

Energy Storage
Overview

Gridedge



October 2016

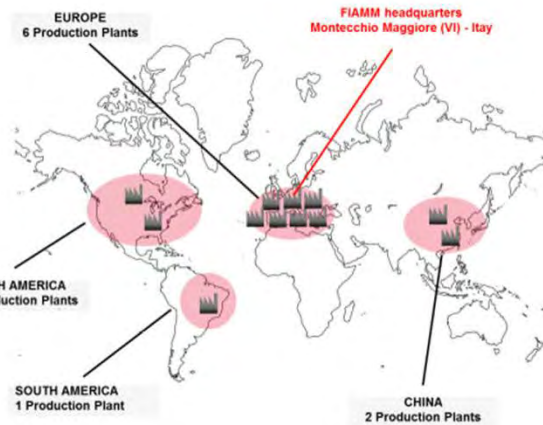
Energy for a sustainable future



**Energy
Valuable
Solutions**

FZ SoNick





Industrial Batteries

FIAMM Industrial Batteries offers a broad range of stationary batteries, designed to guarantee uninterrupted power supply in a myriad of applications.



Acoustic Devices

FIAMM Acoustic Devices is the global leader in the production and supply of horns for the safety of vehicle and people.



Oled

Astron FIAMM, a manufacturer of innovative lighting solutions with OLED technology, has placed its experience at the service of the automotive industry, offering light as a distinguishing element among the various brands and models.



Starter & Mobility Power Solutions

FIAMM Starter & Mobility Power Solutions was established with the aim of satisfying the mobility sector's current and future energy storage requirements.



Energy Storage

FIAMM Energy Storage is aimed to research and propose solutions for the grid optimization and for the planet's energy self-sufficiency thanks to innovative products and systems for energy storage.



Antennas

FIAMM Antennas has been one of the main automotive antenna player in the European market for the last 25 years.

14
**PRODUCTION
PLANTS**

3.000
EMPLOYEES

2015 Turnover
590 M€

✓ **Starters**

- Batteries
- Horns
- Antennas and Cables

✓ **Industrial Backup**

- Backup Power

✓ **Micro Hybrid Vehicles**

- Start & Stop Batteries

✓ **Sodium Batteries**

- Energy Storage
- Energy Backup (TLC)
- Electric Vehicles

✓ **General Lighting**

- **OLED**
(Organic Light Emitting Diode)

**Core
Business**

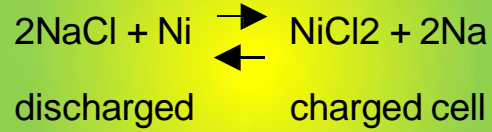
**Proximity
Business**

**NEW
Business**



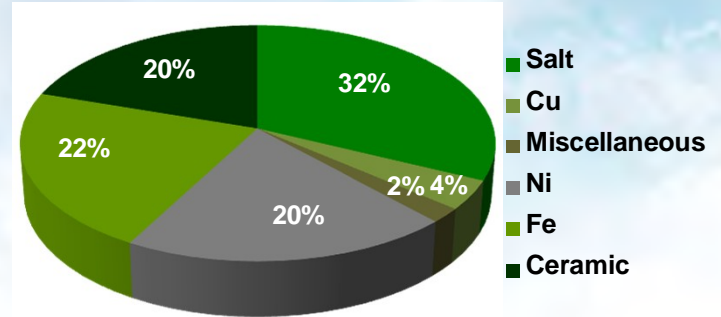
Performances

- ✓ **Temperature Immunity**
(-40 °; +60°C)
- ✓ **Cycling Capability**
> 1.500 cycles - MOBILITY
> 4.500 cycles - ESS (80% DOD)
- ✓ **Battery energy density**
100-;120Wh/kg
150-190Wh/lit
- ✓ **Shelf life** (> 20 years)
- ✓ **No memory effect**



Safety

- ✓ **Intrinsically safe**,
electrochemical safety
- ✓ No gas emissions
- ✓ **No flammable materials**
- ✓ **No fire/water flood reaction**
- ✓ Industrial Process Control
- ✓ Tested in the field
(EV, TLC, ESS,...)
- ✓ BMS control
- ✓ Cell/Battery Mechanical case



