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Synergistic Solutions Comments re core concepts and metrics conducive to creating a high-DER future

See attached document.

Additional submitted attachment is included below.

Synergistic Solutions

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California Energy Commission

Re: Docket 22-OII-01 / Order Instituting Informational Proceeding (OIIP) on Distributed Energy Resources (DERs) in California's Energy Future

To Whom It May Concern:

I would like to offer the following commentary concerning certain core concepts and metrics which will be essential in developing a state policy conducive to creating a high-DER future. To the extent possible, I have organized this material in a manner responsive to David Erne's "Important DER Questions" as listed on Slide 3 of his presentation during the June 1st workshop.

What will create DER value (e.g., economic, resilience, health) for all customers, especially in equity communities?

DER's Primary Value is Derived from Providing Local Energy Resilience and Locational Benefits. Co-location of DERs to adjacent load sources results in intrinsic energy sharing behind a point of common interconnection, regardless of grid operating conditions. In order to deploy high concentrations of DERs within a distribution system, the concept of a "meter" will need to become less fixed and more relative, so that clusters of DERs will be allowed to develop maximum capacity and share resources using the least amount of distribution infrastructure. This optimal outcome is central to determining a DER's "locational benefit."

From this perspective, the primary value of DERs is determined as a function of delivering higher resilience and lower cost by virtue of relative proximity to load, and state policy should focus primarily on how DERs can be best configured to serve these proximate loads. *Proximity to load captures the highest resiliency value at the lowest cost of delivery and should be the guiding star in distribution planning*. Traditional references such as behind or in front of the "meter" need to become flexible, and a DSO/utility should be open to "moving the meter" as a reference point for optimally locating a grid access point that maximizes DER participation and utilization within a specified area. In this manner, DSO infrastructure investments within a multi-site microgrid could be compensated via a rate structure determined by a prorata allocation of projected energy flows (KWh) over the infrastructure's projected lifespan, with an added DSO operational service fee that confers a reasonable rate of return (See "Uniform Integration of Generation and Delivery Costs into Energy Prices is Essential to Rapid DER Deployment" below). Design elements to maximize ROI will incentivize higher utilization of distributed generation through co-location of shared storage and charging facilities that increase overall system utilization, capacity and flexibility.

Proximity Between Generation and Load is a Key Value and Cost Metric. The distance between generation and use of energy directly relates to its relative degree of resiliency, complexity, and cost. The longer the distance, the more transmission/distribution infrastructure is needed for delivery, which increases costs of delivery and opportunities for disruption. Conversely, DERs located at or near the point of consumption are extremely resilient and employ little to no delivery hardware. The most obvious example of this dynamic are behind-the-meter (BTM) resources, which exist primarily to serve on-site load and only require distribution infrastructre for energy exports. Absent the elimination or significant revision of current regulatory barriers such as Rule 218, developing robust BTM systems offering high resilience and relatively fixed costs will become the province of affluent site owners, leaving less creditworthy customers on the hook for traditional grid upgrades. As this "proximity metric" constitutes the primary distinction between DERs and centralized, utility-scale generation, uniform application of a location-based standard that equitably allocates costs and benefits among all resources is imperative to creating a level playing field for a high-DER future.

Equity Communities Stand to Benefit the Most from DER Development. Given the inordinate adverse environmental/economic/social impacts faced by low-income, "equity communities", the value of DERs in alleviating these impacts increases proportionally. For example, many equity communities are located adjacent to commercial/industrial areas and transit corridors that impose a large volume of these adverse impacts. Through holistic DER development, this historically adverse relationship can be reversed through leveraging the high distributed generation potential of commercial/industrial sites for export into adjacent neighborhoods, along with the indirect benefits conferred to these neighborhoods from lower emissions. Aggregation at scale would deliver lower prices for low-income households and planned DER development at schools would offer the ability to create age-appropriate curricula for development of a skilled local workforce benefitting the community. Financing the upfront capital cost of development could be achieved through issuance of local microbonds or through development of uniform service models that deliver a reasonable ROI while allowing the site owner an option to purchase the system once that ROI is realized.

What policies will enable DER owners to be integral to grid reliability?

