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April 30, 2024

ADVICE LETTER 4432-E

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SUBJECT: SUBMISSION OF SAN DIEGO GAS & ELECTRIC COMPANY'S 2023 ELECTRIC PROGRAM INVESTMENT CHARGE ADMINISTRATOR ANNUAL REPORT PURSUANT TO DECISION 23-04-042

PURPOSE

San Diego Gas & Electric Company (SDG&E) hereby submits for approval to the California Public Utilities Commission (Commission) this Tier 2 Advice Letter (AL) for its 2023 Electric Program Investment Charge (EPIC) Administrator Annual Report in accordance with Ordering Paragraph (OP) 8 of Decision (D.) 23-04-042 (Decision).

BACKGROUND

D.23-04-042 adopted the Staff Proposal, related to EPIC annual reporting, with modifications. The Commission agreed that annual reports should be streamlined, where possible, to support the evolving needs of the EPIC program, including leveraging the EPIC database so that the report narratives complement the database, not duplicate it.

The Decision requires the annual reports must be filed as Tier 2 Advice Letters and specifies that incomplete or inaccurate entries in the EPIC database will be grounds for rejecting the Advice Letter and require prompt refile of the annual report within 30 days.

In Appendix C of the Decision, the Commission provided a revised annual report outline to be used moving forward. Annual reports will be used to inform EPIC program evaluations. Further, EPIC Administrators are required to provide a coordinated presentation to the Commission on an annual basis, at either a Commission business meeting or the Commission's Emerging Technology Committee, at the Commission's discretion. The presentation is to be made to the Commission in a timely manner after the submission of Administrators' annual reports. Administrators shall coordinate this presentation via Energy Division Staff, who will provide guidance on timing and agenda.

As part of reporting transparency, EPIC Administrators should likewise be transparent that ratepayers are the source of the billions of dollars in funding that supports the important work of the EPIC Program. To accomplish this, Administrators shall post clearly and prominently in their annual reports and on all program, project, and outreach materials, websites, and any other public materials (including those of third-party EPIC contractors) the following language consistent with other utility ratepayer funding programs: “This program is funded by California utility customers under the auspices of the California Public Utilities Commission.”

DISCUSSION

SDG&E’s 2023 EPIC Annual Report is presented in Attachment A of this Advice Letter. There are no comprehensive final reports to include with this annual report as the remaining EPIC-3 project, Project 7, Module 3, is ongoing.¹ Additionally, SDG&E’s EPIC-4 Investment Plan (Application 22-10-002) was approved by the Commission in D.23-11-086 (EPIC-4 Decision). Since SDG&E’s EPIC-4 Decision, SDG&E has begun the governance process to deploy EPIC-4 which includes the development and implementation of EPIC-4 projects in mid-2024. As such, SDG&E’s 2023 EPIC Annual Report will focus solely on EPIC-3 work, not EPIC-4. Pursuant to this, SDG&E’s 2023 EPIC Annual Report will not provide all the data applicable to Appendix C of D.23-04-042 since EPIC-3 work was approved at the project level, not pursuant to EPIC-4’s structure of Strategic Objectives, Strategic Initiatives or specific funding requirements surrounding the Decision.

D.23-04-042 also encouraged administrators to leverage EPIC project information within the EPIC Database, which is available at: <https://database.epicpartnership.org/projects>. SDG&E’s 2023 EPIC Annual Report will be posted on SDG&E’s EPIC website at: www.sdge.com/EPIC.

PROTEST

Anyone may protest this Advice Letter to the California Public Utilities Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. The protest must be submitted electronically and must be received no later than May 20, 2024, which is 20 days from the date this Advice Letter was submitted with the Commission. There is no restriction on who may submit a protest. The protest should be sent via e-mail to the attention of the Energy Division at EDTariffUnit@cpuc.ca.gov. A copy of the protest should also be sent via e-mail to the address shown below on the same date it is delivered to the Commission.

Attn: Greg Anderson
Regulatory Tariff Manager
E-mail: GAnderson@sdge.com
SDGETariffs@sdge.com

¹ D.12-05-037 at 8.

EFFECTIVE DATE

Pursuant to D.23-04-042, this submittal is subject to Energy Division disposition and should be classified as Tier 2 (effective after staff approval). SDG&E requests this Advice Letter be approved effective May 30, 2024, 30 days from its submittal.

NOTICE

A copy of this filing has been served on the utilities and interested parties shown on the attached list including interested parties in R.19-10-005, A.21-06-021, A.22-05-016, A.23-05-010, and Applicants, by either providing them a copy electronically or by mailing them a copy hereof, properly stamped and addressed. Address changes should be directed to SDG&E Tariffs by e-mail at SDGETariffs@sdge.com.

