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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 July 2, 2021)

ENVIRONMENTAL DEFENSE FUND OPENING COMMENTS ON DER ORCHESTRATION WORKSHOP REPORTS

COLE JERMYN
Environmental Defense Fund
123 Mission Street, 18th Floor
San Francisco, CA 94105
(202) 572-3523
cjermyn@edf.org

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I. INTRODUCTION

The California Public Utilities Commission opened the High Distributed Energy Resources ("High DER") proceeding in 2021 to address topics related to electric load forecasting and system planning to support DER integration and electrification.[1] On March 23, 2026, Commissioner Houck released the Assigned Commissioner's Ruling on Track 1 and Track 2 Distributed Energy Resources Orchestration ("DER Orchestration Ruling").[2] Multiple parties including Environmental Defense Fund ("EDF") filed comments in response to this ruling in April 2026. Energy Division staff hosted two workshops in May and June 2026 on the topics of Distribution System Operator DER orchestration, and DSO-TSO coordination on DER orchestration. On July 9, 2026, Commissioner Houck and ALJ Chang issued the *Assigned Commissioner's and Administrative Law Judge's Ruling Issuing Questions on the Distributed Energy Resources Orchestration Workshop Reports*, requesting opening comments on the workshop reports by July 27th, 2026, and reply comments by July 31, 2026.[3] These comments are responsive to that Ruling.

II. DISCUSSION

1. *Are there any factual inconsistencies or areas needing clarification in the summary workshop reports set out in Attachments 1 and 2. Are the party perspectives discussed in the respective reports accurate?*

EDF provides the following two clarifications on its position regarding DER orchestration as described in the workshop reports.

First, the DSO workshop report states on the topic of grid services and use cases enabled by DER orchestration, "EDF frames DER orchestration through the lens of export tariffs and a bidirectional ratemaking structure."[4] While EDF's presentation during the workshop focused on the potential of export tariffs and grid services tariffs, the ultimate function of these tariffs would be to implement a clear, sustainable cost allocation and recovery framework to underly the

[1] R.21-06-017, *Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future* (June 24, 2021).
[2] R.21-06-017, *Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future*, Assigned Commissioner's Ruling on Track 1 and Track 2 Distributed Energy Resources Orchestration (Mar. 23, 2026) [hereinafter "DER Orchestration Ruling"].
[3] R.21-06-017, *Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future*, Assigned Commissioner's and Administrative Law Judge's Ruling Issuing Questions on the Distributed Energy Resources Orchestration Workshop Reports (July 9, 2026).
[4] DSO Workshop Report at 5.

utilities' DER orchestration efforts. The need for such a framework prior to the utilities' implementation of DER orchestration is discussed further in response to Question 4 below.

Second, the DSO workshop report states on the topic of cost-benefit methodologies and valuation frameworks, "EDF does not propose a stand-alone cost-benefit methodology. EDF implicitly supports applying traditional cost-of-service ratemaking principles bidirectionally (to both import and export), arguing that doing so would more equitably allocate costs to exporting facilities and better align costs and revenues over time, yielding greater rate stability."[5] As discussed in the point above, EDF's presentation in the workshop focused on the export tariff framework, which is primarily a cost allocation and recovery tool that can better align cost allocation with the customers (including interconnecting DER customers) that are causing costs to be incurred. To the extent EDF's presentation identifies benefits associated with the export tariff framework due to greater alignment with traditional ratemaking approaches for allocating costs of grid upgrades to load customers, the DSO workshop report summary of EDF's position here is accurate. However, we would like to clarify two important points regarding EDF's position regarding DER orchestration cost-benefit and valuation frameworks.

- As EDF stated in opening comments, a stand-alone cost-benefit framework using the leveraging may be justifiable in the short term, but before advancing to greater investments in IOU-led DSO DER Orchestration efforts, more robust grid service valuation and optimal planning should be developed and applied. Examples provided included conducting a study on co-optimized system value of orchestrating DERs across the transmission and distribution interface,[6] aligning the compensation framework for DERs with the grid services tariff framework that attributes benefits according to the type of grid services capable of being provided by the DER,[7] and current avoided cost approaches for capturing distribution system value should be based on circuit-specific distribution avoided cost values.[8]
- EDF then expanded on the importance of implementing optimization modeling approaches to identify marginal distribution capacity value in the DSO workshop presentation. EDF stated that LBNL is currently working on an updated methodology that

[5] DSO Workshop Report at 13.
[6] EDF DER Orchestration Opening Comments at 5-6 (Apr. 20, 2026). [hereinafter "EDF Opening Comments"].
[7] EDF Opening Comments at 6.
[8] EDF Opening Comments at 14.

will leverage optimization tools to identify marginal avoided costs related to DER distribution deferrals, and should be implemented as a means of providing increased transparency into avoided cost calculations.[9] Evaluating DERs alongside traditional grid upgrades to identify least-cost solutions is an important concept to a cost-effective DER Orchestration implementation.

