Why is Data so Important to Powering Your Community?

Isolated Power System Connect
Cordova, Alaska
July 29, 2022

PRESENTED BY **Dan Borneo – Sandia**

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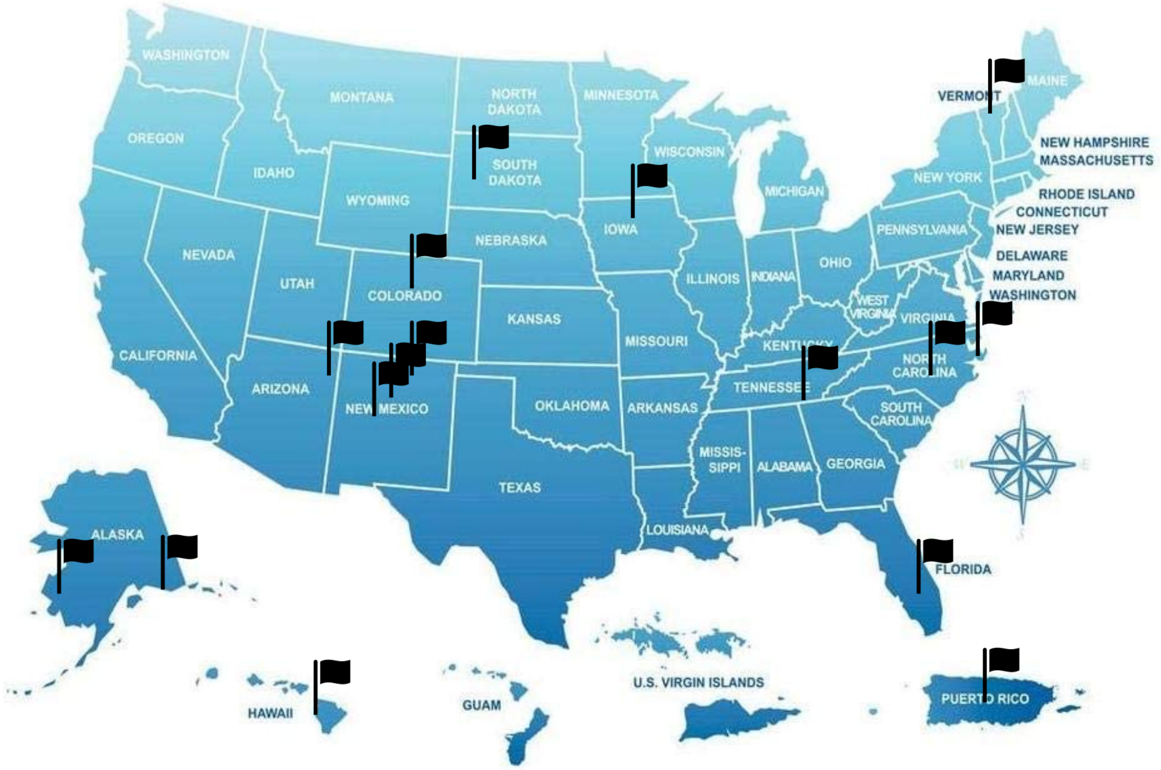
Recent DOE-OE Sponsored Projects

State or Territory	Partner
Alaska	Cordova Electrical Cooperative (CEC)
Alaska	Alaska Village Electrical Cooperative (AVEC)
Arizona (x3)	Navajo Tribal Utility Authority (NTUA)
Colorado	Poudre Valley Rural Electrical Association (PVREA)
Florida (x4)	Seminole Tribe
Hawaii	Natural Energy Laboratory of HI Authority (NELHA)
Iowa	Alliant Energy
New Mexico	Santa Fe Community College
New Mexico	Albuquerque Public Schools



