

FIAMM

Energy Storage
Solutions

Solutions
for
sustainable
energy.

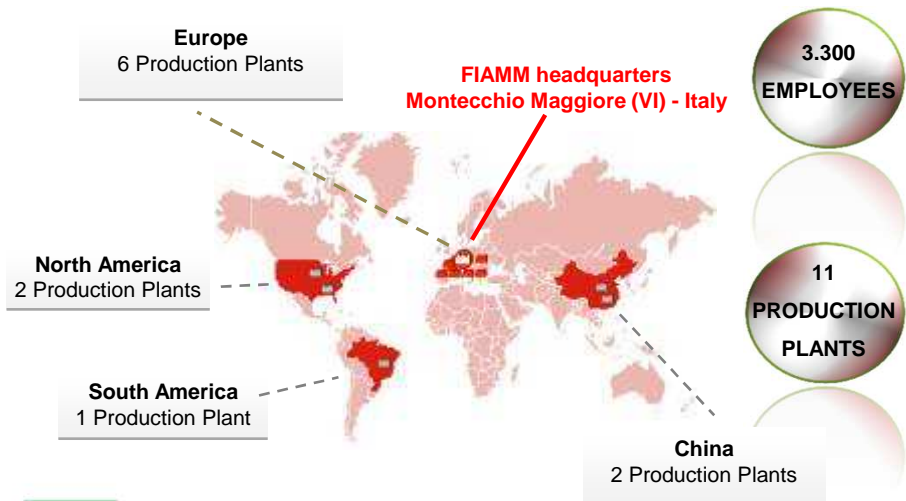
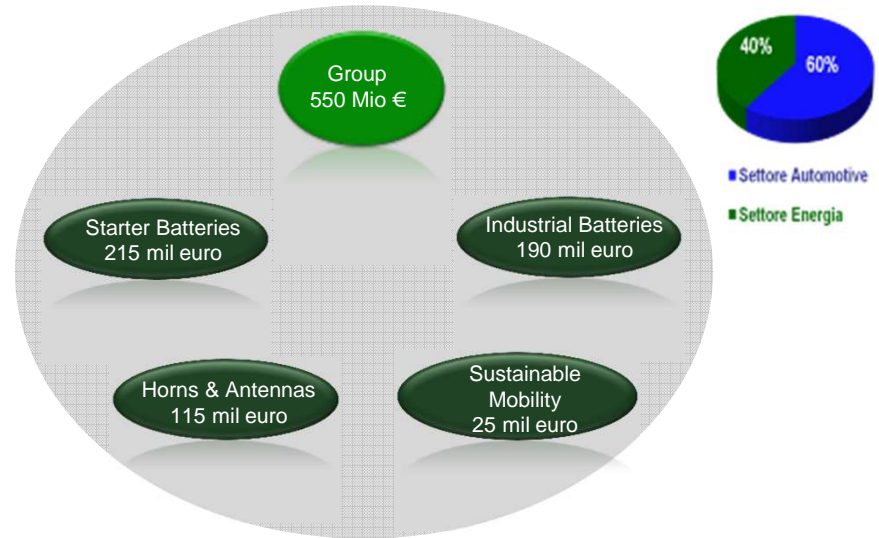
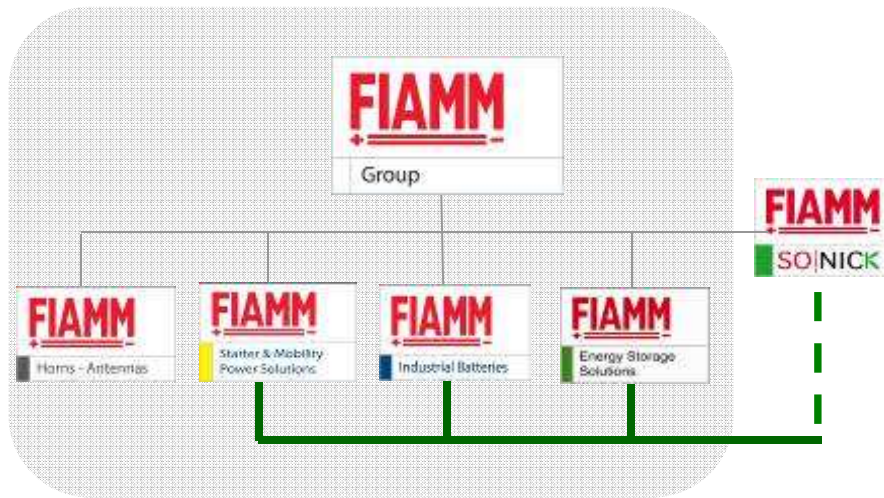


