EPIC 4 Wave 2
Project Proposal Workshop
Innovative Microgrid Testbed and IEEE 2030.5 Edge Testing

November 12, 2025

EPIC 4 Wave 2 Workshop Agenda

9:00 am Safety

9:05 am Opening Remarks & EPIC Overview

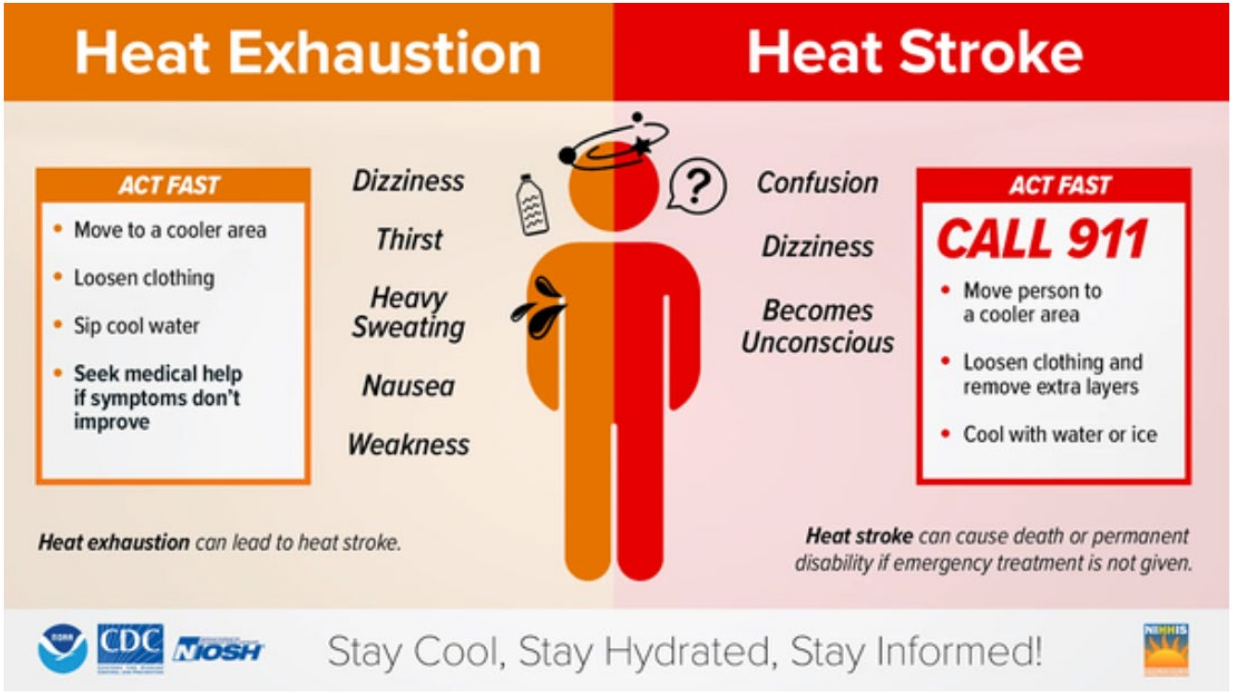
9:10 am Innovative Microgrid Testbed & 2030.5 Edge Testing

9:30 am Q&A

9:40 am Closing Remarks

Safety Moment

Water, Rest, Shade



***Heat stroke** can result in death and requires immediate medical attention.*

- **Stay hydrated** – drink at least a quart of cool water every hour, even if you are not thirsty. *Avoid sugary beverages*
- **Take frequent breaks and rest in the shade** or in a cool environment during the warmest times of the day

Opening Remarks

Conor Paris

Policy & Strategy Manager

Advanced Clean Technology

EPIC Overview

EPIC Mission Statement

EPIC invests in innovation to ensure equitable access to safe, affordable, reliable, and environmentally sustainable energy for electricity ratepayers.1 This program is funded by California utility customers under the auspices of the California Public Utilities Commission.