Zero Impact Battery

- ✓ NO dangerous materials
- ✓ **100% recyclable**
- ✓ NO pollution materials
- ✓ NO gas emissions

Production



Applications

TR SoNick

ST SoNick

TL SoNick

for
TRAILER STORAGE

for
ENERGY STORAGE

for
ENERGY BACK-UP, UPS and
TELECOMS

EV SoNick

RW SoNick

for
SUSTAINABLE MOBILITY

for
Railways ENERGY BACK-UP



SoNick Technology

The sodium nickel technology behind FIAMM SoNick battery

Energy density:

120 Wh/kg at battery

Outside temperature range:

-40° C / +60° C

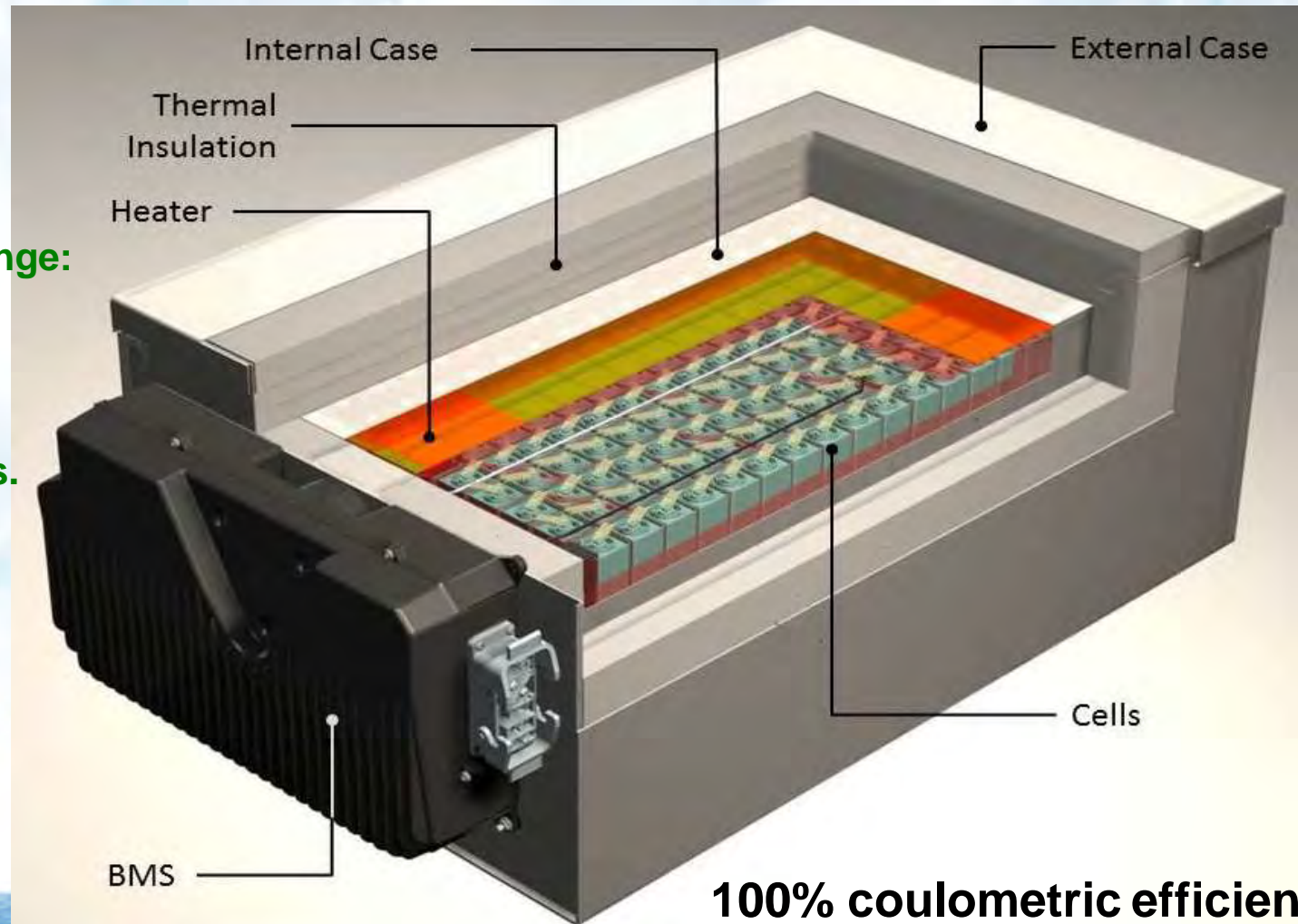
Maintenance free.