FIAMM ESS - Mario Vona



Energy Storage Solutions

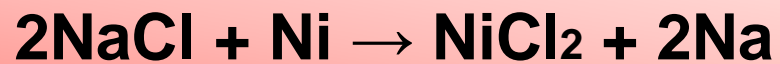
FIAMM ESS/ FIAMM Group



	America	Europe	Asia
Automotive	Ford GM Daimler Chrysler/Caterpillar	Peugeot Renault Volkswagen BMW FIAT Daimler Chrysler Think Iveco	Mazda Daewoo Nissan Honda Toyota Tata FIAT
Industrial	Bellsouth SBC Verizon AT&T Sprint T-Mobile	Telecom Italia Deutsche Telecom Vodafone France Telecom EDF Socomec MTN	Ettek Telekomset Indonesia Singtel Tenaga N. Malaysia Telstra DTAC Thailand China Mobile

FIAMM ESS/ Cell Data

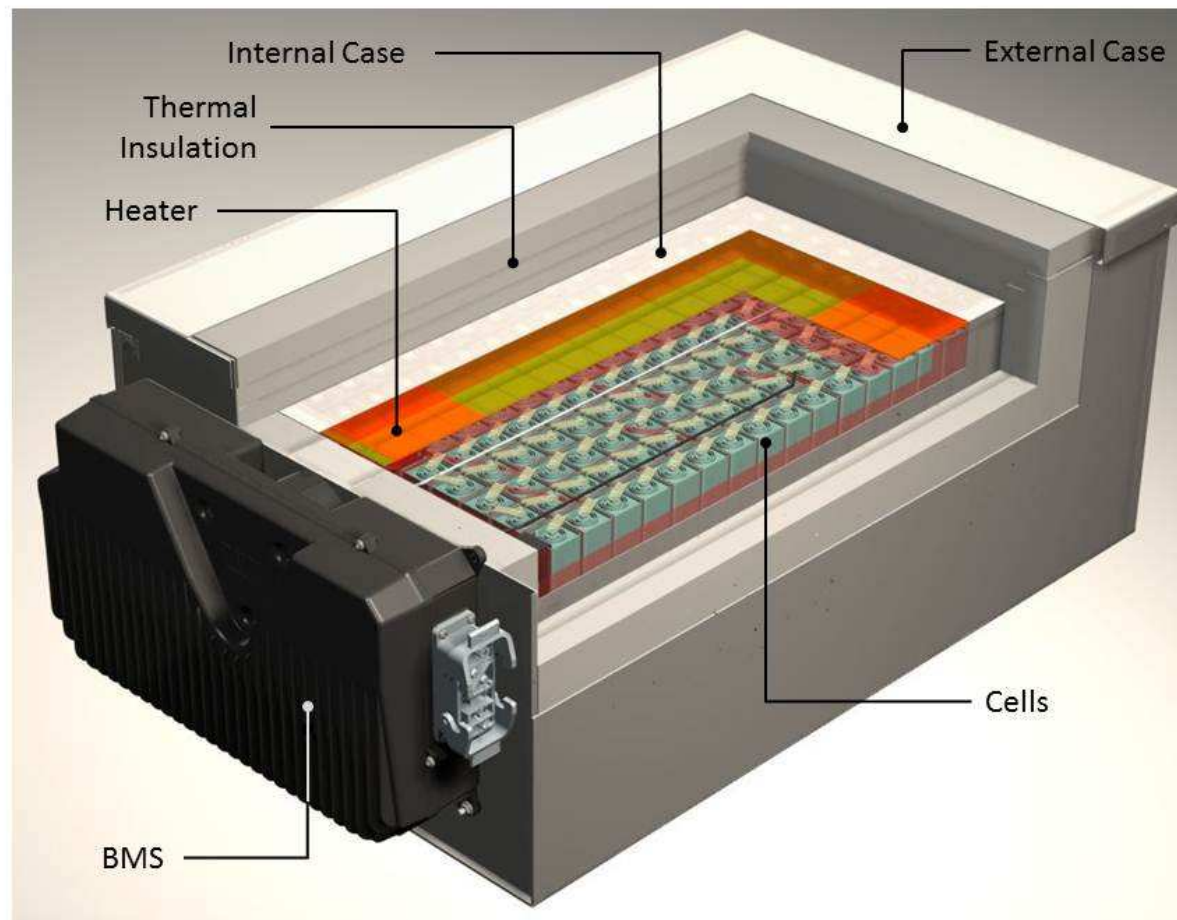
- Voltage: 2.20-2.70 Volt (2.58 OCV)
- Capacity: 38 Ah
- Dimensions: 36 x 36 x 220 H mm
- Weight: 695 g
- Specific Energy: 140 Wh/kg (Pb 25-35 Wh/kg)
- Energy Density: 280 Wh/l (Pb 70-100 (Wh/l))
- Specific Power: 245 W/kg
- Power Density: 491 W/l



