



Decarbonization Opportunities & Barriers Storage & Generation/Infrastructure

Association of Energy Engineers - Southern California
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AGENDA

- Mobile Battery Energy Storage System (MBESS) Pre-Commercial Demonstrations
- Use Cases and Benefits
- Current Initiatives
- Discuss EPIC work
 - Module 1 – Port of San Diego and Cameron Corners Microgrid
 - Module 2 – Community Resource Centers
- Key Findings
- Benefits Analysis
- Cost comparisons
- Next Steps
 - Module 3 – Additional Use Case Applications
- Discussion

- Work supported by utility ratepayers through the State of California's Electric Program Investment Charge (EPIC).

MBESS Pre-Commercial Demonstrations



Pre-commercial demonstration project evaluating the effectiveness of mobile batteries when rotated between applications & identify preferred applications & strategy for the rotation

- Work supported by utility ratepayers through the State of California's Electric Program Investment Charge (EPIC)

Benefit Areas

Improved Safety	Improved Reliability & Power Quality
Improved Performance of the Power System	Lower Greenhouse Gas Emissions
Lower Operating Costs & More Efficient Use of Customer Monies	Economic Development
Ancillary Benefits	Incremental Benefits of a Mobile Solution

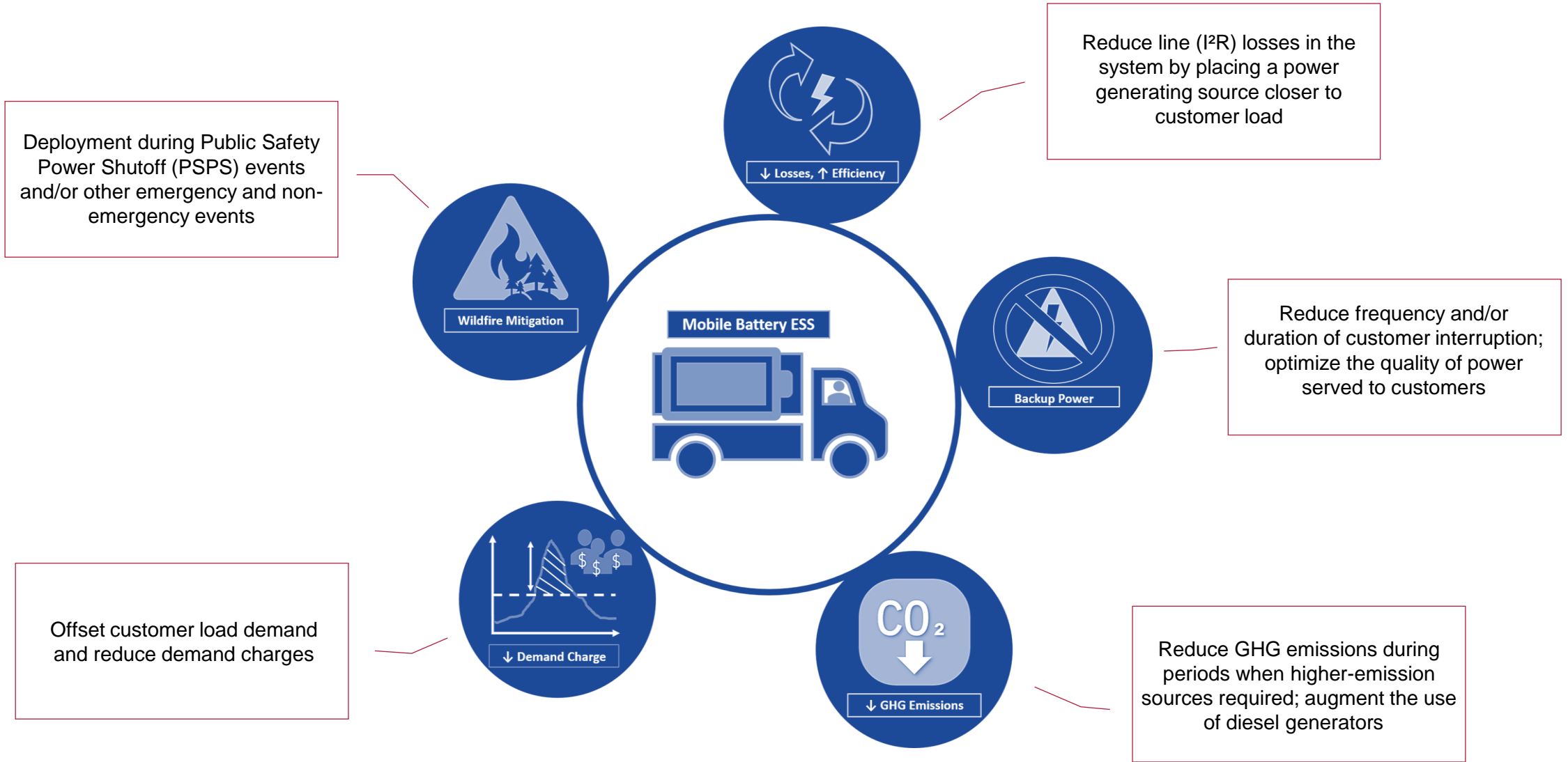
Module 1

Evaluation of stacked benefits at multiple sites