What is EPIC?

Electric Program Investment Charge (EPIC) is a California ratepayer-funded public purpose program that enables the Utilities (SCE, SDG&E, PG&E) and the California Energy Commission (CEC) to invest in and advance new energy solutions to meet California's energy and climate goals and drive innovation in the industry

EPIC program areas include Applied Research and Development, Technology Demonstration and Deployment (TD&D), and Market Facilitation. Utilities focus on TD&D projects.

Mandatory Guiding Principles

EPIC's mandatory guiding principle is to provide ratepayer benefits. Ratepayer benefits are defined as:

- Improving Safety
- Increasing Reliability
- Increasing Affordability
- Improving Environmental Sustainability
- Improving Equity

SDG&E's EPIC 4 Principles and Community Engagement Plan

SDG&E's EPIC 4 Investment Plan incorporates EPIC's Mandatory Guiding Principles in project selection and planning.

Highlights of SDG&E's plan to work with EPIC's Guiding Principles and our communities include:

- Create a project that provides ratepayer benefits:
  - **Improves Safety**
  - **Increases Reliability**
  - **Improves Environmental Sustainability**
- Seek to **improve safety** in testing site and field sites due to leveraging best practices and collaborating with industry stakeholders. All communities will benefit from the project as **DER utilization throughout the service territory will be improved**.
- Host presentation with external stakeholders to create awareness opportunities to **work with the community**

Microgrid Testbed and IEEE 2030.5 Edge Testing

Adam Manley

Principal DER Integration Advisor

Key Definitions

- **ITF – Integrated Testing Facility**

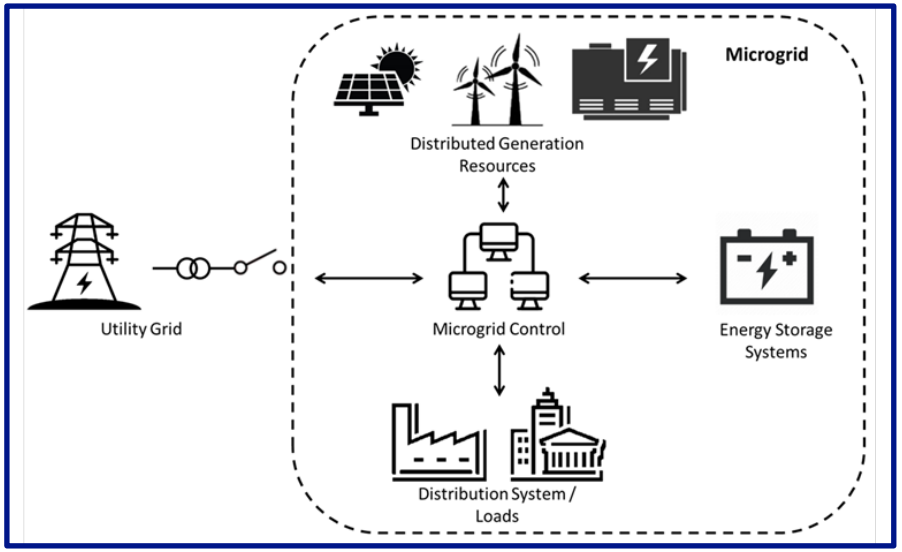
  Facility for testing emerging technologies, device settings, IT equipment, etc.

- **Microgrid**

  Allows one or more buildings to be isolated and powered by a separate generation source.

- **SEC – Site Energy Controller**

  The brain of the entire microgrid (Microgrid Control).

