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GREEN & SAFE SALT BATTERY

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1938 – onward : a story of experience in energy storage systems

1938

Elettra 1938 founded by Dolcetta family in Vicenza area, Italy

1942

FIAMM Spa starts producing lead acid batteries and components

1960

FIAMM Group becomes a WW leader in automotive and industrial lead acid batteries and components

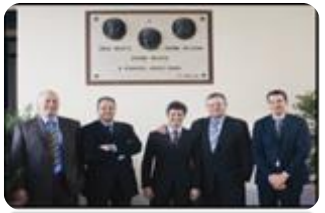
1990

1999

MES-DEA S.A. started the serial production of Sodium Nickel batteries in Stabio, Switzerland

2007

Shareholders restructuring



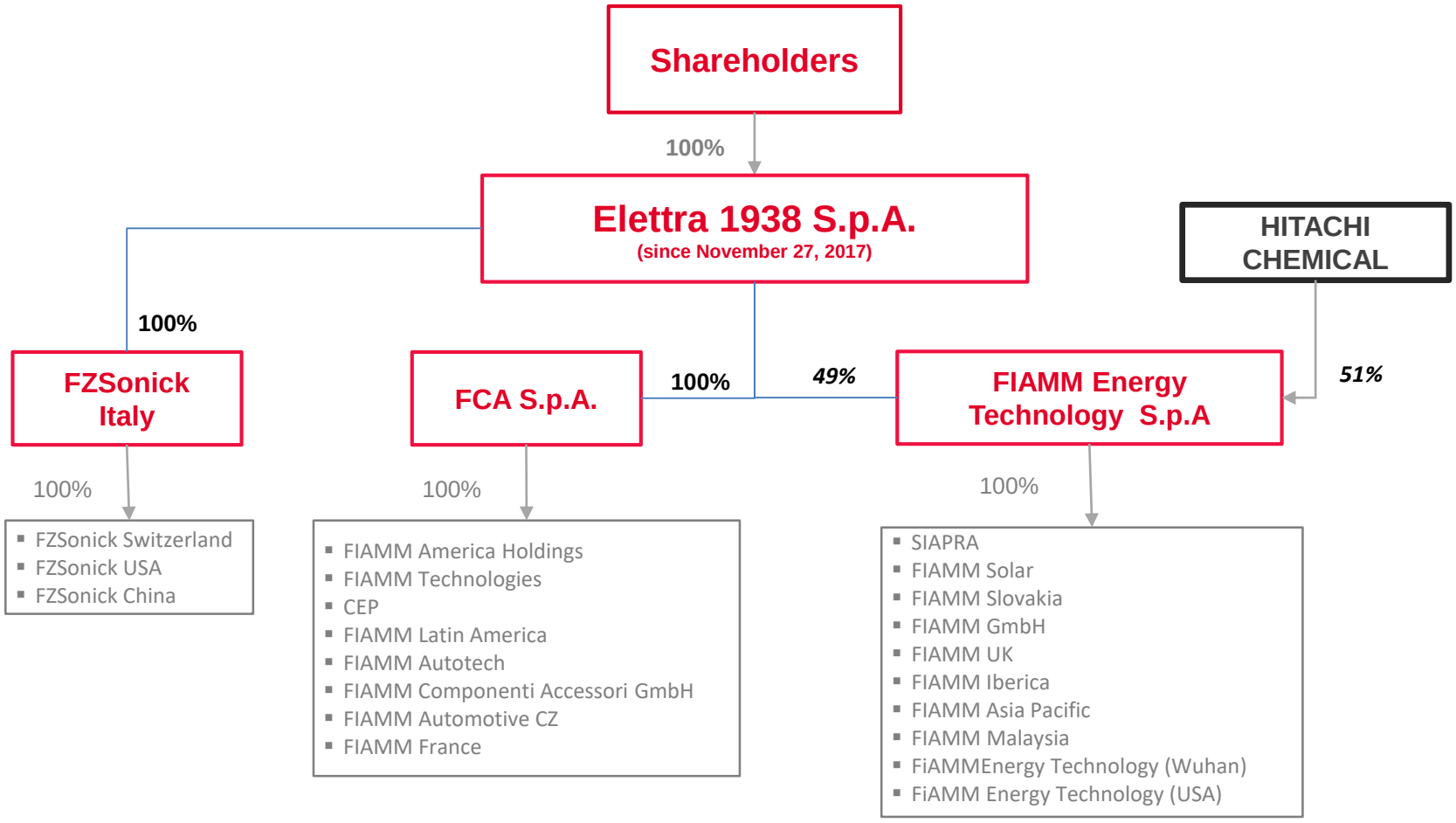
2011

Acquisition of MES-DEA by FIAMM. FZSonick is born

2017

Hitachi Chemical ltd acquired 51% of FIAMM. FZSONICK and FCA (FIAMM components) remain 100% under control of Elettra1938

ELETTRA1938 Group



FZSonick's Footprint

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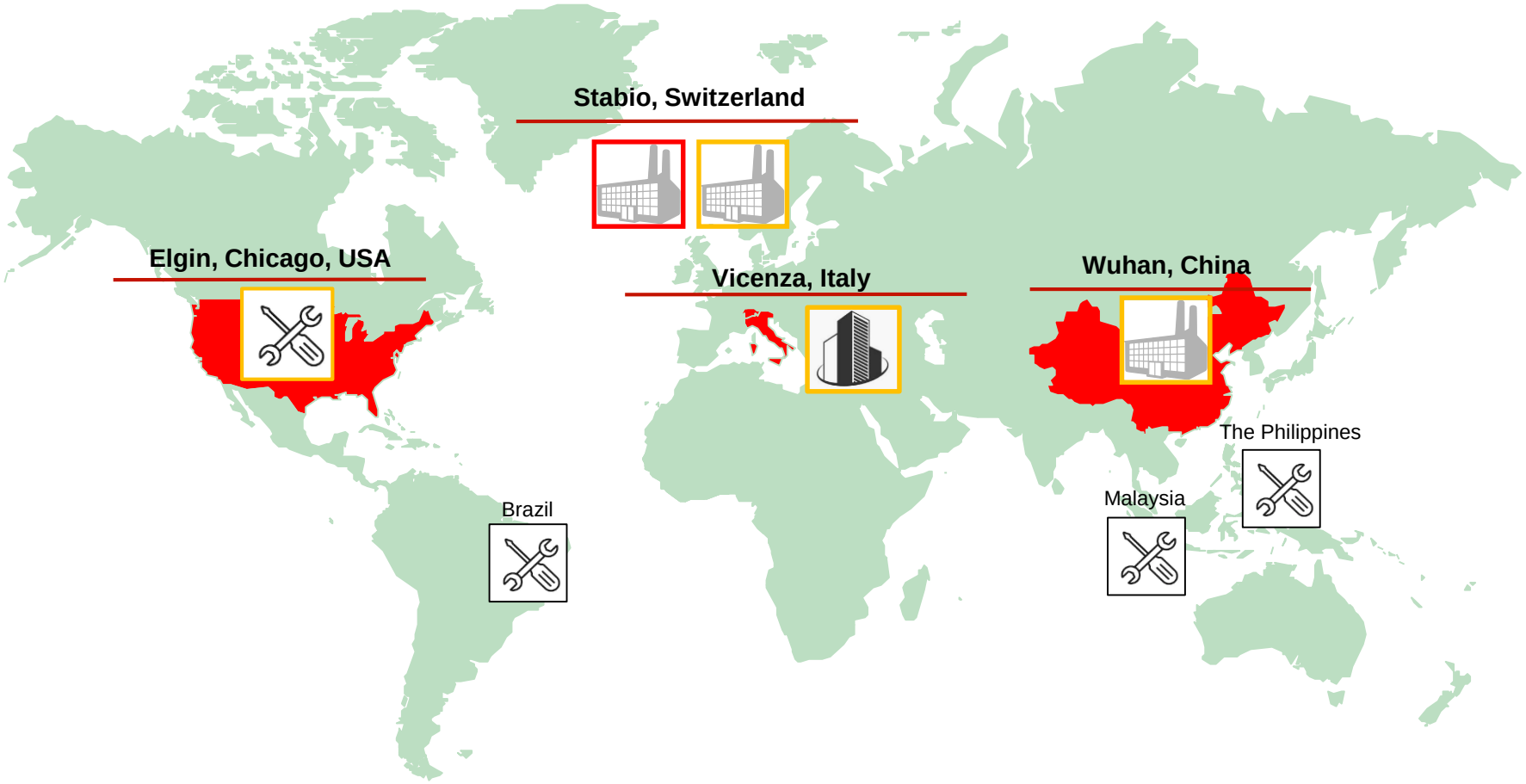