Effective Community Engagement is a Prerequisite for High DER Deployment. As effective DER development requires siting and coordination among multiple sites and locations within given areas of a distribution system, it is essential that communities be engaged at the outset of the distribution planning and procurement process, particularly in disadvantaged communities that lack the human and financial resources to conduct in-house assessments. Integration of energy resilience into community planning will proactively identify areas most in need while increasing DER aggregation, resulting in economies of scale that lower development costs.

Proactive Local Planning is a Fundamental Driver for Aggregated DER Deployment. Historically, scale in energy development is achieved through building large, remotely located facilities. In a high-DER future, scale can only be achieved by aggregating hundreds and thousands of sites through proactive local planning which identifies areas of high energy generation potential located adjacent to load sources that minimizes utilization of distribution infrastructure. Effective DER planning should also calculate an optimal amount of distributed storage capacity that can absorb planned excess generation for later use over a wide durational spectrum, with the understanding that the more storage capacity is shared, the higher the asset's utilization factor.

How can the state take a holistic view of distribution and bulk grid planning to meet SB100 goals?

<u>A Transparent, Criteria-Based Approach will Accelerate DER Adoption and Aggregation</u>. To accelerate DER adoption and aggregation, the Commission should seek to develop a set of transparent, coordinated policies that provide a clear set of criteria conferring certainty for success. With respect to DER aggregators, such a system would provide uniform standards and templates necessary to assemble large DER aggregations.

Going forward, this collaborative process should foster a continuous dialogue in alignment with prior agreements and plans. As projects progress through various phases, efforts should be made to obtain stakeholder feedback to ensure that their needs are being met on a timely basis. The scope of this collaborative process would be determined by the affected service area. For example, developing DERs within a county's unincorporated areas would require collaboration between county agencies, who would then be accountable to underlying municipalities and unincorporated communities directly or indirectly impacted by such developments.

<u>EV Charging/Refueling Infrastructure must be Considered Critical Infrastructure Requiring Minimum Levels of DER Investment and Rapid Deployment of Vehicle-Grid Integration (VGI) Technology</u>. Given California's aggressive goals for electrifying the transportation sector, it is important to co-locate DER hosting capacity that can support electric vehicle charging and/or refueling as a flexible and cost-effective grid asset. As a technology bridging both energy and transportation sectors, VGI offers a compelling value proposition to both commercial and residential customers that seek both energy resilience and zero-carbon transportation assets. Although some may still consider VGI an "emerging technology," the imminent rollout of viable product lines requires serious consideration of the synergies offered in combining both stationary and mobile energy capacity to increase resource adequacy by an order of magnitude higher than currently envisioned.

<u>Uniform Integration of Generation and Delivery Costs into Energy Prices is Essential for Rapid DER Deployment</u>. Today, ratepayers are separately assessed charges for costs related to energy generation and delivery via transmission/ distribution infrastructure. The assumption underlying this historical arrangement is that most if not all energy is generated remotely and requires extensive use of delivery infrastructure. However, in a high-DER future, most DERs will actively use only a miniscule portion of distribution infrastructure to deliver energy to the nearest load source. This inverse relationship between centralized and distributed resources requires a pricing methodology that accurately calculates actual use of grid infrastructure for every KWh generated based upon its location relative to end consumption.

In order to accurately price DER deployments, an integrated model combining energy generation and delivery costs to the end user must be based upon actual use of generation, storage and distribution assets. This integrated approach is simple and easy to understand, based on the common-sense notion that the price of energy should equal the Cost of Generation (CoG), plus a Cost of Delivery (CoD) equal to the sum of all distribution resources needed to transfer the energy to the end consumer. Implicit in both CoG and CoD metrics is an adder providing a reasonable rate return to the owner/operator of each respective asset. At its most basic level, such an approach would employ the following analysis:

Energy Price = Cost of Generation (CoG) + Cost of Delivery (CoD) + a Reasonable Profit Multiplier (RPM)

Where

$$\mathit{CoG} = \frac{\textit{Generation Asset Capex/Opex}}{\textit{Remaining Asset Operational Life on a /KWh Basis}}$$

and

$$\mathit{CoD} = \frac{\textit{Cumulative Asset Capex/Opex of Delivery Infrastructure}^{1}}{\textit{Remaining Operational Life of Cumulative Assets on a /KWh Basis}}$$

and

RPM = a reasonable return to participating stakeholders on a /KWh basis
(Example: 5% profit = 1.05 RPM)

Using this formula, DSOs will be incentivized to develop areas of high-DER penetration that continuously utilize predetermined distribution pathways, resulting in foreseeable profits based on KWhs delivered.