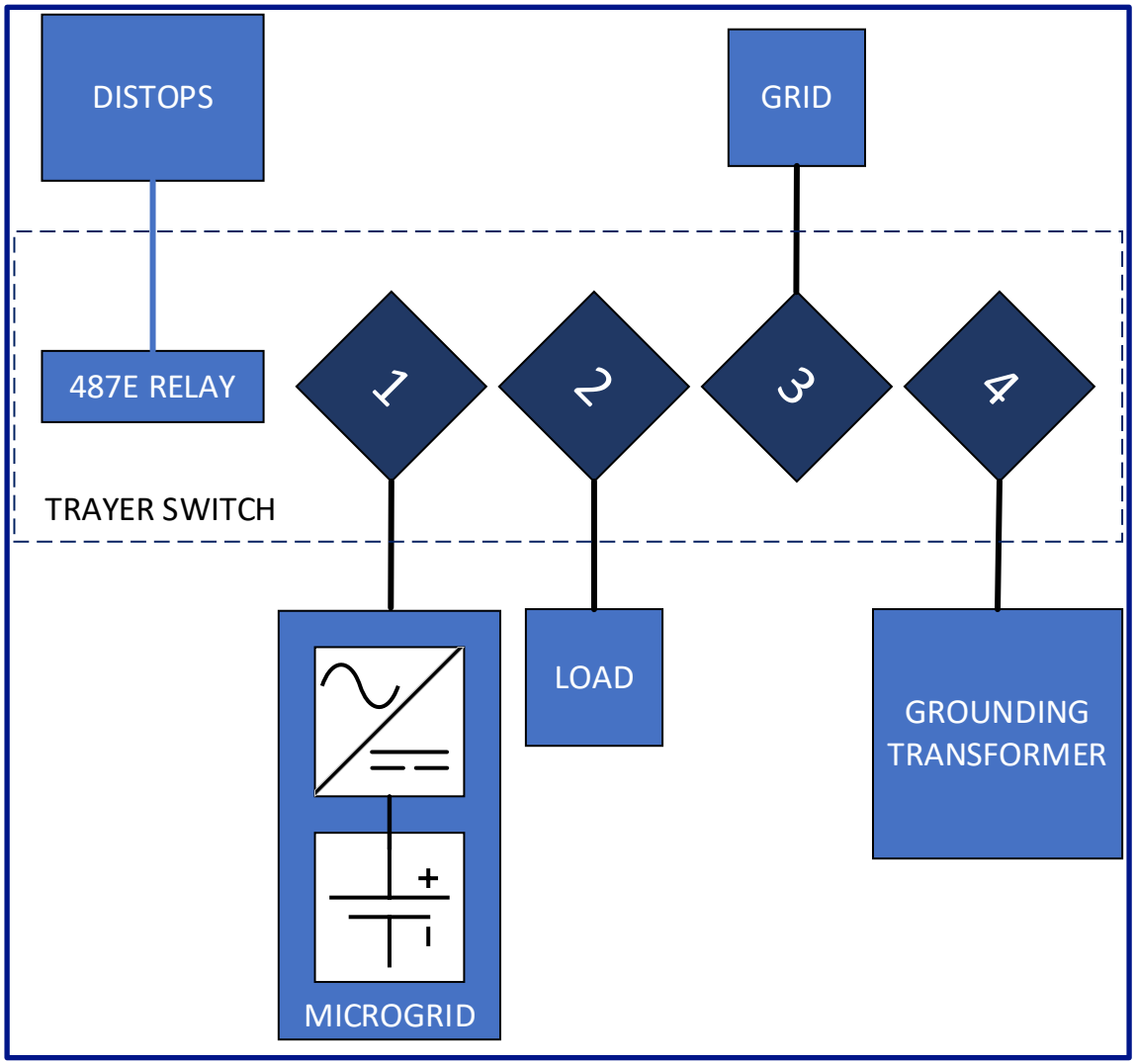


Source: Comodi, G., Iannarelli, A., & Moneti, M. (2022). Experimental Validation of Systems Engineering Resilience Models for Islanded Microgrids.External Link Systems, 10(6), 245. MDPI.

