BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking to Establish Energization Timelines.	Rulemaking 24-01-018
NOT CONSOLIDATED	
Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future.	Rulemaking 21-06-017

SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) REPORT ON LEARNINGS FROM LOAD CONTROL MANAGEMENT STUDY PILOT

JOEL M. MALLORD

Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY

2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-4843
E-mail: Joel.Mallord@sce.com

Dated: March 2, 2026

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Pursuant to Ordering Paragraph 6 of Decision (D.) 26-02-025, Southern California Edison Company (SCE) hereby submits the attached report on learnings to date from its Load Control Management Study (LCMS) pilot. Per the Decision, this report is being filed in both R.24-01-018 and R.21-06-017.

Respectfully submitted,

JOEL M. MALLORD

/s/ Joel M. Mallord

By: Joel M. Mallord

Attorneys for
SOUTHERN CALIFORNIA EDISON COMPANY

2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770
Telephone: (626) 302-4843
E-mail: Joel.Mallord@sce.com

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Appendix A

Southern California Edison Company's

Load Control Management System (LCMS) Pilot – Report on Learnings

Southern California Edison

Load Control Management System (LCMS) Pilot – Report on Learnings

Mar. 2, 2026

1. Executive Summary

Southern California Edison's Load Control Management System (LCMS) Pilot accelerated customer load energization in grid-constrained areas by leveraging customer-owned technology for power import control. The pilot began in January 2024 and concluded in January 2026, at the expiration of the pilot under the terms agreed to with California Public Utilities Commission (CPUC) upon its launch. SCE tested localized autonomous controls and developed a concept for communication-based LCMS systems, that will be used to enable variable and dynamic load controls when SCE's Distributed Energy Resource Management System (DERMS)/Advanced Distribution Management System (ADMS) is deployed.

The pilot's structure and objectives were intended to identify a scalable framework for integrating advanced load management technologies into utility operations while maintaining regulatory compliance and grid safety. The pilot's key goals were met by allowing earlier energization while ensuring safe, reliable service for new customers. Additionally, the pilot evaluated the effectiveness of industry solutions in managing grid capacity via power control systems (PCS).

Upon the conclusion of the pilot in January 2026, SCE came to the following determinations:

- Nine customers, by agreeing to participate in the LCMS pilot, were or will be energized earlier than they would have if required to wait for the planned system upgrade to be completed
- On average, LCMS project participants were energized approximately 20 months earlier than if the customer had to wait for grid upgrades to be completed, with time saved ranging from 5 months to over 3 years depending on the complexity of the grid upgrade
- LCMS, or other flexible service connections, provides significant value for customers that need early site energization and can initially operate at reduced load while coordinating a gradual ramp-up with the completion of grid
- The process for approving LCMS controls was comprehensive, which required moderate level of coordination on both the customer and SCE side; once the LCMS control was approved, the same LCMS control could be used on other sites without the need for additional testing, leading to an effective and efficient process while ensuring grid safety
- While a limited number of projects have operated (or are operating) under the LCMS pilot, all have proven that LCMS controls operate reliably and as intended
- SCE has received positive feedback from customers where LCMS was used for energizing their load project without delays caused by need to wait for grid upgrades

2. Background

The LCMS Pilot was launched by SCE to expedite the energization of new customer projects, particularly for electric vehicle (EV) charging infrastructure, in regions where the grid faces capacity constraints. Traditionally, customers in these areas were required to wait for grid upgrades to be completed before receiving service, resulting in considerable delay in the energization of new projects, creating significant customer impact, and impeding progress toward California's transportation electrification and clean

energy objectives. Many of these customers already have the technical capability to manage their load through automated load management systems, but prior to the pilot, SCE lacked a regulatory pathway to approve customer-owned and operated LCMS solutions. Existing tariffs and agreements did not address the use of customer's PCS technology to accelerate energization, and there were no industry standards for certified customer equipment to operate with a power import control functionality.

To support SCE's customers in their process to energize new load projects in these grid-constrained areas, SCE developed the LCMS pilot with the ability to test the following power control system functionality:

- **Localized Autonomous LCMS:** These systems function independently at the customer location, utilizing preset limits, approved by SCE, to manage loads without communicating with SCE systems.
- **Communication-Based LCMS:** These systems receive power limits and operational instructions from SCE's DERMS/ADMS platforms via communication channels using the IEEE 2030.5 protocol to enable dynamic adjustment based on real-time or variable (day ahead) grid conditions.