/s/ Clay Faber
CLAY FABER
Director – Regulatory Affairs



ADVICE LETTER SUMMARY

ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.:

Utility type:

ELC GAS WATER
 PLC HEAT

Contact Person:

Phone #:
E-mail:
E-mail Disposition Notice to:

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas WATER = Water
PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #:

Tier Designation:

Subject of AL:

Keywords (choose from CPUC listing):

AL Type: Monthly Quarterly Annual One-Time Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #:

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL:

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested? Yes No

If yes, specification of confidential information:

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? Yes No

Requested effective date:

No. of tariff sheets:

Estimated system annual revenue effect (%):

Estimated system average rate effect (%):

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected:

Service affected and changes proposed¹:

Pending advice letters that revise the same tariff sheets:

¹Discuss in AL if more space is needed.

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102
Email: EDTariffUnit@cpuc.ca.gov

Name:
Title:
Utility Name:
Address:
City:
State: Zip:
Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email:

Name:
Title:
Utility Name:
Address:
City:
State: Zip:
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General Order No. 96-B
ADVICE LETTER SUBMITTAL MAILING LIST

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SPURR

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Southern California Edison Co.

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TerraVerde Renewable Partners LLC

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Service List

R.19-10-005, A.21-06-021
A.22-05-016, A.23-05-010

Attachment A

SDG&E® 2023 EPIC Annual Report

San Diego Gas & Electric Company

2023 EPIC Annual Report

April 30, 2024



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1. EXECUTIVE SUMMARY

PREAMBLE

The submission of the Annual Report (Report) for the 2023 calendar year is pursuant to Decision (“D.”) 23-04-042 Ordering Paragraph (“OP”) 8. This Report provides an overview of SDG&E’s EPIC activities during the 2023 calendar year.

The California Public Utilities Commission (CPUC) established the Electric Program Investment Charge (EPIC) to assist the development of non-commercialized new and emerging clean energy technologies in California while providing assistance to commercially viable projects. EPIC consists of three program areas: (1) applied research and development; (2) technology demonstration and deployment; and (3) market facilitation, consisting of market research, regulatory permitting and streamlining, and workforce development activities. EPIC activities must be designed to produce electricity ratepayer benefits for San Diego Gas & Electric (SDG&E), Pacific Gas and Electric (PG&E), and Southern California Edison (SCE) customers.

The annual EPIC funding is collected from customers in electric utility bills at the following levels: PG&E (50.1%), SCE (41.1%), and SDG&E (8.8%). The California Energy Commission (CEC) administers 80% of the funding with authorization to invest in all three program areas. SDG&E, PG&E and SCE administer 20% of the funding with funding shares proportional to their respective collections and are limited to investing only in pre-commercial technology demonstrations. Therefore, SDG&E’s share of the EPIC funding is $0.2 \times 0.088 = 1.76\%$.

SDG&E proposed and received approval for five projects that demonstrate system integration solutions in its first triennial application for the years 2012-2014 (EPIC-1).¹ In addition, SDG&E proposed and received approval for six projects that demonstrate grid modernization and technology integration solutions in its second triennial application for years 2015-2017 (EPIC-2).² SDG&E proposed and received approval for seven projects in multiple policy areas in its third triennial application for years 2018-2020 (EPIC-3).³ SDG&E proposed and received approval for its 2021-2025 Investment Plan (EPIC-4).⁴ This report provides an update on SDG&E’s 2023 progress and year-end status for the ongoing project work under EPIC-3 Project 7, Module 3. Due to the timing of the Commission’s decision for SDG&E’s EPIC-4 Investment Plan approval, SDG&E had no EPIC-4 development to discuss herein.

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

¹ SDG&E’s Application (A.12-11-002) for EPIC-1, approved in D.13-11-025, issued November 19, 2013.

² SDG&E’s Application (A.14-05-004) for EPIC-2, approved in D.15-04-020, issued April 15, 2015.

³ SDG&E’s Application (A.17-05-009) for EPIC-3, approved in D.18-10-052, issued November 2, 2018.

⁴ SDG&E’s Application (A.22-10-002) for EPIC-4, approved in D.23-11-086, issued December 4, 2023.

A. Overview of Programs/Plan Highlights

In Application (A.) 12-11-002, SDG&E requested Commission approval of five programs that demonstrate advanced distribution system integration solutions. In November 2013, SDG&E's Application and First Triennial EPIC Plan was approved in full, with minor modifications, by the Commission in D.13-11-025.⁵

In A.14-05-004, SDG&E requested Commission approval of its Second Triennial EPIC Plan which included five programs that have the potential to help modernize the utility power system to improve customer benefits, as well as a sixth project for SDG&E participation in industry research development & deployment (RD&D) consortia. In April 2015, SDG&E's Application and Second Triennial EPIC Plan was approved in full, with minor modifications, by the Commission in D.15-04-020.

In A.17-05-009, SDG&E requested Commission approval of its Third Triennial EPIC Application which included seven project areas addressing topics in grid modernization, such as safety, advanced operation solutions, and resiliency.

