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Synergistic Solutions - Comments Concerning Accelerating Distribution Grid Connections

Additional submitted attachment is included below.

Synergistic Solutions

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May 31, 2023

California Energy Commission

Re: Docket No. 23-IEPR-05 / Accelerating Distribution Grid Connection for the 2023 Integrated Energy Policy Report (IEPR)

To Whom It May Concern:

I would like to offer the following commentary concerning certain core concepts and metrics necessary to accelerate distribution grid connection for the 2023 IEPR. The primary focus of these comments concerns the essential role of distributed energy in connection with transportation electrification, which as evidenced by the presentations given at the May 9 workshop[1], constitutes a major hurdle in developing a resilient, reliable distribution grid in which critical loads supplied by DERs can become impervious to grid disruption.

Complete Interconnection/Energization Pathways from Generation to Load Must be Fully Developed within Designated Local Energy Markets. Today, grid connections are viewed as either connecting load (energization) or generation (interconnection), after which little clarity is given towards where and how energy will ultimately be delivered and consumed. While this distinction makes sense in a centralized energy model where long distances separate generation and load, the proximity of DERs to load allows for relatively simple energy pathways, with associated costs and benefits, to be fully mapped out within a designated Local Energy Market platform comprised of physically proximate consumers and producers of electricity who trade electricity.[2]

At the May 9 workshop, conversation centered on the need to apply interconnection "lessons learned" to the energization process, when in truth both objectives should be integrated into one process that recognizes the benefit of DERs to minimize grid impacts from EVSE and other emerging load centers. 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 energy consumption, a value proposition aligned with energy physics[3] and optimized through increased proximity. In this instance, grid costs

[1] https://www.energy.ca.gov/event/workshop/2023-05/commissioner-workshop-clean-energy-interconnection-electric-distribution

[2] See Lisa Cohn, Microgrid Knowledge, "The day of reckoning approaches for local energy markets," December 16, 2022. See Also Guidehouse Insights, "Local Energy Markets Can Expand Deployment of Renewables, Stabilize the Grid, and Increase ROI," 4Q 2022

[3] Wikipedia, "Kirchhoff's Circuit Laws".

should be relatively easy to assess based on *infrastructure actually used*. For example, a parking lot with a dedicated solar canopy and storage could function as its own local energy market, where vehicles are charged using a mix of grid energy, on-site capacity and even surplus energy from other EVs (as determined by market signals and the individual needs of each EV owner).

Updating CALGreen[4] Building Codes and Standards is Essential to Accelerate DER Connection and Integration. While transportation electrification is always a primary concern, equal attention should be given to the massive scale of construction needed to achieve California's housing goals. To this end, CALGreen codes and standards need to be updated via code change supplements in the 2022 Intervening Code Adoption Cycle[5] which is scheduled to become effective on July 1, 2024. To the greatest extent possible, these code changes should incentivize the creation of building and architectural standards that maximize on-site, or adjacent distributed capacity needed to future proof new construction and minimize grid stress.

Given California's aggressive housing targets, and the ability of new construction to mitigate incremental cost, failure to adequately modernize existing CALGreen building codes and standards would result in a massive cumulative opportunity cost as newly constructed facilities built on old standards would then need to be retrofitted at a much higher incremental cost. These updated codes should also recognize that new construction containing DER technologies can also serve as a DERMS hub for additional distributed capacity located amongst older existing sites as part of a local energy market behind a point of shared grid connection.

Proactive Community Engagement and Local Energy Planning is a Prerequisite for Accelerated DER Deployment at Scale. 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 and empowered 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 defray development costs among a multitude of projects.

As Critical Infrastructure, EV Supply Equipment (EVSE) Charging Facilities Require Minimum Levels of Co-Located Distributed Capacity. Given California's aggressive goals for electrifying the transportation sector, it will be important to co-locate a minimum level of DER hosting capacity that can support electric vehicle charging and/or refueling on a continuous and uninterrupted basis. To allay consumer concerns, easy access to reliable charging capacity will be essential, particularly along major transit corridors. Consumer assurance can only become a reality if an adeqate number of charging locations are deemed immune to grid disruption.

[4] California Green Building Standards Code—Part 11, Title 24, California Code of Regulations
[5] https://www.dgs.ca.gov/BSC/Rulemaking/2022-Intervening-Cycle

In remote areas, high levels of resilience are achievable by either locating charging stations near existing generation and storage or including generation/storage capacity as a design element. Within population centers, major charging locations would need to be located at or near commercial-industrial centers or similar areas with large hosting capacity. All these efforts will require the active participation and consent of communities and businesses within designated portions of the distribution grid.

Bidirectional EVSE offers Benefit Multipliers for an Agile, Cost-Efficient Energy Transition. As a technology bridging both energy and transportation sectors, vehicle-grid integration (VGI) technologies offer a compelling value proposition to both commercial and residential customers that seek both energy resilience and zero-carbon transportation assets. *As accessing the enormous dispatchable capacity of EVs can serve to avoid significant resource adequacy expenditures, there can be no successful transition scenario that does not include VGI as a central feature*.

Although some may still consider VGI an "emerging technology," dedicated R&D efforts by state and national agencies and the imminent rollout of commercial product lines requires serious consideration of the synergies offered by VGI to increase resource adequacy by an order of magnitude greater than previously envisioned. To date, top-down analyses have placed a premium on vehicle-to-grid (V2G) applications, but less complex vehicle-to-home (V2H), vehicle-to-building (V2B) and vehicle-to-vehicle (V2V) applications should be considered low-hanging fruit in the near term. Such behind-the-meter (BTM) VGI applications, combined with distributed capacity, will be particularly effective in keeping system-wide EVSE load to a manageable level.

Comprehensive and Granular Mapping Data from Generation to Load is Needed for Effective DER Planning. 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 analyze 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 concentrations of distributed energy generation that would place a premium on load-shifting excess energy for later discharge during high peak demand conditions.

DSO/Utility Compensation Must be Performance-Based to Maximize Distributed Energy Flows. 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 systemic load which will inevitably accompany the electrification of all economic sectors, the question is not whether distributed or centralized energy resources are "better" than the other, but which combination of both approaches works best and who will ultimately pay for the costs of expanding and modernizing our transmission/distribution infrastructure. *Proximity to load captures the highest resiliency value at the lowest cost of delivery and should be the guiding star in distribution planning*.

Therefore, to accelerate connection of DERs to the distribution grid, juxtapositions of generation to load must be identified and developed into local energy markets where most, if not all, generated energy is consumed within its boundaries. If properly designed, such markets should operate on a relatively grid-neutral basis with little to no adverse impacts. Indeed, in many cases these arrangements would likely increase local hosting capacity as many load-intensive sites could be operated primarily using local energy market resources.

Synergistic Solutions appreciates the opportunity to provide these comments 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.

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

Sincerely,

Robert Perry, Principal Consultant