

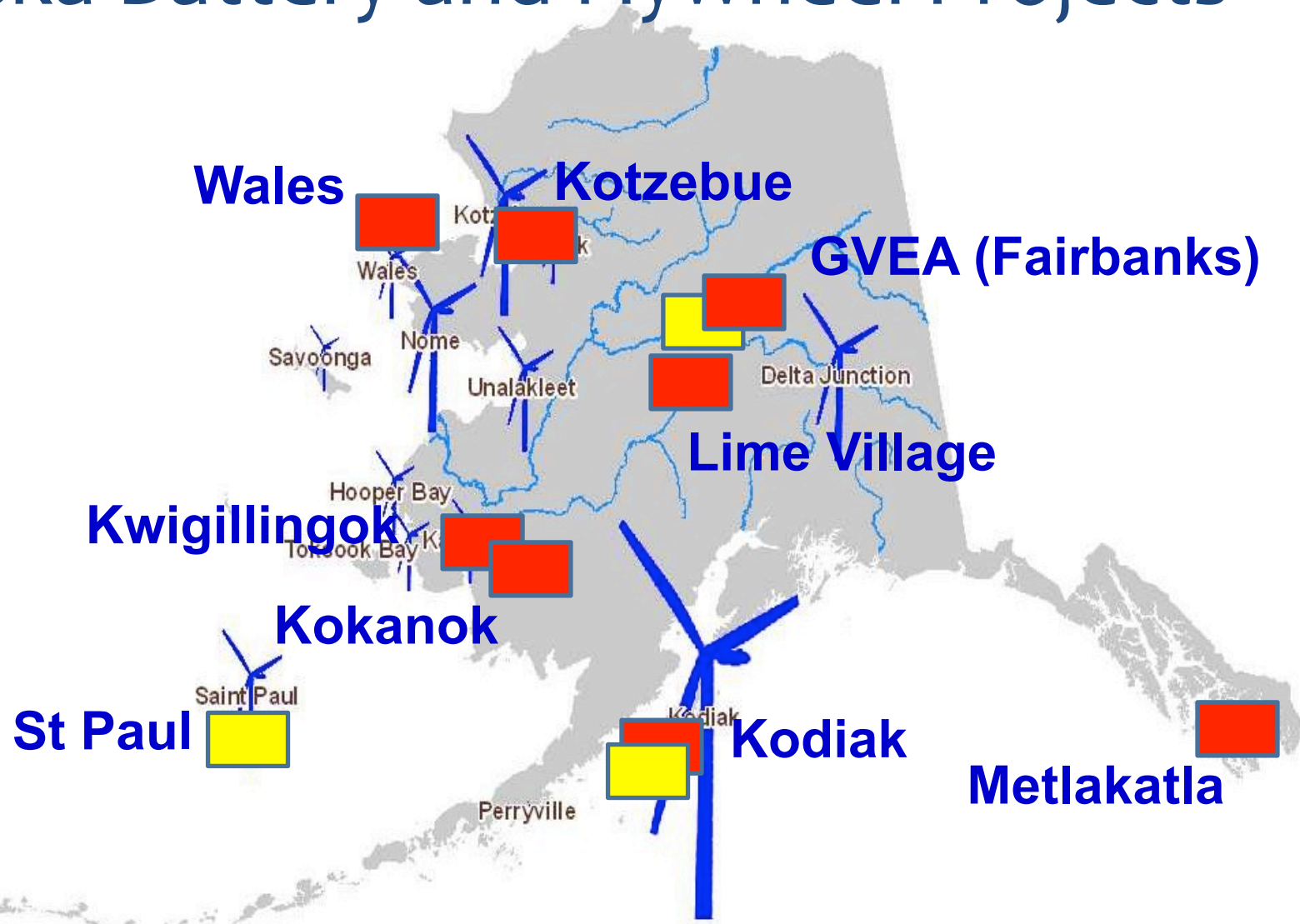
Innovations in energy storage

Islanded Grid Wind Power Workshop 2016

Gwen Holdmann, Director, Alaska Center for Energy and Power



Alaska Battery and Flywheel Projects



Ingredients for Successful Planning

- What is the goal?
 - Specific targets
 - Measureable benchmarks
- How do we get there?
 - Deliberate planning
 - Long-term vision
 - Short term milestones
 - Manageable sub-projects



Good questions to ask

- Is this the right storage solution for my application?
- Is this an economic solution?
- Has the system been successfully operated under similar circumstances?
- Does the warranty provide reasonable protections?
- Will the company still be around in 5 years?

