

ENERGY STORAGE SOLUTIONS

Taking ESS projects to the next level



Energy storage is crucial to manage the global energy transition

Energy networks across the world are entering a period of unprecedented change due to the accelerated transition to new, green and clean energy sources. They must address the 'triple D' challenge of decarbonization, decentralization and digitalization.



Decarbonization: by 2040 renewable resources will provide 55% of the world's electricity - more than double the current level.



Decentralization: the balance of generation assets is shifting from large, centralized plant to smaller resources distributed across the grid.



Digitalization: Digital management is essential for the control of multiple distributed energy assets. It also enables flexible support for electricity networks through demands response management and the aggregation of generation and storage assets.

Energy storage systems can deliver the resilience and flexibility to address these challenges. They help to balance demand and supply, support grid stability, eliminate curtailment of renewables and facilitate new revenue streams and innovative business models.



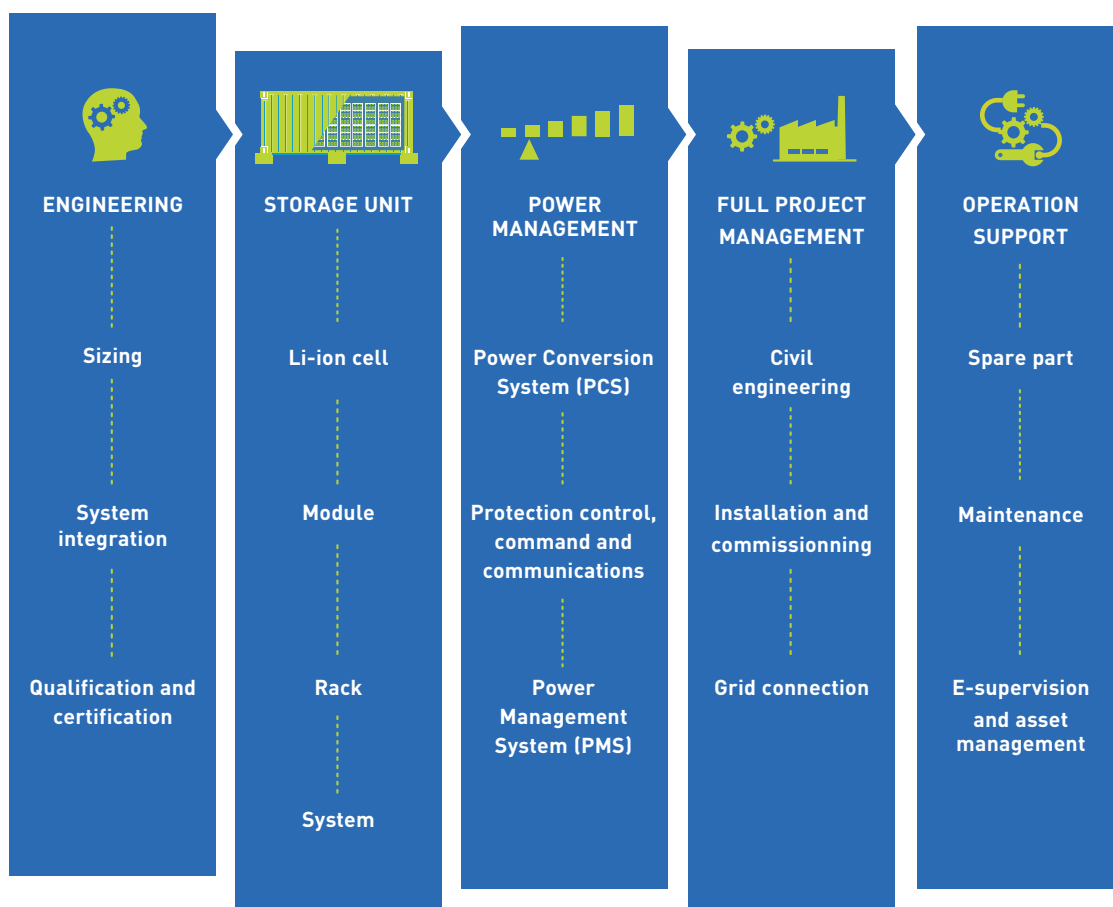
Saft has developed a range of energy storage solutions based on lithium-ion (Li-ion) technology that are deployed currently in utility scale installations, microgrids and behind the meter for Commercial and Industrial (C&I) customers.



Saft offers fully integrated Energy Storage solutions

Unlike some suppliers, battery technology is part of Saft's DNA. We have the expertise and knowledge to deliver, safe, reliable high-performance Li-ion batteries.

Saft delivers the battery as part of a complete fully integrated system that includes every element up to the grid connection.