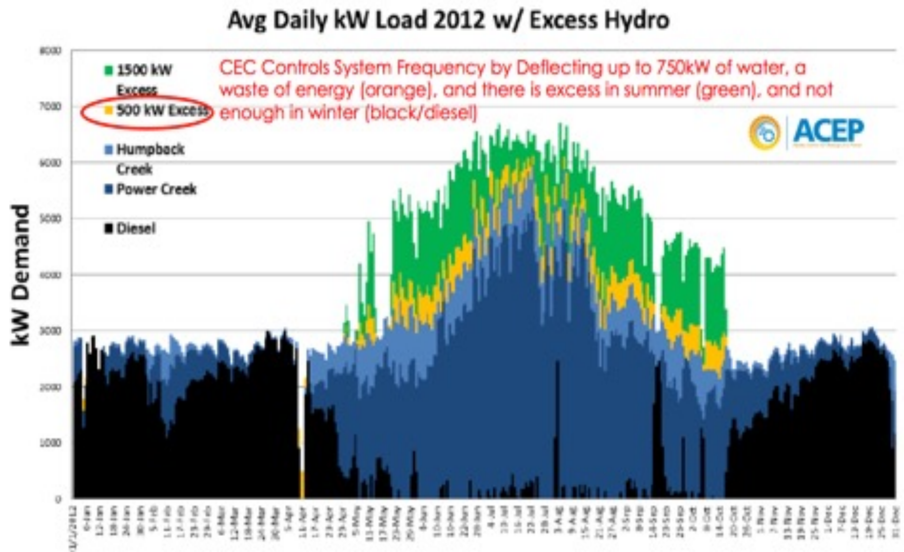
State or Territory	Partner
New Mexico	Picuris Tribe
North Carolina	NC Electric Membership Corporation (NCEMC)
North Carolina	Ft. Bragg Sandhills Utility Services (SUS)
Puerto Rico	Villalba Municipality
South Dakota	Ellsworth AFB West River Electric Association (WREA)
Tennessee	Electric Power Board of Chattanooga (EPB)
Vermont	Green Mountain Power (GMP)

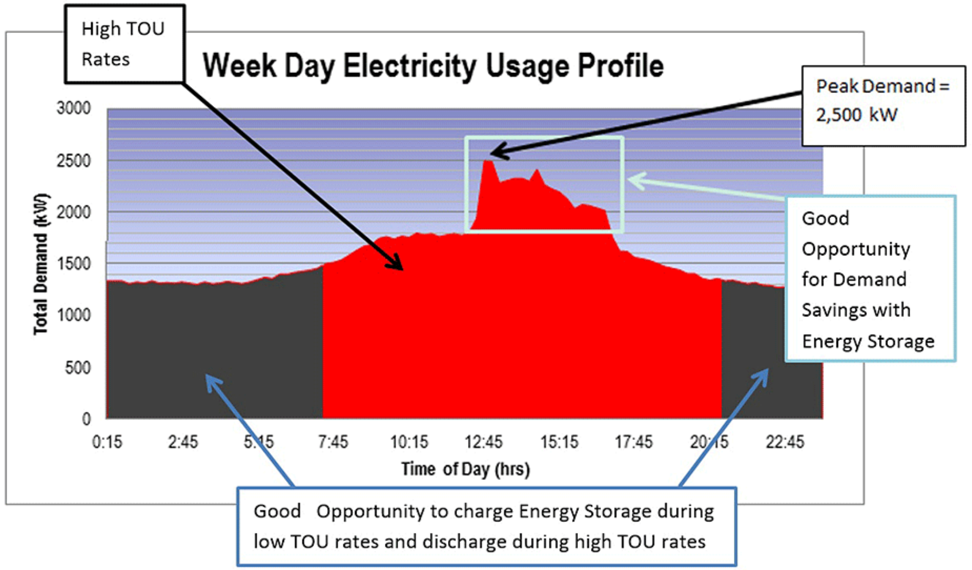
Outline

- The importance of data in **determining** the right grid resources for your community
- The importance of data in **optimizing** the use of grid resources in your community
- Best practices based on lessons learned in other communities

Determining the right resources for your community

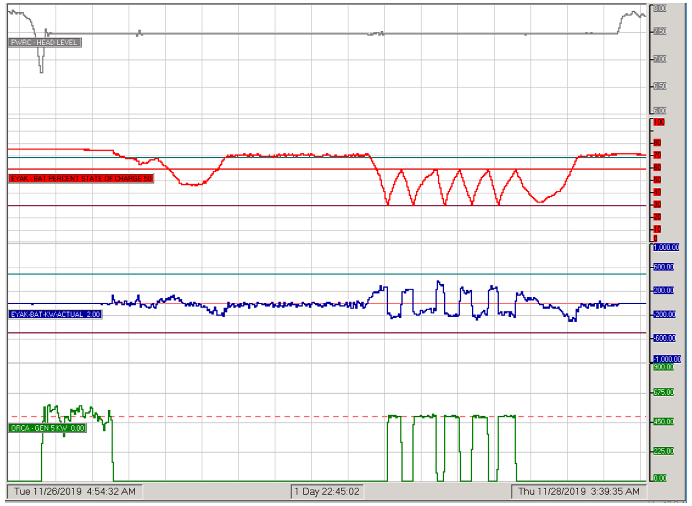
- Collecting Data
  - Your energy and power usage and needs
    - What is your “current” (no pun intended) Load profile?
    - What is the forecasted need for N years?
    - What are you Costs
  - What Problem(s) are you trying to solve
- Analyzing Data
  - Sizing and choosing the right technology
    - Load Profile
      - kWh consumed - when and how of kWh
    - Utility Bills
      - Demand Charges
      - Time of use rates
      - kWh charges
      - Other charges
    - Determining applications