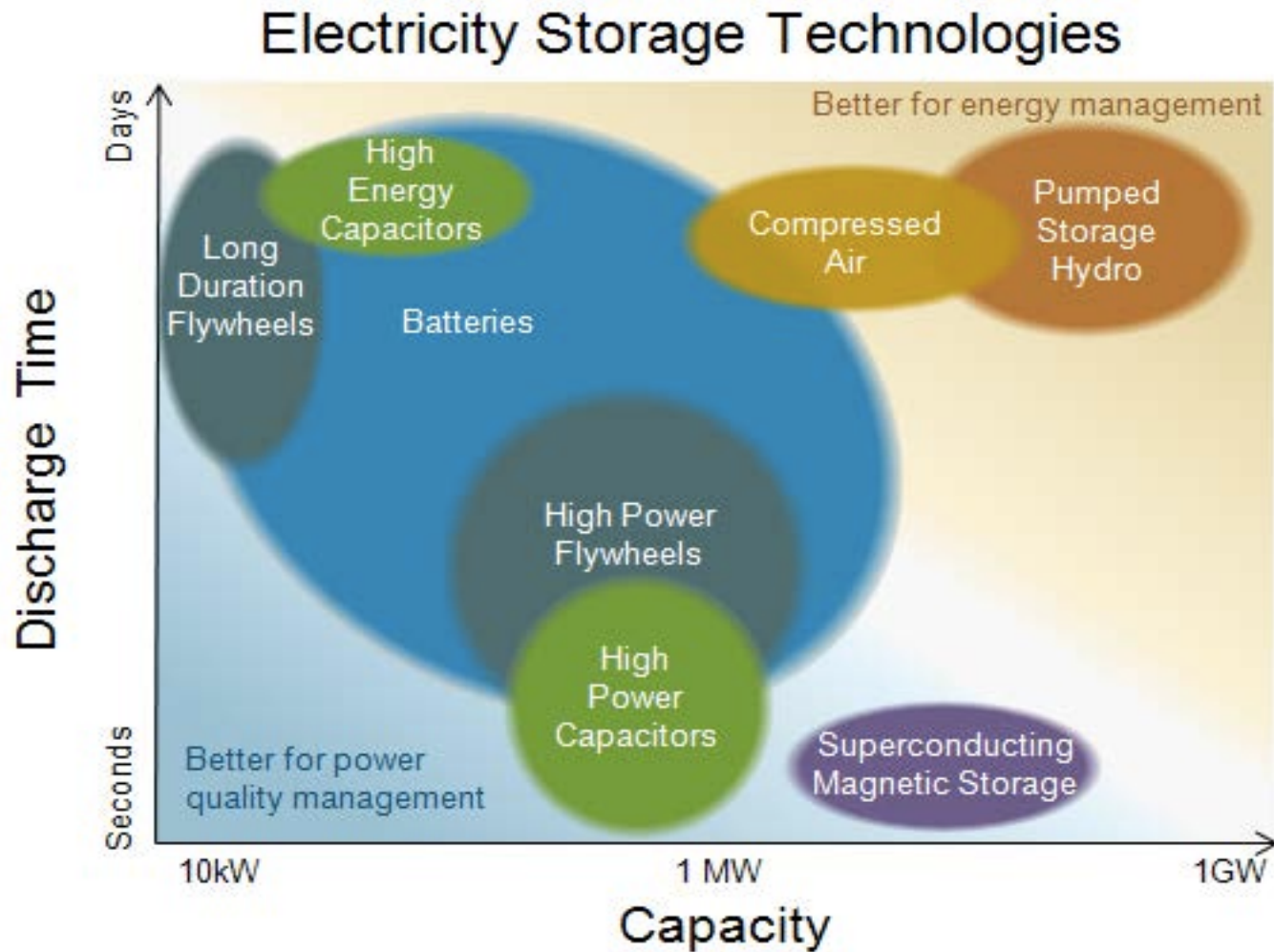


Is this the right storage solution?

- Potential
 - Elevation difference
 - Electrochemical
 - Super capacitors
 - Chemical
 - Magnetic
 - Mechanical
- Kinetic
- Thermal



Is this the right storage solution?



Source: U.S. Energy Information Administration, based on Energy Storage Association



Is this the right storage solution?