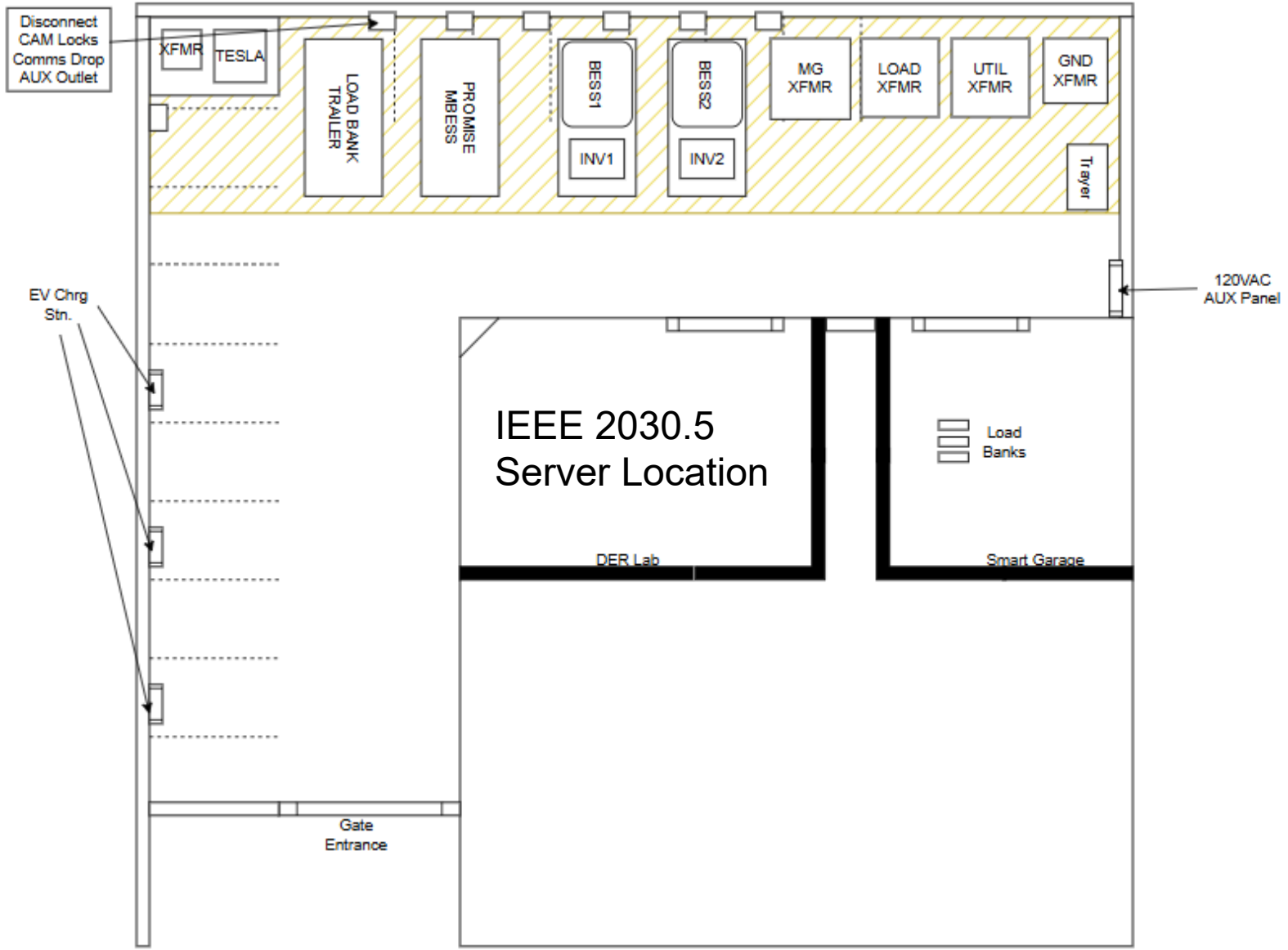
Design

Microgrid Basics:

- Point of Interconnection
- Microgrid Simulator
  - DC source
  - Test Inverter
- Load
- Grid Simulator
  - AC Source
- Grounding source
- Networking Equipment



Proposed Testbed



Innovative Microgrid Testbed and IEEE 2030.5 Edge Testing

Project Proposal Overview

Why it matters:

As SDG&E moves towards California's goal of renewable energy by 2045, utilizing behind the meter DER will be integral part of reaching that goal. By developing this state-of-the-art microgrid testbed, SDG&E will collaborate with our Electric Distribution Operations Department to prepare our utility to leverage renewable energy in our service territory for improved reliability, safety and environmental sustainability.