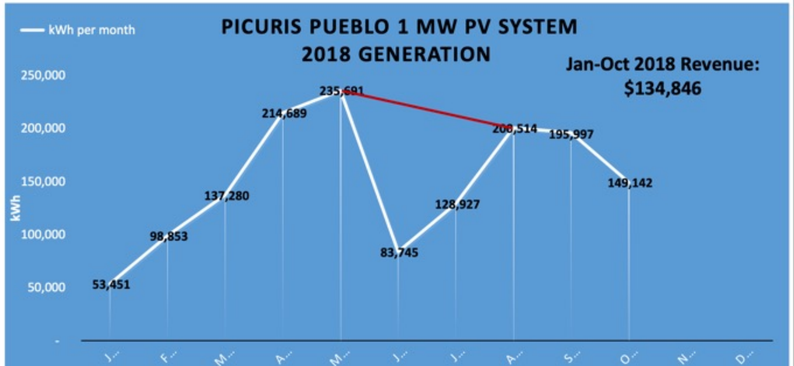


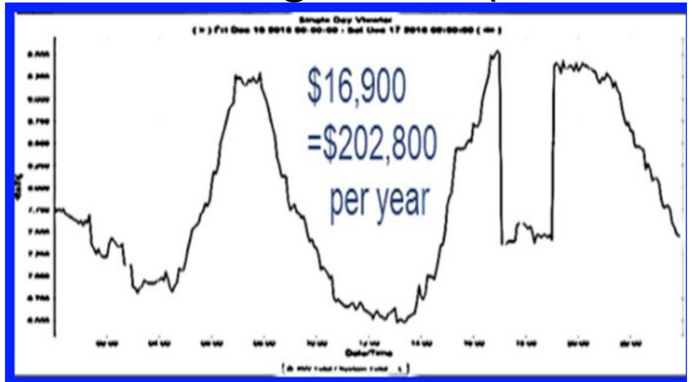
Optimizing grid resources in your community

- Collecting Data
  - Performance monitoring – measuring power and energy
    - Tells us how the technology is working
    - Capacity fade
    - Warranty



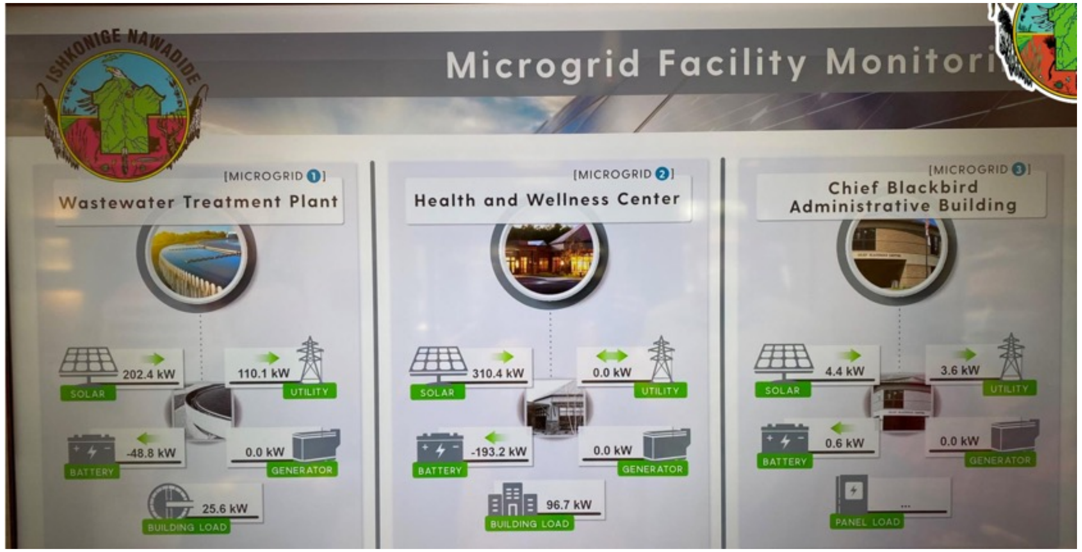
- Energy Tracking / Using Data
  - Operations, maintenance and adjusting for optimal use
    - Is the technology accomplishing the goal?
    - Is it reliable?
    - How cost effective is it? Are we saving money?
    - How can we increase the work load on the system without decreasing the life (too much)?



