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Evaluating Distributed Wind for California

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

Electric Program Investment Charge 2026–2030 (EPIC 5) Research Concept Proposal Form

The California Energy Commission (CEC) is currently soliciting research concept ideas and other input for the Electric Program Investment Charge 2026–2030 (EPIC 5) Investment Plan. For those who would like to submit an idea for consideration, please complete this form and submit it to the CEC by **August 8, 2025**. More information about EPIC 5 is available below.

To submit the form, please visit the e-commenting link: https://efiling.energy.ca.gov/EComment/ECommentSelectProceeding.aspx and select the Docket **25-EPIC-01**. Enter your contact information and then use the "choose file" button at the bottom of the page to upload and submit the completed form. Thank you in advance for your input.

1. Please provide the name, email, and phone number of the best person to contact should the CEC have additional questions regarding the research concept:

   Michael Bergey, DWEA President: mbergey@bergey.com, 405-204-6653

2. Please provide the name of the contact person's organization or affiliation:

   Distributed Wind Energy Association (DWEA)

3. Please provide a brief description of the proposed concept that you would like the CEC to consider as part of the EPIC 5 Investment Plan. What is the purpose of the concept, and what would it seek to do? Why are EPIC funds needed to support the concept?

   Evaluation of behind-the-meter distributed wind systems, from 1 kW to 5 MW, in California's high wind areas for their grid services potential, with and without storage. The results would inform policy makers on the role, if any, that distributed wind can play in meeting California's grid reliability and climate goals. Distributed wind warrants an evaluation because advanced American technology has lowered costs, NREL scoping studies have revealed potential in the hundreds of GW, and California wind resources have the best temporal fit to grid demand in North America. This evaluation is a missing link in use of distributed wind technology to

compliment other clean energy and storage technologies that have been deployed at scale in California.

4. In accordance with Senate Bill 96[i], please describe how the proposed concept will "lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory energy goals." For example, what technical and/or market barriers or customer pain points would the proposed concept address that would lead to increased adoption of clean energy technology or innovation? Where possible, please provide specific cost and performance targets that need to be met for increased industry and consumer acceptance. For scientific analysis and tools, provide more information on what data and information gaps the proposed concept would help fill, and which specific parties or end users would benefit from the results, and for what purpose(s)?

   A thorough evaluation of distributed wind in California should include the benefits, customer-facing and utility-facing, present and future costs, and the obstacles to greater deployment. NREL's scoping studies, referenced below, indicate an economic potential in California for behind the meter distributed wind of 6.3 GW on residential properties and 26 GW in disadvantaged communities in 2022, based on detailed resource, load, and parcel data.

   There is a scale economy with wind turbines and present LCOE's range from $80 - $200/MWh. Industry and US-DOE have identified technology paths that could lower these costs to $50 -$80/MWh by 2035. Operating lifetimes are already at 40-years for Tier 1 products and 80+ years appears possible with minimal OPEX. California companies could participate in US-DOE supported technology and product development R&D and California's high market potential and high energy costs could lead to increased in-state manufacturing.

   Distributed wind is not appropriate for densely populated urban and suburban environments, so the application opportunities are rural homes, businesses, and public facilities. Data gaps include modeled and monitored correlations of demand and production, evaluating the value of different levels of storage, safety statistics (for permitting), opportunities to add value by retrofitting to existing PV systems, and other that might be emerge from a scoping study. We see these evaluations benefiting ratepayers, utilities, and city and county management and planners.

5. Please describe the anticipated outcomes if this research concept is successful, either fully or partially. For example, to what extent would the

research reduce technology or ratepayer costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the innovation at scale? How will the innovation lead to ratepayer benefits in alignment with EPIC's guiding principles to improve safety,[ii] reliability,[iii] affordability,[iv] environmental sustainability,[v] and equity?[vi]

The proposed initial EPIC study of distributed wind should reveal opportunities for CEC EPIC funding to advance technology and deployment (e.g., bespoke wind turbine power electronics) and opportunities for policy interventions (e.g., deployment incentives tied to grid benefits or giving DW the same exemption from property tax enjoyed by solar) outside of EPIC's scope. The longer term outcomes are a meaningful contribution to California's clean energy goals and the economic development impact from distributed wind deployment at scale. Ratepayers would gain another cost-effective distributed energy resource option and utilities would see additional VPP resources to address grid issues and increase resiliency. Follow-on EPIC funding could accelerate cost reductions and deployment.