D.18-10-052 approved the project areas that were included in the application but only released 2/3 of the funds, pending approval of a Research Administration Plan (RAP), which occurred in 2020. The RAP application, A.19-04-026, was a joint filing of IOU Administrators and was approved in D.20-02-003, releasing the remaining funds.⁶ The EPIC-3 funds were applied to four project areas in A.19-04-026.

In A.22-10-002, SDG&E requested Commission approval of its application for the Fourth EPIC cycle. Beginning in EPIC-4, the cycles will change from a three-year basis to a five-year basis. The application consisted of two strategic objectives, each with a corresponding strategic initiative, and was filed in October of 2022. In November 2023, SDG&E's 2021-2025 EPIC Investment Plan (EPIC-4) was approved by the Commission in D.23-11-086.

B. Status of EPIC-1 and EPIC-2 Projects

All EPIC-1 and EPIC-2 projects were completed by the close of 2018, as reported in the 2019 Annual Report. All final reports for the EPIC-1 and EPIC-2 Cycles were provided with prior annual reports and are posted on the SDG&E EPIC public website.

C. Status of EPIC-3 Projects

All EPIC-3 projects, except Project 7, were completed by the close of 2021. Current funding information for SDG&E's EPIC-3 Cycle is provided in Table 1.

⁵ D.13-11-025 at 63 and 136.

⁶ The IOUs' Joint Application (A.19-040-26), approved in D.20-02-003, issued February 10, 2020.

Table 1. SDG&E’s EPIC-3 (2018-2023) Portfolio as of December 31, 2023

EPIC-3 Projects (2018--2023)				
EPIC-3 Projects	Incurred⁷ Costs (\$ thousands)	Encumbered⁸ Costs (\$ thousands)	Commitments⁹ (\$ thousands)	Project Status
3. Application of Advanced Metering Infrastructure (AMI) Data to Advanced Utility System Operations	1,527	1,527	1,527	Complete
4. Safety Training Simulators with Augmented Visualization	1,944	1,944	1,944	Complete
5. Unmanned Aircraft Systems (UAS) with Advanced Image Processing for Electric Utility Inspection and Operations	709	709	709	Complete
7. Demonstration of Multiple-Purpose Mobile Battery for Port of San Diego and Other Applications	3,400	4,672	4,672	In Progress
SDG&E Program Administration	902	916	916	In Progress
Total	\$8,482	\$9,768	\$9,768	

⁷ As used in this Report, incurred costs mean actual booked expenditures.

⁸ As used in this Report, encumbered costs are funds that are specified for contracts (D.13-11-025 at 101; Ordering Paragraph 45) or for in-house work necessary in collaboration with a contractor (D.13-11-025 at 53). They differ from commitments in that commitments are the identification of blocks of funds to be assigned to projects, whereas encumbrances specify how the commitments will be used in the projects.

⁹ As used in this Report, commitment means assigned for anticipated work on a project, including anticipated contractual commitments, equipment purchases, software licenses, associated technical work by the SDG&E project team, and other expenses directly associated with the project work.

D. Status Summary of EPIC-3 Project 7

EPIC-3 Project 7

The following is a brief summary of EPIC-3, Project 7, Module 3, the last project of the cycle. A more detailed description of the activity in this project appears in the main body of this annual report.

Project 7: Demonstration of Multi-Purpose Mobile Battery

- The objective of SDG&E's EPIC-3 Project 7 is to perform a pre-commercial demonstration of mobile battery energy storage systems (MBESS) and examine the value proposition from using MBESS across multiple sites and use cases. An MBESS is a battery energy storage system on wheels that can provide multiple use cases based on a single MBESS application or a combination of several applications (stacking of applications) to provide grid support and reliability/resiliency solutions for utility projects at different sites. This project is divided into three work modules to align with different mobile batteries, use cases and application situations. Modules 1 and 2 were completed and documented in comprehensive final reports filed with the CPUC at the end of 2021 and posted on the EPIC public website.

- **Module 3**

Module 3 is designed to include trials of Institute of Electrical and Electronics Engineering (IEEE) 2030.5 to assess the extent to which it will improve the value proposition for use of MBESS and stationary DER. IEEE 2030.5 is the default communication method established by the Smart Inverter Working Group. This demonstration serves to highlight the benefits and challenges associated with this communication profile. As a primary test case, the project team seeks to leverage 2030.5 as a means of controlling the MBESS to provide a demonstration of alleviating circuit Operational Flexibility (OpFlex) constraints under specific scenarios (e.g., planned abnormal distribution switch states).

With funds remaining in EPIC-3, Project 7, Module 3 was allocated additional funding allowing for demonstrations of a second phase of use cases for the MBESS. Module 3 will also seek to demonstrate these additional use cases and metrics for testing, application, and benefit realization of the MBESS in chosen applications.