Saft can call on its global industrial footprint to resource all the key ESS elements manufactured to the highest levels of quality, reliability and performance. This enables us to manage and deliver your entire ESS project from establishing your business needs and technology goals, to designing, building and commissioning the system, connecting it to the grid and supporting its operation until end of life.



Our customers rely on Saft's expertise, technical know-how and partnership approach. Now we have taken our ESS service to the next level.

Adding a new dimension to ESS projects

Saft has built on its experience in the Direct Current (DC) side of energy storage by adding a new capability to cover the vital Alternating Current (AC) elements.

With this integration capability for ESS projects you no longer need to deal with separate suppliers. Now, you can obtain a solution with all the major ESS components –

energy storage, PCS, transformer and PMS – from a single supplier.

The result is a seamless service that will take you from initial concept, modeling and sizing through to the delivery and grid integration of an operational ESS.

When you work with Saft, your ESS is tailor-made to suit your specific technical and business needs.

All the elements are guaranteed to work together for optimum performance and reliability. Your ESS will deliver an effective return on investment from day one. And it will keep delivering throughout the life of your project.

Energy Storage Unit

The battery stores energy and releases it when needed.

- Up to 2,5 MWh in a 20-foot container
- Extended life Li-ion technology
- Thermal, State Of Charge (SOC) and safety management
- Designed for low maintenance

Power Management System

The PMS acts as the brain of the ESS to match energy storage with energy consumption.

- Site power controller
- Optimum power dispatch with SOC control
- Remote monitoring
- Data logging



Saft's turnkey ESS service includes:

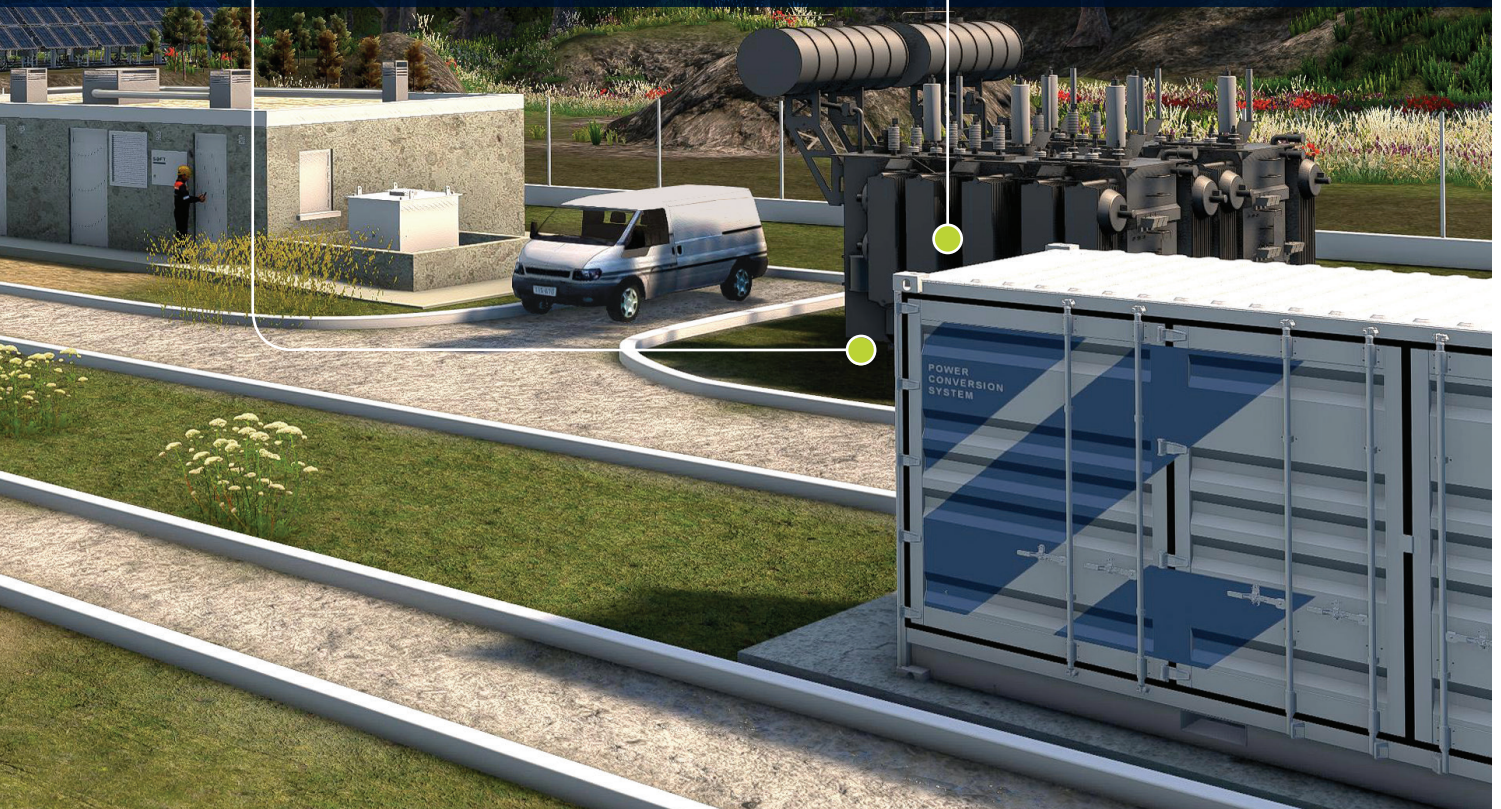
- Design, sizing and manufacture of the energy storage system based on our product ranges: **Intensium® Max Power, Intensium® Max High Energy and Intensium® Mini.**
- Specification, qualification and supply of the PCS and transformer
- Network connection and integration
- Performance guarantee and warranty

