SABLE ISLAND NATIONAL PARK RESERVE MICROGRID

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AGENDA

ADVANCING A GREENER FUTURE:

Sable Island History, Case for Change, and Timeline of Events

MEETING UNIQUE CHALLENGES:

Developing a Sustainable Microgrid in a Remote Location

MODERNIZING REMOTE ENERGY SUPPLY:

Microgrid Design & Key Components

SAVING ANNUAL FUEL CONSUMPTION:

Comparing Existing Power Plant vs. New Power Plant

SETTING A NEW STANDARD:

Lessons Learned in Remote Microgrid Design

QUESTIONS

ABOUT THE ISLAND

A UNIQUE ECOSYSTEM

- 42 km long
- 290 km southeast of Halifax
- Home to over 190 plant species, 350 bird species, 375 wild horses

ABOUT THE ISLAND

A REMOTE AND ISOLATED PLACE

Seasonally accessible by sealift

Lack of wharf structure = limitations on materials size and weights

Helicopter and flights limited to 1500 lbs / four people

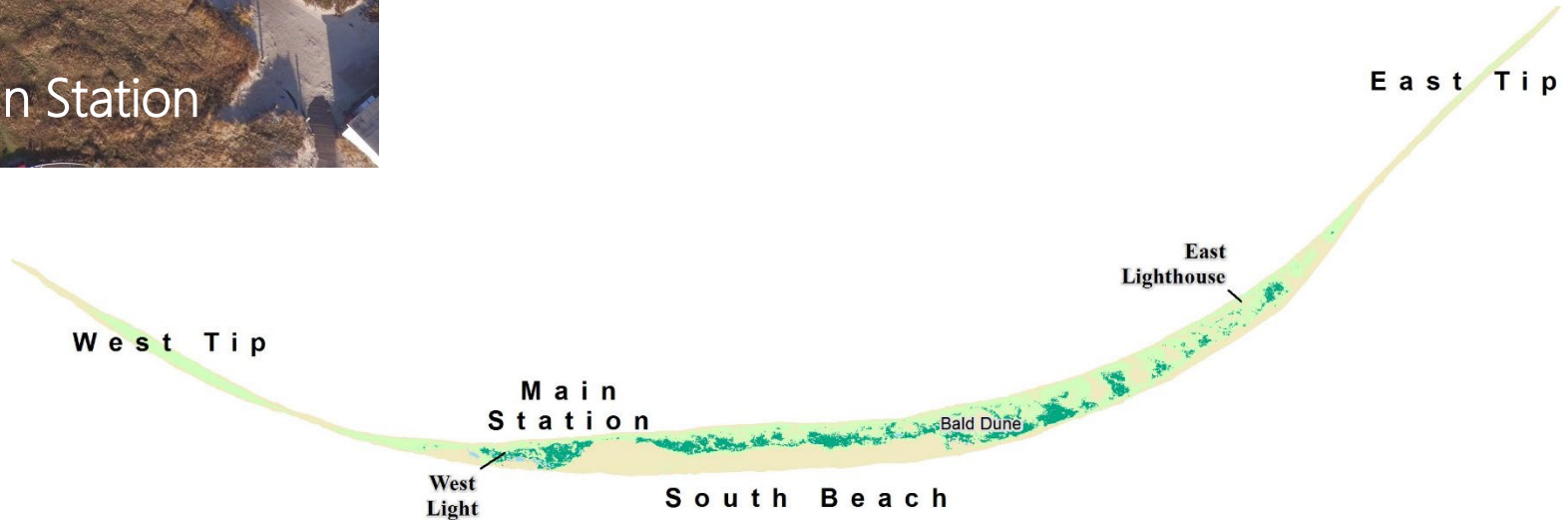
ABOUT THE ISLAND

A NEW CHAPTER OF STEWARDSHIP

2013: Sable Island National Park Reserve Established

2019: SINPR Management Plan Launch, key strategies:

- ✓ Protect national and cultural heritage
- ✓ Facilitate support for conservation
- ✓ **Increase sustainability, innovation, efficient operations** (target: 50% fossil fuel reduction)