BMS included.

Zero ambient emissions.

100% recyclable.

Long Life 4.500 NPC



100% coulometric efficiency

Solution Range

Electrical
Vehicles

Industrial

Energy
Storage



Suitable for any place of installation:

Marine transportation

Harsh environment

Extreme temperature

Safe from physical damage

No hazardous emissions



Seismic Test





Solutions for Energy Storage



Residential Application: GridEdge All-in-One

Residential Energy Storage Solution: safe, compact, flexible. 6kWh upwards



Community & Industrial Application: FIAMM Cabinet

Community Energy Storage Solution: safe, compact, modular. 17 up to 75 kWh



SoNick Technology



Modular Concept



Indoor and Outdoor



MWh System Application: FIAMM Energy Spring

MWh System Energy Storage Solution: scalable, suitable for any place of installation.



Energy Spring 1

Containerized Energy Storage System for outdoor applications comprising of 32-64 ST523 SoNick batteries (up to 1.4 MWh).



Energy Spring 3

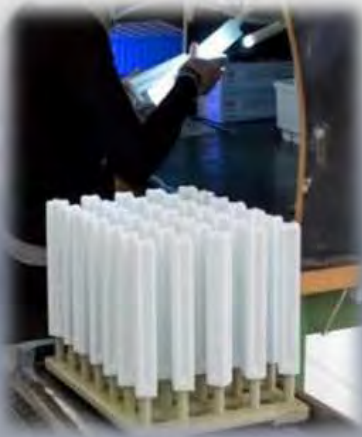
Containerized Energy Storage System for outdoor applications comprising of 12-24 ST523 SoNick batteries (up to 450 kWh).

Turn key solution with switchboard, AC panel, air conditioning, PCS and BMS.



FZSoNick
+ -

Applications and References



SoNick Technology for Energy Storage



FIAMM – Green Energy Island



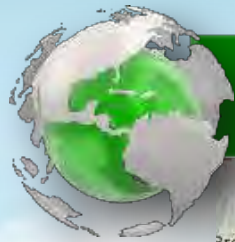
UNIT: Rack solution (10 Z37 620V 38Ah)

ENERGY: 230 KWh

POWER: 180 KW

- Smart-Grid system
- Peak shaving
- Load shifting
- Mitigation of renewable generation randomness

CAI TORINO - Bivacco Gervasutti



**Location: Courmayeur,
2835 m. Freboudze glacier**



UNIT: 1 48TL80 (48V 3,9kWh)

ENERGY: 4 KWh

POWER: 3 KW

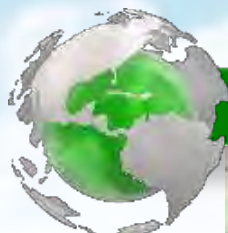
**ENERGY
STORAGE**

- Off-Grid Application
- Photovoltaic panels on the roof
- self-diagnosis system and environmental data detection

With CAI Torino



DUKE ENERGY - Sub-Station Rankin



Location: Charlotte - USA



UNIT: 1 Energy Spring (12 Z37 620V 38Ah)

ENERGY: 240 KWh

POWER: 120 KW



**ENERGY
STORAGE**

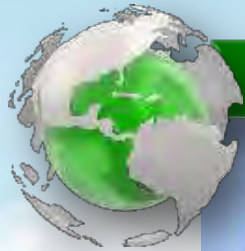
- Photovoltaic integration
- Power Smoothing

With S&C for DUKE ENERGY



Awarded at San Diego's DistribuTECH as Best Renewable Integration Project!

