commission decisions must be attentive to the local dimension, must attend to their practical outcomes and impacts for people and communities, especially the most vulnerable.

The third core observation is that electricity, although delivered by the grid as a commodity, is more fundamentally a social determinant of health, comparable to clean water and healthy food. Placing this observation in the context of the DER technology revolution, it becomes clear that electricity service can be integrated into local communities to address urgent local needs in ways the grid was never designed for and is not suitable to deliver.

- Local DER-based electricity services can provide climate resilience, to maintain life-or-death functions during the inevitable grid outages, and do so with carbon-free DERs that provide year-round clean power.
- Locally owned and operated electricity assets can be integrated into local economies to build local wealth and economic health. With the proper open-access regulatory framework, the utility distribution system can be an efficient, reliable enabler of local energy economies.
- Distribution-connected front-of-meter solar+storage hybrid resources deployed on the built environment close to load can supply a major portion of California's renewable

energy needs without requiring transmission interconnection and new transmission capacity and without triggering land-use concerns. California can achieve its ambitious climate and renewable energy goals by unlocking DER capabilities much faster and less expensively than by confining DERs to the provision of demand response and relying entirely on transmission-connected new renewable generation.

These profoundly beneficial possibilities are all feasible with technologies available today. The barriers are institutional, so the solutions require wise policies and regulations. The fundamental shifts in approach required of the Commission are a greater sense of urgency and a dedication to meeting the energy needs of people and communities. The needs of the grid and the utilities must follow from the needs of the people.

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Respectfully submitted,

________/s/__________
LORENZO KRISTOV
KURT JOHNSON
THE CLIMATE CENTER
1275 – 4th St. #191
Santa Rosa, CA 95404
Telephone: (970) 729-5051
kurt@theclimatecenter.org

________/s/__________
ROGER LIN
CENTER FOR BIOLOGICAL DIVERSITY
1212 Broadway, St. #800
Oakland, CA 94612
Telephone: (510) 844-7100
rlin@biologicaldiversity.org

________/s/__________
BEN SCHWARTZ
CLEAN COALITION
1800 Garden St.
Santa Barbara, CA 93101
Telephone: (626) 232-7573
ben@clean-coalition.org

________/s/__________
KENNETH SAHM WHITE
Consultant
350 BAY AREA
Telephone: (831) 295-3734
sahmsahm@umich.edu

________/s/__________
ALLIE DETRIO
Senior Advisor
MICROGRID RESOURCES COALITION
700 Pennsylvania Ave Suite 420
Washington, DC 20003
Telephone: (415) 825-0133
allie@reimagine-power.com

________/s/__________
GREGG MORRIS, Executive Director
Tam Hunt, Legal Director
THE GREEN POWER INSTITUTE
a program of the Pacific Institute
2039 Shattuck Ave., Suite 402
Berkeley, CA 94704
Telephone: (510) 644-2700
tam@communityrenewables.biz