FZSonick Group by numbers

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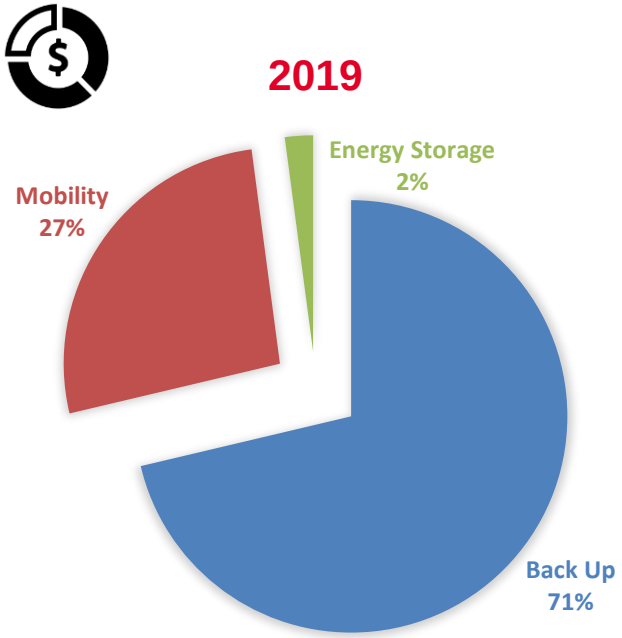
Elettra1938's Group revenues: 630 M € (2019)



In 2019 **FZSonick** has produced
2000 cells/day
equivalent to 4800 pcs batteries

FZSonick EBITDA = 10%

FZSoNick product by number

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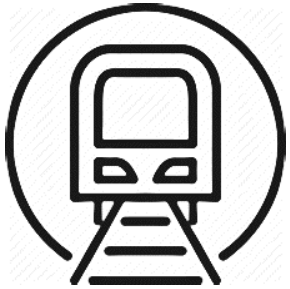
OIL&GAS
> 500 batteries systems installed

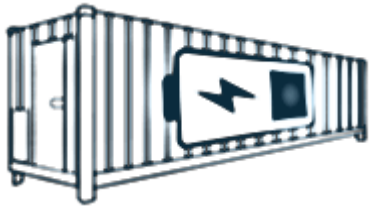
PRODUCTION
> 4,5 M cells manufactured

TELECOM
> 20,000 batteries systems installed

Installations in 5 continents



RAILWAYS
> 1,500 batteries systems installed



ENERGY STORAGE
> 3,000 batteries systems installed

ELECTRICAL MOBILITY
> 4,500 batteries systems installed

TECHNICAL

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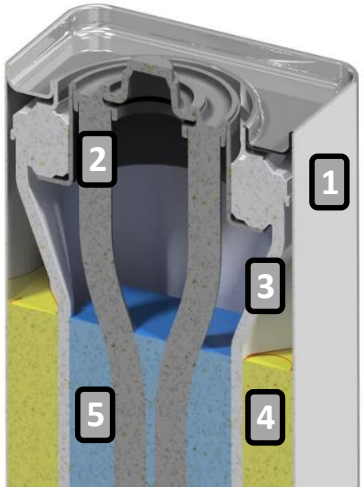
- Active materials
  - discharged state: sodium chloride and metal powders (mainly nickel)
  - charged state: sodium and metal chlorides



1. Steel cell case (anode)
2. Metal (Ni) current collector (cathode)
3. Solid electrolyte β-Allumina
4. Sodium negative electrode (anode)
5. Porous positive electrode (cathode)

$$2NaCl + Ni \rightleftharpoons NiCl_2 + 2Na$$

discharged cell — charged cell

- Operating temperature of the cell: 250°C to 350°C
- Electrolyte & Separator: solid state ß”alumina and molten state NaAlCl4 catholyte

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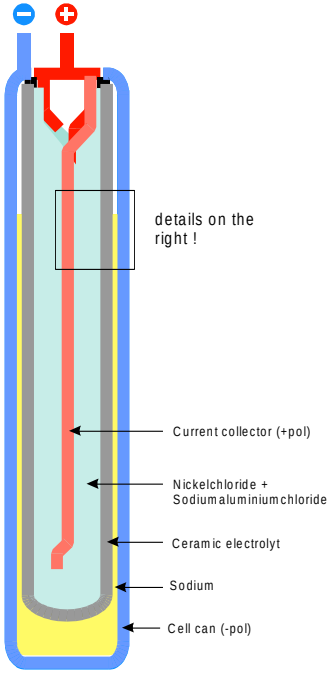