2. *What, if any, additional information or development on a proposed orchestration framework should be considered before directing the IOUs to file DER orchestration framework applications? What recommendations do parties have regarding any additional work needed and timelines for completing such work, including timing for filing of IOU DER orchestration applications?*

3. *Given the time required to prepare and decide on potential IOU DER orchestration applications and the related IOU pilots currently underway, how can IOUs:*

   a) *Ensure DER orchestration strategies and implementation stages proposed in future applications incorporate lessons learned, relevant data, and any other benefits generated from the currently ongoing pilots and the information set forth in the record of this proceeding?*
   b) *Coordinate the pilots with the formal DER orchestration application proceeding?*

As discussed in EDF's opening comments on DER orchestration in April, the IOUs are currently at different stages of maturity in developing and deploying the infrastructure, IT, and operational structures needed to implement different elements of DER orchestration.[10] To address this, EDF recommends a phased implementation framework that includes "clear criteria for when participation will be scaled to include the next tranche of customers and ultimately all interested customers."[11]

To allow for lessons learned to be identified and shared with the Commission and across the IOUs, the utilities should file regular reports, at least annually, on the state of their relevant pilots and other related elements of DER orchestration. This includes updating on the status of their DERMs implementation, and once a utility's DER orchestration plan is approved the status of its implementation and resulting impacts.

[9] DSO workshop hearing transcript at 5:49:30.
[10] EDF Opening Comments at 11.
[11] *Id.* at 12.

4. *What, if any, specific pre-application steps and activities related to DER orchestration, such as convening workshops or a working group process, should be completed prior to the IOUs filing of DER orchestration applications?*

EDF recommends that the Commission convene a working group to develop a DER orchestration framework prior to the IOUs filing DER orchestration applications. The recommended objectives of this working group are discussed in response to Question 5 below.

5. *If convening a working group or workshops is warranted, what should be the explicit objectives and key topics to address?*

EDF recommends three key objectives/topics for the DER orchestration working group that would together represent a DER orchestration framework: 1) an implementation framework, 2) a cost allocation framework, and 3) an evaluation framework. The implementation framework, as discussed in response to Question 3 above, would identify the implementation phases for the IOUs including eligible technologies, scale of customer participation, and the IOU's technical and operational needs to implement each phase. This would allow each IOU to undertake consistent efforts scaling towards the same end goal of developing technology-neutral DER orchestration processes aligned with discrete grid services and universal availability of DER orchestration programs, while recognizing that each is at a different starting point and readiness level. The Commission should direct the DER orchestration working group to propose this phased implementation framework.

The cost allocation framework would ensure that the utilities' investments, both capital and O&M costs, are reasonably assigned to customers and designed to appropriately incentivize the utilities to deploy DER orchestration in a manner that supports system affordability and reliability. As discussed in response to Question 1 above, EDF's presentation during the DSO DER orchestration workshop focused on the potential of the grid services tariff and export tariff model to serve this role in compensating and recovering costs from DER owners. But, prior work is needed to allocate costs, including evaluating current and alternative methods of assessing cost causation of grid upgrades for the various use cases envisioned for DSO Orchestration, before these tariffs can be used to recover them. The Commission should direct the DER orchestration working group to propose such a cost allocation and cost recovery methodology.

