Applications That Reduce The Use Of Diesel Gensets

PARTNERS: DOE-SANDIA-ACEP-CEC; SAFT/ABB PACKAGE

Office of ELECTRICITY

ABB

Sandia National Laboratories

ACEP
Alaska Center for Energy and Power

CEC

SAFT

Cordova Alaska Aerial View

Humpback Creek Hydroelectric Plant
1250kW (2 x 500 kW + 1 x 250 kW)
17,000 foot UG and submarine transmission line

Power Creek Hydroelectric
6278kW (2 x 3124 kW)
25 kV transmission ties to Eyak Substation, Inflatable dam

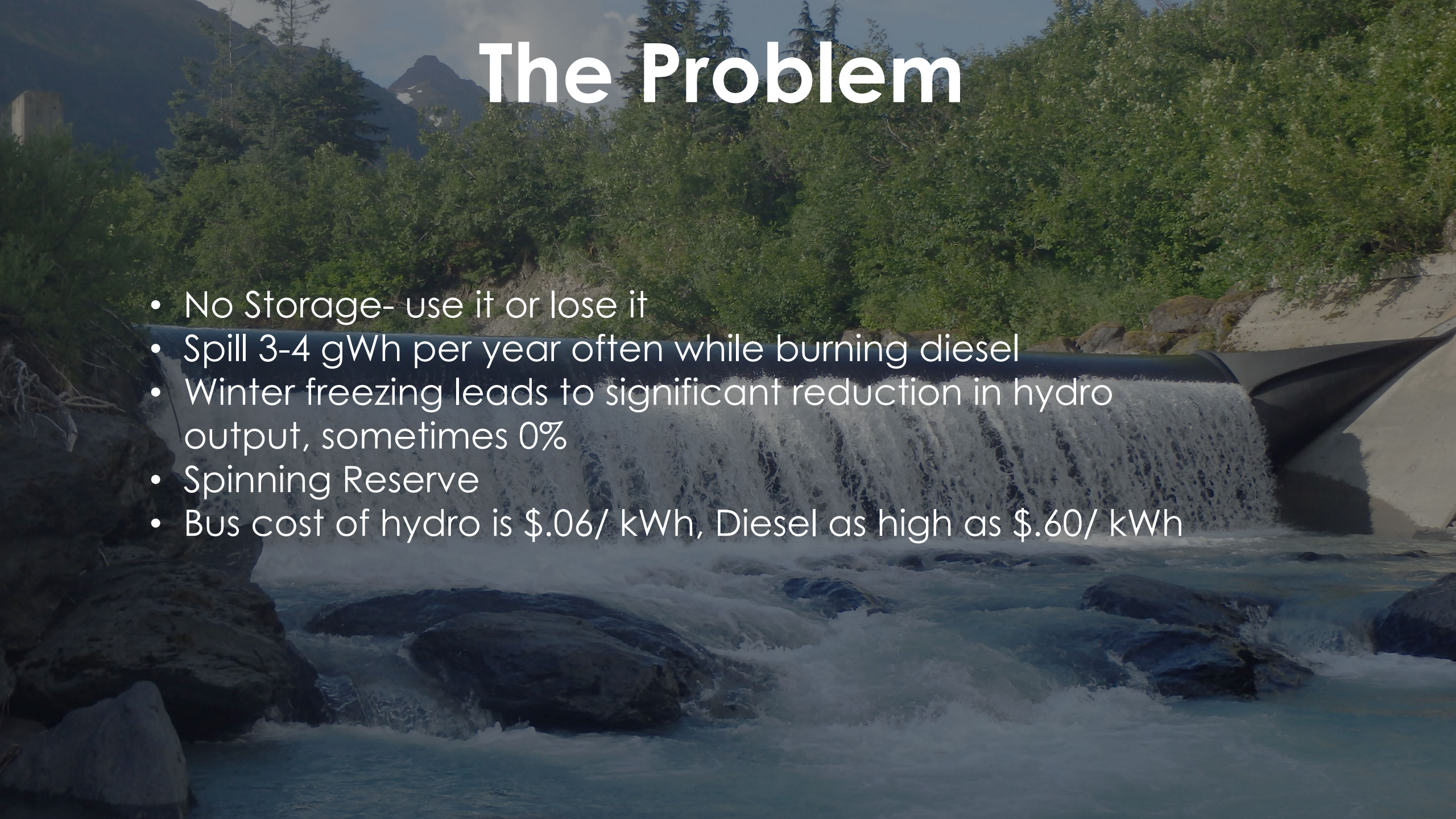
City of Cordova
1,566 customers, 18MW
One Substation
78mi UG distribution lines