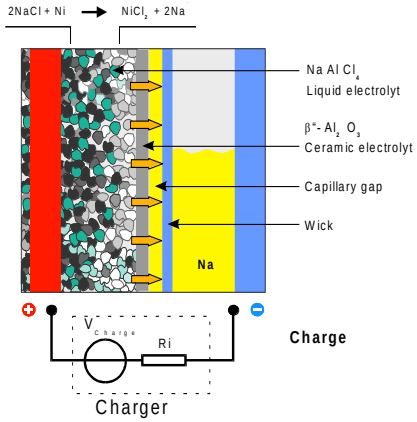

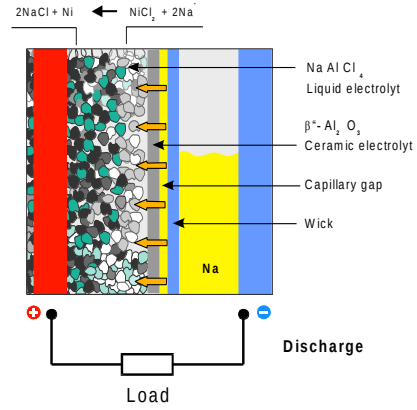

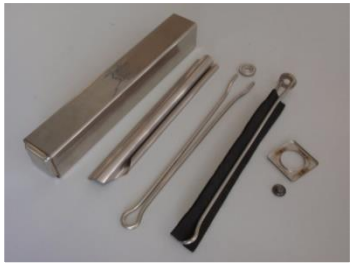

$$2NaCl + Ni \underset{\text{discharge}}{\overset{\text{charge}}{\rightleftharpoons}} NiCl_2 + 2Na$$

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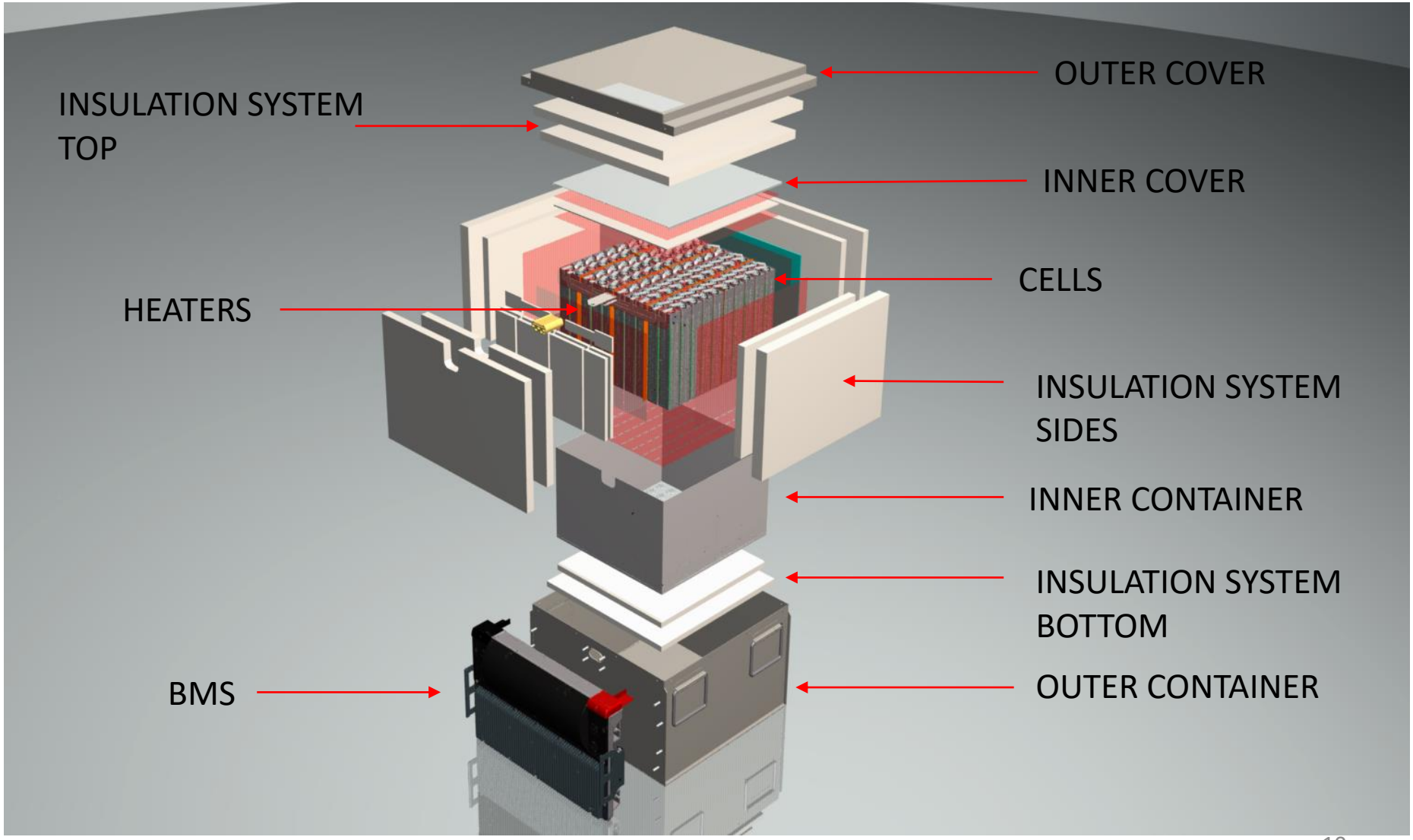
GREEN & SAFE SALT BATTERY



FZSONICK Technology Overview

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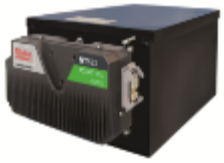
— Processes —	— Technology —		— Output —
Ceramic Processes	• Ceramic Granulations • Isostatic Pressing • Sintering • Thermocompression Bonding		• Beta-Alumina Tube • Alfa-Alumina Collar • Tube-Collar Subassembly
Metallurgic Processes	• Powder Mixing • Roll Compactation • Salt Synthesis		• Granulated Active Mass • Catholite
Cell Assembly	• Laser Welding • Vacuum Drying • Active Mass Filling • Cell sealing (laser weld)		• Finished Cell
Battery System	• Cell Pack Assembly • Activation Process • BMS Mounting • Operation/Performance Checks		• Complete Battery System

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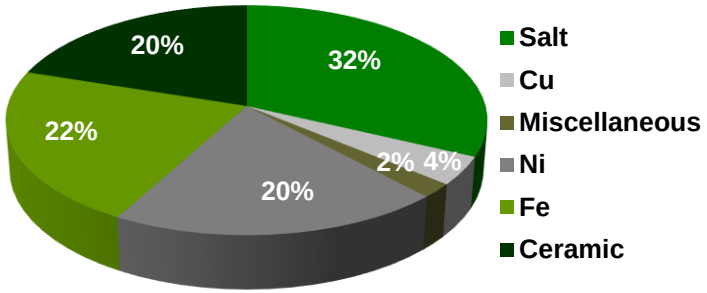
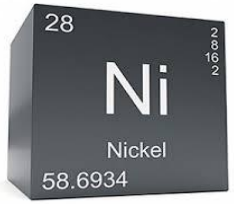
- Low environmental impact:
  - Zero ambient emissions
  - Free of highly toxic materials
  - 100% recyclable stainless steel, nickel, iron, salt, ceramic
  - Battery ext. temp. only a few degrees above environment



