

ICE Krome Service Processing Center Resilience Assessment

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Introduction

- DHS Immigration & Customs Enforcement (ICE)
 - Krome Service Processing Center in Miami, FL
 - Congressional appropriations to enhance resilience

- Support from NREL:
 - Evaluation of project feasibility
 - Assistance with project design
 - Drafting of RFP and source selection
 - Project implementation guidance



Resilience

As defined in the DHS Resilience Framework:

The ability to adapt to changing conditions and withstand and rapidly recover from disruption.



Krome SPC
Site Overview



Krome SPC
Site Overview

"Old Krome"

"New Krome"



Objectives

- Identify improvements to power systems to protect mission critical loads from various hazards
 - Hurricane winds, flooding, lightning, hail, wildfires, power surges, and wildlife ingress
- Protect facilities from damage that would require a long recovery time after a major event, such as a hurricane



Findings from Site Assessments



Existing Old Krome Generators

- Two separate circuits; generators are not tied together
- Each generator is at/above 100% capacity under full load
 - 80% is recommended



Photo by Michael Young, NREL



Old Krome Electrical Distribution Equipment

- High risk of failure
- Identified as primary concern by site staff
- Amp interrupting capacity appeared to be insufficient



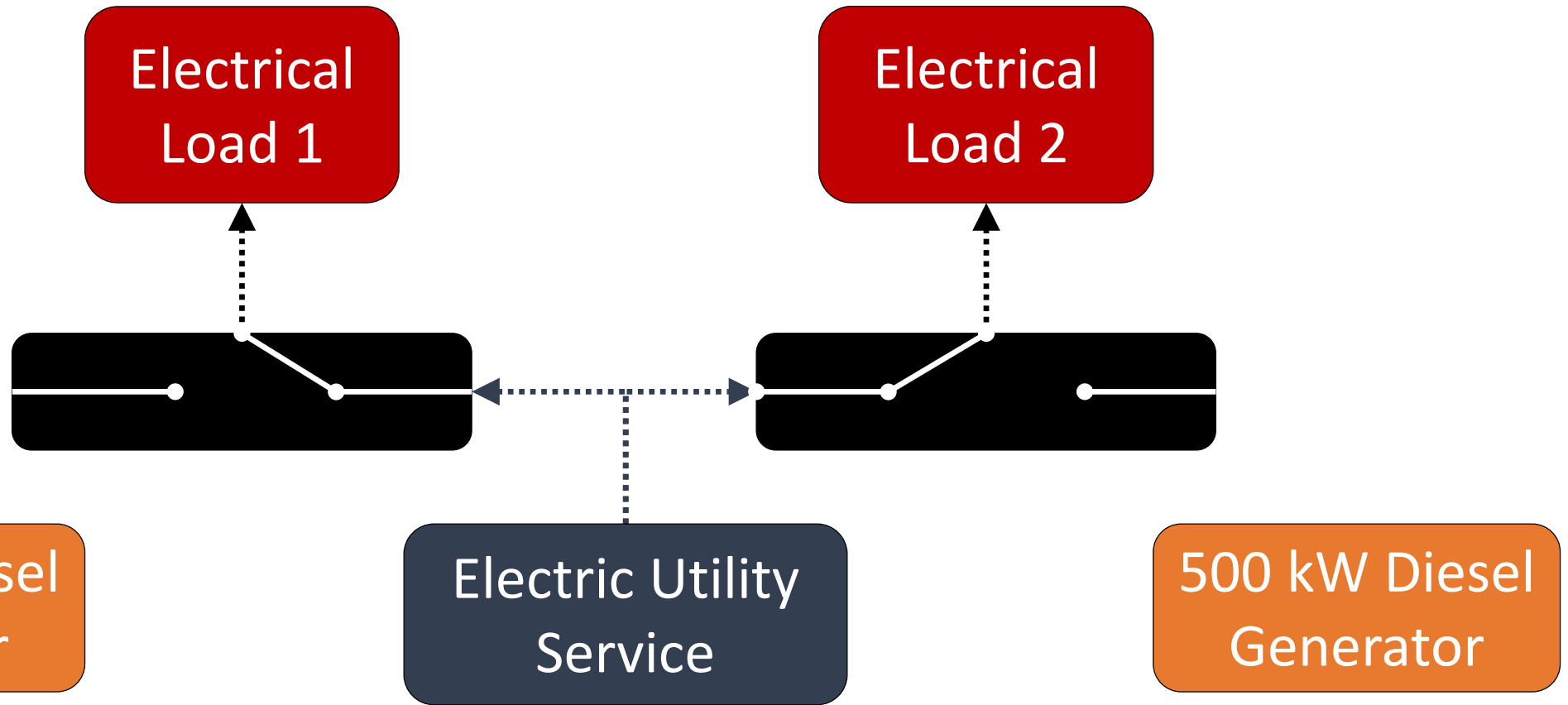
Old Krome Electrical Distribution Equipment