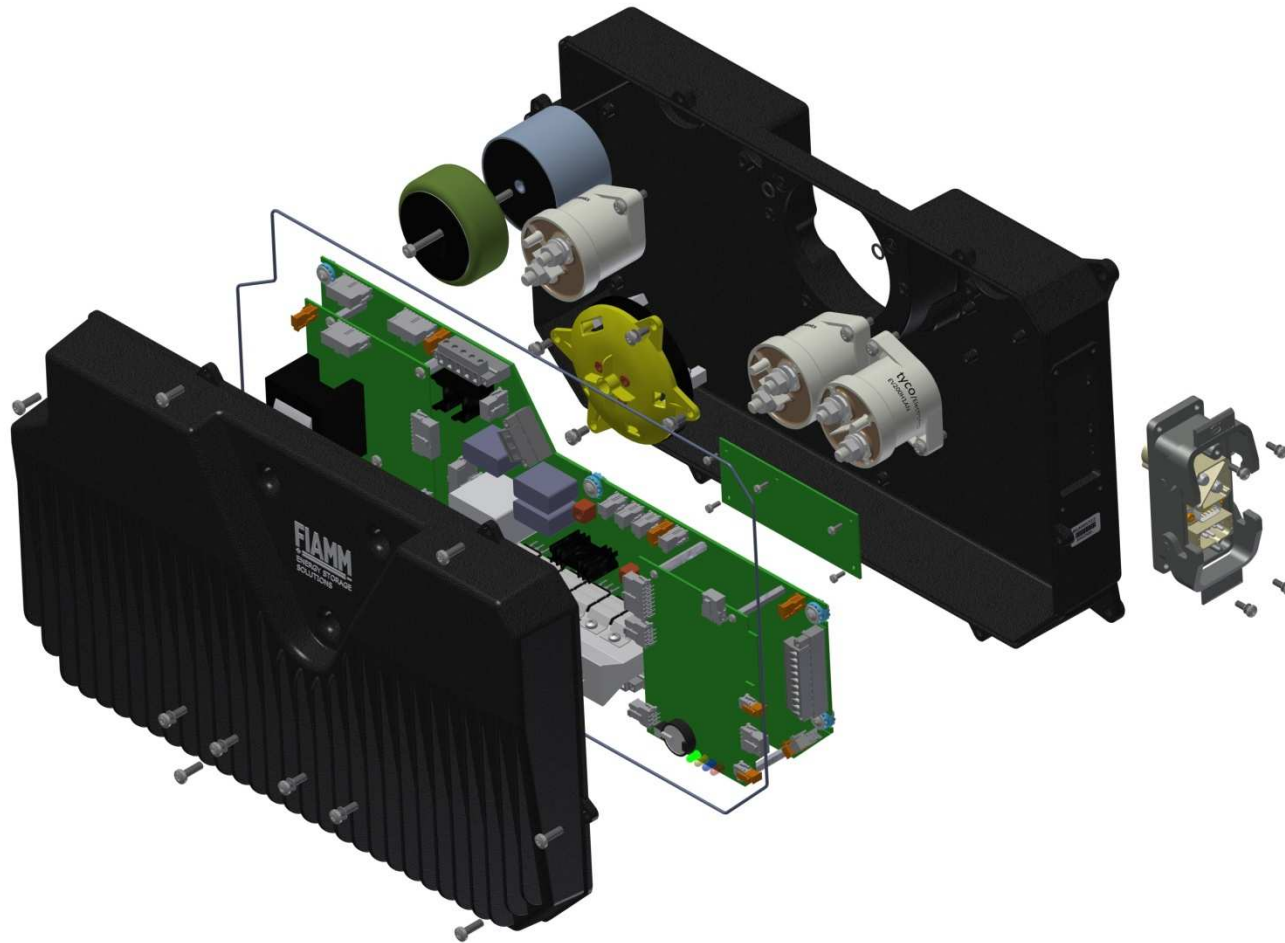
discharged cell

charged cell

FIAMM Sonick / Battery Structure and main components



FIAMM Sonick / BMS main functionalities



