

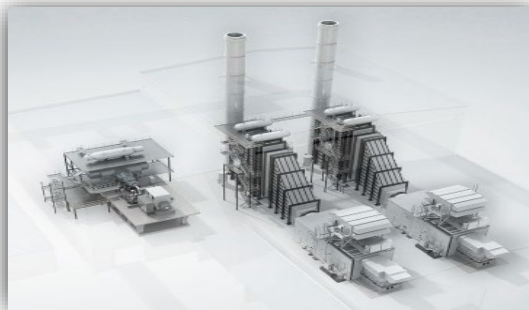
**Instant performance at
the push of a button**

Efficiency, Dispatchability, and Reliability



Renewable Generation

- + Zero CO₂
- Stochastic supply
- No grid inertia contribution
- No grid control contribution



Gas Fired Generation

- = CO₂ Emissions ½ of Coal plant
- + Dispatchable
- + Synchronous Inertia
- + Continuous supply
- *but not instantaneous*

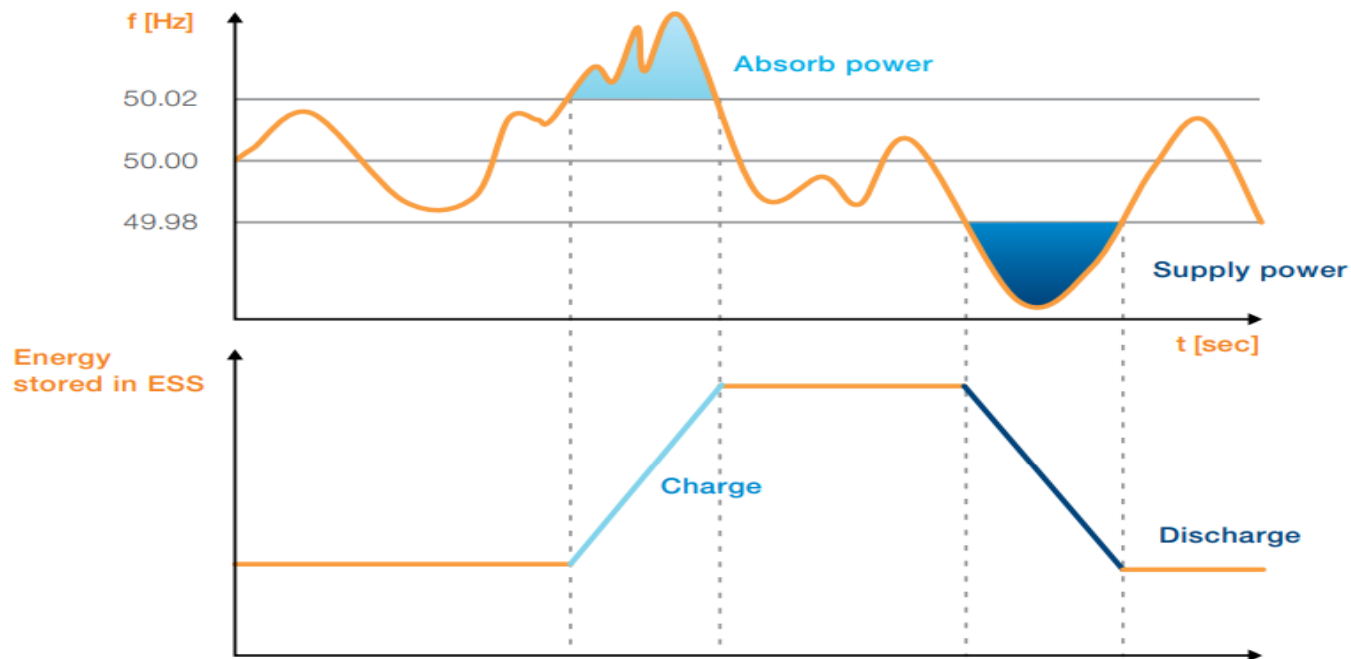


Stored Energy from a Battery

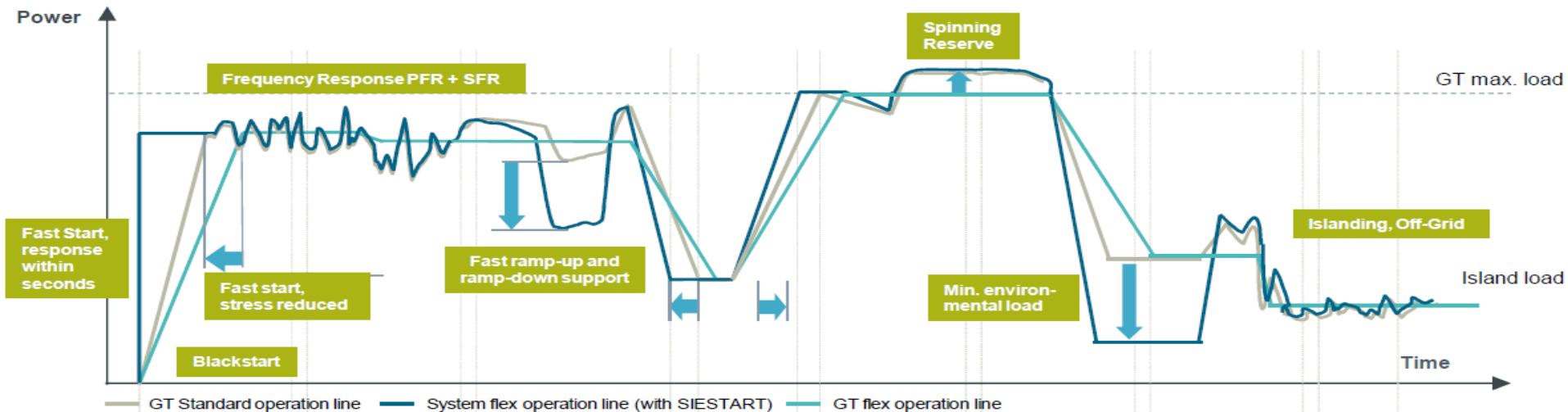
- + Zero CO₂
- + Instantaneously Dispatchable
- + Synthetic Inertia
- *but not continuous*