- Age and condition of equipment indicate safety and reliability concerns
- Utility power and generators both connect to loads through main switchboard

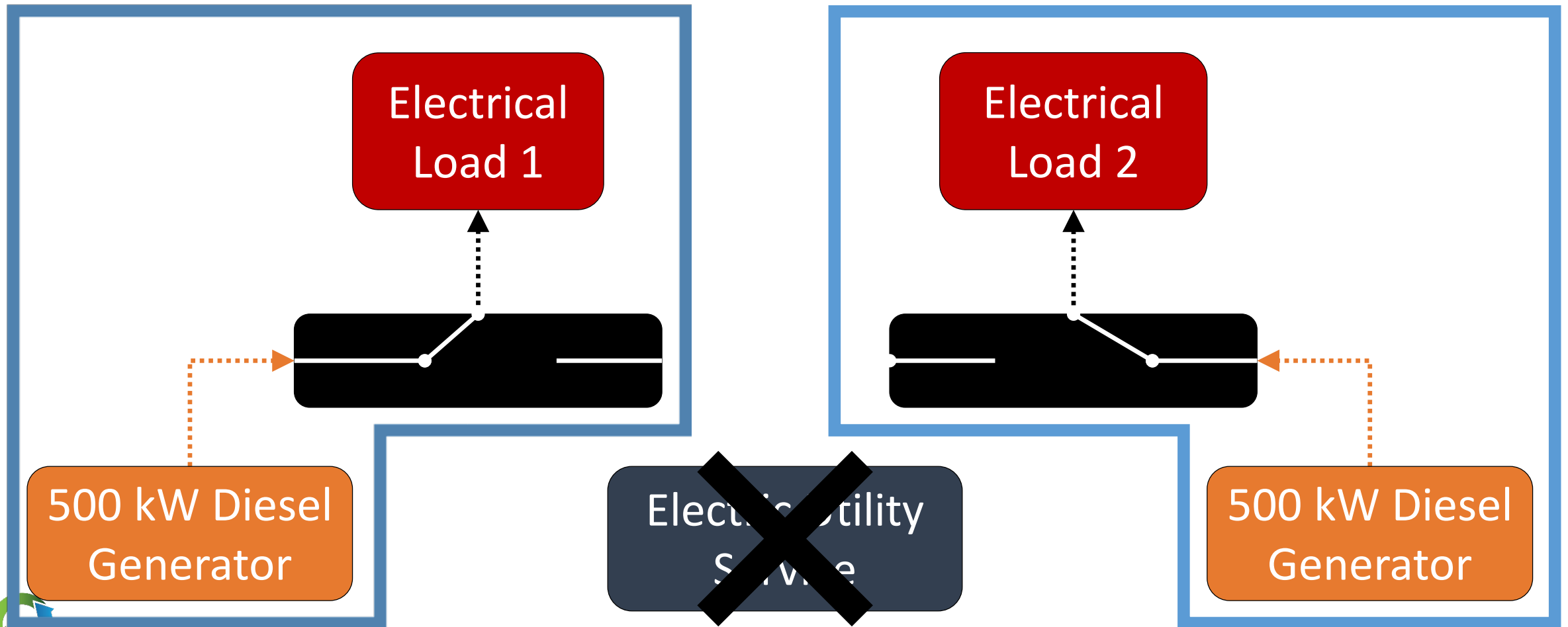


Photo by Michael Young, NREL

Current Layout of Old Krome Electrical System



