

Leveraging DERs and Load Flexibility for Affordability and Grid Reliability

INITIATIVE DESCRIPTION	Pages 40 - 43
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- Advances coordinated distributed energy resources (DERs) and flexible loads that can respond to local grid conditions and improve use of existing distribution capacity.
- Combines interoperable customer technologies, grid orchestration, and deployment models to reduce feeder peaks and manage localized constraints.
- Prioritizes scalable approaches that can defer grid upgrades while expanding DER benefits in disadvantaged and vulnerable communities (DVCs).

PROPOSED INITIATIVE BUDGET	\$144M
% OF TOTAL BUDGET (excl. admin & overhead)	19%
# OF RESEARCH TOPIC AREAS	3

ALIGNMENT SUMMARY

STRATEGIC OBJECTIVE ALIGNMENT	Page 41
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To support ratepayer affordability, the EPIC Program will accelerate innovation, demonstration, and deployment of innovative and replicable methods to increase the capacity utilization rate of circuits/feeders and reduce circuit and feeder peak loads, and/or dynamically optimize other feeder/circuit operations in order to avoid or defer costly grid upgrades, through the coordination of DERs, EVs, flexible load, and grid intelligence, with a focus on circuits serving Disadvantaged and Vulnerable Communities where increased adoption of zero-emission technologies can increase equitable benefits.

Demonstrates coordinated DER and load flexibility strategies that reduce feeder peaks, improve circuit utilization, and avoid or defer costly grid upgrades for greater and more equitable benefits.

CPUC ALIGNMENT	Page 42
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- CPUC High DER Proceeding is actively developing DER orchestration, flexible service, operating envelope, and DERMS frameworks to leverage existing distribution capacity more efficiently.
- EPIC can provide field evidence on how interoperable customer DERs respond to utility/DSO signals, manage local constraints, and defer or avoid grid upgrades.
- Grant Funding Opportunities (GFOs) will be scoped, as appropriate, with CPUC and IOU feedback to test features such as the operating architectures, communications requirements, and use cases most relevant to the framework that emerges.
- Ratepayer funding will support transferable, multi-vendor solutions that can reduce distribution investment needs across utility territories.

Advancing Customer-Sited DER Integration and Interoperability

Optimizing Feeder/Circuit Operations

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WHAT PROBLEM ARE WE SOLVING? Page 45

The deployment of distributed energy resources and flexible loads to support grid capacity utilization is limited by proprietary communication protocols and fragmented data models that prevent automated real-time coordination at the grid edge. This forces custom integrations and creates operational blind spots limiting aggregated DERs from mitigating feeder peaks and unlocking broader benefits such as deferred grid upgrades, improved reliability, and lower electricity rates.

START	2027
OUTPUTS	2029
MARKET READY	2029 – 2030

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?	HOW WILL YOU KNOW YOU ARE SUCCESSFUL?	HOW WILL YOU COORDINATE?
• Evaluate prior pilots and standards to identify proven models for consolidating fragmented communication protocols. (p. 46) • Develop interoperability profiles that set uniform configuration rules and standardize data exchange for high-priority DER use cases. (p. 46) • Test and validate BTM devices in sandbox environments to ensure out-of-the-box auto-configuration and secure onboarding. (p. 46) • Deploy multi-vendor field demonstrations across diverse building types to validate real-time circuit peak reduction, cybersecurity, cost savings and avoided costs under live grid conditions. (p. 46)	• Interoperability profiles and schemas enable multi-vendor DER integration with utility DERMS/ADMS platforms. (p. 47) • Compliance and testing frameworks improves protocol compliance rate across multi-vendor handshakes, reducing integration costs and accelerating interconnection timelines. (p. 48) • Field-validated reports validate coordination of multi-vendor DERs reliably dispatch to shape feeder load and reduce circuit peaks. (p. 47) • Plug-and-play DER coordination demonstrates the deferral of distribution infrastructure upgrade costs. (p. 47)	• Build on foundational architectures and data frameworks from prior CEC EPIC and IOU projects, including PEZERR (GFO-23-302), VPP Flex (GFO-23-309), CalFlexHub (EPC-20-025), and CHOIR (GFO-25-302). (p. 47) • Coordinate with CAISO, CA IOUs, CEC standards (FDAS, LMS), and CPUC proceedings (e.g. CalFUSE, Rule 21 updates, and data-access) to align operational tools with distribution planning. (p. 47) • Partner with federal initiatives and standards bodies (e.g., DOE, GMLC, NIST, GWAC) to ensure profiles align with national smart grid architectures. (p. 47)

Improving Grid-Orchestrated DER Coordination and Market Integration

Optimizing Feeder/Circuit Operations

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WHAT PROBLEM ARE WE SOLVING?

