



# Soft Energy Storage Systems

Florida Energy Summit - October 15, 2015

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# An international manufacturing network close to its customers

Saft, international presence

☆ Head office

● Specialty Battery Group production site  
High-performance primary and rechargeable lithium and silver batteries for the electronics, defence and space industries.

● Industrial Battery Group production site  
Rechargeable nickel and lithium-based batteries for demanding industrial applications.

● Saft sales network

● ASB  
ISDN Saft, SOH-EADS

▲ Sites under construction



# Jacksonville 'Factory of the Future'



- Construction of complete battery systems, automated cell manufacture through module production to assembly into ISO containers
- 235,000ft<sup>2</sup> under roof, with a production capability of 372 MWh
- One of the largest rooftop photovoltaic systems in Florida with over 1 MW of solar power

# Mature, reliable technology

- #1 worldwide in Li-ion satellite batteries
- Mercedes S400 hybrid
  - First production vehicle with Li-ion
- Ferrari F1 ERS (3 teams)
- F-35 Joint Strike Fighter
- Airbus A350 XWB

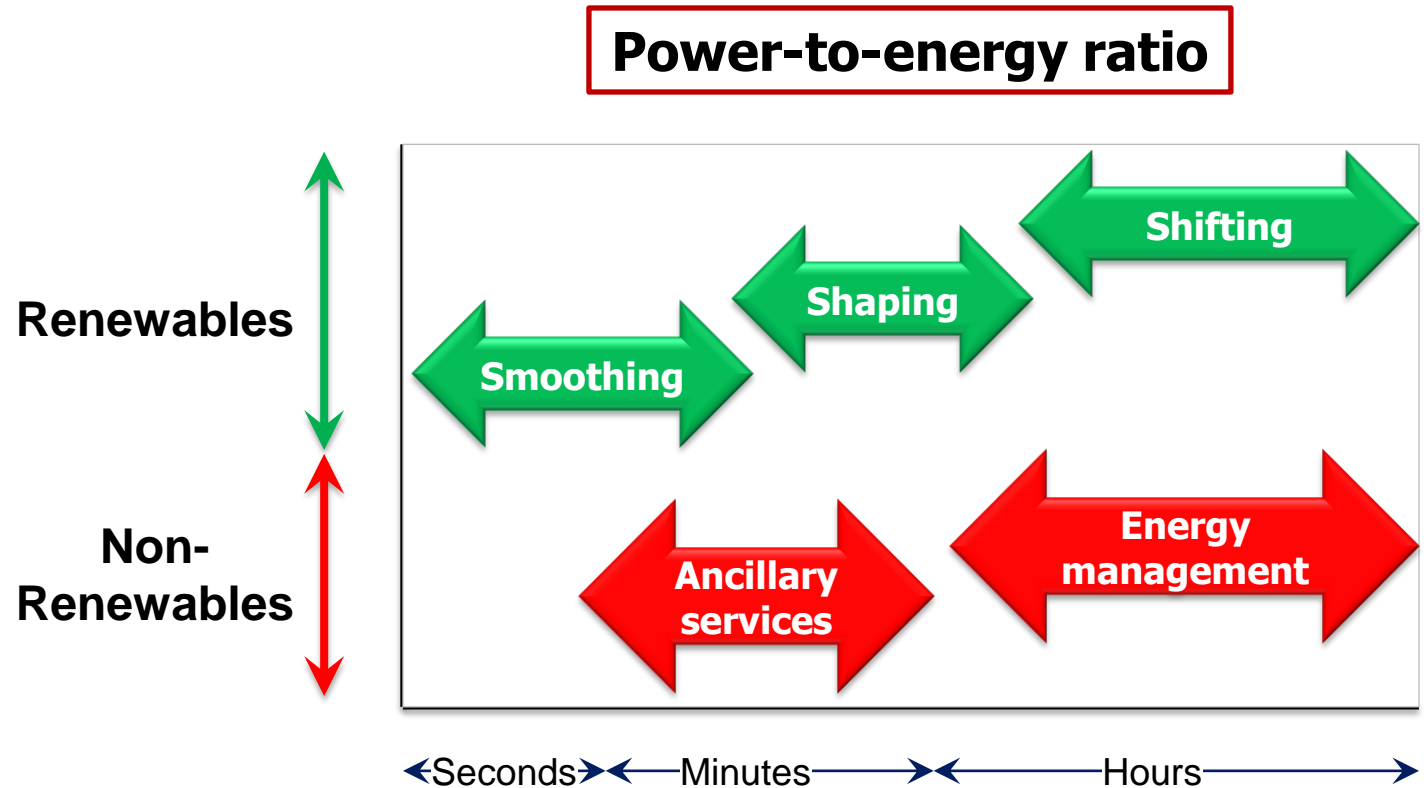


INNOVATION  
AWARD  
2012



# Storage and renewables – 3 solution levels

- Make it **compatible**
- Make it **predictable**
- Make it **dispatchable** when needed