Current Layout of Old Krome Electrical System

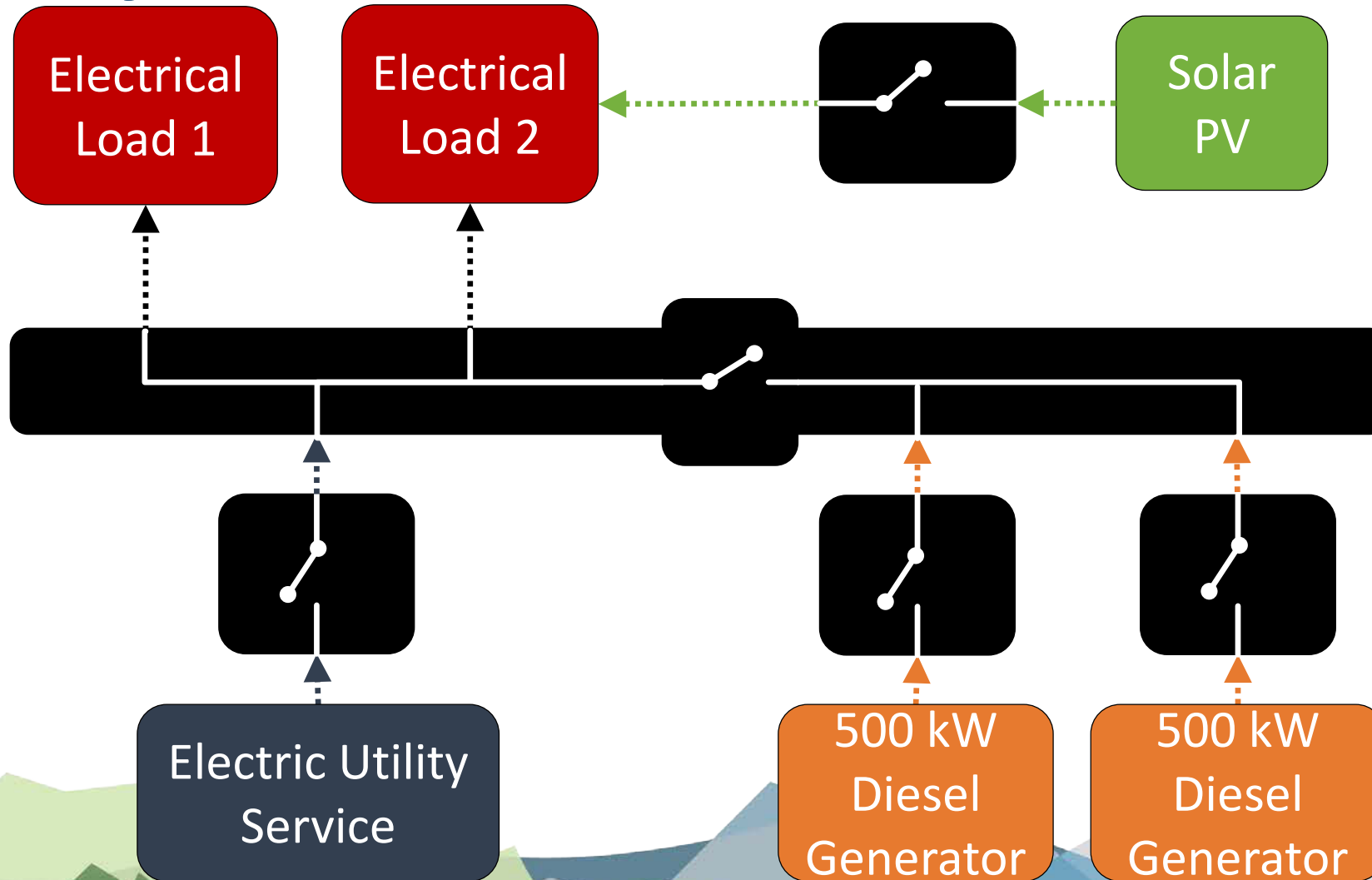


Recommendations to Enhance Resilience

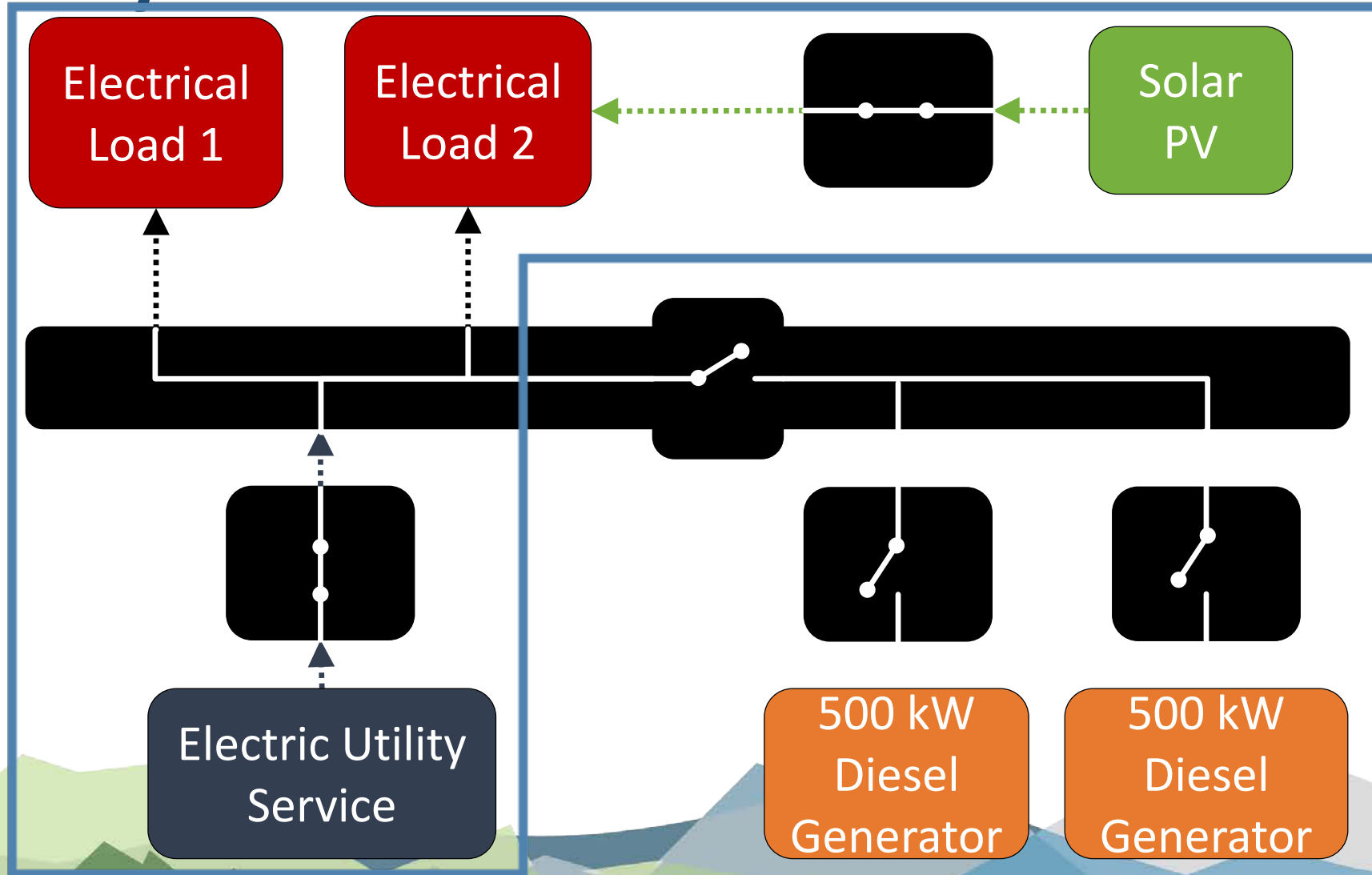
1. Reconfigure Old Krome electrical distribution equipment
 - Replace switchboard
 - Tie both 500 kW generators together to form one Old Krome microgrid
2. Install parking lot canopy solar PV system
3. Upgrade lightning protection and grounding
4. Set up access controls
5. Replace New Krome switchgear enclosures