To ensure that SCE implemented this functionality in accordance with CPUC regulations, SCE submitted a Tier 2 Advice Letter on November 9, 2023, requesting approval to offer LCMS functionally to eligible customers. The CPUC approved the Advice Letter on January 16, 2024, making it retroactively effective as of January 3, 2024. The pilot was established as a two-year program with quarterly reporting to the CPUC. The pilot concluded in January 2026 but remains available for current participants and a limited number of customers previously engaged by SCE who were offered LCMS participation before the end of the pilot.[1]

This report was mandated by Ordering Paragraph (OP) 6 of Decision (D.) 26-02-025, within the Energization Timelines proceeding, (R.) 24-01-018. A second and final report is mandated by OP 6 once all customers have completed their pilot participation.

3. Objectives

The primary objectives of the LCMS Pilot were:

- **Enable Safe and Reliable Service Without Energization Delays:** Energize new or expanded load, such as EV charging stations, within grid-constrained areas while grid upgrades are pending, by managing the load to within available capacity, which allows customers to energize without delays. This approach ensured that available grid capacity is used efficiently, allowing more customers to connect without compromising grid safety or reliability. The pilot aimed to test the localized autonomous LCMS (static controls) and communication-based LCMS (dynamic and variable controls) to manage customer loads.
- **Evaluate Industry Technology:** SCE would test products intended to maintain a power import limit control that can be reviewed and approved by SCE, and which will be owned and operated by the customer to manage customer load to within SCE approved power import limits. The evaluation included review of technical specifications, testing of PCS equipment, and monitoring of system performance to meet technical and operational requirements

[1] *See* D.26-02-025, Section 5.2, pp. 17-18.

- **Support State Policy Goals**: Facilitate the deployment of EV charging infrastructure and other electrification initiatives in alignment with California's energy and environmental objectives by developing regulatory pathways and standardized agreements to approve customer-owned PCSs to manage customer load that did not exist prior to the LCMS pilot. The pilot established a formal, CPUC-approved framework—including technical requirements and a standardized agreement—providing clarity and legal certainty for both SCE and participating customers.
- **Advance the Development of Standards and Best Practices**: Gather operational data and experience to inform the development of industry standards, regulatory frameworks, and potential permanent adoption of customer-owned LCMS solutions.

4. Process For Enabling a new LCMS project

a. Customer requests service or increased capacity

When a customer seeks to initiate service or expand their existing capacity, the customer begins with the intake process by submitting a formal request to SCE (Step 1 in the energization process). This step makes the customer responsible for ensuring compliance with all relevant procedures and requirements outlined in the energization process and provides the necessary information for SCE to commence with required engineering studies, among other aspects of the energization process.

b. Engineering Study

An engineering analysis is conducted (step 2 of the energization process) to assess both the available grid capacity and the eligibility of a customer's project to participate in the LCMS pilot. If the project requires grid upgrades and SCE is unable to meet the requested energization timeline, but partial capacity is available, participation in the LCMS pilot may be offered.

Under the LCMS pilot, only one LCMS customer was permitted per SCE grid constraint, such as feeder or substation loading limitations. If project was deemed eligible to participate in the LCMS pilot, SCE would inform the customer of this option upon completion of the engineering study. If customer agreed to proceed, the customer was required to agree to install a UL 3141 certified PCS or SCE approved PCS to manage and limit power imports, as well as execute the LCMS Pilot Agreement which was approved by CPUC.

For LCMS participation, appropriate technical documentation (such as system single line diagrams) was required to demonstrate that the PCS would actively monitor the site's full electrical load at the point of common coupling and could control the site load as needed in accordance with LCMS power import requirements as specified in the LCMS Pilot Agreement.

Regarding customer equipment, SCE required the use of a PCS certified to UL 3141 by a Nationally Recognized Testing Laboratory (NRTL). SCE accepts certification from any NRTL, provided that the appropriate Certificates of Compliance are provided to SCE. For equipment not certified by an NRTL prior to May 2025—prior to publication of the UL 3141 PCS standards—SCE conducted vendor-specific lab type testing with customers to ensure PCS met LCMS performance requirements. Within the LCMS pilot, SCE reviewed and coordinated type testing to approve three vendor-specific power control systems, which included an evaluation of customer test procedures based on SCE's requirements for safe operation with the utility grid. Once the PCS was approved (using UL 3141 certification or SCE type

testing), the approved PCS can be used at multiple locations without additional SCE site commissioning testing.