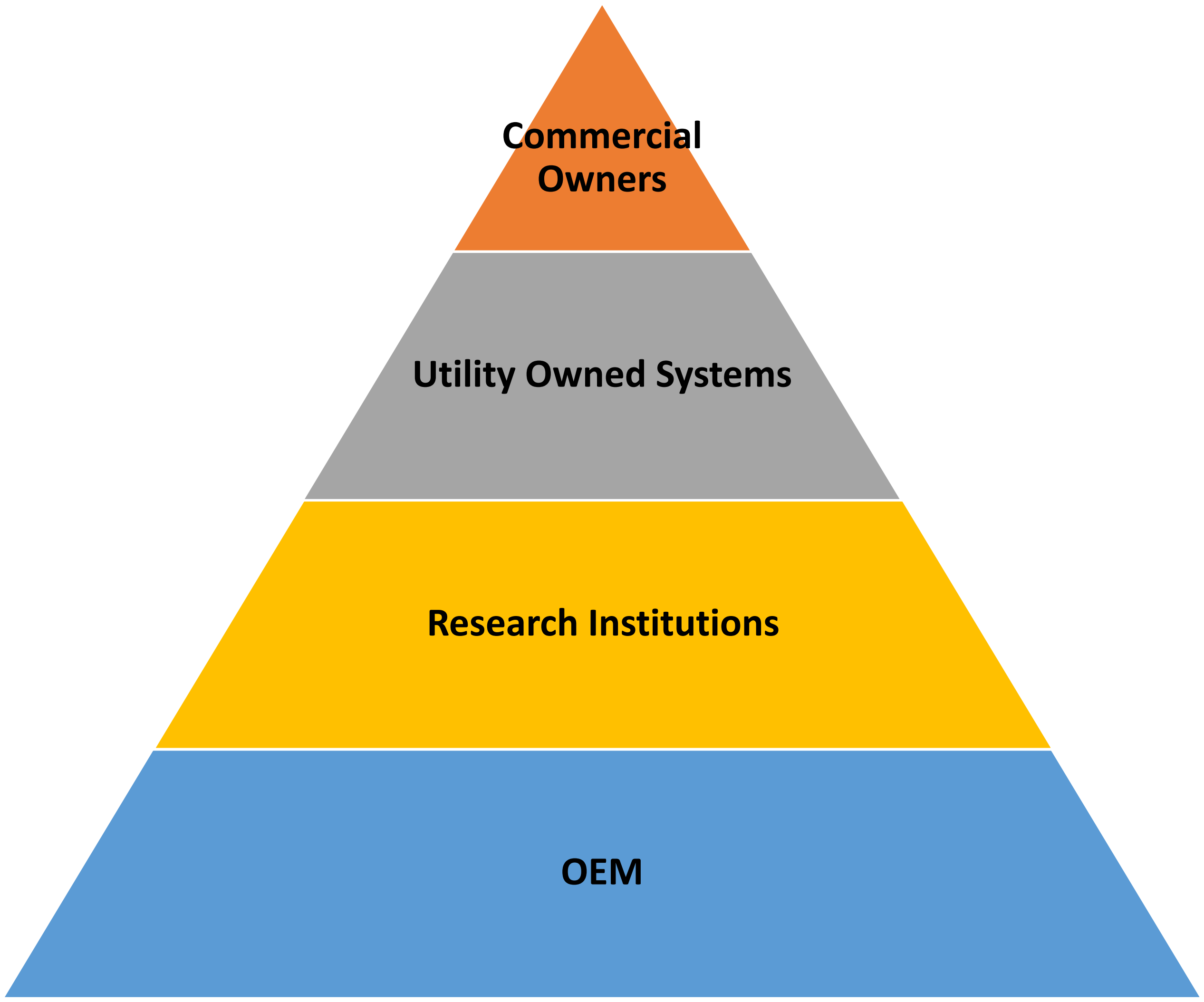


Best Practices for Best Results

- Resources needed for a successful operating system
  - Trained personnel
  - Planned and scheduled data collection
  - Reliable data monitoring equipment
  - Reliable communications and data storage systems