ADVANCING A GREENER FUTURE

TIMELINE OF EVENTS

STRATEGIZE

Action *2019 Management Plan* key strategy: sustainability, innovation and efficient operations

2020

2021

CONCEPTUALIZE

Explore microgrid options and technical solutions, develop concept designs, assess viability & costing

2022

REFINE DESIGN

Develop detailed design package and construction documents for preferred solution

2023

ISSUE FOR TENDER

Two-phase qualification, shortlisted proponents visit Sable Island to assist with project understanding

2024

CONSTRUCT

Build a new green micro-grid power generation system

2025

STRATEGIZE

Action *2019 Management Plan* key strategy: sustainability, innovation and efficient operations

REFINE

Develop det
package and
documents f
solu

CONCEPTUALIZE

Explore microgrid options and technical solutions, develop concept designs, assess viability & costing

WHY ARE MICROGRIDS IMPORTANT?

MEETING UNIQUE CHALLENGES

DEVELOPING A SUSTAINABLE MICROGRID IN A REMOTE LOCATION

ENERGY RESILIENCE

Reduce diesel used in fixed speed generators and associated CO_2 emissions.

ENVIRONMENTAL IMPACT

Mitigating risks in an ecologically sensitive area and managing construction around bird migration patterns.

REMOTE ISLAND LOGISTICS

Getting people and materials that can withstand harsh conditions to safely to site and planning around the yearly sealift.

MODERNIZING REMOTE ENERGY SUPPLY

MICROGRID DESIGN APPROACH & ACHIEVEMENTS

Designing with Constructability and Maintainability top of mind.

Key Components:

1. CVT Generator & Microgrid Control System
2. Solar Energy Generation
3. Battery Storage Technology

ACHIEVEMENTS

62%
Reduction in fuel consumption on island per year (includes heating and vehicle fuel)