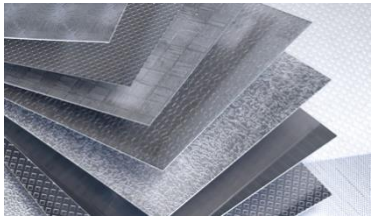
ceramic : aluminium, oxygen, sodium

sodium

nickel



metals : iron, aluminium, nickel



carbon

silica-based materials

FZSONICK Technology Overview : recycling

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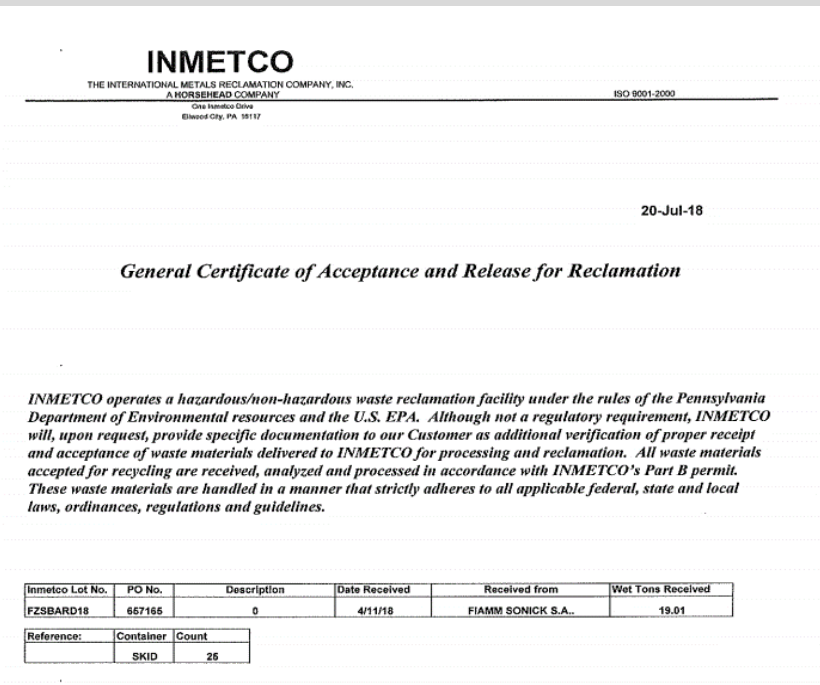
The basic materials of a Sodium Nickel Chloride cell are **nickel, iron, common salt and ceramic**;
the cell case and the battery box are steel and the thermal insulation is a silica based material.

An exhausted battery can be used for **steel production**:
the metallic boxes, the nickel and the iron content will become part of the final product,

salt and ceramic will form the slag in a process consistent way and the slag is normally used as asphalt for road construction.

INMETCO, a leading recycler of metallic materials for the production of stainless steel, certified since 1998 the recycle cycle for Sodium Nickel Chloride technology :

Exhausted batteries can be 100% recycled after use without the need of additional processes , and, last but not least , **the recycling cost is already included in the selling price .**



INMETCO
THE INTERNATIONAL METALS RECLAMATION COMPANY, INC.
A HORSEHEAD COMPANY
ISO 9001-2000
One Inmetco Drive
Elwood City, PA 16117

20-Jul-18

General Certificate of Acceptance and Release for Reclamation

INMETCO operates a hazardous/non-hazardous waste reclamation facility under the rules of the Pennsylvania Department of Environmental resources and the U.S. EPA. Although not a regulatory requirement, INMETCO will, upon request, provide specific documentation to our Customer as additional verification of proper receipt and acceptance of waste materials delivered to INMETCO for processing and reclamation. All waste materials accepted for recycling are received, analyzed and processed in accordance with INMETCO's Part B permit. These waste materials are handled in a manner that strictly adheres to all applicable federal, state and local laws, ordinances, regulations and guidelines.

Inmetco Lot No.	PO No.	Description	Date Received	Received from	Wet Tons Received
FZSBARD18	667165	0	4/11/18	FIAMM SONICK S.A..	19.01

Reference:	Container	Count
	SKID	25

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- Sodium-Metal Chloride battery achieved various certifications. Most Important are:

Telcordia® NEBS MET CERTIFIED

- GR63
- GR1089
- GR3176

UL

- UL1973
- **UL9540A**

IEC

- IEC/EN61000-6/-4
- IEC60068-2
- IEC/EN60529

- Temperature limits	- Short circuit	- Nail Penetration
- Electro Magnetic Compatibility	- Overdischarge	- Immersion Test
- Overcharge	- Shock and vibration	- Fire resistance

- a detailed evaluation of the Health and Safety Issues of the Sodium-Metal Chloride battery, performed by the National Renewable Energy Laboratory – US Department of Energy, is available.

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

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UL9540A : Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems

Module Level Test
External Short Circuit

Module Design: 100 ML3X cells, 48 V, 200 Ah, 104.3 kg (230 lbs.).
Thermal Runaway Propagation: No propagation occurred.
External Flaming: No external flaming occurred.
Locations of Flame Venting: No external flaming occurred.
Flying Debris: No flying debris occurred.
Peak Heat Release Rate: No external flaming occured.
Re-ignitions: No re-ignitions.
Gas Composition Pre-Flaming: Less than 1 L of methane, no other gases observed.
Gas Composition After Flaming: No flaming occurred.

Module Level Test
Nail Penetration

Module Design: 100 ML3X cells, 48 V, 200 Ah, 104.3 kg (230 lbs.).
Thermal Runaway Propagation: Propagated through all cells in module.
External Flaming: No external flaming occurred.
Locations of Flame Venting: No external flaming occured.
Flying Debris: No flying debris occurred.
Peak Heat Release Rate: No external flaming occurred.
Re-ignitions: No re-ignitions.
Gas Composition Pre-Flaming: CO_2 (0 L); CO (3 L); CH_4 (49 L); H_2 (0 L).
Gas Composition After Flaming: No flaming occurred.