FIAMM ESS/ Comparison different Electrochemical

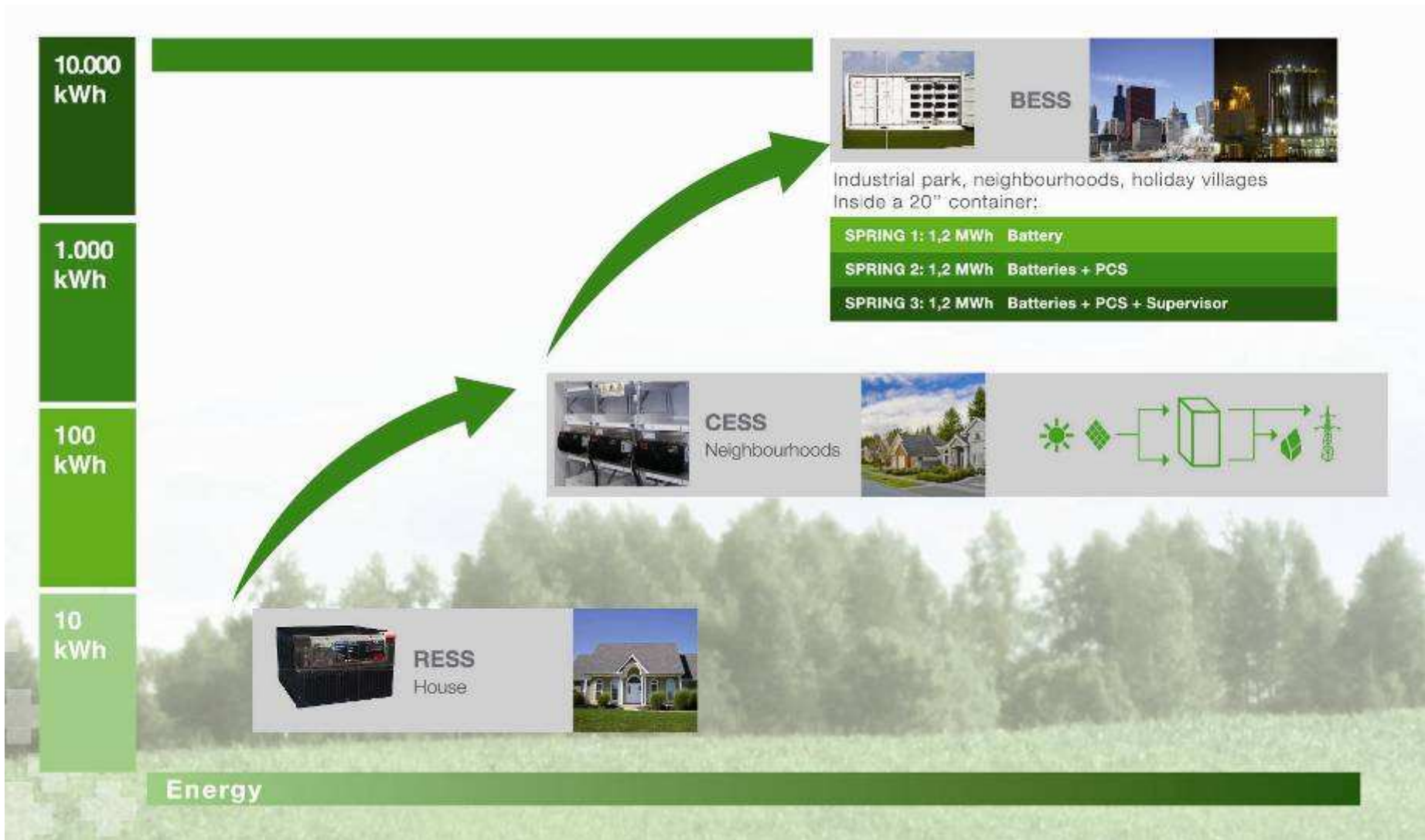
Comparison among different electrochemical storage systems for the key grid applications