XCEL SAT - Community Energy Storage Demo



Location: Denver – USA



UNIT: 1 cabinet (3 Z37 620V 38Ah)

ENERGY: 70 KWh

POWER: 25 KW

- Demo project
- Photovoltaic integration
- Power smoothing
- Ramp control

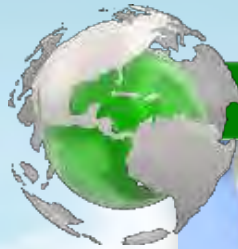
**ENERGY
STORAGE**



With EXCEL SAT



SMUD – Community Sub-Station



Location: Sacramento - USA



**ENERGY
STORAGE**

UNIT: 2 cabinet (8 ST523 620V 23,5kWh)

ENERGY: 188 kWh

POWER: 50 kW



With Parker for SMUD

- Smart-Grid
- Photovoltaic integration
- EV charge



**Location: Le Bourget du Lac
- France**



UNIT: 1 Energy Spring (6 ST523 620V 23,5kWh)

ENERGY: 140 KWh

POWER: 50 KW

With INES CEA

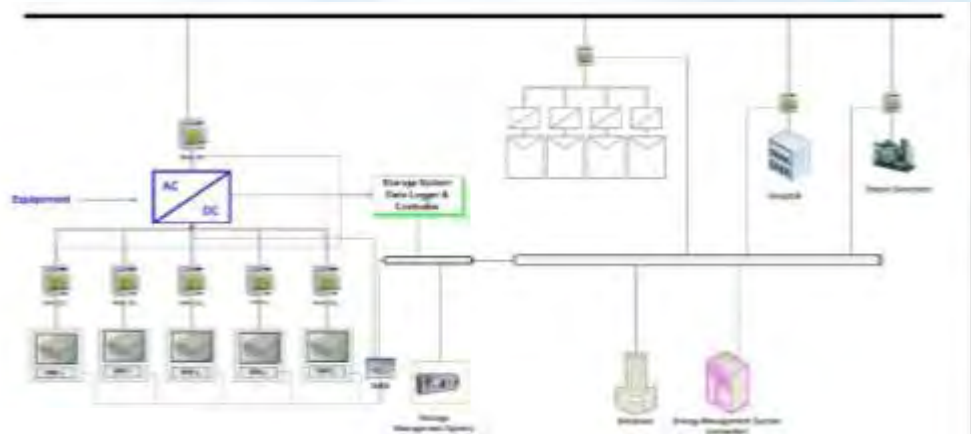
- Validation of Sonick Technology within Smart-Grid
- Photovoltaic integration



**Location: Martinique –
West Indies**



**ENERGY
STORAGE**



With l'Agence Martiniquaise de l'Energie

UNIT: 8 ST 523 (620V 23,5kWh)

ENERGY: 188 KWh

POWER: 80 KW

- Self-consumption Optimization
- Participation to the energetical mix during the peak consumption hours
- Energy Power and Energy supply