○ Power Conversion System and Transformer ○

The PCS interfaces the Direct Current (DC) battery with the Alternating Current (AC) network.

The MV or HV transformer specifications are customized to match the operational parameters of the grid connection point.

- Easy to install and connect
- High efficiency even at partial load
- High reliability
- Suitable for harsh environments



A track record covering the full ESS spectrum

100
MW
deployed

19
countries

50
locations

Islands
37% of locations
Microgrids
14% of locations

Field proven ESS know-how

- Lowest possible costs in terms of CAPEX, OPEX and Total Cost of Ownership (TCO)
- Maximum availability, reliability and resiliency
- High performance over the project lifetime
- Ease of integration
- Local implementation and ongoing support

Stability for long-term support

Saft has been in the battery business for 100 years and has over 15 years of experience in ESS projects. Our longevity is built on financial and organizational stability. Furthermore, as part of the Total group we have the backing of a major player in the world energy market and a clearly defined vision of a renewable energy future.

When you work with Saft, we aim to be your long-term partner, supporting you every step of the way to keep your assets in perfect working condition throughout their service life.

Saft - an integral element in Total's drive for better energy

Saft is playing an integral role in Total's strategy to become a major player in low-carbon electricity through natural gas and renewables, with the share of low-carbon businesses in the group's portfolio reaching 20 % in 20 years' time.

Saft extends its ESS reach

Fully integrated solutions

High performance

Long life guarantee



Field-proven customer performance



Anahola - US - KIUC

Application: Island PV integration

Challenge: Maintain grid stability with increased penetration of solar PV generation

Saft Solution: 4 MWh - 6 MW

Functions: spinning reserve, frequency response, PV smoothing

Key indicators: very fast response to frequency disturbances, avoided load-shedding and PV curtailment

Application: Islands wind integration

Challenge: A fully commercial ESS to maintain grid stability as the level of wind penetration increases.

Saft Solution: 0.7 MWh - 2.1 MW

Functions: Wind ramp control, frequency regulation, reactive power supply

Key indicators: controlled power variability at injection point, reduced curtailment



Faroe Island Denmark - SEV
With our partner ENERCON



Alaska, US - KEA

Application: Microgrid

Challenge: Combining an ESS with a hybrid wind/diesel generator power system to provide clean, reliable and cheap electricity for a remote Arctic community.

Saft Solution: 0.9 MWh - 1.2 MW

Functions: spinning, diesel optimization

Key indicators: reduction of diesel consumption, operation down to -50°C, avoided wind curtailment

Application: Commercial and Industrial

Challenge: Installing an ESS for a manufacturing facility to optimize the utilization of its PV panels.

Saft Solution: 50 kWh - 200 kW

Functions: PV self-consumption, peak demand reduction

Key indicators: 100% PV Self-consumption, reduction of energy bill



Spain - EXKAL



Saft: your ideal ESS partner

Saft's specialized and experienced teams have the technical expertise and industrial know-how to deliver the full ESS project to meet your business and operational needs. Our end to end approach covers:

- Initial consultation
- Developing your business case
- Sizing and modelling of the optimum ESS
- Creating a detailed design
- Manufacturing, installation and commissioning of an integrated solution
- Operational optimization
- Lifetime service and maintenance support.

With three hubs in North America, Europe and Asia, local application engineers and project delivery teams can support your project anywhere in the world.

We also work closely with you to share advice and knowledge to keep your ESS operating effectively throughout a long service life.



North America hub



Europe hub



Asia hub

Pre-Project > Project > Manufacturing > Installation > Service

Saft Intensium® Max at NTPC Colville Lake - located 50 miles inside the Arctic Circle in Northern Canada

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