Finally, the working group should develop an evaluation framework for Commission consideration. This includes identifying the benefit-cost tests that will be used, as well as qualitative indicators including resilience and customer value of avoided outages. Additionally, this evaluation framework should address issues related to how implementation is being considered with wholesale market needs and price signals, as well as transmission system expansion and system optimization. As discussed in EDF's April comments and elaborated in response to question 1 above, this framework should include as a goal the inclusion of circuit-specific avoided cost values, "including the development of a marginal cost of capacity to inform annual distribution system planning and investments."[12] But IOUs must also be prepared to inform the working group chartered with overseeing the development of these frameworks regarding how accelerated DER deployment and DER Orchestration will reduce or mitigate the need for transmission-level upgrades and improve overall utilization of the entire grid, not just the distribution system. This last point is especially important to get right from the outset given that, from the perspective of CAISO as shared in the DSO-TSO workshop, "[t]he grid is evolving faster than the operational frameworks that support it."[13] This strongly suggests that DER Orchestration applications must demonstrate more detailed and rigorous planning about expected use cases and system value, as well as a plan for flexibility and adaptability to integrate with future evolving grid communications and control interfaces across the grid, in order to avoid costly "pilot and test" patterns that do not seek to answer core questions about system co-optimization up front.

By settling this three-part framework in advance of individual IOU filings, the Commission can ensure that the IOUs are working towards the same end goals and their results are evaluated on a consistent basis.

6. *Parties provided recommendations on regulatory pathways. Please provide feedback on the recommended regulatory pathways or provide alternative proposals.*

EDF agrees with Cal Advocates' position that the IOUs general rate cases are the proper venue to consider cost recovery for DER orchestration expenses.[14] The Commission should

[12] EDF Opening Comments at 14.
[13] CAISO DSO-TSO workshop, *Coordination at the transmission-distribution interface,* at 10 (June 5, 2026).
[14] DSO Workshop Report at 16.

adopt a DER orchestration framework as discussed above in response to Question 5, and then direct the IOUs to propose as part of their GRC filings the specific projects and programs needed to implement that framework. At the beginning of this process, it may be appropriate to approve cost recovery of certain near-term expenses outside of the GRCs given the staggered timing of the IOUs filings.

7. *Of the six key discussion topic areas identified during Workshop 1 for developing a DER orchestration framework, which topics or subtopics are best suited for development through stakeholder working groups or future workshops?*

8. *How should the Commission and/or IOUs ensure engagement with California Tribal Nations, environmental social justice communities, and other communities that may be impacted by implementation of the DER orchestration framework that may not be tracking the current proceeding, or have capacity to engage on the highly technical aspects of the proceeding?*

9. *Regarding PG&E's Workshop 1 presentation, when implementing the primary use cases described under Key Topic #1 (system peak reduction, speed to power, and resource-efficient grid investments), are these the correct use cases to implement? If so, which use cases should be implemented first, and which should be implemented in parallel or sequentially?*

EDF agrees that these three use cases—peak reduction, speed to power, and resource-efficient grid investments—are the appropriate use cases for near-term prioritization. These use cases should be implemented in parallel, with specific prioritization determined by the use case with the greatest net benefit for a particular project. Sequential implementation could leave benefits unleveraged, as some DER orchestration projects could serve multiple of these use cases. For example, a project that addresses speed-to-power needs by unlocking existing grid capacity can also represent a resource-efficient grid investment by mitigating or avoiding an otherwise-needed upgrade. The IOUs should focus on implementation that maximizes the cumulative benefits of these use cases.

10. *How should the Commission coordinate DER orchestration implementation for IOUs in different stages of technical readiness with regards to telemetry, DER management systems, and other DER orchestration aspects?*

As discussed in response to Question 5 above, EDF recommends that the Commission adopt a DER orchestration implementation framework. This framework would account for each

IOU's readiness level for each element of DER orchestration, while laying out consistent end goals they should all be working towards. Requiring each IOU to be on the same timeline would excessive immediate investment by some, and/or actively slowing down others. Instead, each should be expected to move on parallel timelines that account for each IOU's starting point.

11. *How can current AMI 1.0 and next-generation AMI 2.0 Grid Edge DERMs capabilities support IOU-led DSO DER orchestration programs?*

    a) *What additional communications or technical capabilities are necessary to enable reliable dispatch and settlement of DERs via Grid Edge DERMs?*
    b) *What are differences in capabilities, advantages, and disadvantages of Grid Edge DERMs compared to centralized Enterprise DERMs for enabling IOU-led DSO DER orchestration?*