Application	Pb acid	Ni/MH	Na/S	Na/NiCl ₂	Redox Flow	Li/ion	Super capacitor
Time-shift	●	●	●	●	●	●	●
Renewable integration	●	●	●	●	●	●	●
Network investment deferral	●	●	●	●	●	●	●
Primary Regulation	●	●	●	●	●	●	●
Secondary Regulation	●	●	●	●	●	●	●
Tertiary Regulation	●	●	●	●	●	●	●
Power System start-up	●	●	●	●	●	●	●
Voltage support	●	●	●	●	●	●	●
Power quality	●	●	●	●	●	●	●

● Suitable ● Less suitable ● Unsuitable

* Source: EASE Roadmap 2030

FIAMM ESS/ FIAMM Solutions for Energy Storage



FIAMM ESS/ BESS Solution: FIAMM Energy Spring

Battery Energy Storage Solution: scalable, compact, suitable for any place of installation. Turn key solution.



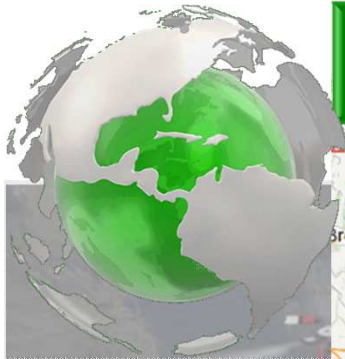
FIAMM ESS/ BESS Solution: FIAMM Energy Spring

Battery **E**nergy **S**torage **S**olution: scalable, suitable for any place of installation.
Turn key solution.



FIAMM ESS/ Bivacco Gervasutti

ESS



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



UNIT: 1 48TL80

ENERGY: 4 KWh

POWER: 3 KW

With CAI Torino

Five fiberglass modules were used for the construction of the new fully technological “Bivacco Gervasutti”.

It represents an off grid energy storage application of Sodium Nickel Chloride batteries. Solar energy captured by photovoltaic panels on the roof is stored in a 48TL80 FIAMM SoNick battery.



FIAMM ESS/ FIAMM Green Energy Island

ESS



Location: Almisano, Italy



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

ENERGY: 230 KWh

POWER: 180 KW (Peak)



Location: South Korea



UNIT: Rack Solution (6 Z37 620V 38Ah)

ENERGY: 141 kWh

POWER: 198 KW (Peak)

With POSCO

FIAMM ESS/ Kepco Project

ESS



Location: South Korea



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

ENERGY: 100 kWh

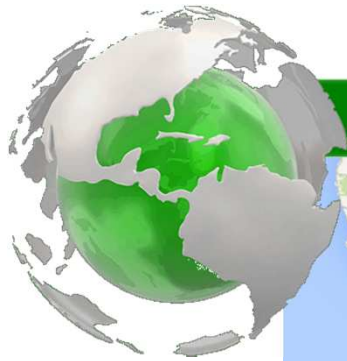
POWER: 50 kW for 2 hours



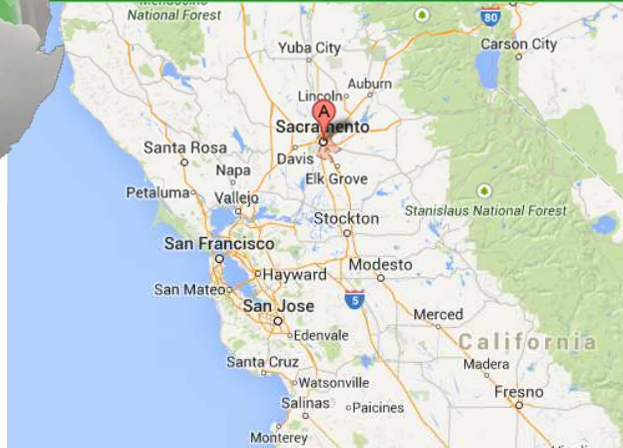
With POSCO

FIAMM ESS/ SMUD project with Parker Sub-Station

ESS



Location: Sacramento - USA



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

ENERGY: 188 kWh

POWER: 50 kW

FIAMM ESS/ DUKE project with S&C Sub-Station Rankin

ESS



Location: Charlotte - USA



With DUKE Energy

UNIT: 1 Energy Spring (12 Z37 620V 38Ah)
ENERGY: 240 KWh
POWER: 120 KW

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



FIAMM ESS/ MALDIVES project

ESS



UNIT: 1 Energy Spring (64 ST523 620V 23,5kWh)
ENERGY: 1.2 MWh (400 KW x 3h)
POWER: 400 KW