62%
Reduction in GHG emissions by >160 tons of CO_2 emissions per year

Equivalent to saving annual emissions from 30 homes per year

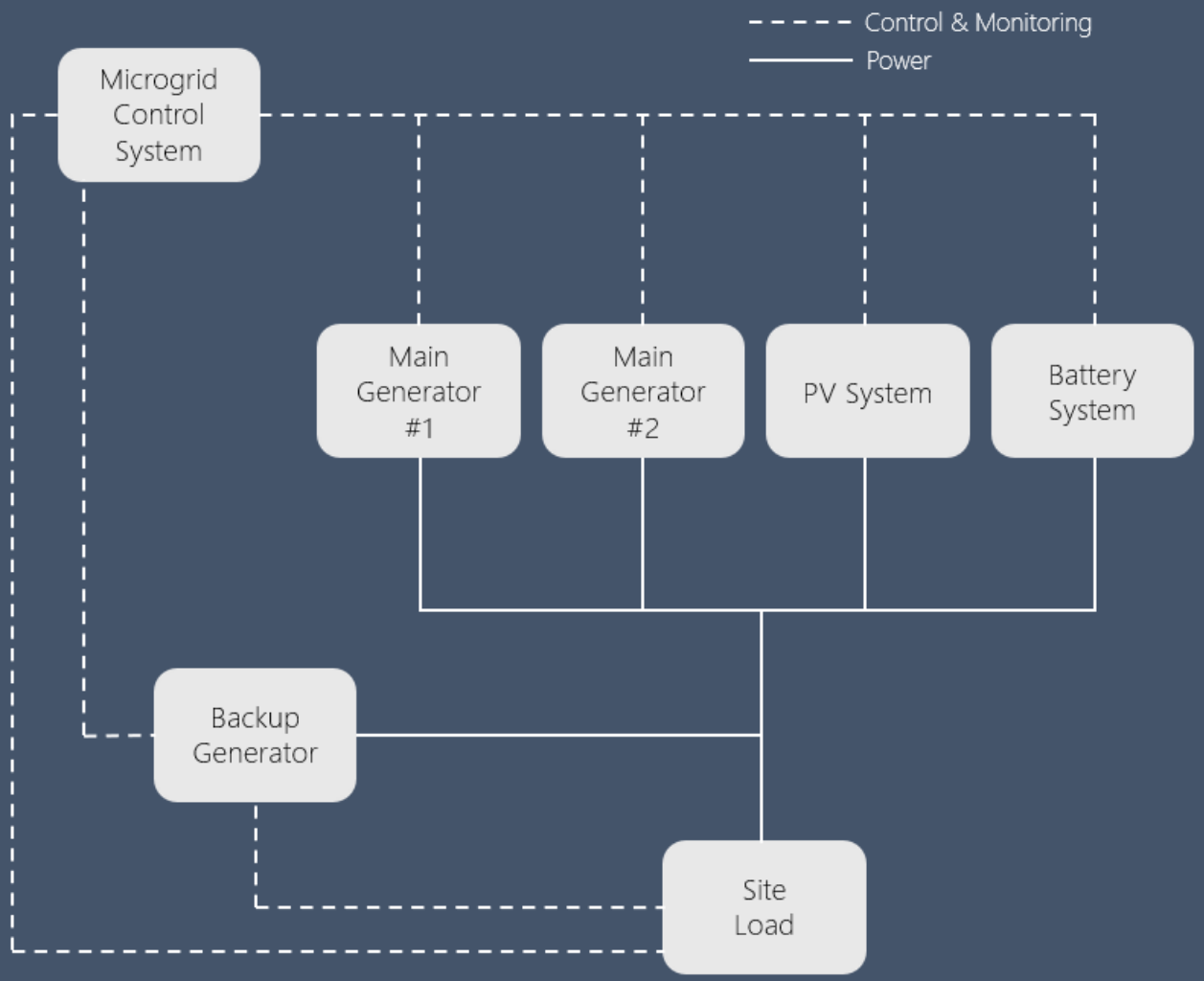
$364k
Annual savings in energy costs

1. CVT GENERATOR & MICROGRID CONTROL

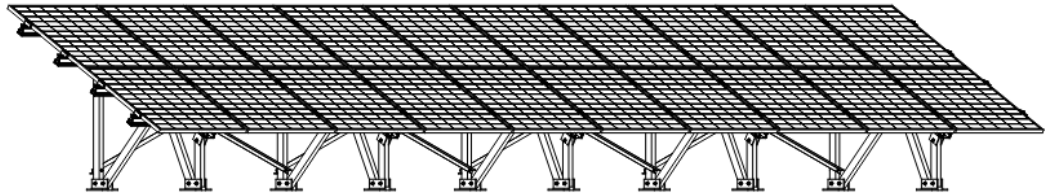
MODULAR/EXPANDABLE FOR FUTURE GROWTH

BUILT IN REDUNDANCY

PROVIDES DIAGNOSTIC INFORMATION



2. ROBUST SOLAR ENERGY GENERATION



30 YEAR PRODUCT & PERFORMANCE GUARANTEE

ABLE TO WITHSTAND UP TO 500KG/M²

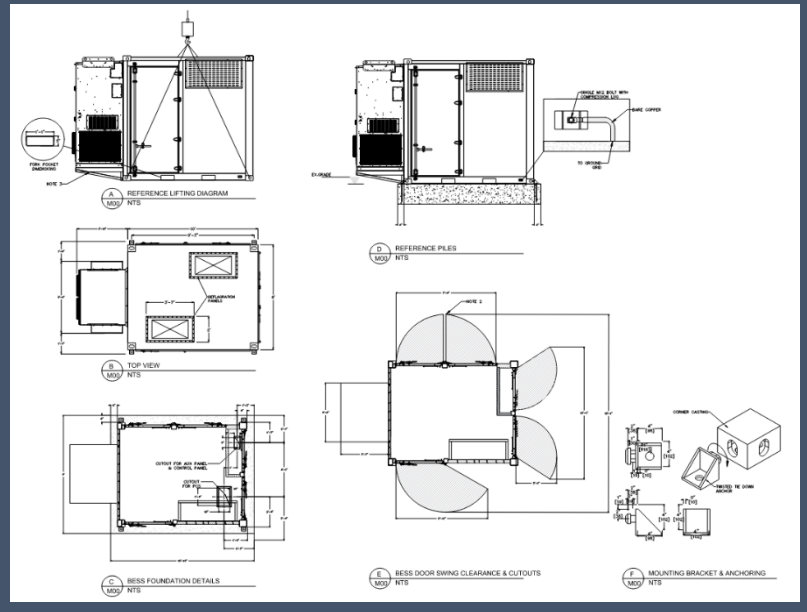
TESTED TO IEC 61701 (Salt Mist Corrosion)