Project Focus:

This project is to build a new and innovative microgrid testbed at SDG&E's Integrated Test Facility (ITF) and conduct trial testing of IEEE 2030.5 gateways and DER controllers in a safe environment. We will be collaborating with SDG&E's Electric Distribution Operations to test their IEEE 2030.5 head end controller with the project use cases.

Estimated Budget: $1.8 M

Opportunity

- Safety test DER and IEEE 2030.5 in a lab environment
- Test 2030.5 edge technologies and integrate with Distribution Operation's head end
- Help California reach its renewable energy goals

Project Objectives

- Build Microgrid Testbed at the Integrated Test Facility at SDG&E
- Test edge technologies related to IEEE 2030.5 in conjunction with SDG&E's Distribution Operations Department

Benefits

- Testing in a lab environment is safer & more economical
- Entire service territory experiences renewable energy use case benefits
- IEEE 2030.5 use cases improve reliability

Opportunity

- **Improve Safety**
  - Safety test DER and IEEE 2030.5 in a lab environment
- **Collaborate With Distribution Operations**
  - Test 2030.5 edge technologies and integrate with Distribution Operation's head end
  - Proposed testbed will be integrated with Electric Distribution Operations system, IT hardware & software, and field technologies that can control Distributed Energy Resources
- **Improve Environmental Sustainability**
  - Help California reach its renewable energy goals by 2045
  - Prepare Distribution System to take advantage of the renewable energy installed in our service territory to perform important use cases such as VPP and Operational Flexibility
  - Demonstrate the capability of harnessing the power of renewable energy in new ways
- **Improve SDG&E and Customer Projects**
  - Testbed will allow SDG&E to test edge technologies and the whole, integrated, control system
  - Multiple edge technologies will be evaluated, granting the utility, and customers, more proven options when it comes to equipment selection

Project Objectives

- **Build Microgrid Testbed**
  - Location: The Integrated Test Facility at SDG&E
  - Testbed will be capable of evaluating multiple IEEE 2030.5 gateways
  - Testbed will be capable of evaluating multiple grid edge system controllers
  - Testbed will be integrated with SDG&E's Distribution Operations Test Environment for full integration testing
- **Improve Safety**
  - Lab environment will allow renewable energy systems to be tested in a safe, controlled manner
- **Testing Integrity**
  - Properly planned and built testbed will allow for repeatable tests with fewer unpredictable variables such as weather, other personnel working in environment, etc.
  - Full control over all equipment: OT hardware, IT hardware, software, firmware versions, wiring, etc.
- **Demonstrate Successful IEEE 2030.5 Operations**
  - Demonstrate successful IEEE 2030.5 operations with production model equipment ranging from Distribution Operations head end all the way to BESS
  - Share lessons learned with the industry

Benefits

- **Improving Safety**
  - Testing in a lab environment is safer than testing at field sites
  - Less windshield time
  - Protection from the elements
- **Improving Environmental Sustainability**
  - In the future, entire service territory will experience renewable energy use case benefits
  - Demonstrating improved usefulness of renewable energy
- **Increasing Reliability**
  - IEEE 2030.5 improves reliability through use cases related to Operational Flexibility (better circuit reconfiguration options during outages)
  - Fewer risks to the Electric Distribution System availability by testing in a lab environment rather than on the production system
- **Improving Equity**
  - IEEE 2030.5 use cases will benefit entire service territory

Thank You

Questions ?

Feel free to contact SDG&E's EPIC Program Manager:
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