362kW/1499kWh Battery

Module 2

Back up power solution for planned safety outages & emergency events
100kW/525kWh Battery

Use Cases and Benefits



Current Initiatives



Portable Generator Deployment Program



Module 1 – 362kW/1499kWh Battery



Demonstration & evaluation of stacked benefits identified utilizing a mobile BESS at multiple locations with multiple use cases

Use cases demonstrated include:

- Safety
- Load factor correction
- Load smoothing
- Peak shaving
- Demand response
- Load blackstart & islanding

Locations include:

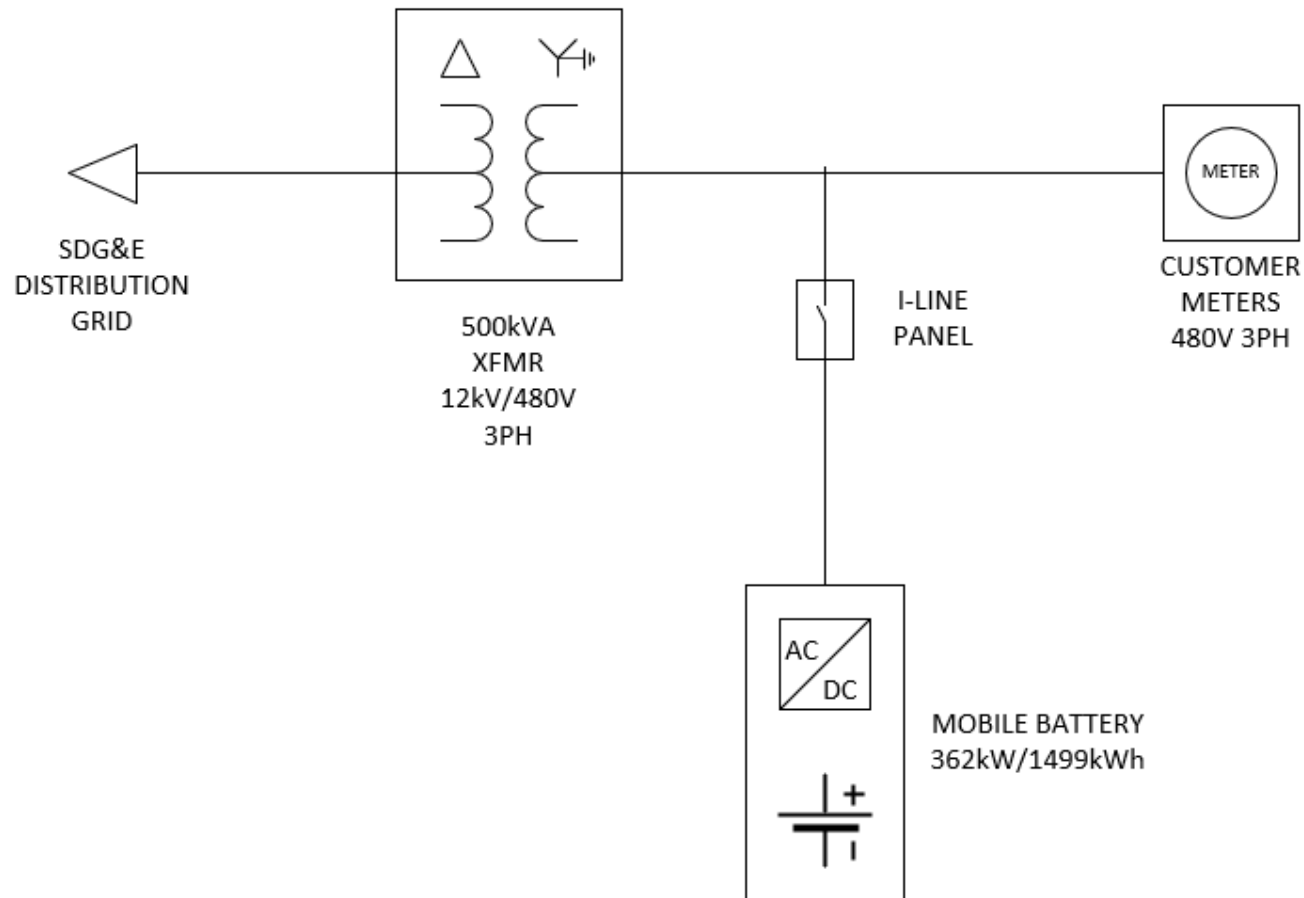
- Marine Group Boat Works, Port of San Diego tenant – Chula Vista, CA
- Cameron Corners Microgrid - Campo, CA