3. BATTERY STORAGE TECHNOLOGY

ACTS AS AN ENERGY BUFFER

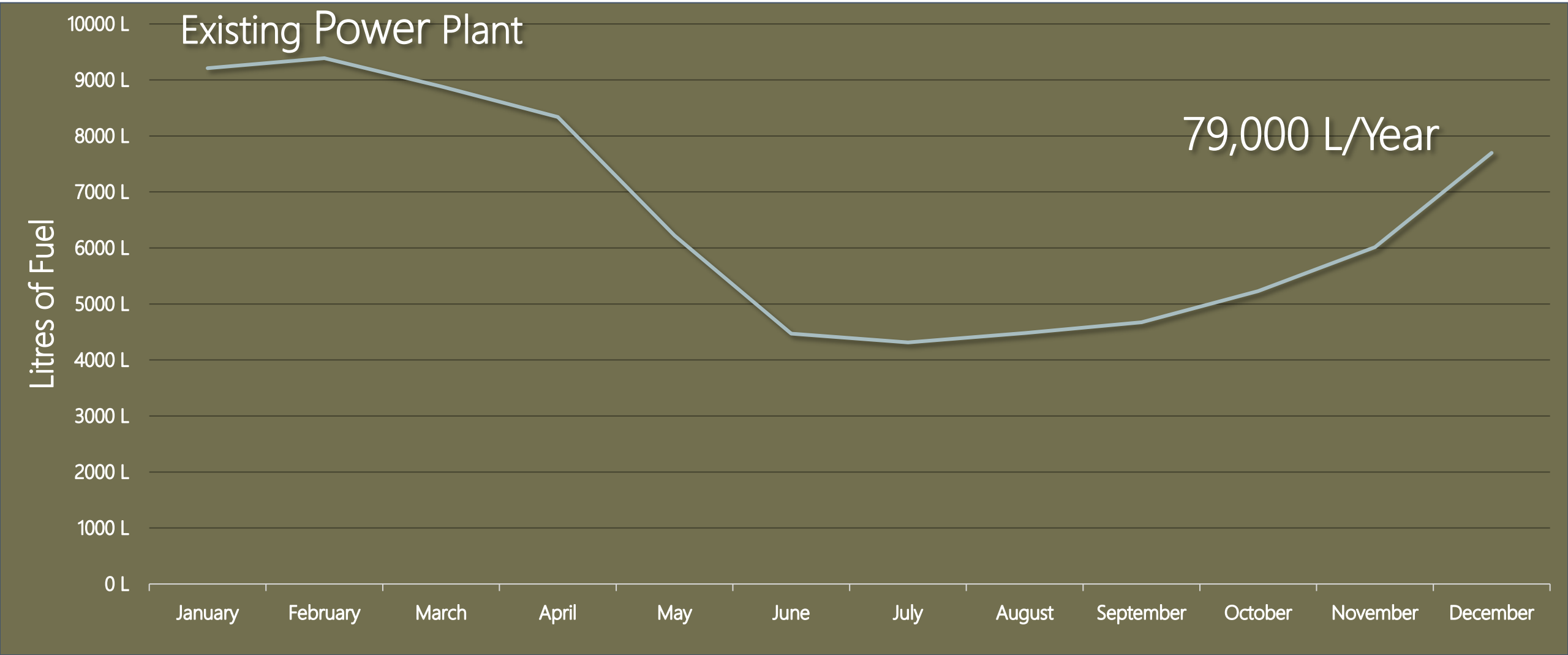
BUILT FOR HARSH ENVIRONMENT

COMPRISED OF “OFF THE SHELF” COMPONENTS



SAVING ANNUAL FUEL CONSUMPTION

COMPARING EXISTING POWER PLANT VS. NEW POWER PLANT (EXCLUDES HEATING & VEHICLE FUEL CONSUMPTION)