12. *What customer-owned DER technologies (e.g., EVs, smart thermostats, water heaters, batteries, other flexible loads) are currently capable of and/or best fits for participating in IOU-led DSO DER orchestration programs to provide value to ratepayers?*

    a) *What technical or operational barriers remain for broader participation?*

13. *What requirements should be established to enable reliable integration of customer-owned DERs into IOU DER orchestration programs?*

    a) *How should IOUs account for customer behavior and resource availability when determining the dependability of orchestrated DERs on the distribution grid?*

14. *How should circuit-level demand flexibility be modeled by IOU DSOs to better inform how distribution planning investments should be allocated in future planning cycles?*

EDF recommends that circuit-level demand flexibility be assessed in terms of the range of potential flexibility represented by flexible end-use loads behind the customer meter (including battery storage devices) and paired with resource potential studies regarding behind-the-meter rooftop solar and front-of-the-meter DERs of all types. These resource potential studies should include periodic updates to conventional resource potential studies (based on available rooftop/land area, technology costs, market economics, customer adoption trends, resource integration costs, etc.) but also feature periodic requests for proposals or requests for offer from DER solution providers. These together can inform as to the entire picture of demand flexibility at the distribution level.

EDF emphasizes that flexibility on a given circuit is a function both of the latent flexibility inherent in existing customer assets (e.g., space and water conditioning, electric vehicles) as well as more typical exporting resources. Given the uncertainty in future adoption levels by circuit, EDF recommends that IOUs evaluate ranges of adoption based on adoption modeling factors. However, given the use case of informing distribution planning investments, simple scenario modeling at the aggregate feeder-level may not be sufficient, and as a longer-term objective, IOUs should pursue iterative and probabilistic DER adoption methods that can inform specific feeder constraints based on location.[15]

15. *In PG&E's opening comments on the Assigned Commissioner's Ruling Issuing Questions on the Electrification Impact Study Part 2 Final Reports, PG&E stated that "the EPIC 4.08 pilot is intended to improve how load flexibility is represented in scenario planning by helping translate flexible load potential into inputs that can be assessed in" distribution system investment plans.1 What, if any, learnings from PG&E's EPIC 4.08 pilot and its ongoing development can be used to model load flexibility into the annual Distribution Planning and Electrification Process (DPEP) and how would that be accomplished?*

16. *The DSO ensures that the system is operated in a safe, reliable manner and is responsible for optimizing system performance. What components are needed for a DER orchestration framework that will ensure these operations continue while also allowing for the flexibility needed to manage load that incorporates a high level of DERs?*

17. *The IOUs have previously made statements regarding opportunities for lowering costs. Please provide explicit examples of these opportunities including how these opportunities may shift between initial implementation and further scaling.*

As discussed in response to question 1 above, EDF supports adoption of the Lawrence Berkeley Lab distribution avoided marginal distribution capacity cost method currently being developed for the Commission under the statewide avoided cost proceedings.[16] Part of the evolution in distribution avoided cost methodology being developed under this process is to apply DER deployment to mitigate not just capacity constraints through substation- and feeder-level upgrade deferrals, but also to leverage the capability of DERs, especially inverter-based DERs, to offset the need for more traditional solutions to voltage and power quality violations

[15] For an example of this, see Mulkin, O., Heleno, M., and Mike Ludkovski, "Selecting Critical Scenarios of DER Adoption in Distribution Grids Using Bayesian Optimization," *IEEE Transactions on Power Systems* 41, no. 4 (July 2026): 2559. Available at: https://ieeexplore.ieee.org/document/11359014.

[16] See "Avoided Transmission and Distribution Costs Study: Draft Research Plans," CPUC webinar (August 22, 2025), available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/energy-efficiency/ider-cost-effectiveness/td-study-webinar-slide-deck.pdf.

like voltage regulators and capacitor banks.[17] EDF recommends leveraging these methods and capabilities to inform the DER Orchestration cost-benefit and evaluation framework discussed in response to question 5 above.

18. Are there any other relevant issues not discussed in the March 23 Assigned Commissioner's Ruling, but brought up in the workshops that the Commission should consider for the DER orchestration application process?

III. CONCLUSION

EDF thanks the Commission and utilities for the opportunity to provide these comments.

Respectfully submitted,

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/s/ Cole Jermyn
Cole Jermyn
Senior Attorney, Clean Affordable Power
Environmental Defense Fund
123 Mission Street, 18th Floor
San Francisco, CA 94105
Telephone: (202) 572-3523
cjermyn@edf.org

[17] *Id.,* at 14 and 22.