Module 1 – Accomplishments



Marine Group Boat Works (MGBW)



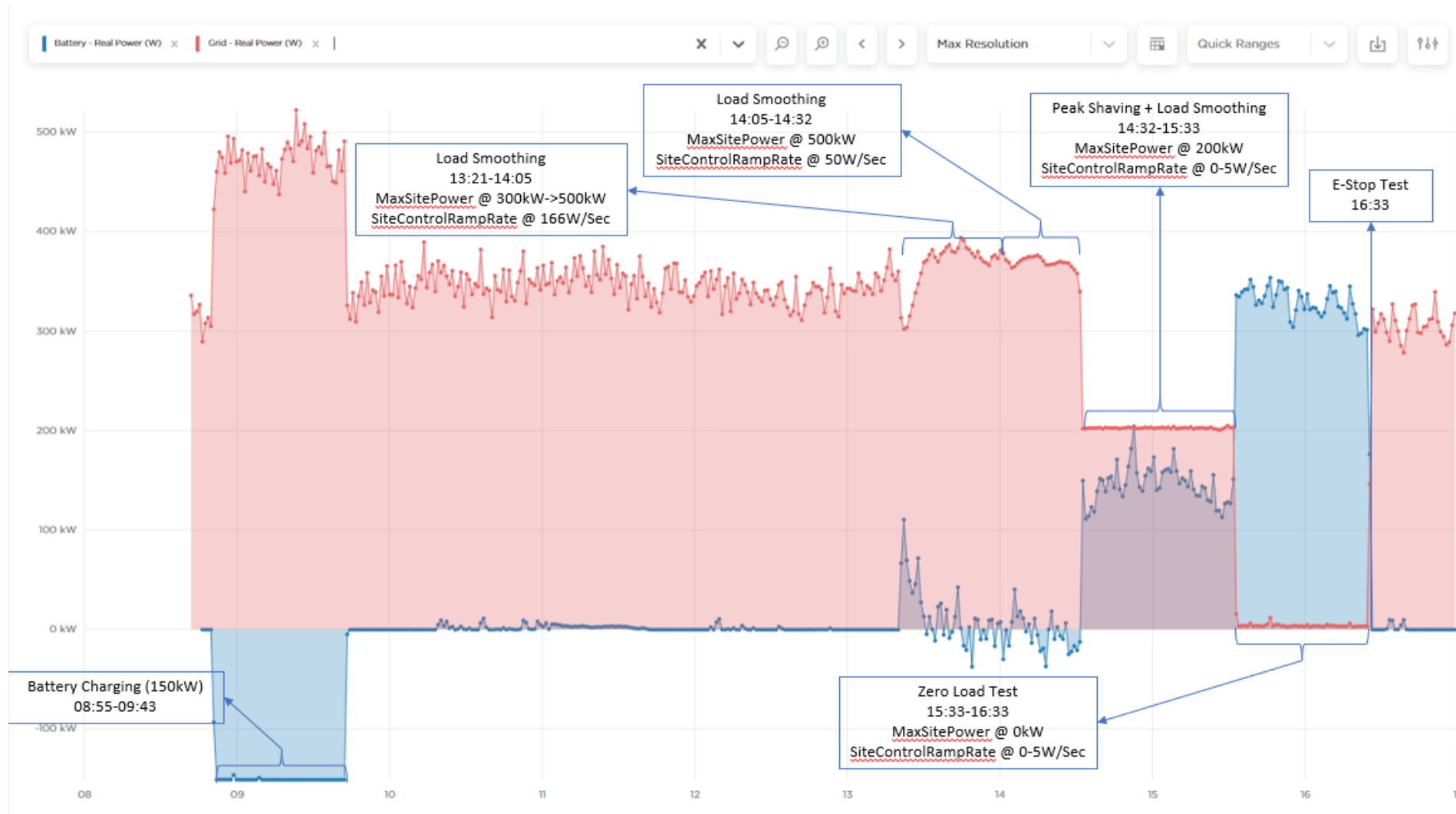
MGBW is a full-service marine vessel hauling, refitting, repair & construction facility.