Condition of left and right faces of module after the nail penetration test

FZSonick is the unique ES technology that reached the UL9540A certification both at cell and module level

BATTERIES COMPARISON

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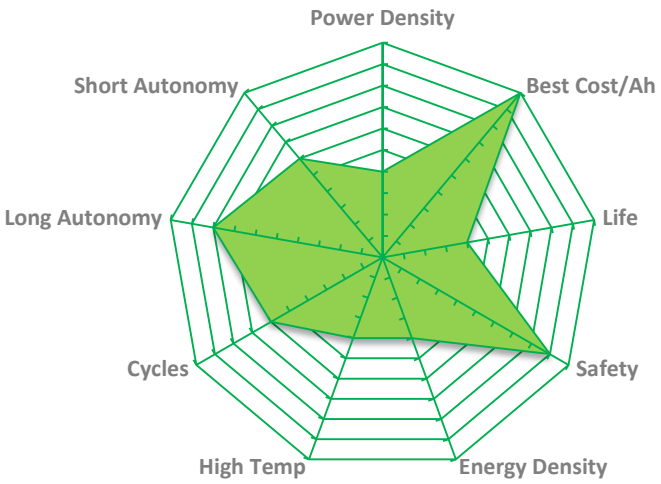
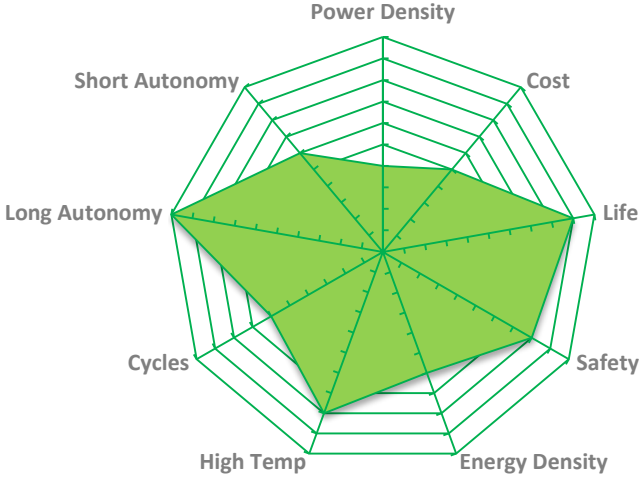
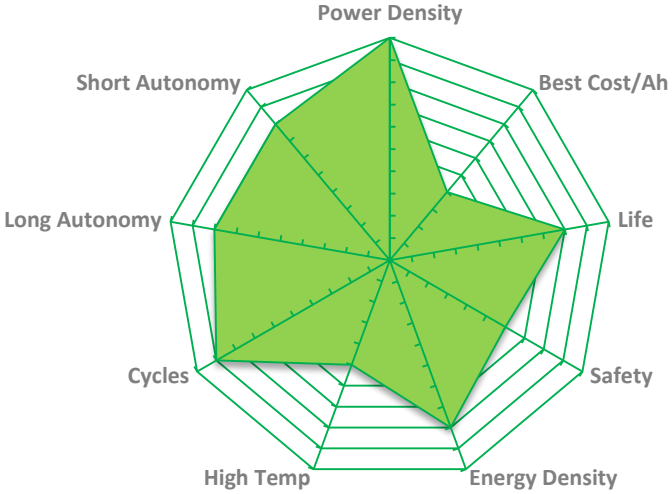
Lead Acid VRLA



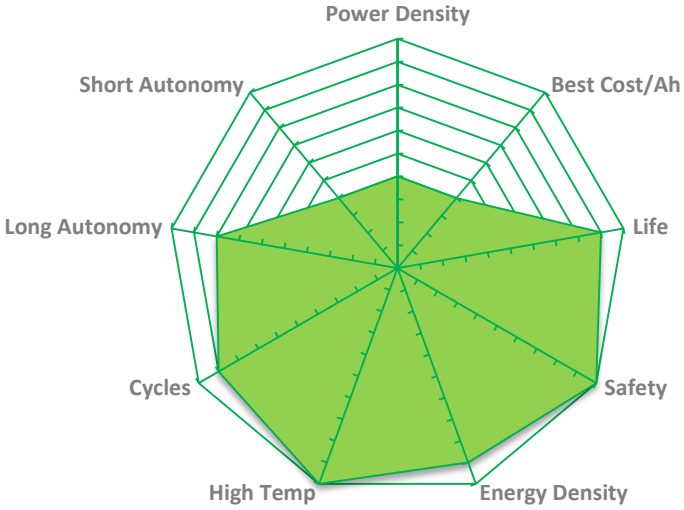
Nickel Cadmium



Lithium Ion (LiFePo)



Sodium Nickel



BATTERIES COMPARISON

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Features	VRLA	Vented LA	NiCad	Li Ion	Sodium Nickel
Expected life (years)	5-15 years	12-20 years	12-20 years	10-15 years	15-20 years
Decay vs. Temperature @30 C	<50%	<50%	<20%	<20%	0%
Energy density	Standard	Standard	Standard	High	High
Recharge	Moderate	Moderate	Moderate	Fast	Fast
Cooling required	Moderate	Moderate	Moderate	Low (?)	None
Battery Monitoring System	Optional	Optional	Optional	Included	Included
Technology maturity	High	High	High	Moderate	Moderate
Ageing (floating)	Yes	Yes	Yes	Yes	None
Shelf life	Short	Very short	Medium	Medium	Very Long
Initial cost	Low	High	High	Very High	Very High

Note: average values based on different type of Li Ion chemistries

COMPARISON OF BATTERIES ENVIRONMENT

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Features	Lead Acid	NiCad	Li Ion	Sodium Nickel
Outdoor Installation	NO	NO	NO	YES
Risk				NONE
Safety devices (eg. Safety shower, ..)	YES	YES	NO	NO
Room ventilation	YES	YES	NO	NO
Air Conditioning	YES	YES	YES	NO
Maintenance	YES	YES	YES (for Air Cond.)	NO
Single module redundancy	NO	NO	NOT CLEAR	YES
Predictable failure*	NO	NO	NOT CLEAR	YES

*capability to detect a battery cell or module malfunctioning with no or low impact to the whole string.