Orca Power Plant
10.8 MW Diesel
Control Center, CEC

Crater Lake Dam Storage
may offset 25% Diesel consumption


Power Creek
Hydroelectric Intake

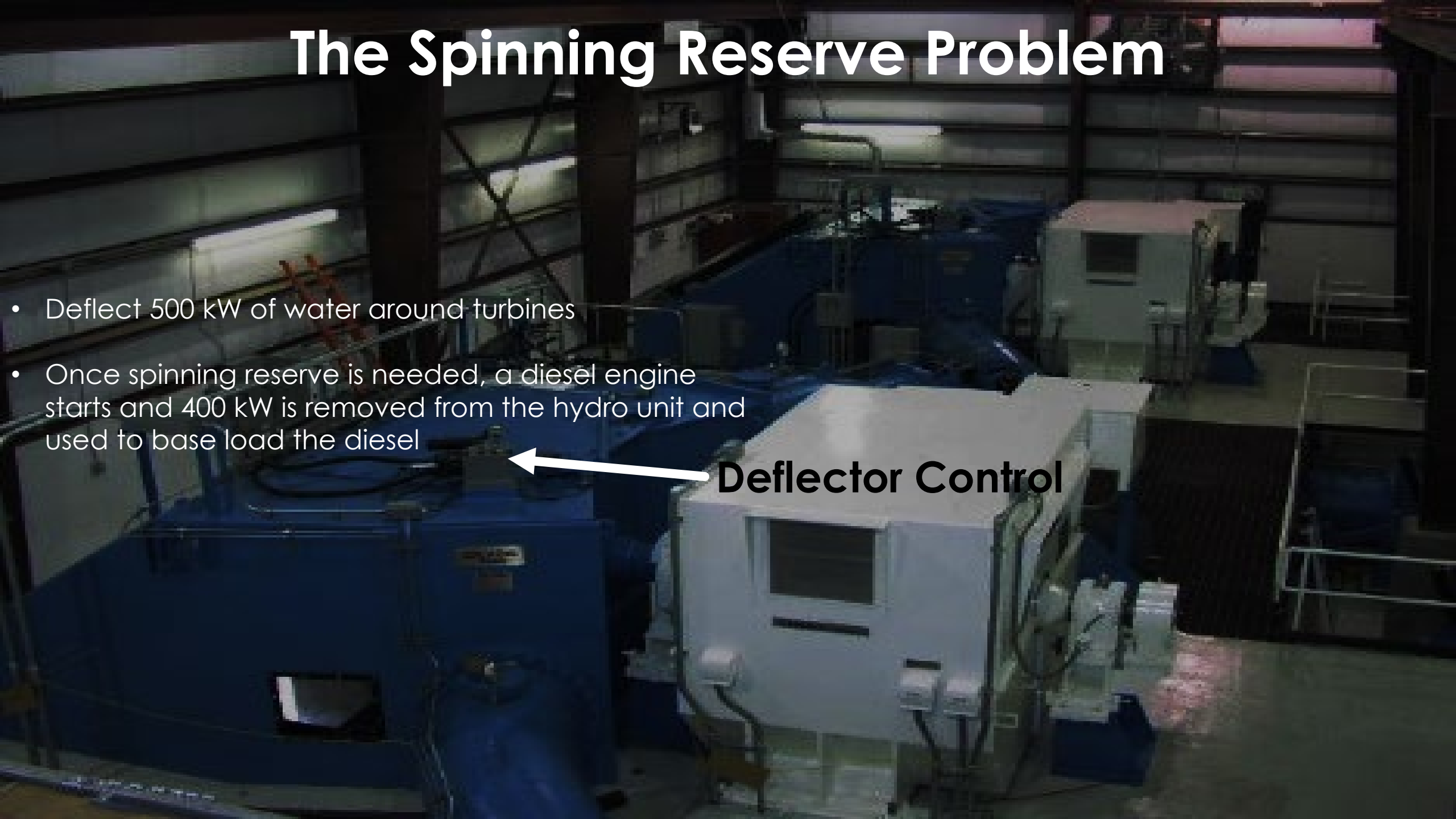
The Problem



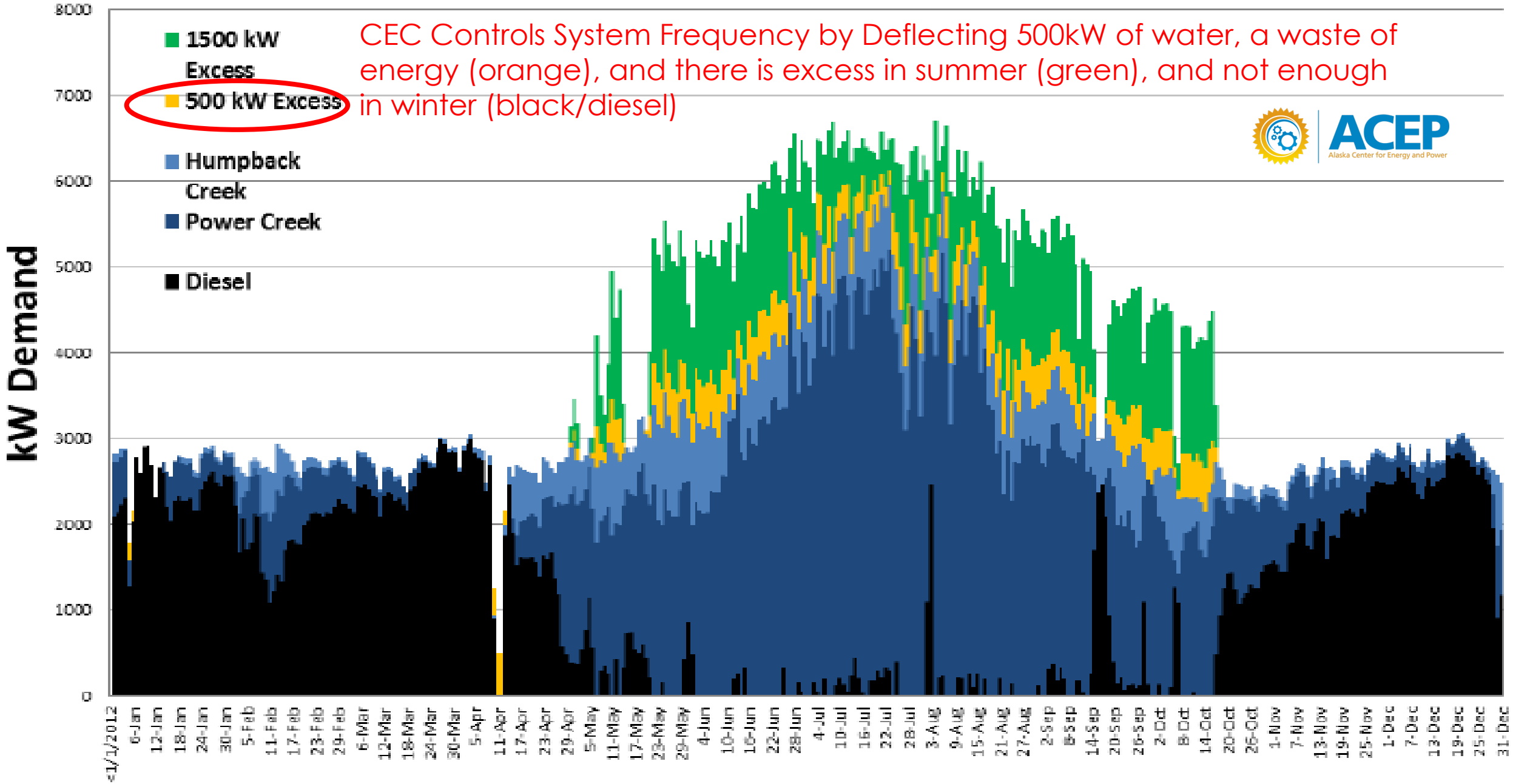
- No Storage- use it or lose it
- Spill 3-4 gWh per year often while burning diesel
- Winter freezing leads to significant reduction in hydro output, sometimes 0%
- Spinning Reserve
- Bus cost of hydro is $.06/ kWh, Diesel as high as $.60/ kWh

The Spinning Reserve Problem

- Deflect 500 kW of water around turbines
- Once spinning reserve is needed, a diesel engine starts and 400 kW is removed from the hydro unit and used to base load the diesel