PV EPC – Micro-Grid System for a Luxury Resort



- Micro-Grid
- Photovoltaic integration, WindGen and Diesel PowerGen

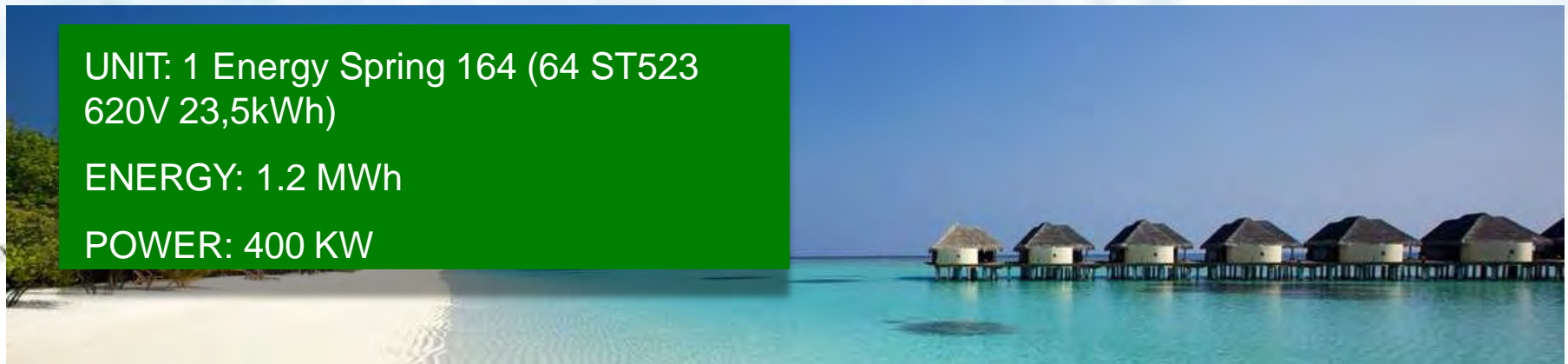


With a PV EPC for a Luxury Resort

UNIT: 1 Energy Spring 164 (64 ST523
620V 23,5kWh)

ENERGY: 1.2 MWh

POWER: 400 KW



EDF EN – Toucan Storage Plant

ENERGY
STORAGE

Gridedge
Energy for a sustainable future



UNIT: 4 Energy Spring 164 + 1 Energy Spring 132 (288 ST523 620V 23,5kWh)

ENERGY: 4,5 MWh

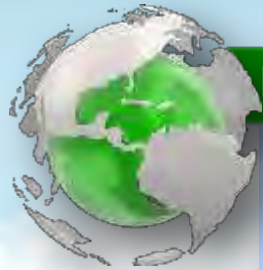
POWER: 1,5 MW

- Grid Conditioning
- PV system regulation
- Maximization of the PV output capacity



With EDF EN

EDF EN – SoNick Technology Testing Plant



Location: Colombiers - France



**ENERGY
STORAGE**



**UNIT: 1 Energy Spring 303
(3ST523 620V 23,5kWh)**

ENERGY: 70 KWh

POWER: 20 kW

- Validation of Sonick Technology within Smart-Grid
- Photovoltaic integration



With EDF EN

SIEMENS - Smart Polygeneration Micro-Grid System



**Location: Campus Savona
- University of Genoa**



UNIT: 1 Energy Spring 306 (6 ST523 620V 23,5kWh)

ENERGY: 140 KWh

POWER: 62 kW

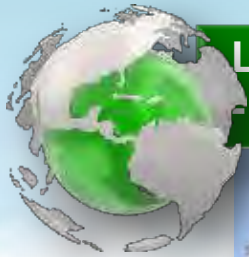


**ENERGY
STORAGE**

With SIEMENS for Genoa University

- Micro-Grid
- R&D facility test-bed





**Location: Codrongianos
- Sardinia**



UNIT: 4 Energy Spring 164 (256 ST523
620V 23,5kWh)

ENERGY: 4.15 MWh

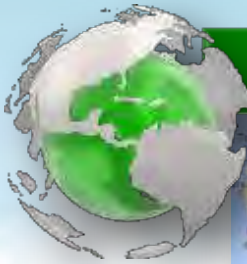
POWER: 1.2 MW

- Grid Balancing
- Maximization of the power capacity transport of the Power Grid
- HV line Voltage Regulation

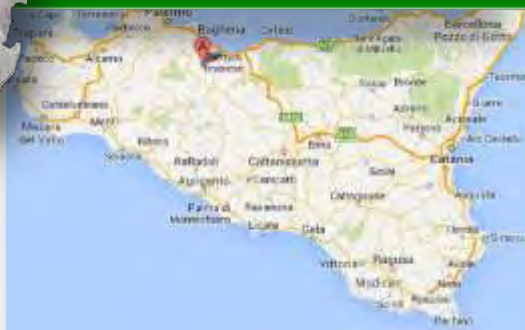
With TERNA



TERNA - Grid Services (Storage LAB)



Location: Ciminna - Sicily



**UNIT: 4 Energy Spring 164
(256 ST523 620V 23,5kWh)**

ENERGY: 4.15 MWh

POWER: 1.2 MW

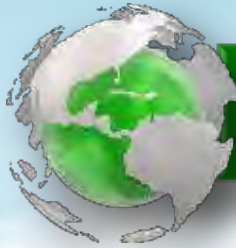
**ENERGY
STORAGE**



- Grid Balancing
- Maximization of the power capacity transport of the Power Grid
- HV line Voltage Regulation