A quick example is that the Rule 21 power electronics requirements and UL 1741-SB, which have been a significant barrier to market entry and friction to innovation, may be overkill for distributed wind given its lower level of deployment and project density, TOU resource correlation, and highly variable nature (e.g, inherent inability to maintain islanded operation). Rightsizing interconnection requirements could lower costs and increase the pace of technology refinement and innovation.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.

   The ultimate metrics would be the California potential for LCOE reductions, deployment potential for units, capacity, and energy, and peak shaving and resiliency contributions to the grid.

7. Please provide references to any information provided in the form that supports the research concept's merits. This can include references to cost targets, technical potential, market barriers, equity benefits, etc.

   1. https://distributedwind.org/distributed-wind-energy-101/
   2. NREL, "Assessing the Future of Distributed Wind: Opportunities for Behind-the-Meter Projects", Lantz, Sigrin, et al, NREL Technical Report NREL/TP-6A20-67337, November 2016, https://docs.nrel.gov/docs/fy17osti/67337.pdf

3. NREL, “Distributed Wind Energy Futures Study”, McCabe, Prasanna, et al, NREL Technical Report NREL/TP-7A40-82519, May 2022, https://www.nrel.gov/docs/fy22osti/82519.pdf
4. “DWEA Distributed Wind Vision – 2015-2030, Strategies to reach 30 GW of “behind-the-meter” wind generation by 2030”, DWEA, 2015. https://distributedwind.org/wp-content/uploads/2012/08/DWEA-Distributed-Wind-Vision.pdf

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:[vii]
    a. Transportation Electrification
    b. Distributed Energy Resource Integration
    c. Building Decarbonization
    d. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas
    e. Climate Adaptation

    Please describe in as much detail as possible how your proposed concept would support these goals.

    DWEA’s recommendation/concept aligns with the EPIC 5 Investment Plan strategic goals for b, c, and d. Distributed wind is an underutilized DER technology with significant deployment potential and the initial study we recommend would reveal its potential benefits from greater integration. Behind-the-meter distributed wind is almost always connected to a building and the electricity they produce reduces its carbon footprint. Wind energy has zero carbon emissions so increasing deployment of distributed wind moves California closer to its 100% Net-Zero goal.

About EPIC

The CEC is one of four EPIC administrators, funding research, development, and demonstrations of clean energy technologies and approaches that will benefit electricity ratepayers of California's three largest investor-owned electric utilities.

EPIC is funded by California utility customers under the auspices of the California Public Utilities Commission.

To learn more about EPIC, visit: https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program

EPIC 5 documents and event notices will be posted to: https://www.energy.ca.gov/proceeding/electric-program-investment-charge-2026-2030-investment-plan-epic-5

Subscribe to the EPIC mailing list to stay informed about future opportunities to inform the development of EPIC 5: https://public.govdelivery.com/accounts/CNRA/signup/31897

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i See section (a) (1) of Public Resources Code 25711.5 at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC&sectionNum=25711.5.

ii EPIC innovations should improve the safety of operation of California's electric system in the face of climate change, wildfire, and emerging challenges.

iii EPIC innovations should increase the reliability of California's electric system while continuing to decarbonize California's electric power supply.

iv EPIC innovations should fund electric sector technologies and approaches that lower California electric rates and ratepayer costs and help enable the equitable adoption of clean energy technologies.

v EPIC innovations should continue to reduce greenhouse house gas emissions, criteria pollutant emissions, and the overall environmental impacts of California's electric system, including land and water use.

vi EPIC innovations should increasingly support, benefit, and engage disadvantaged vulnerable California communities (DVC). (D.20-08-046, Ordering Paragraph 1.) DVCs consist of communities in the 25 percent highest scoring census tracts according to the most recent version of the California Communities Environmental Health Screening Tool (CalEnviroScreen), as well as all California tribal lands, census tracts with median household incomes less than 60 percent of state median income, and census tracts that score in the highest 5 percent of Pollution Burden within CalEnviroScreen, but do not receive an overall CalEnviroScreen score due to unreliable public health and socioeconomic data.

vii In 2024 the CPUC adopted five Strategic Goals to guide development of the EPIC 5 Investment Plan. A description of the goals can be seen in Appendix A of CPUC Decision 24-03-007 available at: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M527/K228/527228647.PDF