Overall, the project evaluated the effectiveness and value proposition of implementing a mobile battery (or multiple mobile batteries) to showcase the benefits when rotated between applications and identify the desirable applications and strategies for commercial adoption.

E. Status of EPIC-4

SDG&E has not selected nor committed EPIC-4 funding to specific projects, but the funding remains committed to the Strategic Initiative. Current funding information for SDG&E’s EPIC-4 Cycle is provided in Table 2.

Table 2. SDG&E’s EPIC-4 (2021-2025) Portfolio as of December 31, 2023

EPIC-4	Incurring¹⁰ Costs (\$ thousands)	Encumbered¹¹ Costs (\$ thousands)	Commitments¹² (\$ thousands)	Funding Status
Strategic Initiative: Grid Modernization	-	-	7,285	In Progress
Strategic Initiative: DER Integration	-	-	7,285	In Progress
SDG&E Program Administration	123	1,628	1,628	In Progress
Total¹³	\$123	\$1,628	\$16,199	

¹⁰ As used in this Report, incurred costs mean actual booked expenditures.

¹¹ As used in this Report, encumbered costs are funds that are specified for contracts (D.13-11-025 at 101; Ordering Paragraph 45) or for in-house work necessary in collaboration with a contractor (D.13-11-025 at 53). They differ from commitments in that commitments are the identification of blocks of funds to be assigned to projects, whereas encumbrances specify how the commitments will be used in the projects.

¹² As used in this Report, commitment means assigned for anticipated work on a project, including anticipated contractual commitments, equipment purchases, software licenses, associated technical work by the SDG&E project team, and other expenses directly associated with the project work.

¹³ Total pursuant to Appendix B of D.21-11-028 but could vary due to rounding.

2. INTRODUCTION AND OVERVIEW

A. Background on the EPIC Program

The EPIC program was established by the California Public Utilities Commission (alternatively referred to as “The Commission” or “CPUC”) in D.11-12-035 to provide public interest investments in applied research and development, technology demonstration and deployment, market support, and market facilitation of clean energy technologies and approaches for the benefit of ratepayers of California investor-owned utilities (IOUs). D.12-05-037 established the purposes and governance structure for the EPIC program and D.13-11-025 clarified many of the program’s regulatory requirements. D.23-04-042 adopted a number of administrative improvements for EPIC that are aimed to increase transparency and focus on specific strategic goals.

The EPIC program is designed to provide funding for electric utility research, development, and demonstration (RD&D). Specific funding allotments are made to four EPIC Program Administrators, including SDG&E.¹⁴ The EPIC program was intended to run through 2020 and is comprised of three triennial program cycles (*i.e.*, EPIC-1, EPIC-2, EPIC-3). It has been extended into 2030. The EPIC-4 cycle has been approved to run for five years, 2021-2025 and EPIC-5 cycle has been approved for years 2026-2030. In November 2023, SDG&E’s 2021-2025 EPIC Investment Plan (EPIC-4) was approved by the Commission in D.23-11-086.

B. EPIC Program Components¹⁵

The IOUs, including SDG&E, may only administer EPIC projects in the area of pre-commercial technology demonstration and deployment (TD&D). Post-commercial demonstrations and deployments are not permitted under the program. Utility participation in the early stages of the research and development process, *i.e.*, basic research and applied research for new utility-related technology, is also not permitted.

C. EPIC Program Regulatory Process

Pursuant to D.12-05-037, SDG&E was required to submit an application seeking Commission approval of an EPIC plan every three years. SDG&E submitted its First Triennial EPIC Plan for the years 2012-2014 (A.12-11-002) on November 1, 2012 (EPIC-1) and received full Commission approval of its EPIC-1 Plan in D.13-11-025. No hearings were held. SDG&E submitted its Second Triennial EPIC Plan for the years 2015-2017 (A.14-05-004) on May 1, 2014 (EPIC-2) and received Commission approval of its EPIC-2 Plan in D.15-04-020. No hearings were held. SDG&E submitted its Third Triennial EPIC Plan for the years 2018-2020 (A.17-05-009) on May 1, 2017 (EPIC-3). The Commission approved SDG&E’s EPIC-3 Application in D.18-10-052, issued on November 2, 2018, with partial release of the funds, pending

¹⁴ The EPIC administrators are the California Energy Commission (CEC), SDG&E, Southern California Edison Company (SCE) and Pacific Gas and Electric Company (PG&E).

¹⁵ Since EPIC-3 work was approved at the project level, not pursuant to EPIC-4’s structure of Strategic Objectives, Strategic Initiatives, SDG&E plans on addressing these activities in its 2024 Annual Report

approval of a Research Administration Plan (RAP) which occurred in 2020. The RAP application A.19-04-026 was a joint filing of the IOU Administrators and was approved in D.20-02-003. The EPIC-3 funds were applied to four project areas in the approved application.