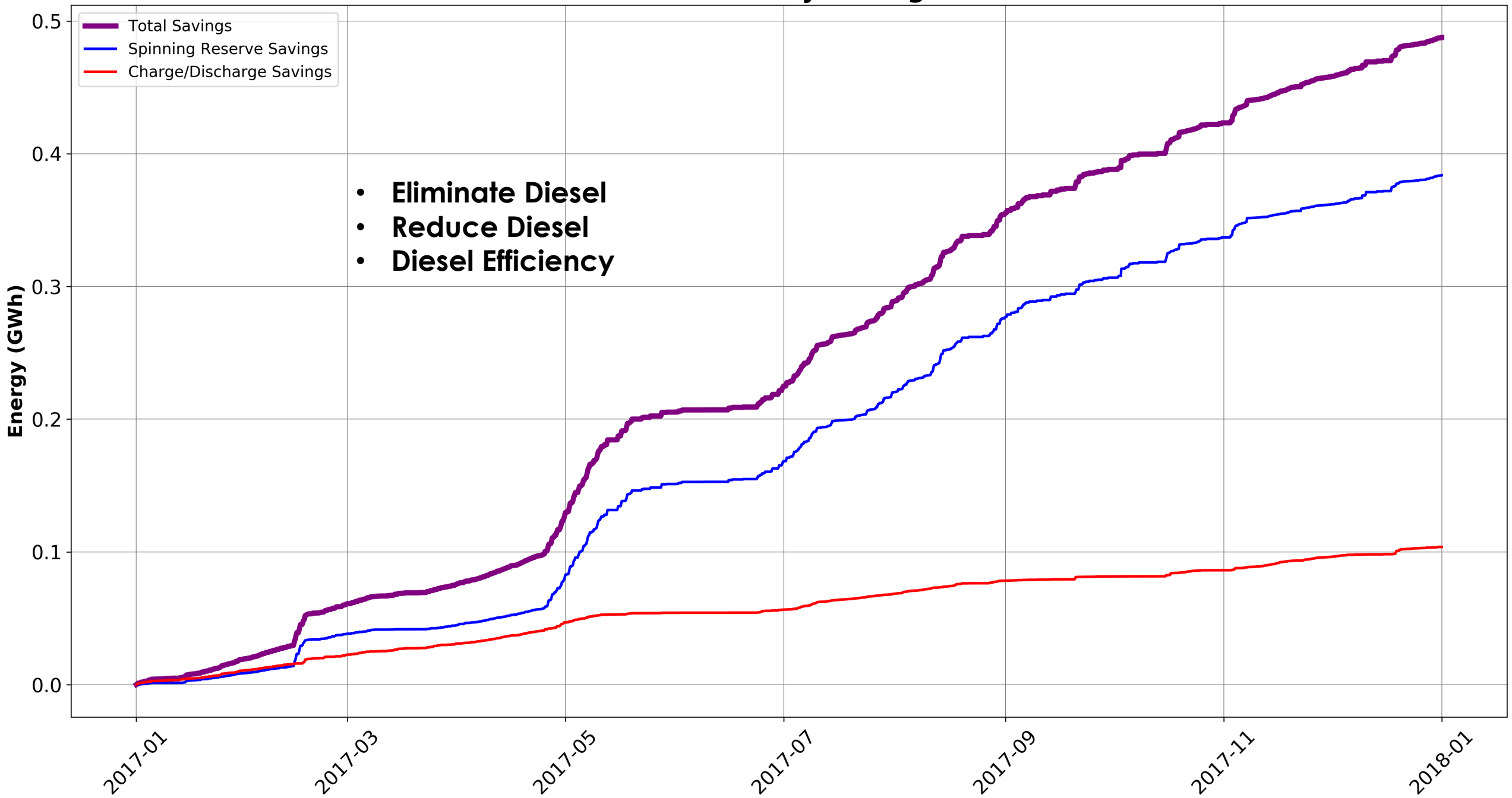
Avg Daily kW Load 2012 w/ Excess Hydro

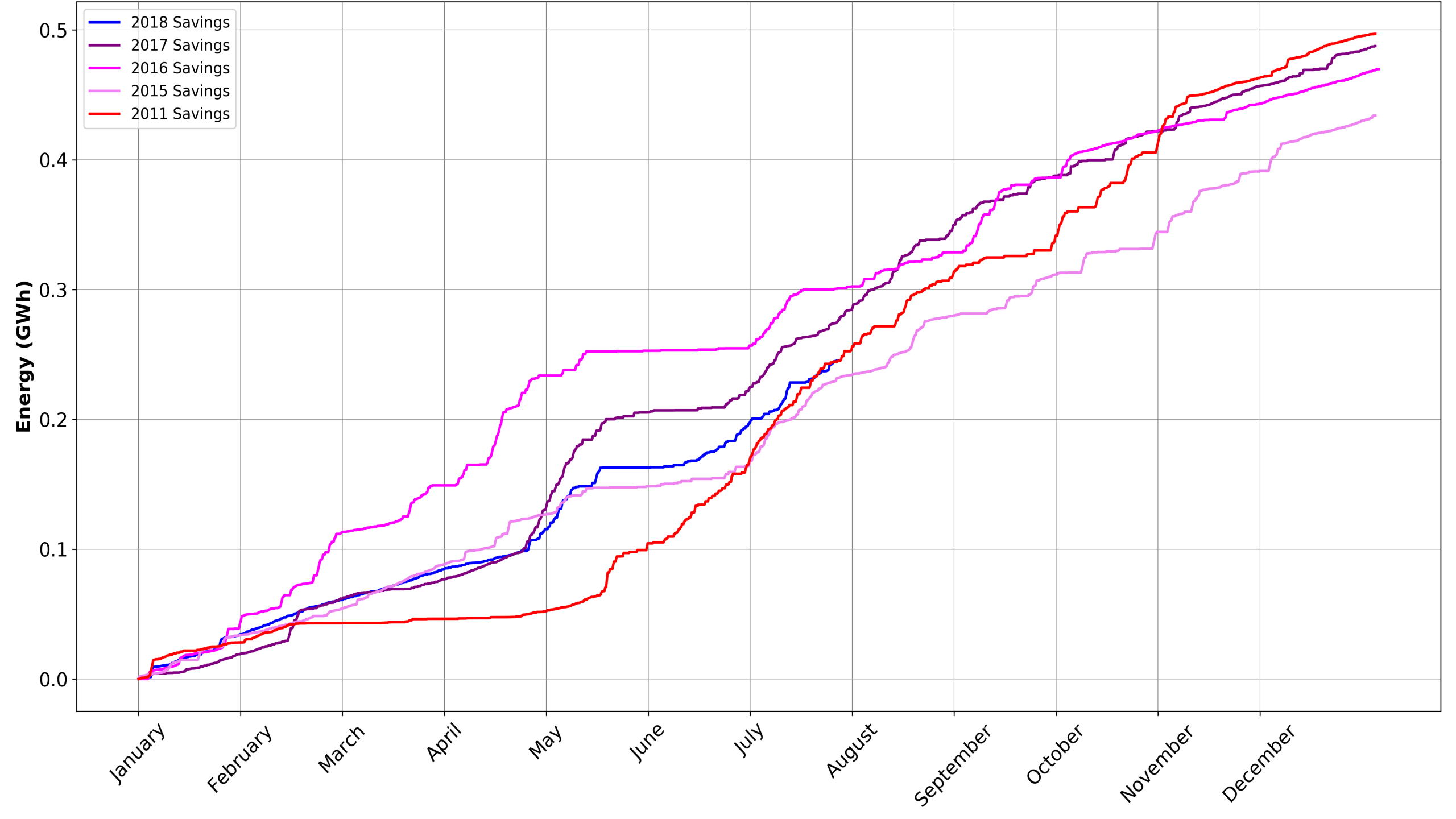


Battery Benefits

- Spinning Reserve
  - Eliminate Diesel
  - Reduce Diesel
  - Diesel Efficiency
- Diesel Efficiency
  - Diesel-off
  - Diesel shut-off
  - Diesel Efficiency
- Resiliency
  - Natural Disasters- Earthquakes, Tsunamis, Avalanches
- Arbitrage
  - Charge with $.06 hydro

Total Potential Battery Savings thru 2017




2018 Savings
2017 Savings
2016 Savings
2015 Savings
2011 Savings
Energy (GWh)
0.0
0.1
0.2
0.3
0.4
0.5
January
February
March
April
May
June
July
August
September
October
November
December

Summary

- A BESS is the best fit for Cordova Electric Cooperative.
- Not possible without partners; DOE, Sandia, ACEP
- Swiss Army Knife
  - Storage, Spinning Reserve, Black Start Capabilities, UPS for Critical Loads, Sectionalizing our Local Microgrid
- Opens the door for solar


Questions?