In the LCMS pilot, SCE implemented power import limits based on three seasons with two values per season. Season 1 represented the winter season covering the months of November to February, season 2 represented the spring season covering the months of March to May, and season 3 represented the summer season covering the months of June to October. Each season had a lower limit based on time of the day and a higher limit that could be achieved outside the restricted time. A sample of LCMS power import parameters is shown below.

Table 1: Sample of LCMS parameters as specified in an LCMS Pilot Agreement

LCMS PARAMETERS

Months	Season	Overall Limit (MVA)	Overall Restriction Timeframe	Unrestricted limit (MVA)
(Nov-Feb)	Winter	2.2	(06:00 to 20:00)	5.170
(Mar-May)	Spring	2.7	(08:00 to 19:00)	5.100
(Jun - Oct)	Summer	2.2	(07:00 to 19:00)	4.390

c. Eligible customers complete PCS evaluation process and execute LCMS Pilot Contracts Agreements

After the customer completed the evaluation process and received approval for their equipment, they reviewed the LCMS agreement. Once they have confirmed the terms and conditions, the customer signed the LCMS agreement, formalizing their participation in the program, and moving the project forward to the next steps, i.e., commencement of the design, procurement, and energization of the facility.

d. Customer site is energized and ready for use

From the date the site was energized, customer demand is tracked through Advanced Metering Infrastructure (AMI) data and regularly compared against the established LCMS settings to ensure compliance and proper operation.

e. Operations and performance monitoring

An LCMS Operations dashboard was created to display project information. This dashboard used data from an internal process that compared AMI usage to the seasonal LCMS settings and reported any exceedances that may have occurred the previous day. In situations where site usage exceeded the established limits, an automated email notification is sent to various internal teams and LCMS customer/operator, prompting them to take appropriate action.

f. Transition to Full Load

Once SCE engineering confirmed the grid upgrade had been completed and would allow the LCMS customer to utilize their full requested load safely, an LCMS agreement termination notice was sent. This informed the customer that the agreement had ended and they were permitted to operate without usage restrictions up to the originally requested capacity.

g. Reporting Requirements

SCE submitted quarterly reports for the LCMS pilot to the CPUC. These reports included details such as relevant project milestones and performance metrics.

5. Pilot Results

a. Count of Participating in LCMS Pilot Projects

In the LCMS Pilot, via the engineering review process, SCE offered the LCMS process to 21 projects. From this set of LCMS-eligible projects, nine agreed to proceed and executed an LCMS agreement, eight are in the process of evaluating the LCMS process before determining participation, and four have determined that LCMS is not ideal for their project.

b. Review and Approval of LCMS Power Control Systems

SCE conducted comprehensive reviews and witnessed type testing of three vendor-specific power control systems as part of the LCMS pilot. Each system underwent evaluation based on customer-submitted test plans that were approved by SCE for the control type testing. These tests ensured that the control systems met operational requirements and demonstrated compliance with safety and performance standards before being used as part of the LCMS pilot project. Once the PCS passed the approved test plan, the approved PCS could be used at multiple locations without any additional SCE required commissioning testing.

The process of reviewing and approving PCS for use in the LCMS pilot was sufficiently rigorous and comprehensive to ensure PCSs operated as intended, so as to prevent untended impact to the distribution system. The process included the following:

- A PCS manufacturer and/or PCS operator would develop a testing plan to test that the PCS monitored the power import and control flexible load (such as EV chargers) to not exceed the limit as specified in the test plan
- SCE would review the test plan and offer comments and proposed changes (if necessary) to the test plan
- The PCS test was conducted in a lab or at the project site depending on customer preferences. In the LCMS pilot both methods were used and provided the same level of results.
- Upon completion of the test, verification of passing the testing criteria was completed and the PCS was approved to be used as part of LCMS pilot for one or multiple projects.
- The timeline for completing this process was dependent on the customer to develop the test plan. However, once a test plan was developed, the process for testing was completed generally within the following two weeks or depending on the availability of the customer.
- Given that the type testing was focused only on the power import control, SCE did not receive feedback on the testing being excessive. Customers were accepting of the testing process to verify performance of PCS.
- PCSs that have been approved by SCE (three in total) may be used by other customers without additional SCE testing.