Example:
Chena Hot Springs battery
energy storage system



Is this an economic solution?

Example: Nome, Cordova

Objective: Avoid or delay diesel starts by providing spinning reserve capacity (SRC) with storage.

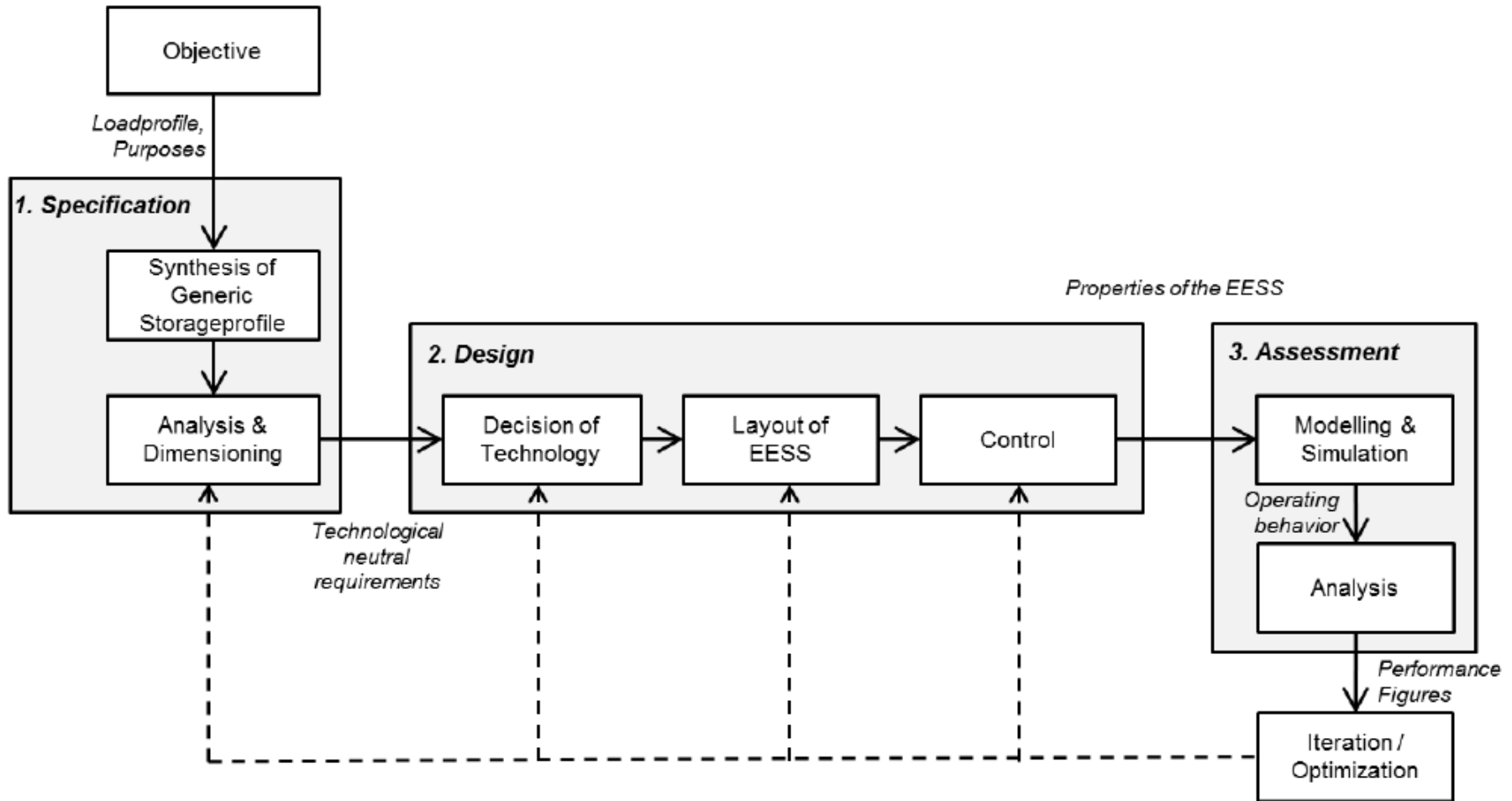
Nome Wind-diesel system

- 4 MW average demand
- 2.7 MW wind nameplate capacity
- Diesels: 1.9, 3.6, and two 5.4 MW units