In theory, this pricing formula should apply equally to all forms of generated or stored energy, wherever located relative to the end user. For traditionally centralized generation assets requiring transmission over long distances, the integrated price model would combine relatively low costs of generation due to economies of scale, and high costs of transmission and distribution infrastructure. An ameliorating factor is that these high delivery costs are usually spread amongst a very high volume of energy, which should result in a reduced /KWh cost. For DERs, the costs of generation are generally higher, but actual CoD is much, much lower given the close proximity between generation and load.

Is one better than the other? Whether this calculus results in a wide price disparity between centralized (remote) and distributed (local) energy resources remains to be seen, but this integrated approach levels the playing field by revealing the actual price of energy as delivered to the consumer.

Interconnection Pathways Must be Proactive and Strategic through Community Planning. Just as energy pricing must undergo complete transformation, so should the process of effectively interconnecting DERs to proximate load centers. Today, interconnection is seen as connecting load (consumption) or generation (export capacity) to the nearest point of grid connection, after which little clarity is given towards where and how the energy will ultimately be delivered and consumed. To maximize DER development and adoption, a utility/DSO in a high-DER future must be able to forecast and map the most efficient (shortest) energy path from existing and potential generation sources to consumption, a value proposition aligned with energy physics and optimized through increased proximity.

[1] CoD is locationally situational and is calculated by creating an inventory of distribution infrastructure between the point of generation (PoG) and point of consumption (PoC) and aggregating the cost of those assets over their remaining lifecycles on a /KWh basis, with a reasonable ROI added. This should not be a difficult task for utilities that regularly submit extensive General Rate Cases in support of their proposed rate structures.

<u>Comprehensive and Granular Mapping Data is needed for Strategic DER Planning</u>. While the creation of California's ICA maps is truly a great achievement, these maps will need to significantly increase in granularity, so a developer can look at a proposed site and determine not only the circuit's load and available capacity, but also identify adjacent load and generation sources in order to accurately estimate delivery costs from points of generation and consumption. For example, if a developer is interested in siting distributed generation capacity, it would look for proximity of adjacent load centers to minimize delivery costs. Conversely, for IFOM storage capacity, the developer would look for a concentration of distributed energy generation that would value load-shifting excess energy for later discharge during high peak demand conditions.

<u>DSO/Utility Compensation Must be Performance-Based to Maximize Distributed Energy Flows</u>. The utility, or other entity designated as a Distribution System Operator (DSO), should be compensated based on its ability to design, maintain and operate distributed infrastructure that maximizes energy flows between DERs and adjacent loads. Using a tariff structure based on high levels of DER utilization, a DSO would be compensated on a volumetric basis for large volumes of distributed energy flows within a designated portion of the distribution system.

Conclusion

Given the massive increase in grid demand which will inevitably accompany the electrification of all sectors of our economy, the question is not whether distributed or centralized energy resources are "better" than the other, but who will ultimately pay for the costs of expanding and modernizing our transmission/distribution infrastructure. To realize the benefits of a high-DER future, we must (i) examine the fundamental differences between traditional and distributed resources, (ii) develop an objective, universal method of allocating cost to all generated energy based on actual infrastructure use, and (iii) give local governments and communities agency to determine the development path that best meets their needs.

A DER-rich environment cannot be created through modification of traditional assumptions and past practices, and new metrics and perspectives must be developed "from the ground up" that equitably assess the cost and benefits of generation and storage capacity located proximate to load. By examining all stages of energy generation, transmission and distribution, an integrated price structure based on actual use will create a level playing field that accurately calculates the costs and benefits of all energy resources, wherever located, in relation to the end user.

Synergistic Solutions appreciates the opportunity to provide these comments regarding the OIIP and looks forward to working collaboratively with the Commission and all interested parties to craft a policy framework necessary to realize California's high DER future.

If you have any questions, please feel free to contact me by email or phone (818-384-4557).

Sincerely,

Robert Perry

Robert Perry, Principal Consultant