With Terna

ITAIPU – Off-Grid System for Military Settlements



Location: Foz de Iguaçu, Paraná, Brasil



**ENERGY
STORAGE**

**UNIT: 1 Energy Spring 164
(64 ST523 620V 23,5kWh)**

ENERGY: 1,5 MWh

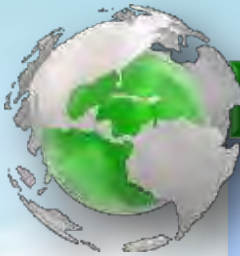
POWER: 400 kW

- Off-Grid
- Military services

With ITAIPU



ENEL GREEN POWER – Micro-Grid System



Location: Ollagüe Chile



UNIT: 1 Energy Spring 132
(32 ST523 620V 23,5kWh)

ENERGY: 560 KWh

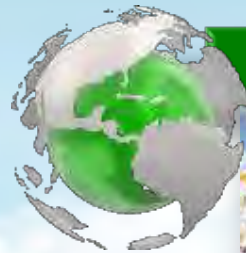
POWER: 200 KW

**ENERGY
STORAGE**

With ENEL GREEN POWER

- Micro-Grid
- Combination with PV, WindGen and diesel PowerGen





Location: South Korea



UNIT: 2 Cabinet (8 ST523 620V 23,5kWh)

ENERGY: 100 kWh

POWER: 50 kW for 2 hours



- Micro-Grid
- Load shifting
- Peak shaving

With POSCO Energy for Kepco

On-Grid System for Esselunga



UNIT: 2 cabinet 104 (8 ST523 620V 23,5kWh)

ENERGY: 188 kWh

POWER: 50 KW

- Energy Intensive Services
- Time-shifting

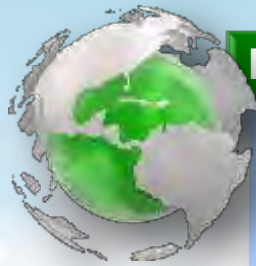


**ENERGY
STORAGE**

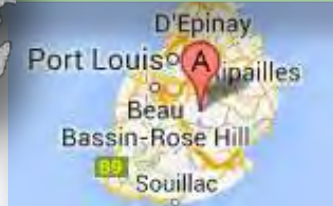
With a system integrator for ESSELUNGA



Micro-Grid System for a Luxury Resort



Location: Mauritius



UNIT: 3 cabinet 104 (12 ST523 620V 23,5kWh)

ENERGY: 282 kWh

POWER: 125 kW



**ENERGY
STORAGE**

- Micro-Grid
- Time-shifting
- Spinning Smoothing
- Peak shaving

With ELVI for a Luxury Resort



Smart-Grid System for Politecnico of Bari



**ENERGY
STORAGE**

UNIT: 2 cabinet 303 (8 ST523 620V
23,5kWh)

ENERGY: 141 kWh

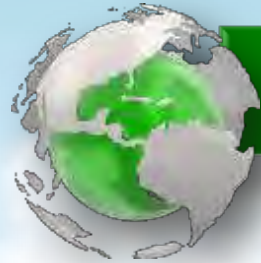
POWER: 65 KW

- Multi-generation Micro-Grid
- Energy Intensive Services



**With a syst. Integrator for
Politecnico of Bari**

CEIF – Micro-Grid System for Cagliari University



**Location: Ottana -
Sardinia**



- Micro-Grid
- Energy and Power Intensive Services
- Different generation sources