No single technology can meet the requirements of efficiency, dispatchability, and reliability

SIESTART – Frequency Response



Optimized performance and new opportunities for grid and services and turbine operation



Blackstart and support of grid restorage

Fast Start Up

Primary Frequency Response

Secondary Frequency Response

Acceleration & stabilization of load ramps

Operating reserve for peak power

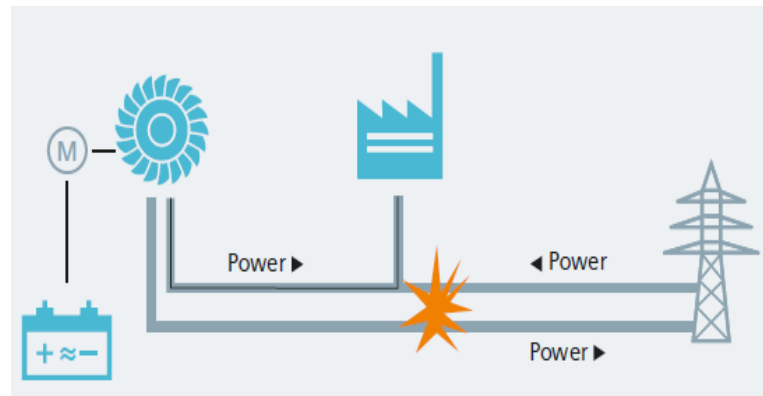
Minimum load

Islanding off-Grid

Reliable Energy Supply

Grid operators can ensure their grid infrastructure

- ❑ Modular energy storage system based on cutting-edge power electronics and Li-ion batteries
- ❑ Ensure reliable and continuous power
- ❑ Flexible and scalable design with various sizes and configurations
- ❑ Nominal capacity up to 5 MWh in one standard container
- ❑ Black-Start Capabilities – secure energy in event of outages.
- ❑ Provide opportunity for additional revenues



independent from the OEM technology*!

Energy Storage Applications

Microgrid / RE	Island Mode / off grid	Monitoring and controlling the grid
Renewable Energy (Medium Voltage)	Capacity firming (Renewable power plant)	The variable, intermittent power output from a renewable power plant, such as wind or solar, can be maintained at a committed (firm) level for a period of time
	Time shifting/ arbitrage	During periods of high demand the energy storage system supplies power, reducing the load on less economical peak-generating facilities
Frequency regulation	Frequency regulation	Grid frequency is an indicator of grid stability . Differences between power generation and power demand cause the grid frequency to fluctuate, and can result in damage to equipment, unwanted tripping, or even a blackout. Grid operators use reserves to maintain grid stability in the event of an anomaly that has not been previously corrected as a result of grid inertia. Primary reserves are the fastest services and are first in line to stabilize frequency deviations or to 'stop the drift'. Thanks to the fast response times of SIESTORAGE technology, it can provide both upward and downward regulation, and can be used as an alternative to the conventional slower responding generators, therefore reducing costs and increasing supply reliability.

Energy Storage Applications

Load leveling	During periods of high demand the energy storage system supplies power, reducing the load on less economical peak-generating facilities
Black Start / Emergency Shutdown	Restart or shutdown of a power plant in case of dispatch or emergency failure
Frequency regulation	Charged or discharged in response to an increase or decrease of grid frequency
Spinning Reserve	The energy storage system is maintained at a level of charge ready to respond to a generation or transmission outage
Power Quality/ Voltage support	Helps protect downstream loads against short-duration events or to maintain the grid voltage by injecting or absorbing both active and reactive power
Peak Shaving / Load leveling	Peak shaving is similar to load leveling, but may be for the purpose of reducing peak demand rather than for economy of operation.

A perfectly integrated Solution

Example of a 40 ft. container layout



SIESTORAGE components

- 1 Converter cabinet
- 2 Grid connection cabinet
- 3 Control cabinet

Battery cabinets incl. battery management system

- 1 Battery cabinet
- 2 Paralleling cabinet

LV + MV components

- 1 8DJH gas-insulated medium-voltage switchgear
- 2 SIVACON S8 low-voltage switchboard
- 3 GEAFOL cast-resin rectifier transformer

HVAC, fire fighting and safety equipment

- 1 HVAC
- 2 Fire detection and extinguishing system

Technology Platforms



Siestorage

PROPERTIES

Speed of Response



Redundancy



Augmentation Flexibility



Application Switching



Advancion

PROPERTIES

Speed of Response



Redundancy



Augmentation Flexibility



Application Switching



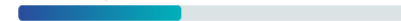
SunFlex Energy Storage

PROPERTIES

Speed of Response



Redundancy



Augmentation Flexibility



Application Switching



Your One-Stop Shop

Siemens and AES joined forces to create the next big thing in energy storage

- ❑ The largest deployed fleet of energy storage projects of any company
- ❑ Service contract with availability warranty
- ❑ Siemens Financing Solution offering comprehensive financing program



513

TOTAL MW



68

PROJECTS*



16

COUNTRIES

*Deployed or Awarded

Preventive
Maintenance



INCLUDED

24/7 Customer
Support



INCLUDED

Emergency /
Repair Service



INCLUDED

Spare Parts



INCLUDED