ESS Data Requirements Categories



Courtesy of Waylon Clark, SNL

Battery: (OEM)
- Rack, module, cell level data
  - DC voltages, currents
  - Temperatures
- Calculated values
  - Aggregations, SOC, SOH

Power Conversion: (ALL)
- Inverter data (individual & aggregate)
  - DC voltage, current
  - AC voltage, current, frequency, power factor
- Aggregated/calculated values

Balance of Plant (Environment, Safety Systems): (ALL)
- Cabinet/container data:
  - Temperature, humidity
- Local data
  - Outside temperature, humidity
- Fire
  - Water and/or dry chem system status
  - Smoke/heat sensors
- Alarms
  - Faults, e-stops, door open protection, etc.
- Grid
  - Voltage, current

Two Case Studies

- Cordova Electric Coop, Alaska
  - 1MW / 1 MWh battery – charged by excess hydro
  - Discharged to reduce use of diesel generators
  - Optimization requires sophisticated controls
  - Data analyzed by national laboratories
- Alliant Energy, Decorah, Iowa
  - 2.5 MW / 2.9 MWh battery, charged by excess solar
  - Discharged to reduce demand charges
  - Data issues due to incompatibility between vendors

Conclusions

- Energy Storage resources available online
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Energy Storage Procurement Guidance Documents for Municipalities

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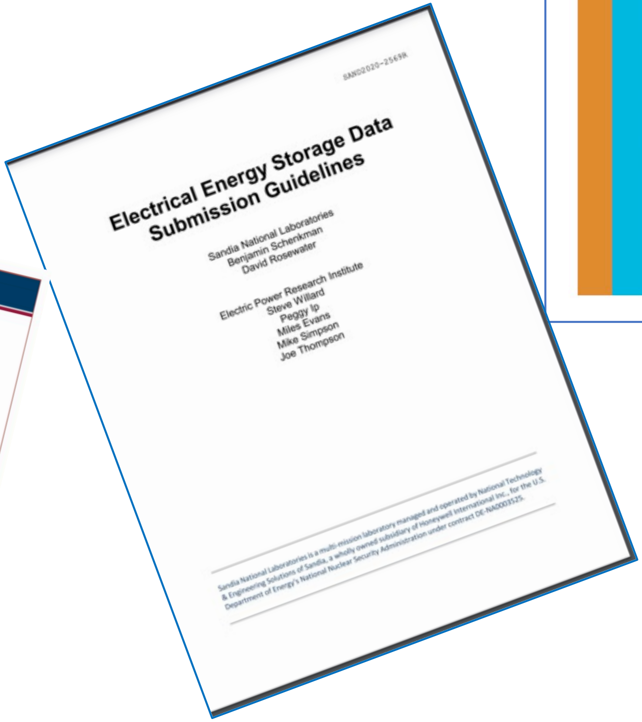
Electrical Energy Storage Data Submission Guidelines

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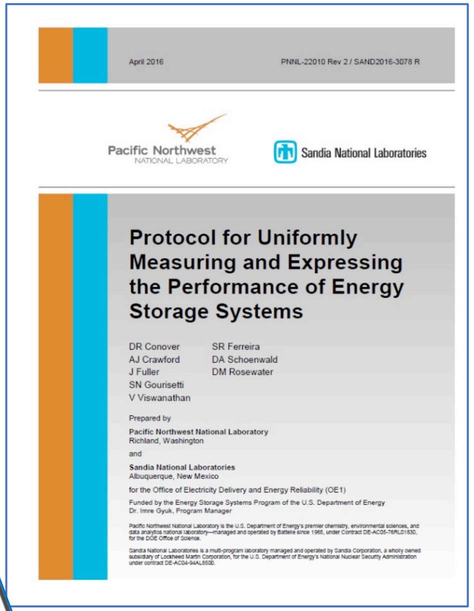
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Protocol for Uniformly Measuring and Expressing the Performance of Energy Storage Systems

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