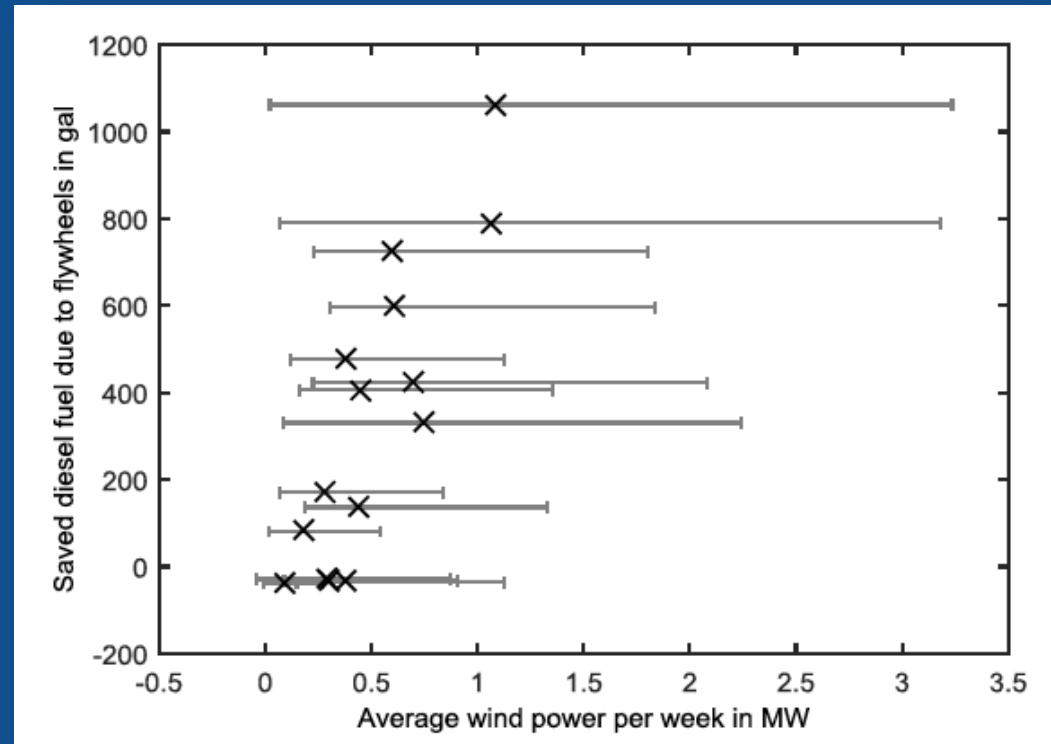
Specification, Design, Assessment

SDA Process developed by our collaborators at TU Darmstadt, Germany.



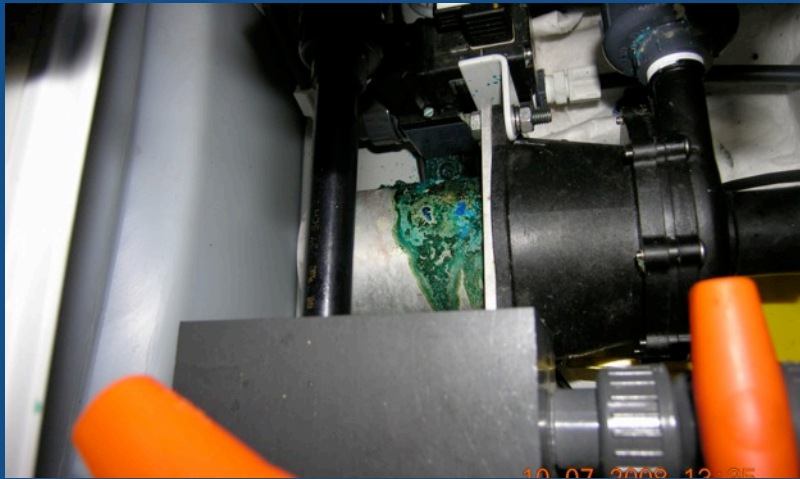
Nome, AK: Assessment

- Fuel savings with primary objective only:
 - 430 to 1150 gal/week (medium to high winds)
 - Slight increase in fuel use for stand-by operation
- Potential value add:
 - Diesel demand smoothing



Has this system been operated under similar circumstances?

Example:
Flow battery testing at ACEP



Does the warranty provide reasonable protections?

Example:
GVEA BESS

