Applications that Reduce the Use of Diesel Gensets

Background:
- Cordova Electric Cooperative owns and operates an islanded microgrid.
- 18 Megawatts of total generation capacity
- One diesel plant, 2 run-of-river hydroelectric projects - no storage!
- Deflect 750kW of hydro for frequency control.
- Growing seafood industry requiring more energy
- Cordova Electric Cooperative achieves 100% hydro generation, 60% of the time.
- Goal: 100% renewable

Problem:
- Water not immediately utilized for generation is spilled.
- Spilled hydro = 3-4 gWh per year!

Solution:
- Demand management - utilize hydro when its available.
- Power to Heat - heating community swimming pool and power house "keep warm" boilers used to allow quick starting large diesel generators.
- Utilize excess hydro to charge grid-scale battery.

The Spinning Reserve Problem:
Once below 750 kW of available spinning reserve on a hydro plant, a diesel engine is started and base loaded to 400 kW. This 400 kW is "removed" from the hydro and transferred to the diesel thereby leaving 1150 kW of unused hydro.

Solution:
- Utilize grid scale battery to control spinning reserve and system frequency.
- Charge battery during times of excess hydro.

Additional Benefits:
A Battery Energy Storage Solution will deliver additional benefits such as emergency power to critical loads (hospital), charge and discharge arbitrage between $0.06/kWh hydro and $0.37/kWh diesel, reduce diesel start and stops.

Multifaceted Benefits:
- A grid scale battery opens the door for solar, which is currently being assessed and strongly considered with our partners.
- Liberates 500kW of hydro rather than deflecting.
- Improve diesel efficiency
- Allow more diesel-off conditions

Project Champions:
- Department of Energy, Office of Electricity, Energy Storage Research
- Cordova Electric Cooperative
- Sandia National Laboratories
- Alaska Center for Energy and Power

New Renewables Milestones!
- Diesel Operating Hours Sharply Reduced:
  - 2019 runtime: 5,000 hours
  - 2020 trending to: 2,500 hours
- Record Hydro Production in 2019 Nov. and Dec. from BESS
  - Previous Nov Record: 90.31% Hydro; New: 95.50%
  - Previous Dec Record: 74.39%; New: 84.65%