

# 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

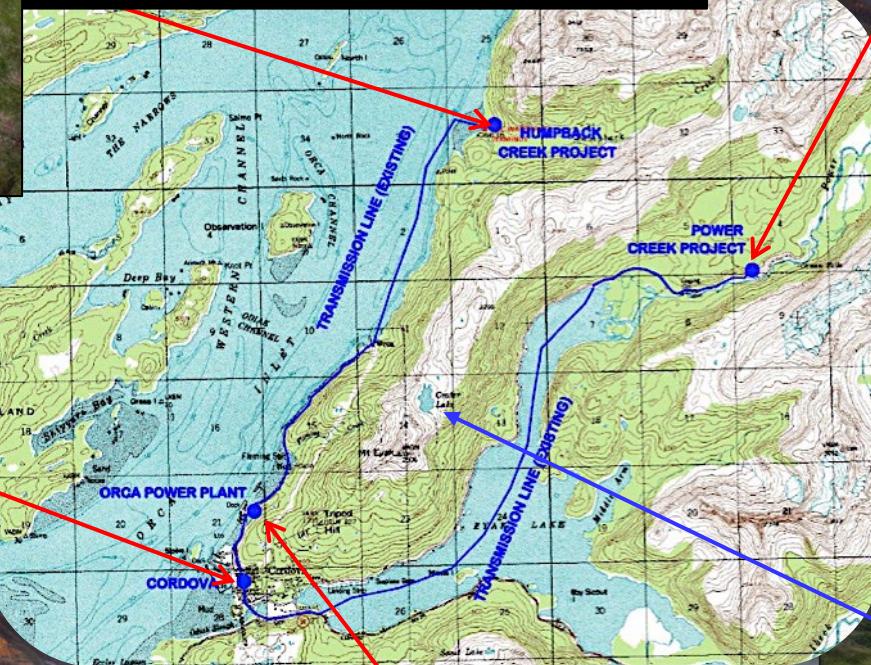


# Cordova Alaska Aerial View





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



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



**Orca Power  
Plant**  
10.8 MW Diesel  
Control Center,  
CEC



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



**Crater Lake Dam Storage**  
may offset 25% Diesel  
consumption



An aerial photograph of a river flowing through a hilly landscape. A concrete intake structure with a green roof and a tall black pipe is situated on a rocky riverbank. A metal walkway extends from the structure into the river. The water is turbulent and white. A paved road runs parallel to the river on the left. The surrounding terrain is a mix of green forest and brown, rocky hills.