D.20-08-042 renewed EPIC for ten years through December 31, 2030, authorizing two five-year investment plant cycles (referred to, respectively, as EPIC-4 and EPIC-5). D.21-11-028 directed the IOUs to file investment plan applications for EPIC-4 on October 1, 2022. SDG&E submitted its Fourth Quinquennial EPIC Plan for years 2021-2025 (A.22-10-002) on October 3, 2022 (EPIC-4). D.23-04-042 adopted a number of administrative improvements for EPIC that are aimed to increase transparency and focus on specific strategic goals, including the Tier 2 Advice Letter submittal of the EPIC Annual Report pursuant to OP 8. In November 2023, SDG&E's 2021-2025 EPIC Investment Plan (EPIC-4) was approved by the Commission in D.23-11-086. SDG&E started the implementation stage of the projects in 2023 and will continue to plan throughout 2024.

The submission of the Annual Report for the 2023 calendar year is pursuant to OP 8 of D.23-04-042.

D. Coordination¹⁶

SDG&E has been tracking the following CPUC Proceedings that align with EPIC:

- Microgrid Order Instituting Rulemaking (OIR) (Rulemaking (R.) 19-09-009)
- Development of Rates and Infrastructure for Vehicle Electrification OIR (R.18-12-006)

The four EPIC Administrators have regular teleconferences and face-to-face meetings as needed to coordinate EPIC activities and engagement.

E. Transparent and Public Process

SDG&E is committed to conducting competitive procurements for those parts of the project work that require contracted services or major purchases of equipment or software. A summary of executed contracts for EPIC-3 Project 7, Module 3 is provided in Table 3 below.

¹⁶ The coordination of the DVCs, CBOs, DACAG regarding the ESJ Action Plan and Justice40; and CPUC's DER Action Plan were not applicable to EPIC-3, but will be addressed in SDG&E's 2024 Annual Report

Table 3. EPIC-3 Project 7, Module 3 Contracts Summary

Cycle	Project Name	Contractor	Contract Effective Date
EPIC-3	Demonstration of Multiple-Purpose Mobile Battery for Port of San Diego and Other Applications	Kitu Systems, Inc.	Contract for Task Work 10-31-22
EPIC-3	Demonstration of Multiple-Purpose Mobile Battery for Port of San Diego and Other Applications	Quanta Technology LLC	Contract for Task Work 12-09-22
EPIC-3	Demonstration of Multiple-Purpose Mobile Battery for Port of San Diego and Other Applications	Southern States, LLC	Contract for Task Work 03-09-23

SDG&E and the other EPIC Administrators are required to host at least two stakeholder meetings annually to discuss their EPIC programs, proposals, and progress.¹⁷ The EPIC IOU Administrators made an announcement at the Disadvantaged Community Advisory Group June 2023 meeting about the Joint IOU EPIC Workshop. The Joint IOU EPIC Workshop was held on June 27, 2023. The annual EPIC Symposium was held as a virtual event on October 3-4, 2023.

SDG&E established and maintains an EPIC website accessible to the public: www.sdge.com/epic. This website provides EPIC program information and updates, as well as SDG&E’s EPIC annual reports and comprehensive final project reports. It is also used to announce contractor bid opportunities.

¹⁷ D.12-05-037 at OP 15.

3. SDG&E’S EPIC BUDGET AND RELATED COSTS

A. SDG&E Authorized Budget and Incurred Costs for EPIC-3 (2018-2023) and EPIC-4

Table 4 below, sets forth SDG&E’s Commission-authorized EPIC budget incurred costs for EPIC-3 as of December 31, 2023.

Table 4. SDG&E Budget and Incurred Costs for EPIC-3 and EPIC-4 as of December 31, 2023 (in \$ thousands)

	EPIC 3 (2023)		EPIC 4 (2023)	
	Technology Demonstration & Deployment	Program Administrative	Technology Demonstration & Deployment	Program Administrative
SDG&E Commission- Authorized Budget ¹⁸	8,852	916	14,571	1,628
SDG&E Incurred Costs ¹⁹ as of December 31, 2023	7,580	902	-	123

¹⁸ D.18-10-052 for EPIC-3 and D.21-11-028 Appendix B for EPIC-4

¹⁹ Incurred costs mean actual booked expenditures.

Table 5 below, sets forth SDG&E’s disbursements to the California Energy Commission (CEC) and California Public Utilities Commission (CPUC) for EPIC-1, EPIC-2, EPIC-3, and EPIC-4 as of December 31, 2023.