FIAMM ESS/ CESS: Excel project

ESS



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

ENERGY: 70 KWh

POWER: 25 KW

With EXCEL SAT

FIAMM ESS/ INES Project

ESS

Location: Le Bourget du Lac
- France



With INES

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

ENERGY: 140 KWh

POWER: 50 KW

FIAMM ESS/ Gabardan project

ESS



Location: Colombiers - France



With EDF EN



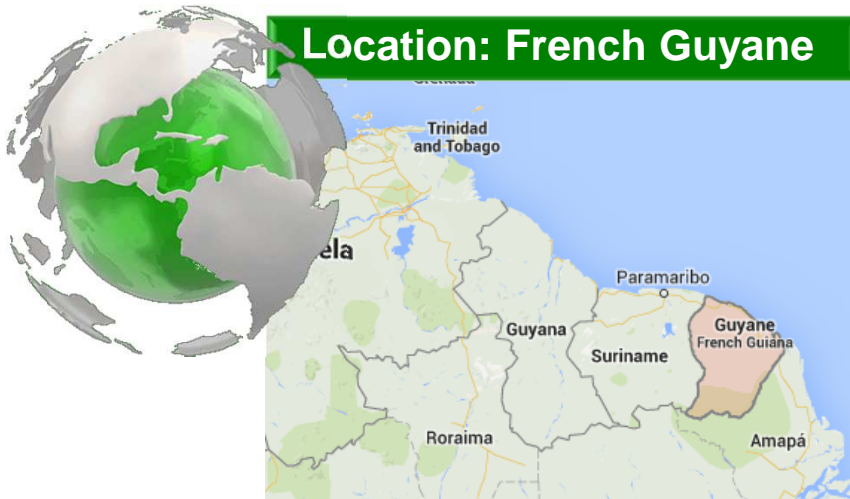
UNIT: 1 Energy Spring 303
(3ST523 620V 23,5kWh)

ENERGY: 70 KWh

POWER: 20 kW

FIAMM ESS/ EDF EN Toucan Project

ESS



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

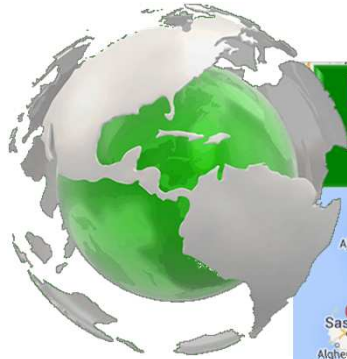
ENERGY: 4,5 MWh

POWER: 1,5 MW



FIAMM ESS/ TERNA: Grid Services (Energy LAB)

ESS



Location: Codrongianos
- Sardinia



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

ENERGY: 4,15 MWh

POWER: 1,2 MW

FIAMM ESS/ TERNA: Grid Services (Energy LAB)

ESS



Location: Ciminna - Sicily

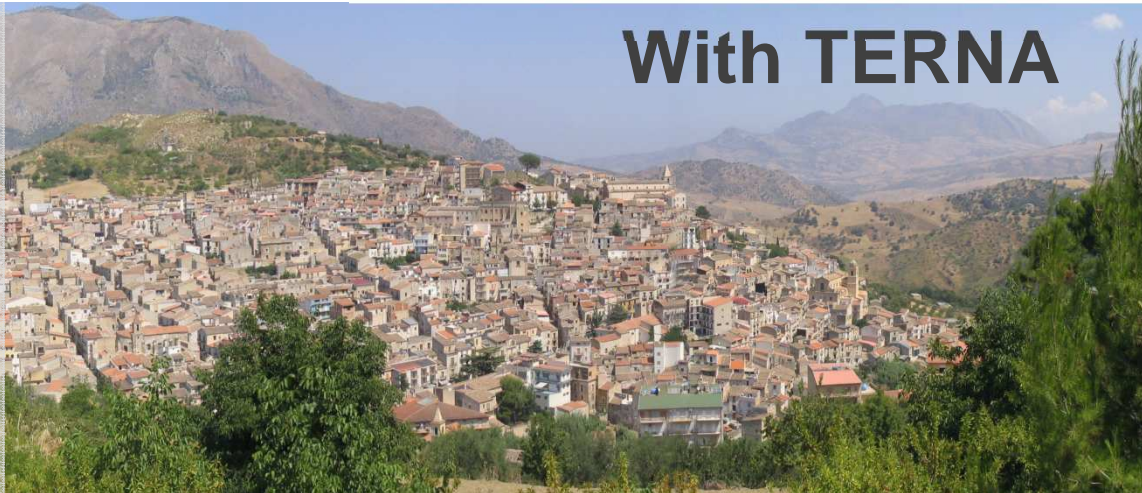


UNIT: 4 Energy Spring 164
(256 ST523 620V 23,5kWh)