# 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

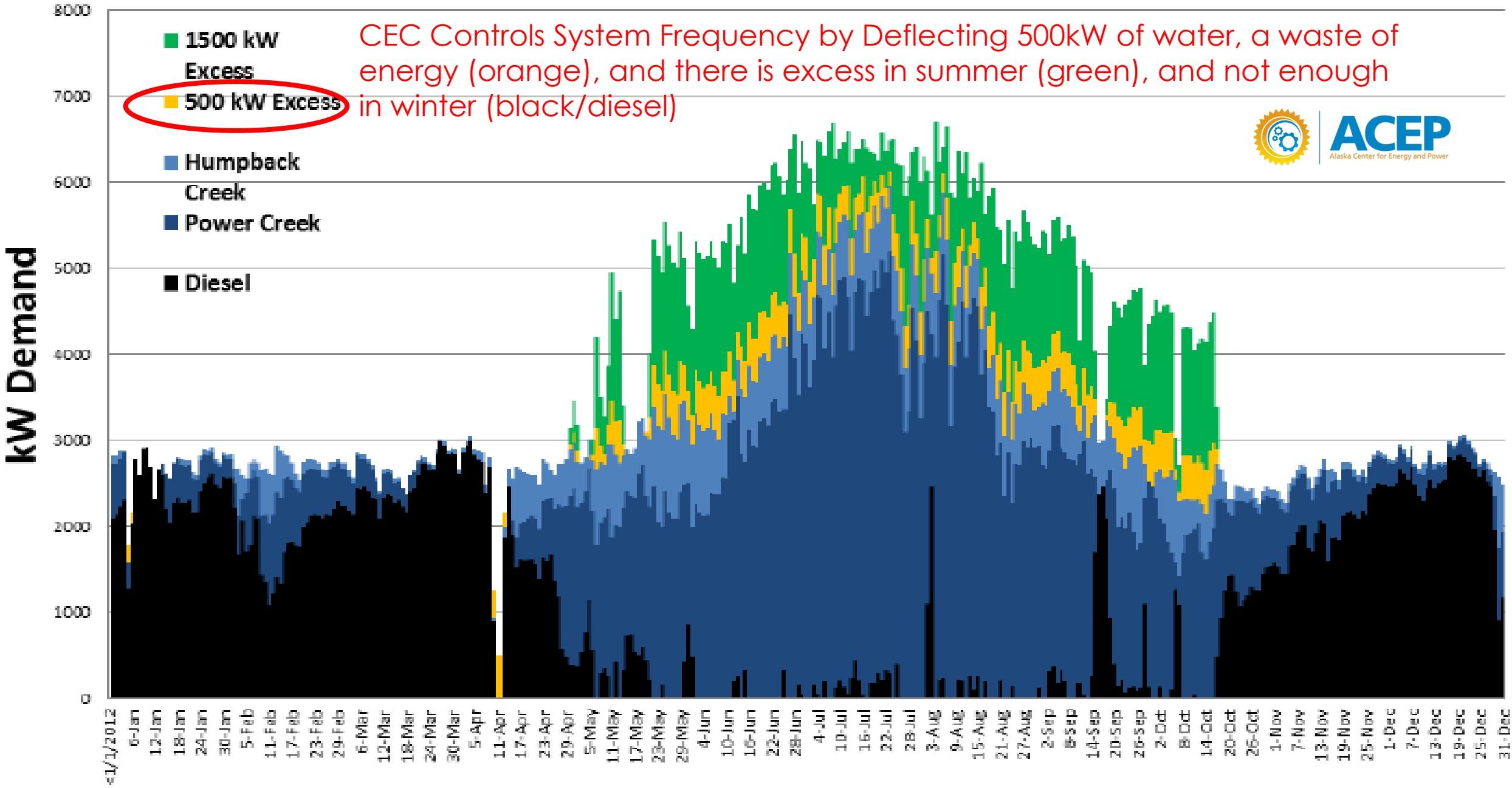
# The Spinning Reserve Problem

- 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



**Deflector Control**

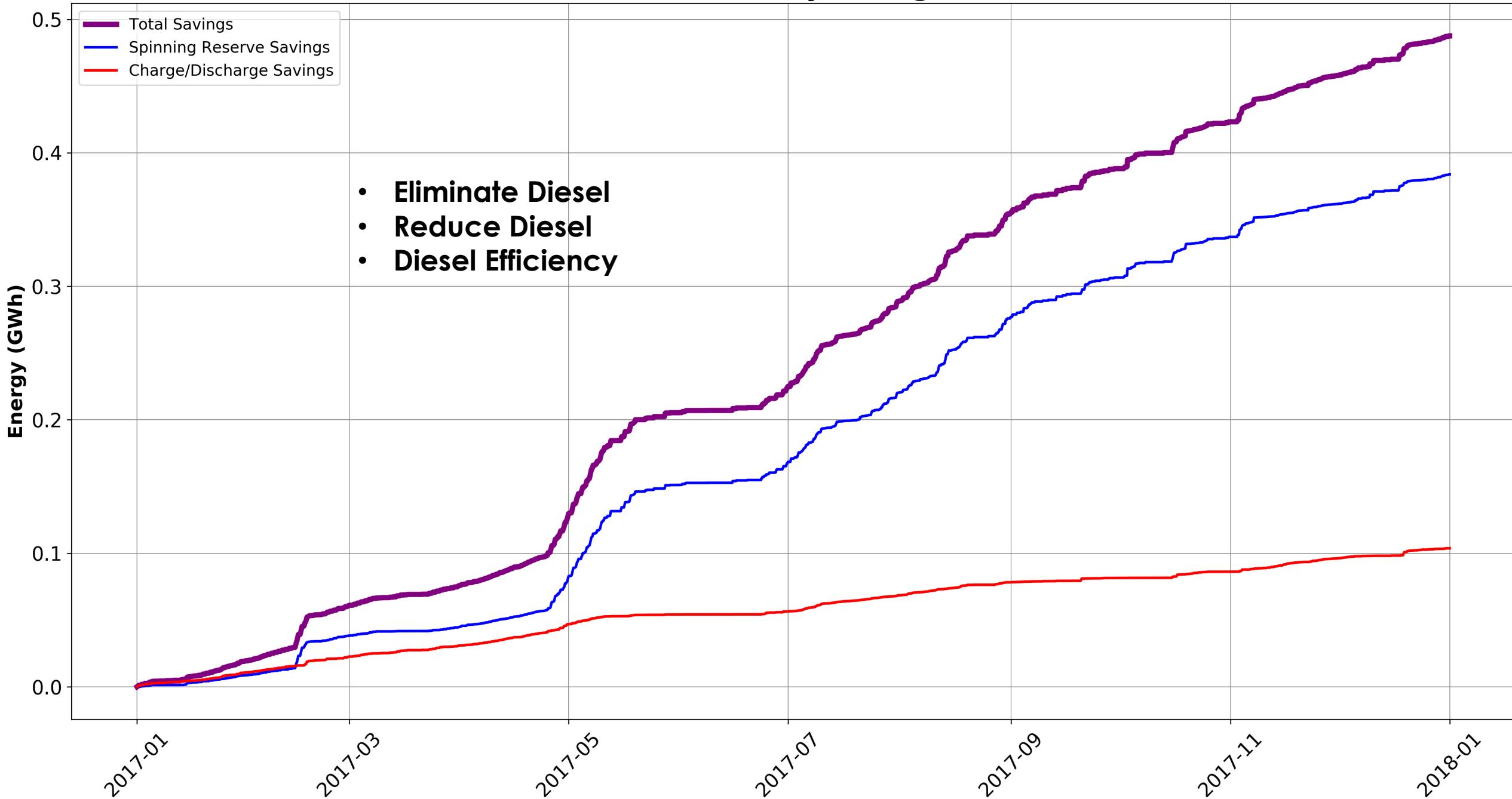
# Avg Daily kW Load 2012 w/ Excess Hydro