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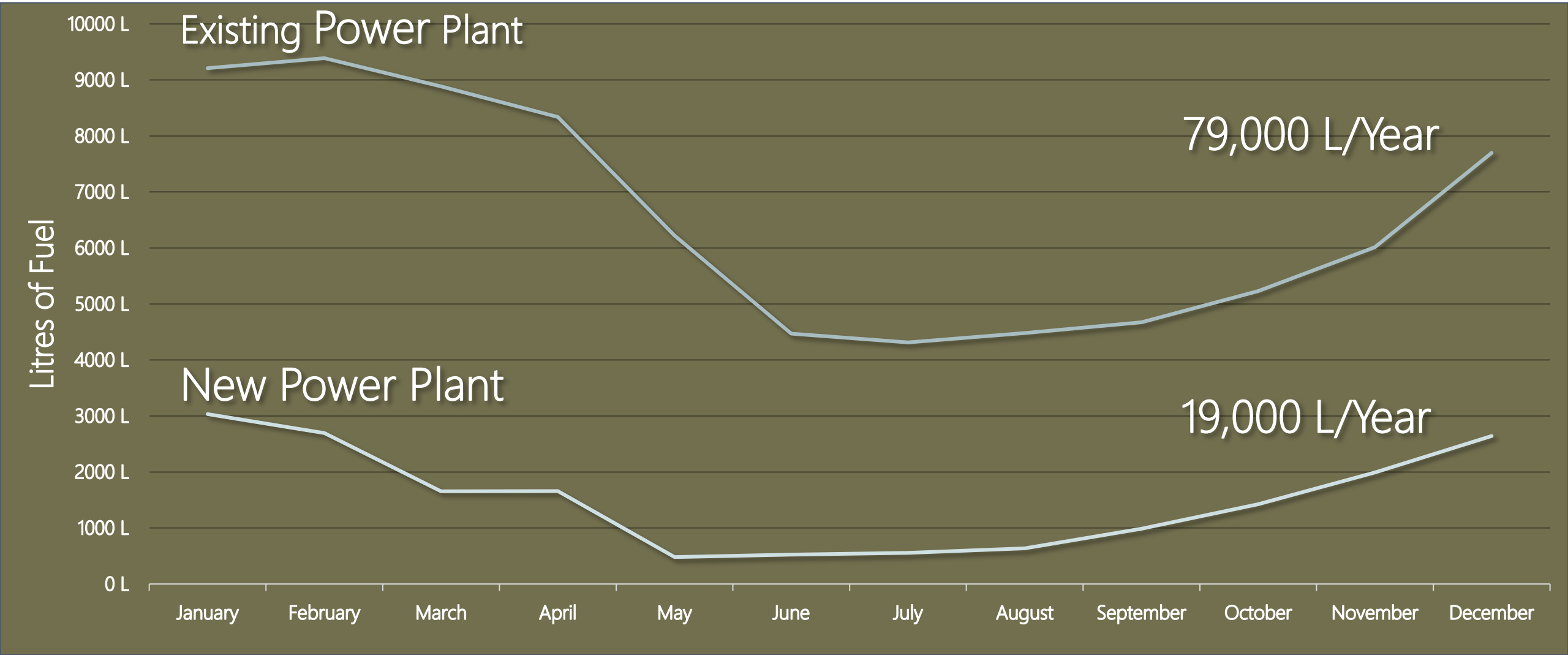
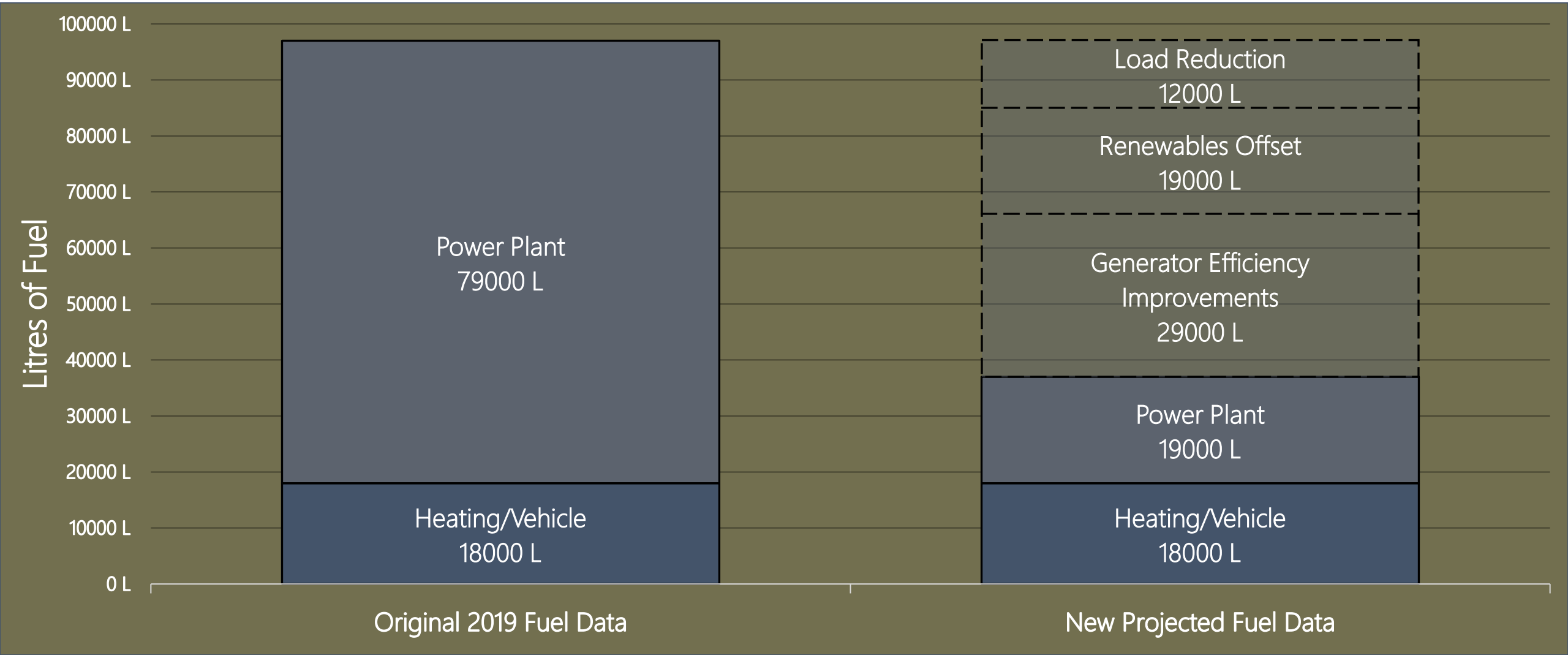