# Storage and renewables

## ■ Compatibility

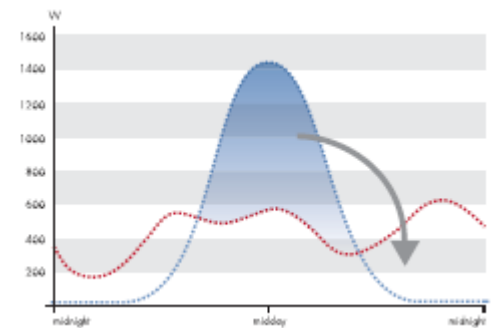
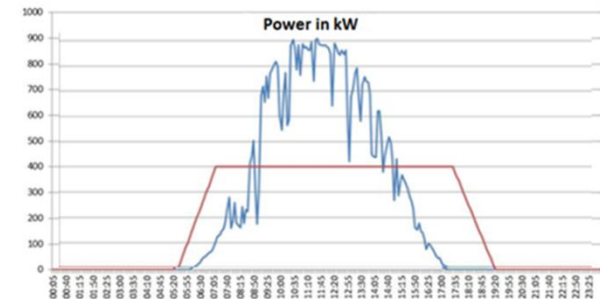
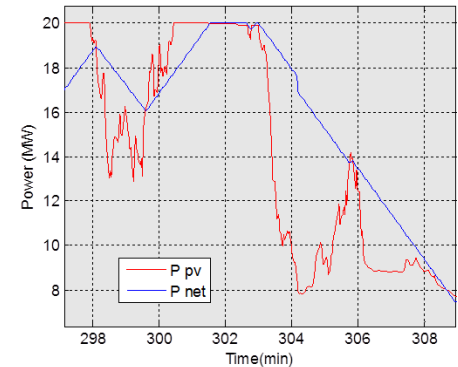
- Ramp-rate control & frequency response
- Low energy requirement
- Important for weak grids

## ■ Predictability

- Firming to forecast
- Moderate energy requirement
- Weak grids and grid management

## ■ Dispatchability

- Shifting to grid peak
- Hours of energy
- Competition with conventional generation



# Saft's Energy Storage Projects Worldwide

More than 65 Intensium® Max containers installed worldwide by 2015 !



# KIUC Anahola PV-storage project

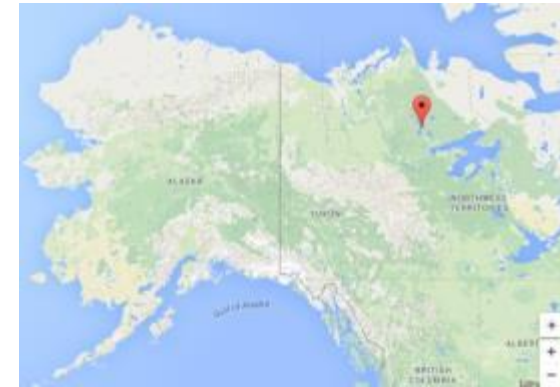
- 6 MW / 4 MWh BESS
  - Frequency Responsive / Spinning Reserve
  - PV Smoothing
- Saft solution
  - 8 Intensium Max 20M medium-power containers – 4.64 MWh
  - 2 ABB 20-foot PCS100 containers – 6 MW





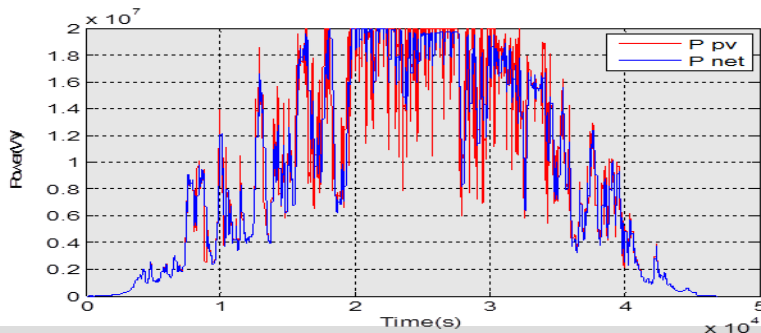
# NTPC Colville Lake microgrid

- 50 km north of Arctic Circle
- 150 inhabitants: 150 kW peak; 30 kW base load
- Diesel fuel delivery only by ice road
  - Cost of generation ~\$2.60 / kWh!
- New power station
  - 2 x 100 kW diesels + 150 kW diesel
  - 50 kW of solar
- IM20M container 232 kWh with 240kW ABB PCS100
- Includes Saft's Cold-weather package
  - Insulation for -50°C performance
  - Hydronic heating coil for glycol heating



# Salinas Commercial PV project, Puerto Rico

- 10 MW<sub>AC</sub> Solar Facility
- ESS requirement for 4.5 MW<sub>AC</sub> peak power
  - GPtech PCS and controls
  - 3 Intensium Max 20P high-power containers
- PPA is for 25 years
  - Intense scrutiny by lender's independent engineer
  - Full 25-year guarantee required!



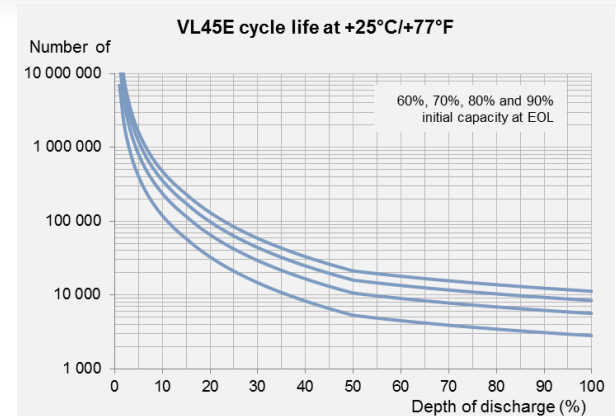
# Saft Li-ion Technology for ESS

## ■ Technology & Features

- Ni Co Al Lithiated oxide / Graphite
- Compact, sealed, w/o maintenance
- Very high efficiency: 95%
- Long calendar and cycle life  
20 years at 60% DOD / day

## ■ Versatility

- Different cell types available for optimum energy to power ratio
- Ability to perform variable power / energy operation profiles



# Saft's Intensium System

