



# Megawatt scale energy storage supports Kauai's transition to renewable energy



Saft Intensium® Max energy storage system (ESS) is helping KIUC to maintain grid stability as the penetration of solar PV generation increases.

KIUC (Kauai Island Utility Cooperative), is the electric utility on Hawaii's fourth largest island. To improve sustainability and reduce reliance on imported fuel, KIUC has an ambitious target to meet half of its power needs with renewable energy sources such as hydropower, photovoltaic, biofuel and biomass by 2023. A key element in KIUC's sustainability plans is the Anahola array.

## Case study

With 59,000 panels and a peak output of 12 MW, this solar PV (photovoltaic) installation is now supplying around 20 percent of KIUC's daytime electricity needs.

### Saft energy storage system allows integration of large amounts of intermittent PV while maintaining grid stability

In common with all PV plant, the output from the Anahola array is highly intermittent due to sudden and heavy cloud cover, with the possibility of 70 to 80 percent of output lost in only a minute. To make PV a reliable and consistent element in its energy mix, KIUC has installed an ESS to react to the frequency fluctuations caused by this fast ramping up and down of PV resources. This is a challenging application that called for Saft's expertise in renewable energy, systems design and engineering to deliver an effective, reliable and financially viable ESS solution.



### Anahola PV installation - key facts

- Customer – KIUC (Kauai Island Utility Cooperative)
- Location – Anahola, Kauai island of Hawaii
- Installation size – 12 MW AC/14.53 MW DC
- Completed – Summer 2015
- Estimated annual production – 23 GWh
- Replacement for fuel imports – delivering 20 percent of Kauai's electricity needs, enough to power 4,000 homes



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## Intensium® Max helps stabilize the KIUC network

Collocated on the Anahola site, Saft's Intensium® Max 20 M lithium-ion (Li-ion) battery energy storage system regulates the voltage, serves as spinning reserve and provides frequency support. The system is housed in eight separate shipping containers plus two containers housing a power conversion system that stabilizes the grid.

## Saft ESS proves its capability to keep the lights on for KIUC

The Anahola array was commissioned in October 2015 and is now helping KIUC's transition to a sustainable mix of renewable resources – it now imports 1.7 million fewer gallons of oil each year, saving 35,000 tons of emissions annually. The Saft ESS is playing a vital role in the Anahola success story by mitigating the effects of its output variability during rapidly changing weather conditions.

To maintain grid stability the ESS reacts to frequency disturbances in less than 50 milliseconds, helping to avoid load-shedding. At times when output exceeds demand the ESS can store it to reduce PV curtailment and also help to meet demand during the evening peak period. Recently, the ESS proved its capability to provide frequency response to events far beyond the variability of the Anahola array. When the 28 MW Kapaia power station tripped Saft's system prevented about half of the island being blacked out.



### Saft ESS solution - key features

- 8 Li-ion energy storage containers
- Rated for 6 MW continuous discharge
- Continuous charging rate of up to 4.5 MW
- 12 MW short term peak power
- 4.63 MWh energy storage capacity
- Supports power conversion system to provide near-instantaneous response to grid frequency events

*“Anahola is an important milestone toward our goal of using renewables to meet 50 percent of Kauai's energy needs by 2023. Using the sun to make electricity has multiple benefits. It reduces our members' costs, stabilizes our rates, keeps dollars in the local economy and contributes to efforts to slow climate change.”*

Jan Ten Bruggencate, chairman of KIUC's board of directors



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