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LSEs and grid operators currently lack real-time visibility into where flexible capacity exists and tools to quantify DERs' locational and operational value. Existing planning, forecasting, and operational approaches rely on static assumptions and system-level signals that inhibit aggregated DERs' ability to respond in a coordinated fashion to localized grid conditions. Inefficient use of the distribution grid increases the need for costly infrastructure upgrades and increases rates.

START	2028
OUTPUTS	2031
MARKET READY	2031 – 2033

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?

- Develop forecasting, monitoring, and valuation tools that can enhance existing planning and settlement processes to better quantify and disseminate the locational and operational value of DERs. (p. 50)
- Demonstrate signal-responsive DER orchestration and locational demand response on the distribution grid to assess and improve systemwide grid impacts under real-world conditions, rather than simulation or forecasting. (p. 50)
- Develop data infrastructure and data access and sharing frameworks to support real-time orchestration and timely measurement and verification — and close the visibility gap — rather than relying on static assumptions. (p. 50)

HOW WILL YOU KNOW YOU ARE SUCCESSFUL?

- Improvements in visibility of DERs at the grid edge and operational forecasting accuracy. (p. 51)
- Cost-effective peak load reduction on targeted feeder lines or circuits through DER coordination and dispatch. (p. 51-52)
- Increased customer participation in demand flexibility programs (p. 51)
- Improved orchestration of DERs to increase capacity utilization on targeted feeder/circuits, measured through value of deferred distribution investments and avoided system costs. (p.51)

HOW WILL YOU COORDINATE?

- Coordinate with market actors, such as IOUs, CCAs, aggregators, CAISO, and customers, through technical advisory committees, funding opportunities, and project scoping. (p. 51)
- Coordinate additionally with IOUs via joint working groups. (p. 51)
- Use lessons and emerging results from EPIC investments in community VPPs, multifamily DER demonstrations, and DER orchestration demonstrations, as well as CPUC's Data Access Working Group and High DER Proceeding to advance tools, strategies, and deployments that avoid grid upgrades and enhance cost savings through improved DER operations.

Equity-Focused DER Solutions for DVCs

Optimizing Feeder/Circuit Operations

WHAT PROBLEM ARE WE SOLVING? Pages 53-54

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DVCs face persistent financial, housing, trust, and infrastructure barriers that limit DER adoption and participation in grid services. Lower participation means these customers can miss both direct DER benefits and opportunities to provide locational grid value through peak reduction, flexibility, and avoided upgrades. This can disproportionately burden low-income and DVC ratepayers when non-participants bear a larger share of remaining grid costs.

START	2028
OUTPUTS	2029
MARKET READY	2032 – 2034

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?	HOW WILL YOU KNOW YOU ARE SUCCESSFUL?	HOW WILL YOU COORDINATE?
• Demonstrate DVC-focused DER models, such as VPPs, multifamily DER packages, community microgrids, and resilience hubs, and their community benefits. (p. 54) • Develop and test ownership, financing, direct install, and benefit-sharing approaches that expand participation. (p. 54) • Evaluate whether and how aggregated DERs can reduce local peaks, provide flexible capacity, and defer upgrades. (p. 54) • Develop replicable models that can inform adoption, such as in IOU, CCA, and CPUC programs. (p. 54)	• Reductions in customer electricity bills for participating DVC customers. (p. 55) • Improved DER and grid-service participation among DVC customers. (p. 55) • Quantified peak reduction, load shifting, flexible capacity, and avoided distribution costs. (p. 55) • Replicable deployment models suitable for broader adoption, such as in a utility, CCA, or CPUC program. (p. 56) • Resilience, environmental, and equity benefits, such as reduced use of diesel backup generators (p. 55)	• Coordinate with IOUs through joint working groups, technical advisory committees, and funding opportunity scoping. (p. 55) • Use lessons and emerging results from ongoing EPIC investments in advanced energy communities (GFO-20-305), community VPPs (VPP-Flex & CHOIR), and multifamily DER demonstrations (PEZERR) to identify remaining gaps for future funding opportunities. (p. 55) • Engage CCAs, CBOs, tribes, and housing partners to inform community needs, contribute to project scoping and implementation, and support scalable deployment. (p. 55)