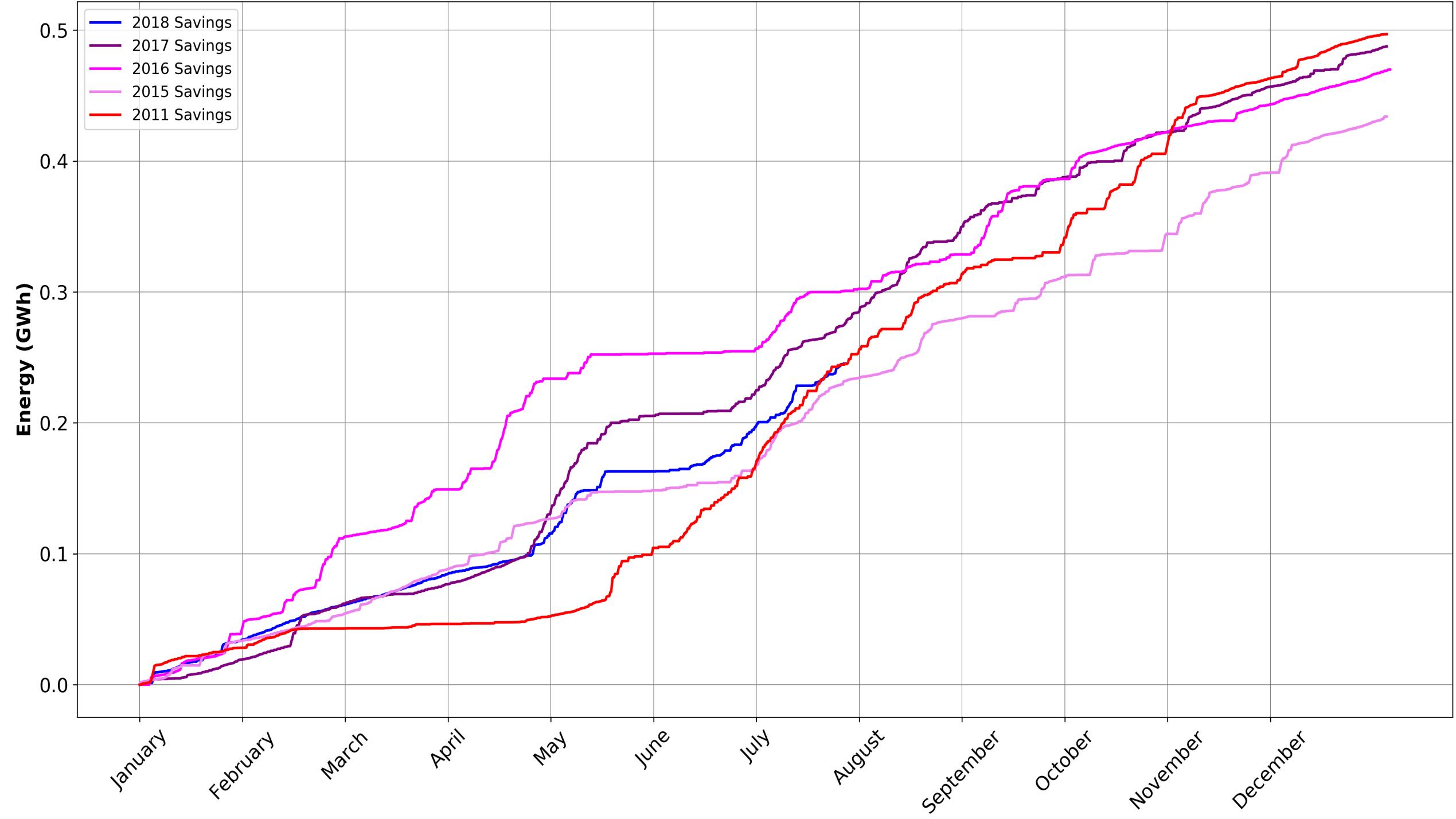


# Battery Benefits

- 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





# 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

A scenic view of a river flowing over a concrete dam structure. The water is a vibrant greenish-blue, creating white foam as it cascades down the concrete steps of the dam. The dam is a light grey concrete structure with a dark metal railing. In the background, there are large, mossy rocks and a dense forest of green trees.

Questions?