ENERGY: 4150 kWh

POWER: 1200kW x 3.5h

With TERNA



FIAMM ESS/ Itaipu Dam

ESS



Location: Paraná, Brasil – Paraguay



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

ENERGY: 1,5 MWh

POWER: 400 kW



FIAMM ESS/ Ollagüe Chile

ESS

Location: Ollagüe Chile



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

ENERGY: 560 KWh

POWER: 200 KW



FIAMM ESS/ ELVI - Esselunga

ESS



Location: Pioltello, Milano



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

ENERGY: 188 kWh

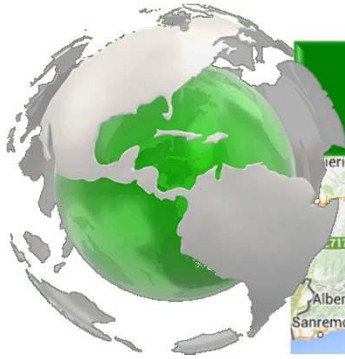
POWER: 50 KW



With ESSELUNGA

FIAMM ESS/ Smart Polygeneration Microgrid

ESS



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



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

ENERGY: 140 KWh

POWER: 62 kW

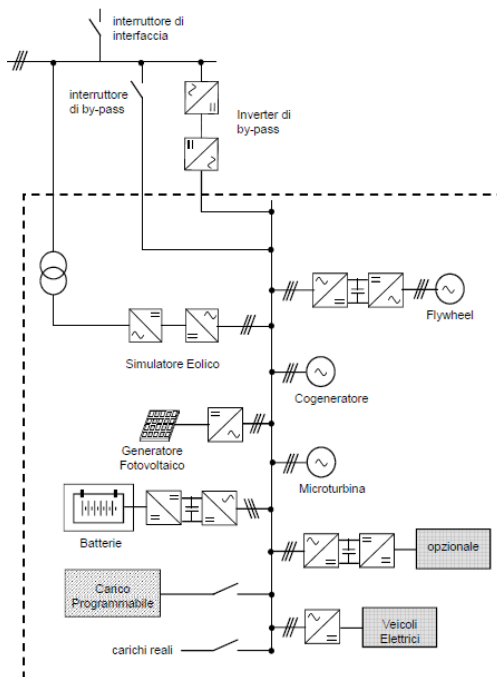
With SIEMENS

FIAMM ESS/ Università Politecnica di Bari

ESS

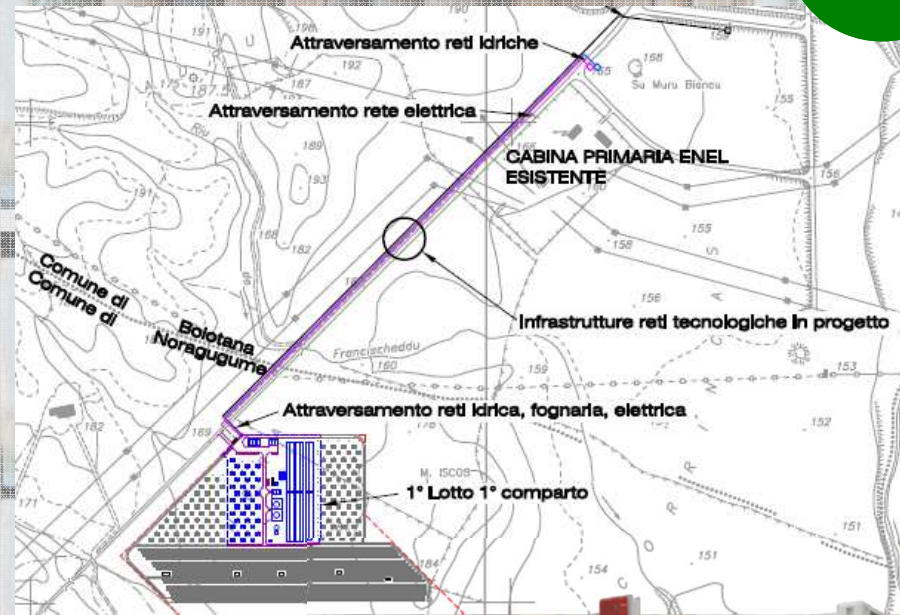


Location: Bari