Activities include welding, grinding, cutting, pumping, & lifting, as well as “cold ironing.”

Use cases demonstrated:

- Safety
- Load Factor Correction
- Load Smoothing
- Peak Shaving
- Demand Response – zero load flow

Module 1 – Accomplishments



Module 1 – Accomplishments

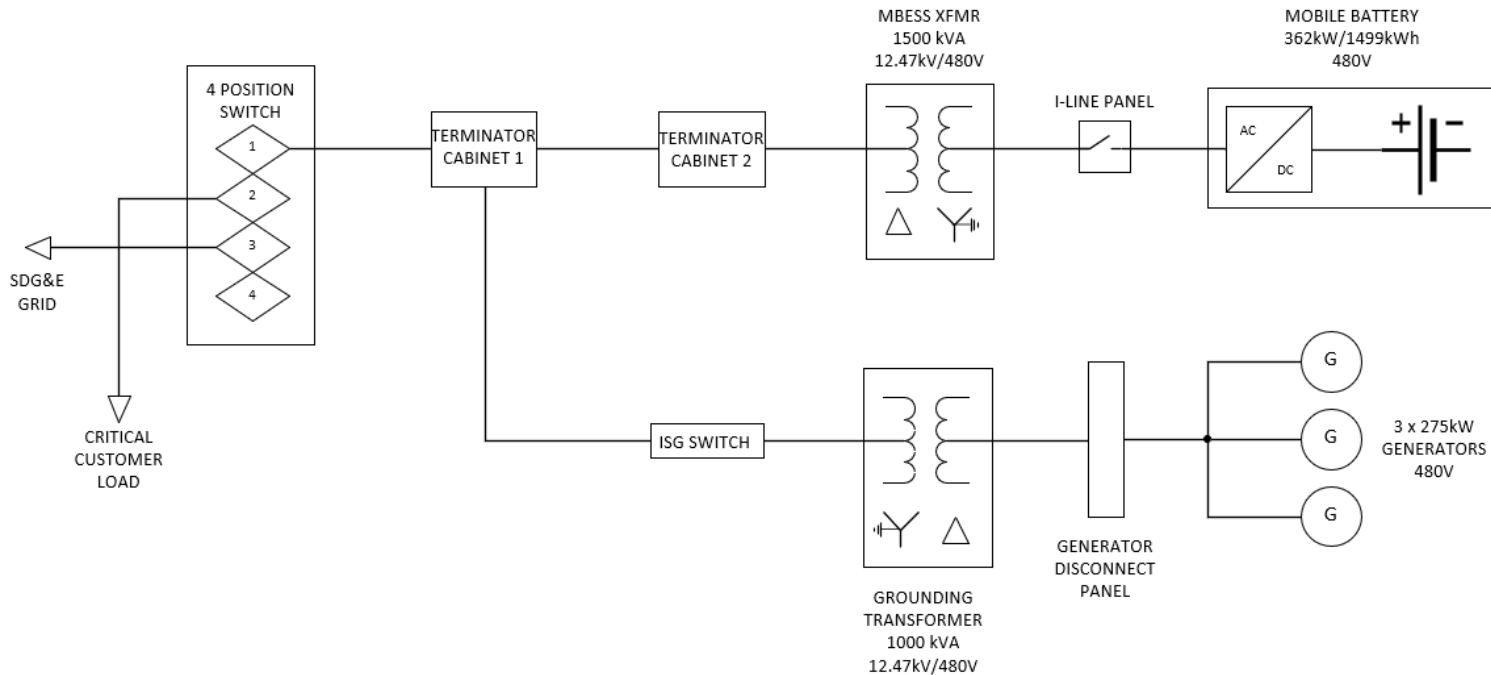


Module 1 Demonstration – Marine Group Boat Works



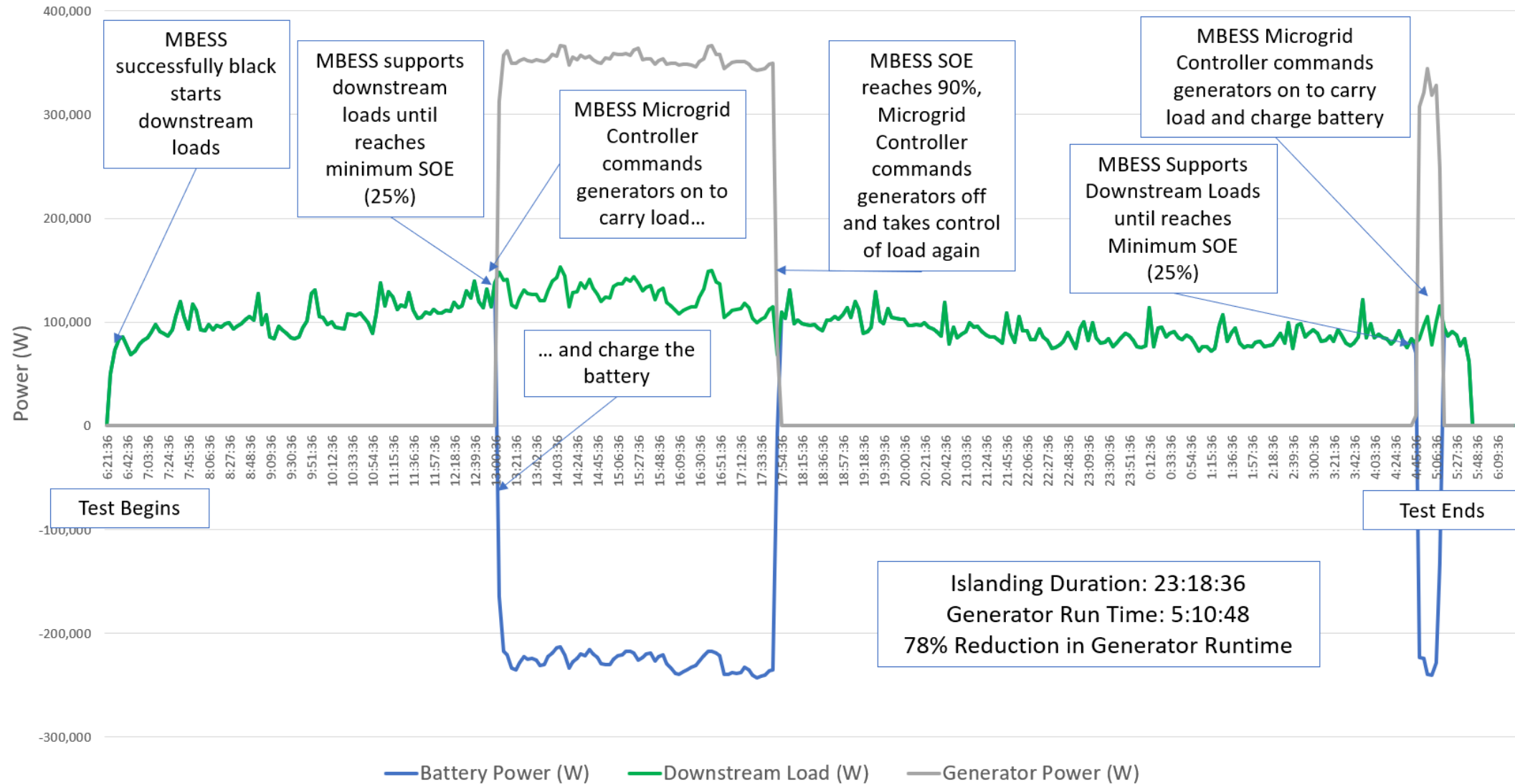
Module 1 – Accomplishments

Cameron Corners Microgrid – Campo, CA



- Microgrid is part of the Wildfire Mitigation Program
- 12 critical customers connected
- Successfully black started & islanded load for nearly 24 hours
- Paralleled generators with battery

Module 1 – Accomplishments



Module 1 – Accomplishments



Module 1 Demonstration – Cameron Corners Microgrid



Module 2 -100kW/525kWh Battery



Demonstration as a backup power solution to community resource centers during planned safety outages & in emergency events

- Demonstrations completed at 2 community resource centers
- Both ran for 24 hours ensuring power reliably and for long periods of time



Module 2 – Accomplishments



Module 2 Demonstration – Community Resource Centers



Dulzura (~7.5 kW)



Pine Valley (~12 kW)

Key Findings

- The MBESS has a high potential value proposition when all potential uses of the battery are considered
- Has analogous functionality to a mobile diesel generator & is nearly silent
- Can support circuit upgrade deferrals
- Addresses GHG reduction and DAC goals, as well as electrification efforts
- Since nearly every interconnection is different, the MBESS is not as “mobile” since it requires different equipment to be brought out for each deployment.



MBESS Benefits



Safety



- Decreased chance of fuel spill
- Noise pollution reduction

Improved Performance of the Power System



- Helps decrease circuit current

Improved Reliability and Power Quality



- Successful ability to blackstart load
- Ability to peak shave & load smooth
- Voltage & frequency regulation
- Increased lifespan for grid equipment

Lower GHG Emissions



- Nearly 303 gallons of diesel fuel saved when using a MBESS instead of a diesel generator annually
- 3 MTCO₂e GHG emissions reduction annually

MBESS Benefits (Cont.)