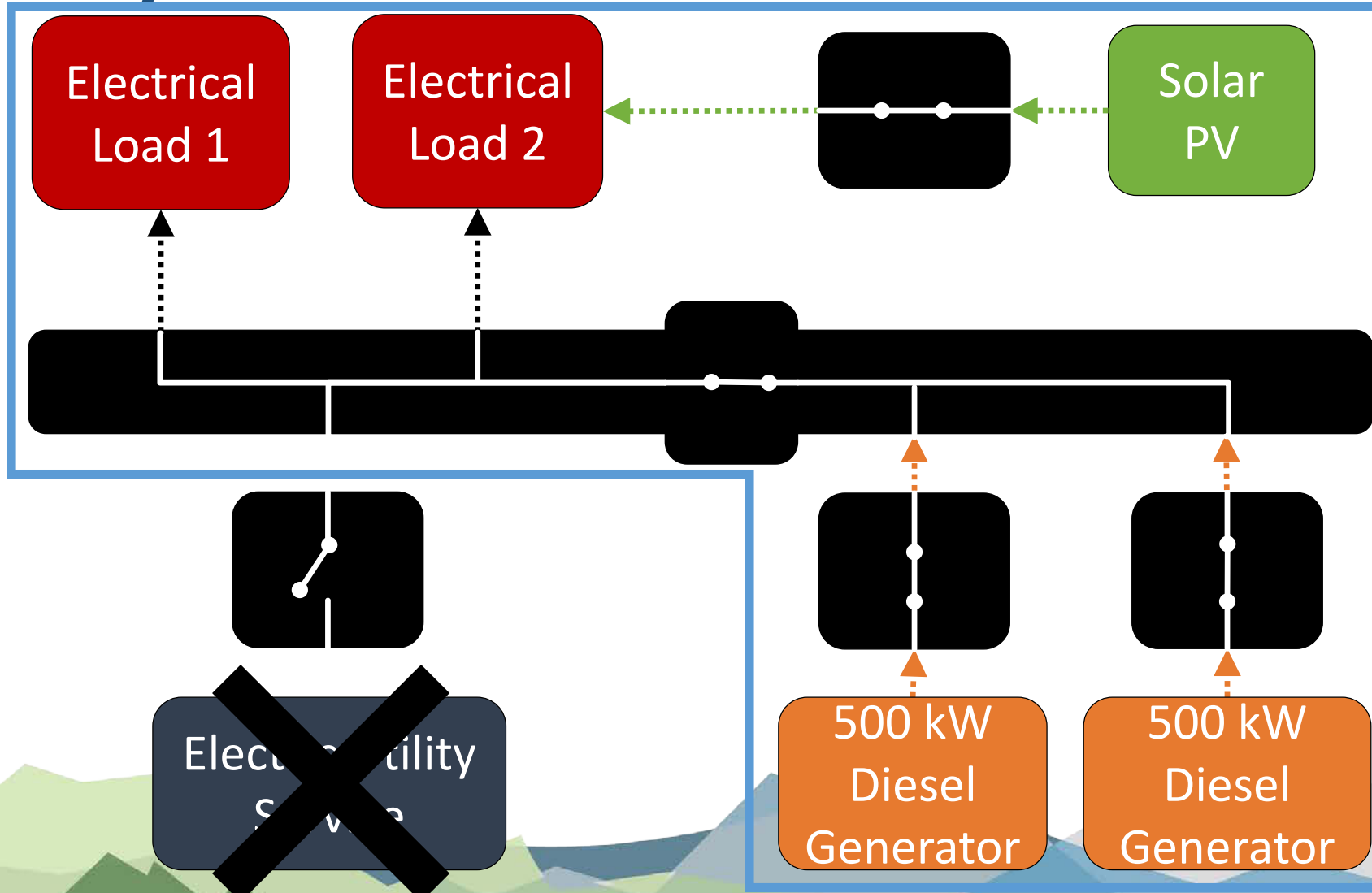
Proposed Reconfiguration of Old Krome Electrical System



