

Accelerating Grid Connection of Clean Energy Resources and Beneficial Loads

Expediting and Streamlining
Interconnection and Energization
Processes

INITIATIVE DESCRIPTION	Pages 57 - 59	PROPOSED INITIATIVE BUDGET	\$89M
- Support development and demonstration of innovative technologies that enable more rapid connection of new clean resources and flexible loads, spanning planning and operations. - Address grid capacity limitations that slow timelines and increase customer and ratepayer costs for DER deployment through software and hardware advancements. - Advance bridging solutions for temporary service and non-bridging strategies to defer or avoid construction of new grid infrastructure. - Invest across a range of technology readiness levels (TRLs), including incubating novel early TRL solutions as well as demonstrating later-stage innovations to improve and accelerate integration of scalable technologies.		% OF TOTAL BUDGET (excl. admin & overhead)	12%
		# OF RESEARCH TOPIC AREAS	4

ALIGNMENT SUMMARY

STRATEGIC OBJECTIVE ALIGNMENT	Page 58
“The EPIC program will support acceleration of the development, testing, and integration of innovative technology, communication protocols, and modeling approaches to streamlining interconnection and energization processes for DER and new load...with a goal to demonstrate the capability to significantly reduce interconnection and energization approval or online timelines...with a priority for addressing challenges in Disadvantaged and Vulnerable Communities.”	

Research topic areas include innovative technologies, improvements and testing of communication protocols, and modeling advancements. The goal is to significantly reduce interconnection and energization timelines while increasing utilization and grid readiness. Funding opportunities will prioritize projects located in and benefitting DVCs.

CPUC ALIGNMENT	Pages 58
- Address emerging needs stemming from High DER and Energization proceedings, including a strong vendor base and market offerings for customer- and utility-facing technologies like power control systems; an improved utility and customer experience with bridging and permanent applications; and open and transparent planning tools and models. - Validate technology performance, cost-benefit analysis and other tradeoffs, and build utility, customer, and stakeholder familiarity. - Direct focus on California grid infrastructure and processes (e.g., 2030.5, FSC), less supported by federal or other funding programs. - Provide a strong pathway to lower costs, more affordable access, and other ratepayer benefits articulated in CPUC proceedings and policies.	

Innovations in Bridging Solutions for Fast Grid Connections

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WHAT PROBLEM ARE WE SOLVING? Page 62

Interconnection and energization of distributed generation, storage, and load projects can be delayed for years if capacity upgrades are required, particularly for larger projects. Bridging solutions can provide partial service while necessary upgrades are being completed, however there are limited options available for customers. There is a need to research and advance a broader portfolio of solutions that balance customer and grid needs while promoting affordability and swift progress on energy and climate goals across the system.

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START	2028
OUTPUTS	2032
MARKET READY	2032+

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?	HOW WILL YOU KNOW YOU ARE SUCCESSFUL?	HOW WILL YOU COORDINATE?
• Innovations in hardware, software, communications, and control strategies, such as mobile solid-state transformers, power control systems, and dynamic operating envelopes that can safely and affordably connect customers more quickly. (pp. 62 – 63) • Data and decision support tools to inform cost-benefit analyses, planning, and service delivery. (pp. 62 – 63) • Support technologies and strategies that are too early for inclusion in GRCs but later stage than most federal funding will support. (pp. 62 – 63)	• Increased number of vendors offering a range of bridging solutions that greater capabilities (e.g., scheduling functions). (p. 63) • Publicly available data and information on costs, benefits, performance, and priority applications for bridging solutions. (p. 63) • Reduced interconnection and energization timelines, additional energy delivered or generated in the time upgrades are completed, and increased availability of standards-conformant devices. (p. 63)	• Building on CEC EPIC and IOU projects that advance flexible service (EPC-26-011), solid state transformers (EPC-25-054), and DERMS-integrated controllers (EPC-25-051). (p. 63) • Regular meetings of joint EPIC administrator working group on Interconnection, Energization, and Large Load Addition to share research and technology needs, project updates, learnings, and challenges. (p. 63) • Potential co-scoping of competitive grant funding opportunity targeting specific technologies or locations. (p. 63)

Technology Alternatives to New Lines and Rights-of-Way

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WHAT PROBLEM ARE WE SOLVING? Page 65

Permitting and constructing new infrastructure can take many years and there is unused load and DER hosting capacity on existing infrastructure in many locations and for much of the year. There is significant potential for use of DER coordination and other advanced grid technologies like power flow controllers and composite conductors as an alternative to constructing new infrastructure however planners and operators have limited experience with these approaches. There is a lack of information on costs, performance, and optimal locations and contexts for use of these alternatives.