BREAKDOWN OF FUEL SAVINGS

COMPARING 2019 DATA TO NEW PROJECTIONS



SETTING A NEW STANDARD

LESSONS LEARNED IN REMOTE MICROGRID POWER GENERATION

1 LESSON Modularity in design supports downstream flexibility

- Scalability
- Simplified Maintenance/ Upgrades
- Risk Mitigation
- Adaptability to Site Conditions
- Possible Shorter Timelines

SETTING A NEW STANDARD

LESSONS LEARNED IN REMOTE MICROGRID POWER GENERATION

2 LESSON

Operators involved in design decisions

- Site Specific Knowledge
- Lifecycle Maintenance Considerations
- Customize Monitoring and Control Strategy
- Increased Buy-in and Responsibility
- Design Phase System Training

SETTING A NEW STANDARD

LESSONS LEARNED IN REMOTE MICROGRID POWER GENERATION

3 LESSON

Less can go wrong with simple design

- Faster and More Efficient Construction
- Lower Material Cost and Waste
- Enhanced System Reliability
- Easier Quality Control and Commissioning
- Lower Long Term Maintenance Costs
- Simplified Budget Control

SETTING A NEW STANDARD

LESSONS LEARNED IN REMOTE MICROGRID POWER GENERATION

4 LESSON Use proven, off-the-shelf technologies to reduce risk

- Known Reliability in Harsh Conditions
- Understood Maintenance Practices
- Reduced Lifecycle Costs
- Competitive Pricing on Materials
- Smooth System Integration
- Easier Upgrades and Expansion


THANK YOU.
QUESTIONS?
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