Proposed Reconfiguration of Old Krome Electrical System

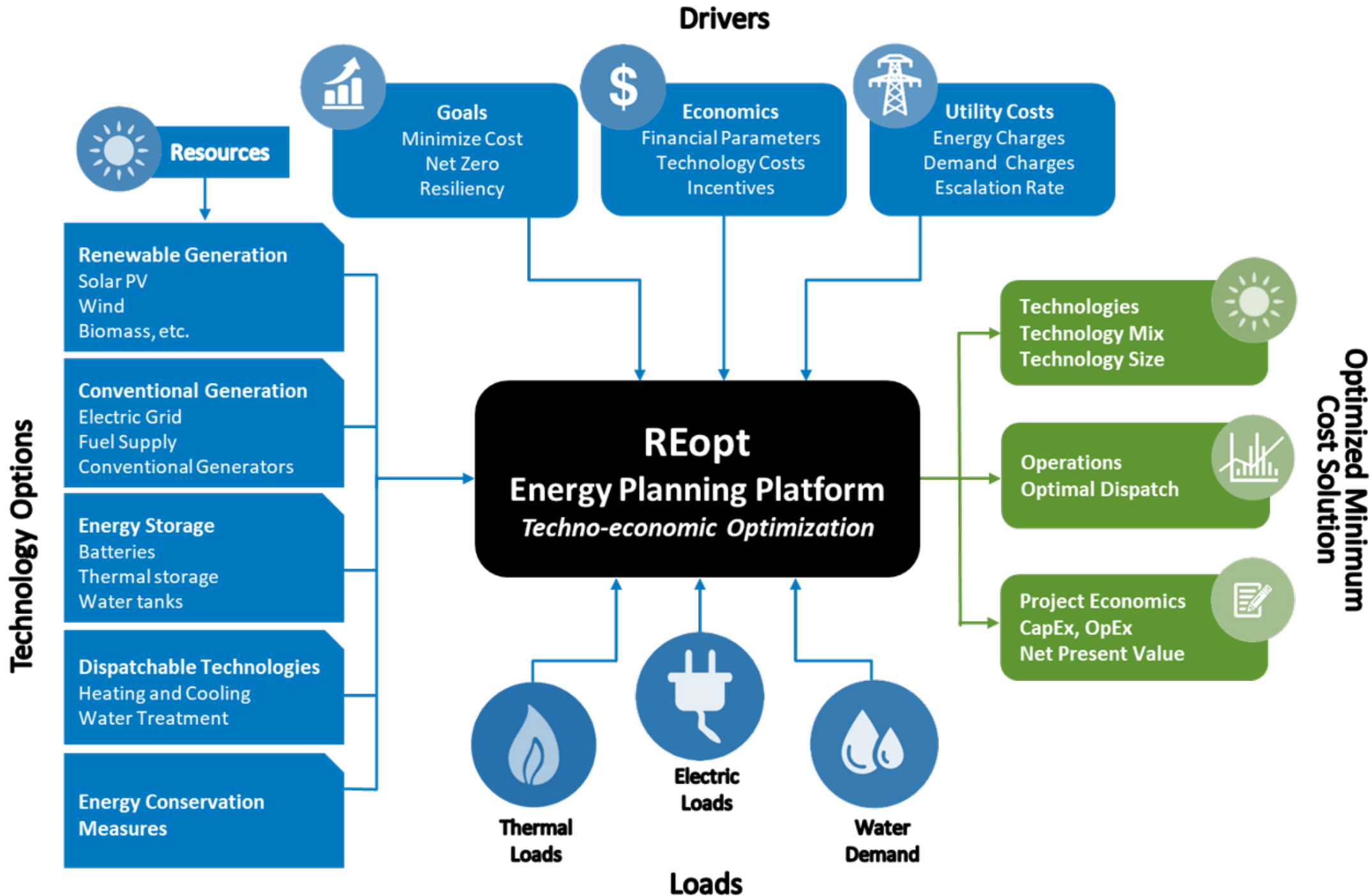


Proposed Reconfiguration of Old Krome Electrical System



Solar PV Optimization Analysis with REopt

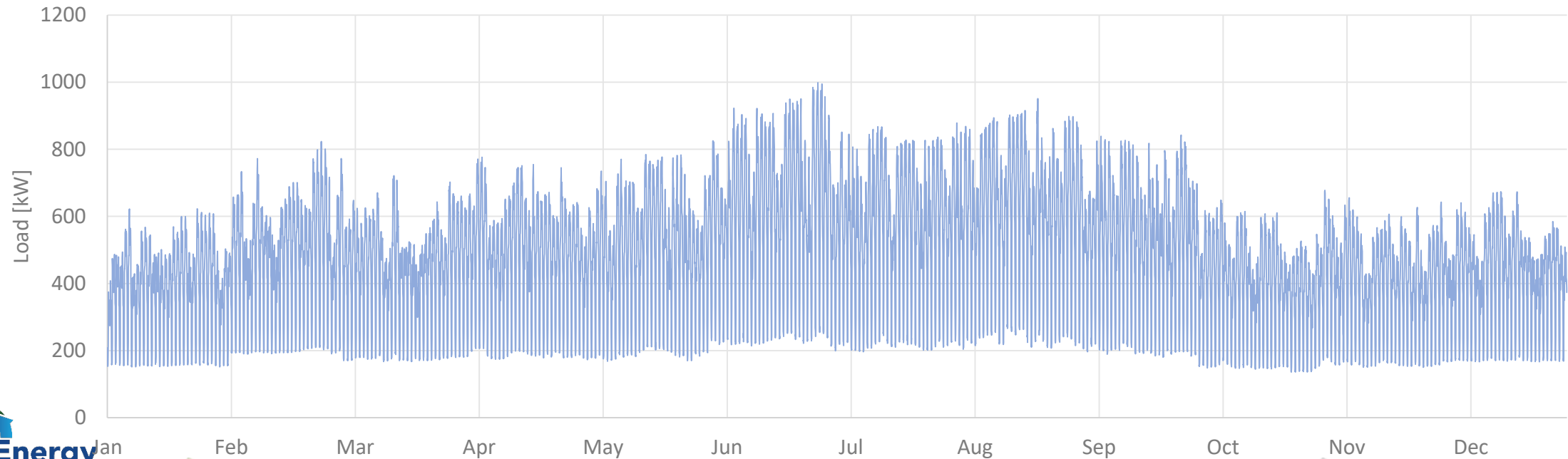




Simulated Electrical Load

- Monthly load data was provided by ICE Krome
- Monthly load data was scaled up by 5% to conservatively account for future load growth
- DOE Commercial Reference Building load profiles, scaled to the site's increased monthly load data, were used to simulate the hourly electrical loads