UNIT: 2 cabinet 303 (8 ST523 620V 23,5kWh)
ENERGY: 141 kWh
POWER: 65 KW

Location: Ottana - Sardinia



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

ENERGY: 564 kWh

POWER: 300 KW



FIAMM ESS/ Mauritius

ESS

Location: Mauritius



D'Epinay
Port Louis
Aripailles
Beau Bassin-Rose Hill
Souillac

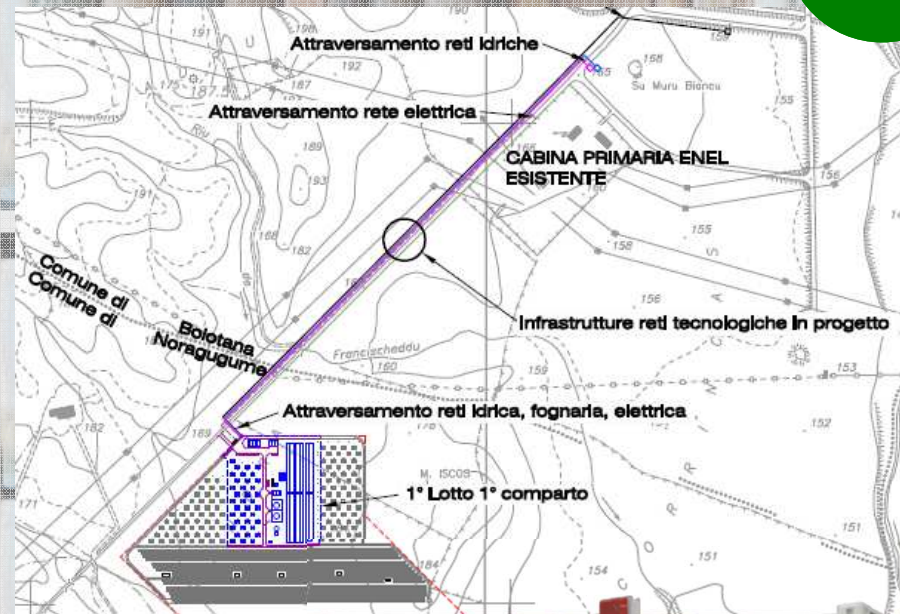
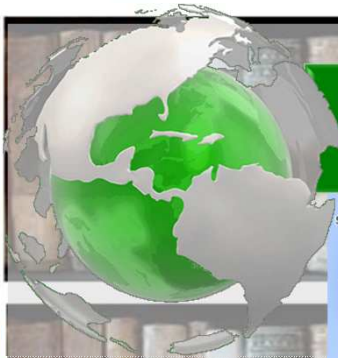
UNIT: 3 cabinet 104 (12 ST523 620V 23,5kWh)

ENERGY: 282 kWh

POWER: 125 kW

With ELVI

Location: Ottana - Sardinia



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

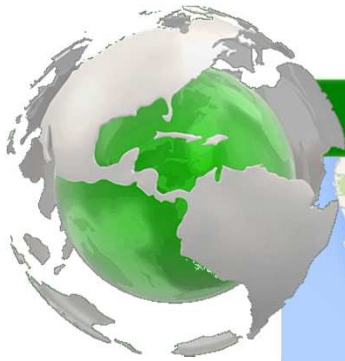
ENERGY: 564 kWh

POWER: 300 KW

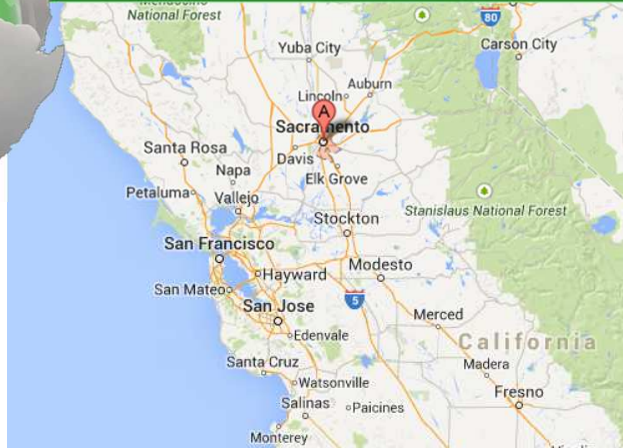


FIAMM ESS/ SMUD project with Parker Sub-Station

ESS



Location: Sacramento - USA



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

ENERGY: 188 kWh

POWER: 50 kW

Thanks for the Attentions

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