**ENERGY
STORAGE**

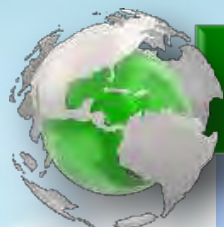
With an EPC for Cagliari University

**UNIT: 1 Energy Spring 324
(24ST523 620V 23,5kWh)**

ENERGY: 564 kWh

POWER: 300 KW





Location: Tilos - Greece



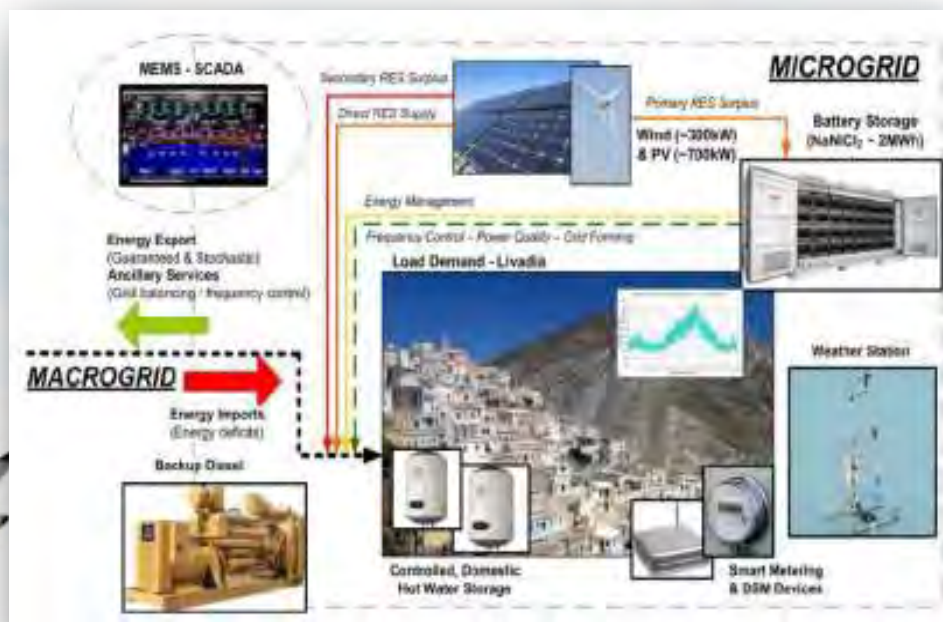
UNIT: 2 Energy Spring 164
(128 ST523 620V 23,5kWh)

ENERGY: 2,4 MWh

POWER: 800 KW

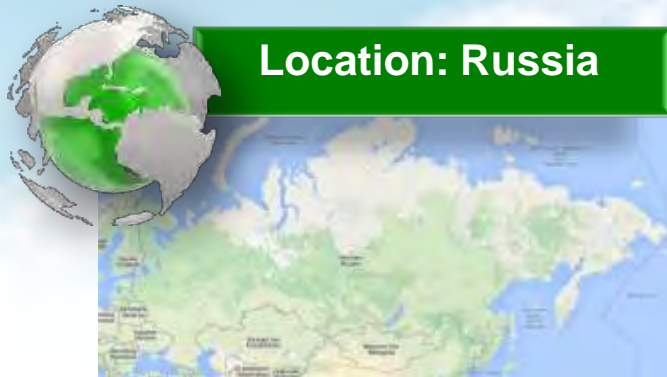
**ENERGY
STORAGE**

With Technological Educational Institute of Piraeus (Greece), CEA (France), Younicos (Germany), WWF (Greece), Open Energy (UK) etc. for TILOS Island



- Smart-Grid
- Micro-Grid energy management
- Energy Intensive Services
- Maximization of RES penetration
- Grid stability
- Ancillary services to the main grid of Kos

Power Feeding for Gas Pipeline



Location: Russia

With Maxinvest

UNIT: 1 Energy OASIS (8 ST523 620V 23,5kWh)
With PV panels (10 kWp), wind turbine and Gen-set

ENERGY: 188 kWh

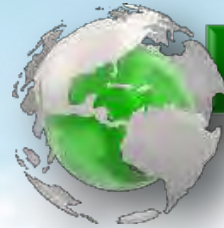
POWER: 30 Kw



**ENERGY
STORAGE**

- Local Micro-Grid
- Off-Grid System
- Gas Pipeline
- PV and Wind Gen for natural gas valve heaters power Supply

University in UK – Demo Storage System



Location: UK



**ENERGY
STORAGE**



UNIT: 1 Cabinet 103 (3 ST523 batteries)

ENERGY: 70 kWh

POWER: 20 KW

- Micro-Grid
- Technology Testing
- Energy Intensive Services for the UK National Grid



GridEdge

Energy for a sustainable future



GridEdge.com.au

1300 474 333



Or Email Us at: info@GridEdge.com.au for more information