Given that the national standard to certify PCS to UL3141 was published in October 2024, PCS certification under UL3141 is the most expeditious and efficient method for use of PCS within a Flexible Service Connections process. In its LCMS pilot, one project used the UL3141 Certification process and as

such the project did not have to undergo any additional testing by SCE, leading to a more efficient process. Further, using UL3141 certified PCS will continue to grow the industry and the use of UL3141 certified technology will gain more traction, leading to lower costs and greater efficiencies when using flexible service connections. While SCE can still offer a method for SCE approving PCSs, it is recommended that UL certification process be used to increase process efficiency and adoption of UL 3141 certified PCS technology.

c. LCMS Power Control Systems Operational Behavior

There were no instances where approved PCS under the LCMS pilot exceeded the approved limits and thus no corrective actions for incorrect PCS behavior was necessary.

d. Changes to LCMS Power Control System Settings

While it is not expected that a change in PCS settings for a given customer would be necessary, some situations necessitate a change in capacity limit, either up or down. Over the course of the pilot, SCE directed customers to reprogram PCS settings due to various circumstances due to grid conditions. Reprogramming occurred on four occasions:

- Temporary Reductions (2): The first instance was due to a newly identified limitation on the corresponding feeder, which led to a temporary reduction in PCS power import limits (PILs). The second instance was due to a temporary system abnormal condition, in which the customer was asked to program their PCS to a lower flat setting until the abnormal condition was studied. Once the engineering study was completed, it was determined that the PCS could be set to the LCMS agreement settings.
- Permanent Capacity Increases (2): In two other instances, refreshed annual distribution system planning data allowed an increase in PILs.

e. Termination of Agreement Due to Completion of Grid Upgrades

Two agreements were terminated after SCE completed grid upgrades that allowed customers to access their full requested capacity. In these instances, LCMS enabled customer energization five and fifteen months earlier, respectively, than if customers had been required to wait for the grid upgrade to be completed. Impacts for the remaining projects are still pending completion of necessary grid upgrades.

6. Lessons Learned

a. SCE successfully Executed LCMS Agreements for 9 Projects

The table below shows the status of the nine customer projects that were enrolled in LCMS, and the actual or anticipated number of months ahead of grid upgrades that projects were energized.

Table 2: List of LCMS Project Pilot Participants

Project #	LCMS Agreement Status	Months Project Energized Ahead of Anticipated SCE Grid Upgrades*
1	Active	41
2	Active	41
3	Concluded	15
4	Concluded	5
5	Active	10
6	Active	11
7	Active	14
8	Active	15
9	Active	17

*Months project energized ahead of completion of SCE grid upgrades for currently Active projects has been estimated using currently available information.

b. Consideration of Distribution System Topology

For one project during the study period, it was initially evaluated as a typical loop-fed system. However, with additional system operational information, it was determined that the system topology was dynamic and caused additional operational limitations, which were not accounted for in the initial analysis. The LCMS customer was energized on a circuit served by a downstream loop-fed substation. During summer months, the available capacity was greatly diminished due to operating conditions which were not studied and reflected in the LCMS tables. Consequently, SCE concluded that, due to the complex and variable nature of operations in loop-fed systems, further studies are necessary to assess LCMS eligibility for each specific loop-fed system.

c. Need for Robust Engineering and Tracking Tools

It is important to refresh LCMS tables annually to ensure they remain aligned with the latest Distribution Planning Process. To support this process, engineers need a robust tool that can facilitate updates to LCMS schedules when an existing LCMS customer is already energized. Ideally, this tool should be capable of generating variable load profiles, consuming customer meter data, and producing new LCMS schedules as needed. Additionally, when an energization request results in LCMS being offered to one customer, subsequent customers may not be eligible for LCMS, making it essential to accurately track these changes. Therefore, SCE recommends developing tools that assist engineers in monitoring when LCMS has been offered and to ensure fair treatment.

d. Relying on delayed performance data did not cause problems in LCMS, but remains a concern moving forward

As explained above, projects on the LCMS pilot did not include real-time telemetry or monitoring capabilities. Instead, performance monitoring was limited to reviewing AMI data that was retrieved after the fact, typically a day later due to timing of when AMI data is collected. In particular for new LCMS projects, because AMI data is not immediately accessible when a customer site is energized, the

AMI data may not immediately be available which can create a longer time until SCE was able to verify performance, especially of concern was when energization occurred during the summer period.