Product & Production Future Guidelines

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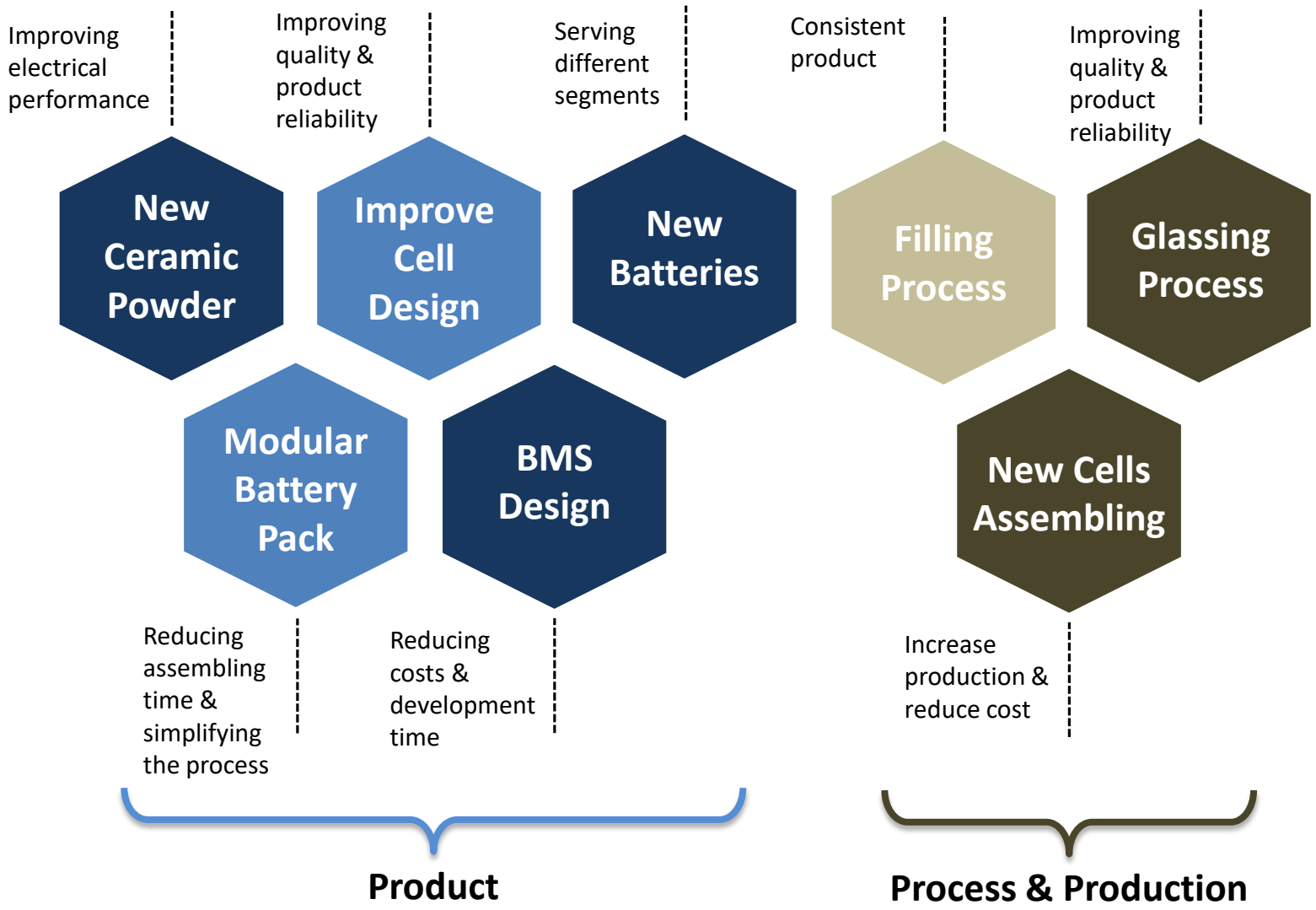

PRODUCTS

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GREEN & SAFE SALT BATTERY

FZSONICK Characteristics

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GREEN & SAFE SALT BATTERY

Performances

- ✓ Temperature Immunity (-40 ÷ +60°C)
- ✓ Cycling Capability
  > 4.500 cycles (80% DOD)
- ✓ Long life (low degradation)
- ✓ Battery energy density
  100÷120Wh/kg
  150-190Wh/lt
- ✓ Shelf life (> 20 years)
- ✓ Not re-usable on different applications (theft deterrent)

Safety

- ✓ Intrinsically safe, electrochemical safety
- ✓ No gas emissions
- ✓ No flammable materials
- ✓ No fire/water flood reaction
- ✓ Tested in the field
- ✓ BMS control
- ✓ Cell/Battery Mechanical case

Zero Impact Battery

- ✓ NO dangerous materials
- ✓ 100% recyclable
- ✓ NO pollution materials
- ✓ NO gas emissions
- ✓ NO valuable resalable materials

Suitable Applications/Markets

- ✓ **Telecom – Harsh Environment Outside Plan, High Energy Density Central Office and Off Grid BTS.**
- ✓ **Oil & Gas Power Generation – On Shore, Off Shore sites and switchgear.**
- ✓ **Railways – Onboard train back up and harsh environment signaling sites.**
- ✓ **Energy Storage – Residential, Industrial and Power Management**
- ✓ **Full Electric Vehicle – Buses and commercial vans**

BACK UP range - RW

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GREEN & SAFE SALT BATTERY

- *Nominal Voltage* 110 VDC
- *Capacity* 80 Ah
- *Energy* 8,7 kWh
- *Optimal use* 1 ÷ 12h rate

- ***Main tech characteristics:***

Voltage Operating Range	88 ÷135 VDC
Heat dissipation	120 W
Max Discharge Current	120 Amps
Bus Voltage Range	120 to 140 VDC
Low Voltage Disconnect	88 VDC
Fuse	125 Amps
Communication Port	CAN Bus
Inputs	EPS , Emergency Load disconnect
Front	616 mm (24.2 in)
Depth	526 mm (20.7 in)
Height	379 mm (14.9 in)
Weight	107 kg (230 lb)
Env.Temperature Range	- 25 to +65 °C (-13 to 150oF)
IP rate	IP65
Comply with:	IEC 60571, 61571, 61991, 62236-3-1, 61508, EN 50126, 50128, 50129, NFPA 130

BACK UP range - UP

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GREEN & SAFE SALT BATTERY

- *Nominal Voltage* 110 ÷ 250 VDC
- *Capacity* 40 and 80 Ah
- *Energy* 8,6 ÷ 9,9 kWh
- *Optimal use* 1 ÷ 12h rate

Main tech characteristics:

Dimensions and Weights

Model	Front	Depth	Height	Weight
48UP200	500 mm	558 mm	322 mm	104 kg
110UP80	500 mm	522 mm	322 mm	114 kg
125UP80	500 mm	560 mm	322 mm	120 kg
130UP80	500 mm	598 mm	322 mm	125 kg
220UP40	500 mm	522 mm	322 mm	114 kg
250UP40	500 mm	560 mm	322 mm	120 kg

Specific Characteristics per Model

Model	Nominal Voltage	Charge Voltage range	Nominal Capacity at 4 hours rate	Gravimetric Energy Density	Max Continuous Discharge Current*	Max Charging current	Interface
48UP200	48 VDC	54-59 VDC	200 Ah / 9600 Wh to 42VDC	91 Wh/kg	200 Amps	40 Amps	RS485 /USB
110UP80	110 VDC	122-160 VDC	80Ah / 8600 Wh to 94VDC	75 Wh/kg	120 Amps	16 Amps	RS485 /Canbus /USB
125UP80	125 VDC	135-160 VDC	80 Ah / 9600 Wh to 105VDC	80 Wh/kg	120 Amps	16 Amps	RS485 /Canbus /USB
130UP80	130 VDC	141-160 VDC	80 Ah / 9900 Wh to 109VDC	79 Wh/kg	120 Amps	16 Amps	RS485 /Canbus /USB
220UP40	220 VDC	243-300 VDC	40Ah / 8600 Wh to 189VDC	75 Wh/kg	60 Amps	8 Amps	RS485 /Canbus /USB
250UP40	250 VDC	270-300 VDC	40 Ah / 9600 Wh to 210VDC	80 Wh/kg	60 Amps	8 Amps	RS485 /Canbus /USB