START	2028
OUTPUTS	2029
MARKET READY	2030+

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?	HOW WILL YOU KNOW YOU ARE SUCCESSFUL?	HOW WILL YOU COORDINATE?
- California-focused studies and decision support tools to quantify scale of opportunity and inform future deployments. (pp. 65 – 66) - Demonstrations of advanced grid technologies to validate performance and guide integration into grid planning, operations, and regulatory processes. (pp. 65 – 66) - Identify opportunities to build commonality in approach across utilities and planning entities, where possible. (pp. 65 – 66)	- Reduced interconnection and energization timelines for equivalent capacity as new assets. (p. 67) - Increased capacity utilization of existing assets relative to counterfactual construction of new infrastructure. (p. 67) - Greater integration of advanced technologies and tools into planning, capital allocation, and operations processes. (p. 67)	- Build on recent projects testing advanced conductor wraps (EPC-25-056) and AMI 2.0 for grid edge optimization (EPC-26-001). (pp. 66 – 67) - Engage in regular meetings with joint EPIC administrators through working group on Interconnection, Energization, and Large Load Addition to share research and technology needs, project updates, learnings, and challenges. (pp. 66 – 67) - Consider coordinated, phased solicitations where IOU projects scale previously successful CEC EPIC-funded technologies. (pp. 66 – 67)

Data and Planning Tools for Grid Infrastructure Investments and Coordinating Customer Decisions

WHAT PROBLEM ARE WE SOLVING?

Pages 68-70

Existing grid planning tools and processes are strained in context of rapid load growth, particularly for large point loads like EV charging plazas. This has resulted in a mismatch between statewide, top-down load forecasts and the utilities’ bottom-up forecasts. There is a need for improved forecasting methods, data-sharing frameworks, and planning tools to inform proactive investment in electricity infrastructure that support increased grid readiness while reducing ratepayer risk of stranded investments.

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START	2028
OUTPUTS	2029
MARKET READY	2029 – 2032

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?

- Investments in forecasting tools and methods with greater spatial and temporal granularity. (pp. 68 – 69)
- Support for probabilistic and scenario-based modeling tools that are publicly available. (pp. 68 – 69)
- Improvements to common data frameworks and ontologies to enhance information sharing and transparency among energy agencies, grid operators, developers, and customers. (pp. 68 – 69)

HOW WILL YOU KNOW YOU ARE SUCCESSFUL?

- More accurate and transparent models used in forecasting and planning processes that balance risk of stranded investments with increased grid readiness. (pp. 69 – 70)
- Reduced forecast error and less mismatch between top-down and bottom-up methods. (pp. 69 – 70)
- References to or use of funded tools or datasets in CPUC proceedings, CEC forecast, and/or utility planning processes. (pp. 69 – 70)

HOW WILL YOU COORDINATE?

- Build on prior EPIC investments in open modeling tools (EPC-17-046) and planning process improvements (e.g., D.24.10.030). (p. 69)
- Engage in regular meetings of joint EPIC administrator working group on Interconnection, Energization, and Large Load Addition to help avoid duplication and build complementarity. (p. 69)
- Prioritize state-wide or generalizable methods that can be applied by IOUs in their service territories. (p. 69)

WHAT PROBLEM ARE WE SOLVING?

Pages 70-71

Progress toward electrification goals is stalled by the long lead times to connect distributed energy resources and new loads. Emerging technologies could accelerate these timelines, but developers of these technologies face barriers to demonstrate and deploy them on IOU infrastructure. IOUs cannot use EPIC funds for applied R&D (AR&D) or market facilitation, and few avenues exist for technology developers to connect with IOUs to learn about opportunities and challenges, share innovations, and connect for technology pilots and demonstrations.

START	2027
OUTPUTS	2029
MARKET READY	2030

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?	HOW WILL YOU KNOW YOU ARE SUCCESSFUL?	HOW WILL YOU COORDINATE?
- Collaborate with IOUs to identify technology needs and opportunities. (p. 71) - Provide targeted support to innovators developing technologies to strengthen grid capacity, provide alternatives to infrastructure upgrades, and mitigate wildfire risk. (p. 71) - Connect technology developers with IOUs for potential pilots, demonstrations, and deployments. (p. 71) - Reduce friction and accelerate timeline to development, testing, and deployment of breakthrough technologies needed by IOUs. (p. 71)	- Channel is established for IOUs to identify and share challenges in need of technology solutions to reduce high capital costs of grid modernization, long timelines, etc. (pp. 73 – 74) - Researchers get targeted IOU support to pilot technologies to advance toward commercialization. (pp. 73 – 74) - Innovative technologies developed by incubator participants are evaluated and adopted by IOUs, facilitating more rapid, safer, and lower-cost electrification, interconnection, and upgrade alternatives. (pp. 73 – 74)	- IOUs to provide input to CEC on technology needs / specifications, advising as appropriate on solicitation scoping; CEC to facilitate referrals to IOUs for pilots and demonstrations. (p. 72) - CEC will fund AR&D and market facilitation, which IOUs may not do. (p. 72) - Adapt elements of CalSEED (RFP-15-305) to provide early-stage support for developers of grid technology; build on grid-focused EPIC research (e.g., GFO-23-306, GFO-23-317, GFO-24-312) to advance promising technologies through higher TRLs and over barriers to commercialization. (p. 72)