Table 5. SDG&E’s Disbursements to the CEC and CPUC for EPIC-1, EPIC-2, EPIC-3 and EPIC-4 as of December 31, 2023 (in \$ thousands)

	EPIC Triennial 1 (2012 – 2014)		EPIC Triennial 2 (2015 – 2017)		EPIC Triennial 3 (2018-2020)		EPIC Quinquennial 4 (2021-2025)	
	RD&D	Program Administrative	RD&D	Program Administrative	RD&D	Program Administrative	RD&D	Program Administrative
SDG&E Disbursements to CEC	16,127	3,024	40,624	2,991	53,986	4,301	7,880	1,302
SDG&E Disbursements to Commission for Regulatory Oversight	N/A	273	N/A	224	N/A	384	N/A	81

Commitments/Encumbrances^{5,6} for TD&D Projects

SDG&E has committed \$8,852K of its TD&D budget for the EPIC-3 cycle to four projects in its approved EPIC-3 application. As of December 31, 2023, SDG&E has committed \$8,852K of EPIC-3 funds for contracted activities and in-house project work on these four projects. As of December 31, 2023, SDG&E has expended \$6,331K on contracted work. SDG&E has spent \$1,249K on internal project work. The total expenditures through December 31, 2023, on EPIC-3 TD&D project work are therefore \$7,580K.

Commitments/Encumbrances for Program Administration

As of December 31, 2023, SDG&E has committed \$916K for its EPIC-3 administrative budget. As of December 31, 2023, SDG&E has committed \$1,628K for its EPIC-4 administrative budget.

Fund Shifting Above 5% between Program Areas²⁰

The utility EPIC Administrators are only allowed to fund EPIC projects in the TD&D program area. SDG&E has done no fund shifting to other program areas.

Uncommitted/Unencumbered Program Funds

SDG&E has committed all of its EPIC-3 TD&D funds to the four projects that were launched in 2019, with execution in 2021. Also included in the committed funds is the final Module of Project 7, Module 3 that is still ongoing.

SDG&E has not committed its EPIC-4 TD&D funds to any projects yet, but the funding remains committed to the Strategic Initiative authorized in SDG&E's EPIC-4 Investment Plan (D.23-11-083).

²⁰ SDG&E notes that EPIC-4 funding shift is 15% between Strategic Objectives. However, SDG&E 2023 Annual Report is applicable to EPIC-3, which was only a 5% funding shift between Program Area.

4. SDG&E EPIC-3 PROJECTS

This section provides a detailed description and status report for the active EPIC-3 project.

A. Project 7: Demonstration of Multi-Purpose Mobile Battery

1. **Investment Plan Period - 2018-2020 (EPIC-3)**
2. **Assignment to Value - Distribution (primary) and Demand-Side Management (primary)**
3. **Objective**

The objective of SDG&E's EPIC-3 Project 7 is to perform a pre-commercial demonstration of MBESS and examine the value proposition from using MBESS across multiple sites and use cases. An MBESS is a battery energy storage system on wheels that can provide multiple use cases based on a single MBESS application or a combination of several applications (stacking of applications) to provide grid support and reliability/resiliency solutions for utility projects at different sites. This third module of EPIC 3, Project 7 will include operational flexibility demonstrations using the IEEE communication protocol 2030.5 to communicate with the MBESS, as well as deployment of the MBESS during planned outages, emergency events, and Public Safety Power Shutoffs (PSPS).

4. **Focus**

The focus of this project was to conduct a pre-commercial demonstration, showcasing the concept of mobile utilization of a containerized battery energy storage system (BESS) for various use cases and locations. Ultimately, the project sought to determine the effectiveness and value proposition from the stacking of benefits when rotating MBESS between applications and identifying which are preferred and most feasible for commercialization.

5. **Scope**

While mobile batteries are commercially available on a limited basis, the mobile utilization of the same asset in various use cases and applied at multiple locations is new.

Therefore, the benefits of adopting such technology needed to be demonstrated and evaluated. To better approach the demonstration, this project was devised into three modules with Modules 1 and 2 completed and final reports posted to the SDG&E EPIC website.