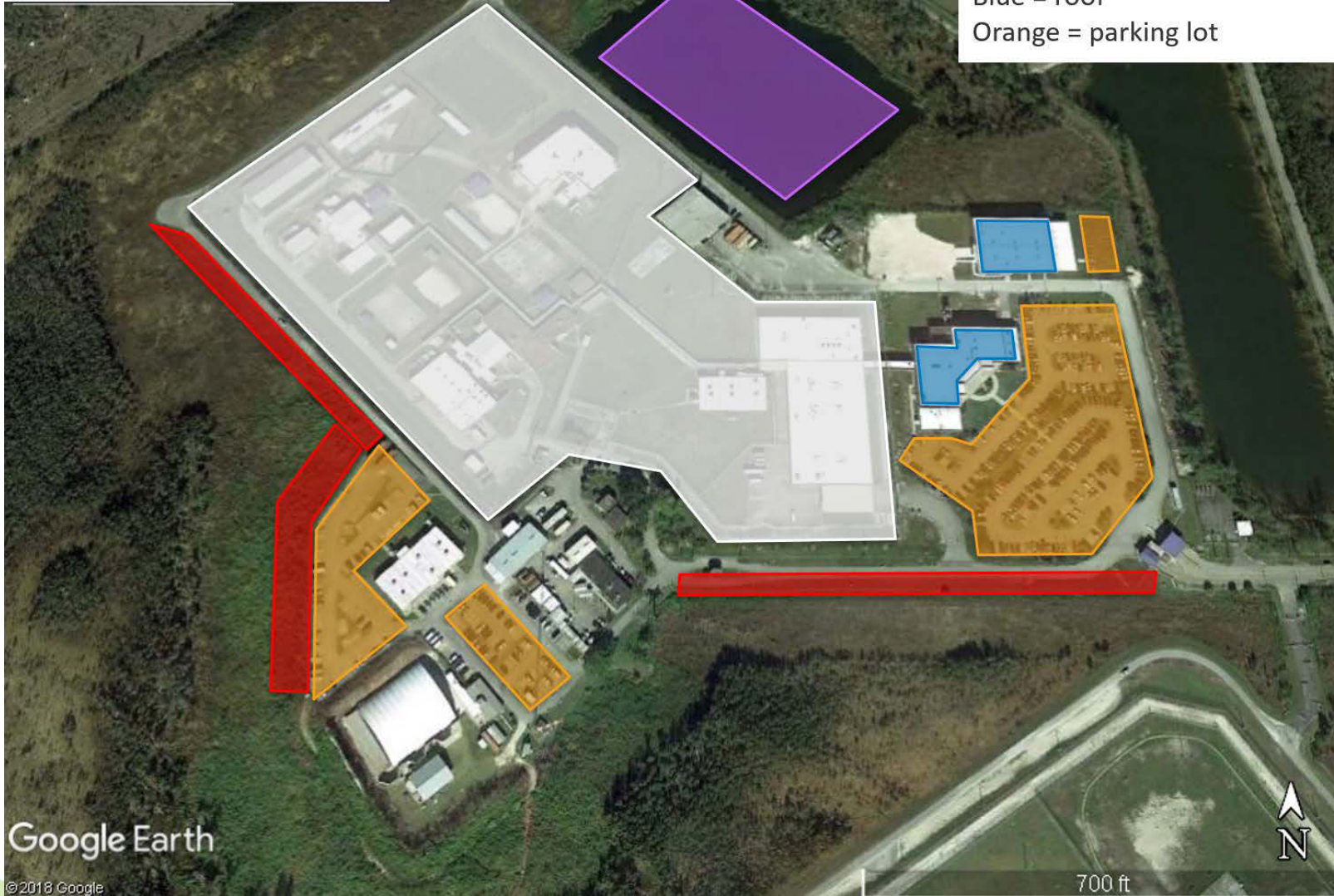
Old Krome Electric Load



Krome SPC

Possible Locations for PV

Red = ground
Purple = water
Blue = roof
Orange = parking lot



Krome SPC
Possible Locations for PV



Google Earth
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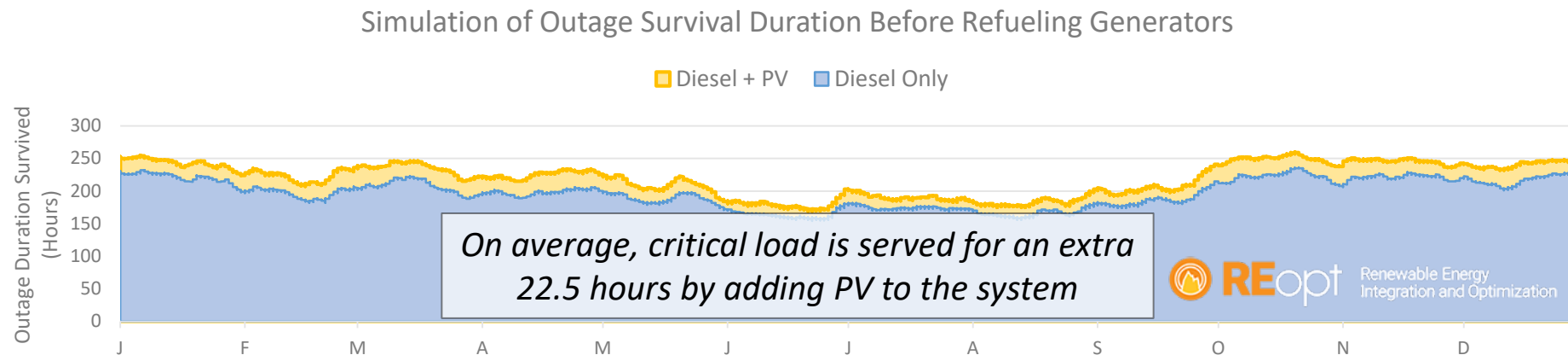
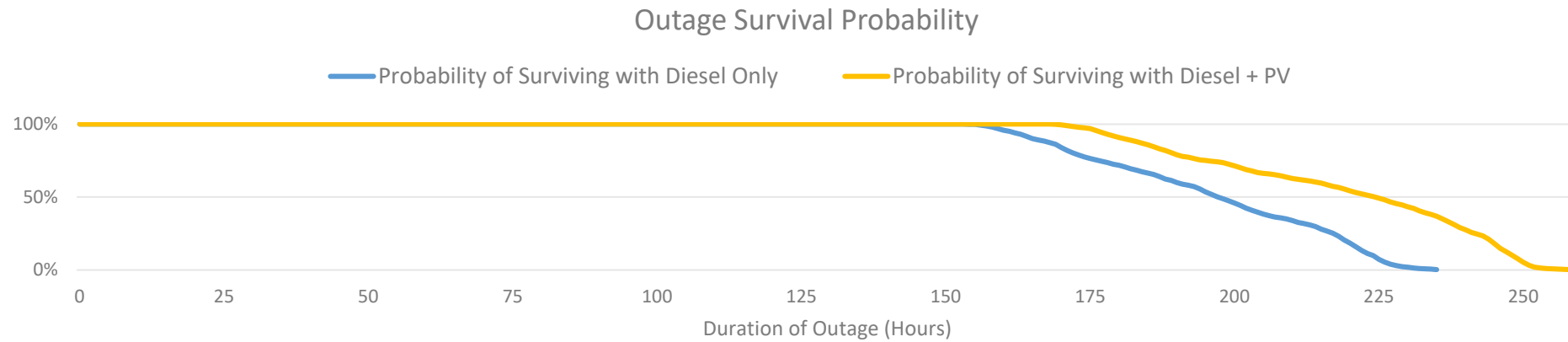


Economic Analysis

- Low cost of electricity for Old Krome account
 - Over 50% less than Florida and National average
- Resilience-optimized solution not economically feasible
- Economically optimized solution simulated for resilience attributes



Solar PV Extends Outage Survivability



Conclusion

- Enhance resilience at ICE Krome SPC by:
 - Replacing switchboard
 - Reconfiguring electrical generation and distribution infrastructure
 - Installing parking lot canopy solar PV system
 - Generates savings for ICE by decreasing grid purchased electricity year round
 - Extends outage survivability by almost a full day (22.5 hours)
 - Decreases cost and emissions associated with islanded microgrid operation



Thank You

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