Lower Operating Costs

- There is a nearly \$650k in net benefits over a 10 year lifecycle
- Nearly \$15k in market function value (30% participation)



Disadvantaged Communities

- Increased ability to support clean air in DACs.
- Can offset temporary load increase due to electrification



Economic Development

- Create a local market for purchase of MBESS to support 2021-2030 grid improvements



Incremental Benefits

- A single resource can provide many uses

Cost Comparison – MBESS and Diesel Generator

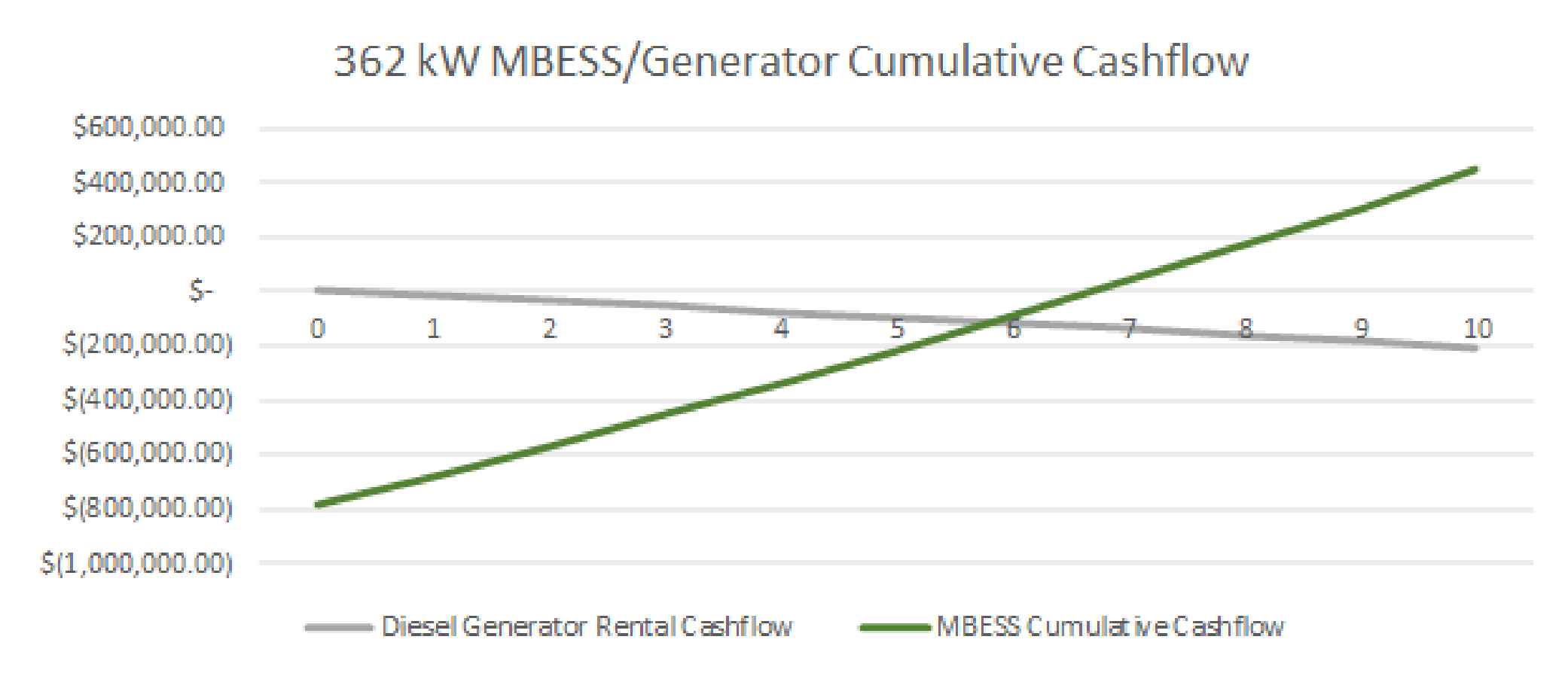


Figure 15: 362 kW MBESS / Generator Cumulative Cashflow

Module 3 – Additional Use Case Applications

Additional use case work is being planned to demonstrate the following:

- Use IEEE 2030.5 to control a battery to improve operational flexibility
- Make a trailer mounted battery more “mobile”
 - Account for the voltage requirements at interconnection
 - What is required for interconnection
 - Metering options and required hardware
- Create an in-house controller to integrate any generator to work with the MBESS for a deployment as needed
- Use the battery in emergency situations and during public safety power shutoffs.

Thank you