Comply with: EN 61000-6-2 / EN 61000-6-4
CE, UL9540A, UL1973
IEC62984 / IEC60529 / IEC

BACK UP range - TL

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+ ***Main tech characteristics:***

Operating Voltage Range	40 ÷54 VDC
Heat dissipation	107 / 110 / 117 W
Max Discharge Current	90 / 120 / 150 (200*) Amps
Bus Voltage Range	54 ÷59 VDC
Low Voltage Disconnect	40 VDC
Fuse	200 Amps
Communication Port	RS485 or CAN / USB
Alarm Contact	230 VAC 2A
Front	496 mm (19.5 inc)
Depth	558 mm (21.9 inc)
Height	320 mm (12.6 inc)
Weight	80 / 95 / 105 kg (177 / 210 / 243 lb)
Env. Temperature Range	- 20 ÷ +60 °C (-4 ÷140oF)
IP rate	IP 55

* Discharge current up to 200A for the new TL200 with bussbars

ESS range

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+ ***Main tech characteristics:***

Operating Voltage Range	450 – 700 VDC
Nominal Energy Capacity	22,5 kWh
Nominal Current Capacity	38 Ah
Max Discharge Power	6,25 kW for 3 hours
Max Charging Voltage	700 VDC
Low Voltage Disconnect	450 VDC
Communication Port	CAN Open
Round Trip Efficency	Min 90%
Front	624 mm (24,6 inc)
Depth	1023 mm (40,2 inc)
Height	406 mm (16 inc)
Weight	256 kg (564 lb)
Env. Temperature Range	- 20 ÷ +60 °C (-4 ÷140°F)
IP rate	IP 43

ESS range

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- ***Cabinet main tech characteristics:***

Operating Voltage Range	500 – 700 VDC
Nominal Energy Capacity	90 kWh
Constant Power Discharge	25 kW for 3 hours
Front	1200 mm
Depth	1200 mm
Height	2300 mm
Weight	1500 kg
Max number of parallel	6
Max number of ST523	4 pcs per cabinet

- ***Container main tech characteristics:***

Operating Voltage Range	500 – 700 VDC
Nominal Energy Capacity	540 or 1400 kWh for 3 hours
Constant Power Discharge	150 kW or 400 kW
Front	6058 mm
Depth	2438 mm
Height	2896 mm
Weight	11 t or 25 t
Max number of ST523	32 or 64 pcs per 20’ container

Mobility range

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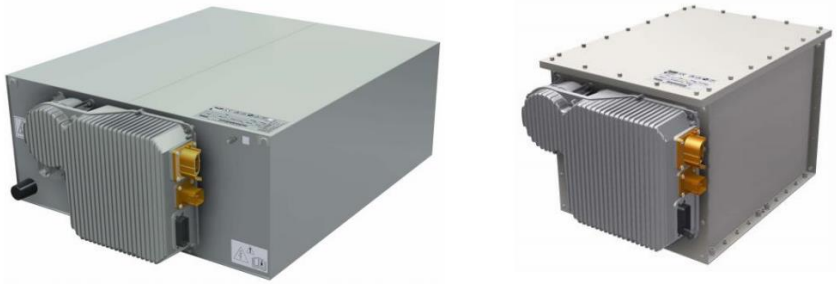
GREEN & SAFE SALT BATTERY

Model	Energy kWh	Capacity (Ah)	Volt	Wh/kg	Vmin (30 Sec peak power)	Vmax (regen breaking)	Energy Density Wh / l	Nr. Of Cells	Dimensions (mm)	Weight (kg)
Z5-278-76	21.2	76	278	113	186	312	181	216	826x530x296	190
Z5-557-38	21.2	38	557	113	372	625	181	216	826x530x296	190
Z37-310-76	23.5	76	310	114	207	348	183	240	900x530x296	208
Z37-620-38	23.5	38	620	114	414	696	183	240	900x530x296	208
Z60-650-38	24.7	38	650	112	434	730	184	252	833x608x296	221
Z36-371-76	28.2	76	371	114	248	417	181	288	841x690x296	248
EV36 + SuperCap	28.2	76	371	114	248	417	181	288	841x690x296	248



EV + SuperCap

Typical applications	Electric Vehicles

Z

BATTERIES FOR THE DECARBONIZATION OF THE TRANSPORT

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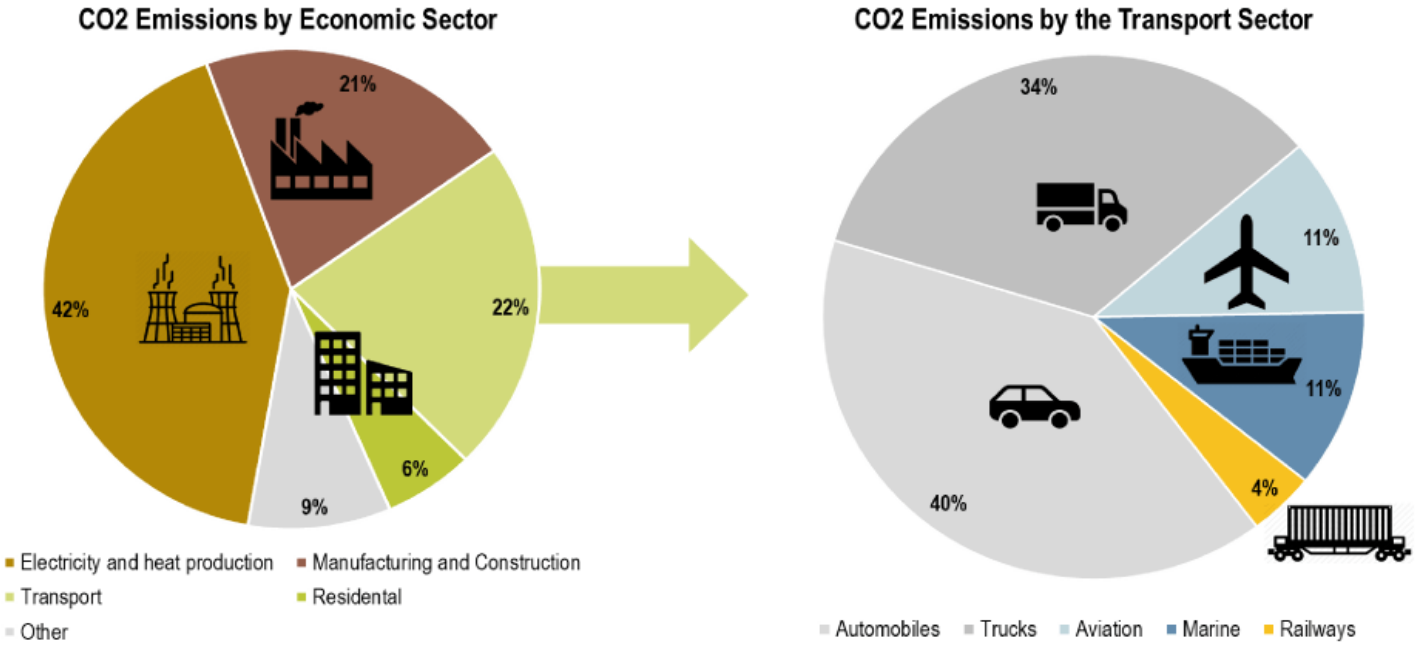
GREEN & SAFE SALT BATTERY