- **Module 3**

6. Benefit Areas

- **Improved Safety:** Public and employee safety are very high priorities for SDG&E. Each project, as a minimum, should comply with existing safety policies and not result in any safety violations or safety incidents. In certain cases, a project can minimize safety risk by either reducing probability of a safety incident, mitigating the severity of an incident, or enabling early detection that allows correction/prevention of unsafe situations.
- **Improved Reliability and Power Quality:** Two goals of power system modernization are to improve the level of reliability and to optimize the quality of power as seen by the customer. Higher reliability means reducing the occurrences of outage and reducing the duration of outages when they do occur. Improved power quality means reducing the disturbances seen in the power itself, such as voltage variation, flicker, and harmonic content in the power waveform.
- **Improved Operational Flexibility and Capacity:** With the ability to store and release energy, operational flexibility constraints are managed through customer agreements to reduce or curtail power during system maintenance or grid outages. Capacity improvements are made with coordinated dispatchable or scheduled electricity production.
- **Improved Performance of the Power System:** Improved system operations and performance (i.e., system electrical efficiency) will help reduce electrical losses in the system, such as reductions in resistive losses associated with current flow through the conductors and reductions in transformer electrical losses.
- **Lower Greenhouse Gas Emissions:** Advanced infrastructure can help reduce electrical system losses, which in turn will reduce the need for electric generation. Less generation means reduced greenhouse gas emissions (GHG). Additionally, infrastructure such as battery storage can store electricity from renewable or other low-emission sources and offset consumption during periods where higher-emission sources would be required, also reducing GHG.
- **Lower Operating Costs and More Efficient Use of Ratepayer Dollars:** Ratepayers can see lower costs on their utility bill through peak demand reduction and shifting utility-delivered consumption to lower-cost time periods. Furthermore, reductions in peak load can defer or eliminate certain utility infrastructure investments and avoid electric procurement and generation costs, ultimately mitigating any potential rate increases.
- **Economic Development:** A secure source of low-cost, high-quality, reliable electric power is essential to economic development and to retain and attract businesses in California. The primary purpose of EPIC funding is to support investments in research and development projects that benefit electric utility customers. The utility EPIC activities are limited by the EPIC ordering decisions to precommercial demonstrations of technologies and integration solutions that provide benefits to customers by promoting greater reliability, lower costs, increased safety, and other designated benefits.

- **Ancillary Benefits:** Finally, EPIC-3 Project 7, Module 3 will create new knowledge, lessons learned, and potential recommendations on the incremental benefits achieved and incremental costs incurred by rotating a mobile multipurpose battery into different applications and locations. Incremental benefits can include increased utilization of the asset, flexibility to assist with more than one use case, and ability to react to real-time situations more effectively. Incremental costs can include up-front equipment costs, up-front setup and administrative costs (such as for interconnection and/or certification), transportation costs, and ongoing operations and maintenance costs. The final evaluation will need to consider incremental cost-benefit analysis of the project to assess whether a mobile-multipurpose battery solution with the added variable of using IEEE 2030.5 is cost effective and viable.

7. Use Cases

The project will leverage the IEEE 2030.5 standard protocol as a means of controlling the MBESS to demonstrate alleviation of circuit operational flexibility (OpFlex) constraints under specific scenarios (e.g., planned abnormal distribution switch states). Additional use cases will include the deployment of the MBESS during planned outages, emergency events, and Public Safety Power Shutoffs (PSPS).

- **Operational Flexibility to Manage Constraints During Reconfiguration –** In a location that is constrained by operational flexibility, the MBESS can reduce or curtail power during system maintenance or grid outages that involve the system reconfiguration that caused the operational flexibility constraint. The range of adjustability and limits on the number of events will be determined by mutual consent and included in the interconnection agreement.
- **Capacity by Increased Generation to Meet Requested Production –** Coordinated dispatchable or scheduled electricity production in accordance with solicitation requirements or grid service tariff rules. This will mostly be the discharge of stored energy. Communications must be enabled, which may be less than real time if the discharge is scheduled ahead of time.
- **Constant Voltage Boost –** Increase voltage that has become lower along a feeder due to distance from a substation and the existence of machine loads. This is achieved with constant or periodic production of reactive power.
- **Voltage Reduction –** Reduce voltage in locations that have regular occurrences of high voltage due to reasons beyond the specific MBESS location.
- **Backup Power Source –** Use of the MBESS during planned outages, emergency events, and PSPS.

8. Deliverables

A comprehensive final report for the third project module, including thorough documentation of the project approach, demonstration results, final benefits estimate, value proposition, and recommendations regarding commercial adoption.

9. Metrics

The project metrics will be tracked through milestones marked by completion of project plan tasks. Specific value metrics for the project will be measured by comparative analysis, utilizing current base practices and historical data (i.e., customer load demand and profile, net energy metering, power quality metering, energy consumption algorithms and calculations, and emissions reporting.), collecting new data through application of the mobile battery system, comparing the data specific to each use case, and analyzing the benefits.

10. Schedule - January 2019 to December 2024

11. EPIC-3 Funds Committed – \$4,672K

12. EPIC-3 Funds Spent as of December 31, 2023 - \$3,400K

Purchase of the mobile batteries and demonstration work was fully executed.

13. Partners (if applicable)

Not applicable.

14. Match Funding (if applicable)

Not applicable.

15. Match Funding Split (if applicable)

Not applicable.

16. Funding Mechanism (if applicable)

SDG&E EPIC funds applied to a combination of internal work and pay-for-performance contracts.

17. Treatment of Intellectual Property (if applicable)

No IP developed.

18. Status Update

For the third module of Project 7, the following activities occurred in 2023:

Quarter (Q) 1 2023

- SDG&E executed an agreement with Southern States in March 2023 for a MBESS companion trailer. This trailer would have the interconnection equipment needed to connect the MBESS to the SDG&E distribution system in order to provide backup power .
- To prepare for the testing of using IEEE 2030.5 to control the MBESS at SDG&E's Integrated Test Facility (ITF), coordination between SDG&E and vendors to achieve communications between the necessary devices was completed.
- The development of a test plan for the IEEE 2030.5 testing for the defined use cases was reviewed and finalized.