While SCE has created an LCMS operations dashboard to efficiently monitor LCMS operations, this verification occurs at best with one-day delay, which limits timely visibility into potential issues. Because of the delay in the collection of AMI data and due to the continual increase in customers using an LCMS/Flexible Service Connection, this can create significant problems in real-time operational due to the unknown operational conditions of the various LCMS projects in particular section of the grid, particularly, of greater concern is times during unanticipated emergency conditions. To address this real time operational concern, SCE recommends implementing a cost-effective monitoring/telemetry capability to support real time grid operations for LCMS/Flexible Service Connection projects.

e. Review and Approval of LCMS control systems

As discussed above, most customers used non-UL certified equipment, in part because certification capabilities were not available until the latter part of the pilot. One project used UL 3141 certified equipment. SCE's testing and certification process was effective, sufficiently comprehensive and reasonably efficient to approve PCS. However, for the PCS certified under UL 3141, the review and approval process was simpler and expedited as compared to using non-UL 3141 certified equipment. Therefore, while non-certified PCS systems remained a viable option, SCE recommended that customers consider using UL3141 certified PCS with power import limit functionality.

f. Transition to full load: Clear communication essential

During the pilot program, two projects were decommissioned following the completion of grid upgrades and notice of conclusion letters were sent to the affected customers. In one instance, a customer was initially confused about the reason for the contract termination. To address this, SCE's notice was amended with a clear explanation for termination, clarifying that LCMS contracts are only maintained until distribution capacity constraints are resolved or if the contract's terms and conditions are violated, no contracts were terminated for violations issues. The team also notes that the use of the term "termination" may be off-putting and will be updated in the future to indicate when an upgrade is completed.

g. Communications-Based LCMS For Dynamic FSC Applications

SCE was unable to offer communications-based LCMS in the pilot primarily because critical systems (ADMS/DERMS/SFT/OE) were not available during the pilot timing. While this functionality was not tested, significant time and resources were dedicated to developing the road map to successfully deploy dynamic and variable power import limits via the use of SCE's ADMS/DERMS once these systems are fully deployed. SCE recommends that this functionality continue to be evolved and operationalized in support of customer energization and interconnection needs, in agreement with the customer and/or as part of a subsequent proceeding, such as the High DER Proceeding, Track 3.

7. Conclusion

Overall, the LCMS pilot has been well received by customers that were seeking opportunities to energize their project ahead of grid upgrades, was successful in delivering value to LCMS project participants via faster energization, met the safety/reliability objectives of the pilot, and provided valuable information that can be used to enhanced future flexible service connection programs.

Key LCMS Pilot Highlights and Accomplishments include:

Enable Safe and Reliable Service Without Energization Delays in Support of State and Policy Goals:

- No grid operational safety incidents were caused by the use of LCMS controls
- LCMS PCS operated as intended with no identified instances of exceeding power import limits
- Several critical load growth projects were energized ahead of the completion of required grid upgrades – these include projects to support an important transportation corridor between California and Nevada

Evaluated Industry Technology to meet LCMS Pilot specifications:

- Several PCS were approved for use in the LCMS pilot, which now can be used for future flexible service connection projects without additional testing.
- Completed the development of the conceptual methodology for evolution to Dynamic and Variable operating envelopes using ADMS/DERMS

Advanced the Development of Standards and Best Practices:

- Knowledge gained from the pilot was used to influence the evolution of the national PCS standard (UL3141). One project directly used the UL3141 certification process.
- Internal tools and processes were developed to verify LCMS operations and tested with LCMS customers which will allow SCE to continue to offer and operationalize additional LCMS or Flexible Service Connection projects in the future.

The following are recommendations that should be considered for future flexible service connection programs based on the experienced gained in the LCMS Pilot project:

- Continue to use LCMS (or equivalent Flexible Service Connection) for new load growth projects where grid capacity is constrained and where needed grid upgrades to meet full capacity create delays in the energization process (i.e., bridging solutions)
- Continue to support the adoption of an industry standard for PCS (UL3141)
- Continue with the evolution of LCMS (or equivalent) from the use of static values to communications-based dynamic and variable values.
- Implement telemetry solutions for projects that may have a significant impact on the distribution system during real time normal and/emergency operations.