

**DOCKETED**

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| <b>Docket Number:</b>   | 25-EPIC-01                                                                                                                                                   |
| <b>Project Title:</b>   | Electric Program Investment Charge 2026–2030 Investment Plan (EPIC 5)                                                                                        |
| <b>TN #:</b>            | 270628                                                                                                                                                       |
| <b>Document Title:</b>  | Flex Power Control, Inc. Comments - Enabling Integrated Bidirectional Energy Systems for Ratepayer Affordability, Grid Reliability, and Community Resilience |
| <b>Description:</b>     | N/A                                                                                                                                                          |
| <b>Filer:</b>           | System                                                                                                                                                       |
| <b>Organization:</b>    | Flex Power Control, Inc.                                                                                                                                     |
| <b>Submitter Role:</b>  | Public                                                                                                                                                       |
| <b>Submission Date:</b> | 6/15/2026 8:03:18 PM                                                                                                                                         |
| <b>Docketed Date:</b>   | 6/16/2026                                                                                                                                                    |

*Comment Received From: Flex Power Control, Inc.*  
*Submitted On: 6/15/2026*  
*Docket Number: 25-EPIC-01*

**Enabling Integrated Bidirectional Energy Systems for Ratepayer  
Affordability, Grid Reliability, and Community Resilience**

Please see attached.

*Additional submitted attachment is included below.*

## **Comments on the Electric Program Investment Charge (EPIC) 2026–2030 Investment Plan**

*Submitted by:* Gregory Smith President Flex Power Control, Inc.

*Subject:* Enabling Integrated Bidirectional Energy Systems for Ratepayer Affordability, Grid Reliability, and Community Resilience

Thank you for the opportunity to comment on the California Energy Commission's proposed EPIC 5 initiatives and research topics.

The draft initiatives appropriately recognize several important challenges facing California's electricity system, including:

- Leveraging Distributed Energy Resources (DERs) and load flexibility for affordability and grid reliability
- Reducing barriers to beneficial bidirectional charging
- Customer-sited DER integration and interoperability
- Scaling DERs and demand flexibility as grid resources
- Building community energy resilience and reliability

These initiatives correctly identify that California's future electric system will require greater intelligence, flexibility, interoperability, and coordination among millions of distributed energy assets.

However, I believe there is a critical gap that deserves additional emphasis.

### ***Grid Intelligence Alone Does Not Move Power***

Much of the discussion surrounding grid modernization focuses on communications, software, forecasting, planning tools, valuation methodologies, and orchestration frameworks.

These capabilities are important.

However, intelligence alone does not move power.

To realize the benefits envisioned in EPIC 5, California must enable safe, cost-effective bidirectional power flow at the lowest operational level of the grid — the customer endpoint.

The ability to intelligently move power between electric vehicles, solar systems, battery storage, household loads, and the utility grid is what transforms distributed energy resources from passive assets into active grid resources.

Without endpoint hardware capable of managing power flow, communications and control systems alone cannot deliver the affordability, reliability, resilience, and flexibility sought by California ratepayers.

### ***Leveraging Existing Ratepayer Investments***

California ratepayers have already invested billions of dollars in:

- Electric vehicles
- Rooftop solar systems
- Battery energy storage systems

Unfortunately, these assets often operate independently and remain significantly underutilized.

The greatest opportunity may not be deploying additional assets, but rather enabling existing assets to work together as coordinated energy systems.

Integrated energy management systems that combine transportation electrification, DER integration, demand flexibility, and resilience can provide:

- Lower customer energy costs
- Peak demand reduction
- Improved grid reliability
- Reduced need for transmission and distribution upgrades
- Increased utilization of existing infrastructure
- Enhanced community resilience during outages
- Improved return on investment for ratepayer-owned assets

### ***The Importance of Integration and Interoperability***

The workshop presentation correctly identifies interoperability as a significant challenge.

Today's residential energy systems are frequently assembled from independent products that were never designed to operate together as a unified system.

As a result:

- Installation costs remain high
- Customer experiences remain complex
- Integration costs are significant

- Reliability is reduced
- Grid-service participation is limited

To achieve meaningful scale, California should prioritize integrated approaches that simplify deployment while improving interoperability among DERs, electric vehicles, batteries, and utility systems.

### ***Commercialization Gap for Integrated Energy Systems***

A significant barrier exists between successful technology development and commercial deployment.

Integrated bidirectional energy systems require both advanced software and sophisticated power conversion hardware.

Unlike software-only solutions, hardware-based systems require:

- Extensive validation testing
- Safety verification
- Interoperability testing
- Manufacturing process development
- Product characterization
- Certification readiness activities
- UL certification
- Pilot production validation

These activities can require investments of several million dollars before utilities, investors, installers, or customers are willing to engage.

Private capital is often unwilling to fund these efforts because revenue generation remains uncertain until certification and deployment are achieved.

Traditional government funding programs frequently focus on technology development or demonstrations, leaving a critical gap between technical feasibility and market readiness.

### ***Recommendation***

I encourage the Commission to expand consideration of integrated bidirectional energy systems within the DER Integration, Transportation Electrification, and Climate Adaptation initiatives.

Specifically, EPIC should consider support for:

- Integrated DER and vehicle energy management systems
- Bidirectional power flow technologies
- Residential energy resilience platforms
- Customer-sited interoperability and integration technologies
- Product characterization and validation
- Certification readiness and safety testing
- Manufacturing readiness and production validation
- Demonstration of integrated residential energy systems utilizing electric vehicles, solar generation, battery storage, and flexible loads

California has an opportunity to bridge the gap between promising innovation and widespread deployment.

By supporting integrated energy management platforms capable of controlling and directing power flow among distributed resources, EPIC can help unlock the value of assets already purchased by ratepayers while improving affordability, grid reliability, and community resilience.

Such investments directly support the Commission's goals of leveraging DERs, expanding beneficial bidirectional charging, increasing grid flexibility, improving resilience, and delivering measurable benefits to California electricity customers.