Q2 2023

- The updates below are for the 2030.5 portion of the project:
 - Integration testing was completed confirming communication between the MBESS controller and the gateway.
 - Continued coordination between SDG&E and vendors to achieve communications for testing.
 - Dry run site acceptance testing was initiated.
- Kick-off meeting was held with Southern States for the MBESS companion trailer. The interconnection equipment purchased by SDG&E was sent to their facility in Georgia.

Q3 2023

- Resolution of trailer issues: i.e. registration and repairs, that prevented transport of the MBESS to conduct the field testing of the 2030.5 use cases.
- Completion of field testing for the 2030.5 use cases: Flexibility during grid reconfiguration, capacity increase, voltage boosting, voltage reduction.
- A purchase requisition was created for a controller device in order to control both

the MBESS and generators during a multiple day outage. This would be in preparation to use the MBESS and generators during a PSPS event.

- Work to interconnect MBESS at SDG&E's Wildfire Mitigation Plan (WMP) Cameron Corners Microgrid for heat wave backup was completed, although continued work is required to get the battery's controller on the network to provide remote access. The MBESS has been on a schedule since then to charge and discharge at times that support the grid the most.
- Identification of additional use case: Charge and discharge of battery at recommended times while the battery is not providing backup power support.

Q4 2023

- The MBESS has been interconnected at SDG&E's WMP Cameron Corners Microgrid site and has been charging and discharging on a schedule without issues since September 15th during hours that support the grid the most.
- Work has been done to put together new controls cabinet that would control the MBESS in conjunction with generators for long duration power backup.
- Final draft report for the 2030.5 Op Flex portion of the project has been completed and submitted to SDGE for review from vendors.
- Meetings were held with Southern States to finalize the design of the new companion trailer for continual work on this module.
- Meetings were held with internal SDGE Information Technology (IT) group to look at the process of adding a cellular modem for the MBESS and have the ability to have it connected to the company network, eliminating the need to use physical fiber connections at a site in order to connect.
- The MBESS was used at the Cameron Corners Microgrid site during two continuous planned outages, totaling around 13 hours of operation on its own. There were generators paralleled with the battery as back up in case the state of charge (SOC) got too low, but ultimately the MBESS was able to power the customer load on its own.

The findings for this module will be included in its comprehensive final report. The final project report will be posted on the SDG&E EPIC public website at www.sdge.com/epic.

The ultimate outcome from this demonstration work to date is that it is recommended that SDG&E pursue commercial adoption of MBESS. However, there are additional use cases to be evaluated and demonstrated in 2024 to continue evaluating the commercial value proposition of MBESS. This added use case work is included in Module 3 and is the final module of the project.

5. CONCLUSION

A. Key Results for SDG&E EPIC Program

As of December 31, 2018, SDG&E had completed all technical project work for its 11 Commission-approved EPIC-1 and EPIC-2 projects. No projects were completed in 2020, and no new final project reports were ready for filing with the annual report. In 2021, three EPIC-3 projects were completed, and two modules of a fourth project were completed. Past EPIC comprehensive final project reports are available on the SDG&E EPIC website at www.sdge.com/epic.

Major accomplishments in 2021 and 2022 for the projects and modules that were completed included performing the demonstration work, data analysis, formulation of findings and recommendations regarding commercial adoption, and preparation of the comprehensive final project reports. In 2023 the last project of EPIC-3 continued to work through multiple use cases to showcase the usefulness of mobile batteries. A portion of the demonstration work planned for this last EPIC-3 project was completed. With the approval of SDG&E's EPIC-4 Investment Plan in late 2023, SDG&E has begun the governance process for developing and selecting EPIC-4 projects. SDG&E supported and contributed to the EPIC database development and maintenance. For EPIC-5, SDG&E's Program Manager and other SMEs attended five in person EPIC-5 Strategic Goal setting workshops, as well as other activities that were organized by the CPUC's PICG coordinator.

B. Next Steps for SDG&E's EPIC Program

Module 3 tasks will continue to be performed in 2024, and that will provide closure on the entire EPIC-3 cycle. This includes performing field work for the final use cases to be demonstrated, as well as finalizing the final reports for all work done in Module 3.

An EPIC-4 cycle was ordered by CPUC in late 2021 and in November 2023, SDG&E's 2021-2025 EPIC Investment Plan (EPIC-4) was approved by the Commission in D.23-11-086. SDG&E started the implementation and governance process for selecting EPIC-4 projects in 2023 and will continue to plan throughout 2024. EPIC-4 projects are forecasted to begin in the second half of 2024.

C. Issues

The delivery of the companion trailer may be delayed due to trailer and equipment lead times, which could delay the close out of EPIC 3, Project 7 in 2024.