CO_2 EMISSION in TRANSPORTATION

FZSoNick
GREEN & SAFE SALT BATTERY



Electricity and Heat production is responsible of about 42% of direct CO2 emissions

Transportation is responsible for 22% of direct CO2 emissions from fuel combustion.

CO_2 EMISSION in TRANSPORTATION

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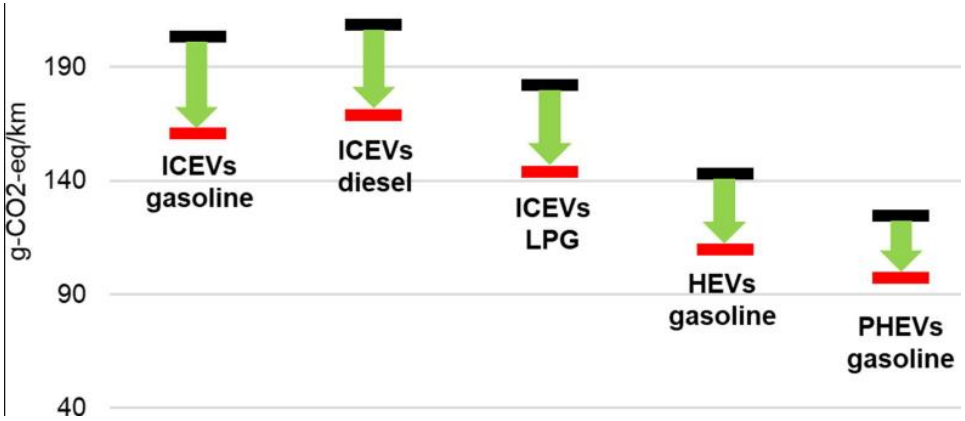
GREEN & SAFE SALT BATTERY

Depending on the level of electrification advanced vehicles will contribute to reduce the global emissions



For BEV and partially for PHEV the global emission will strongly depend from the energy mix used for the production of the electricity

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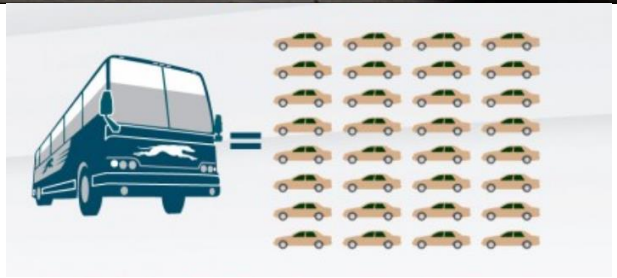
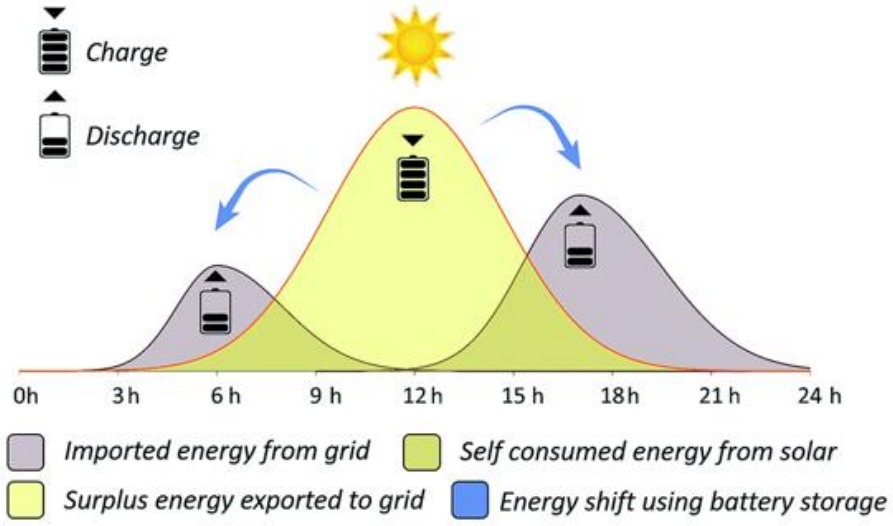
Batteries are an enabling technology as main component for Electrified Vehicles and for the increase of the penetration of renewable sources





SALT BATTERIES FOR DECARBONIZATION

FZSoNick
GREEN & SAFE SALT BATTERY

Sodium nickel chloride batteries have been commercialized since the 1990s and were originally mainly found in electric vehicles (EVs and HEVs).

Today their use has been broadened to include industrial applications, as telecom and back-up markets and grid stationary energy storage systems.

When used in vehicles, they provide advanced solutions for low emission mobility, with a focus on professional applications such as utility vehicles, electric and hybrid buses, delivery vans and trucks used in harsh environment.

Salt batteries are also used in conjunction with photovoltaic and wind farms to contribute to provide stability to the grid and to match the production of the electricity with the utilization.

FZSoNick
GREEN & SAFE SALT BATTERY

From north…

Location: Canada -30° C

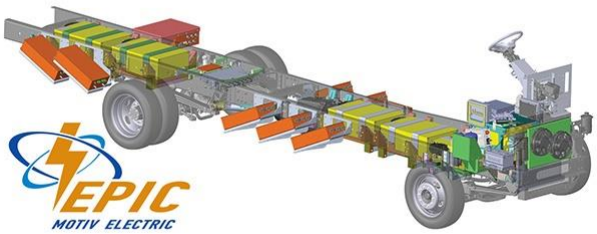
To south…

Location: Abu Dhabi +50° C

LIGHT COMMERCIAL VEHICLES

FZSoNick
GREEN & SAFE SALT BATTERY

Location: USA



Ford eQVM certified producer

With MOTIV for Google

LIGHT COMMERCIAL and UTILITY VEHICLES

FZSoNick
GREEN & SAFE SALT BATTERY

Location: USA

With MOTIV POWER SYSTEMS

FZSoNick
GREEN & SAFE SALT BATTERY

Location EU: Fleets of urban buses

FZSoNick
GREEN & SAFE SALT BATTERY

Location: Europe

IVECO Daily

With IVECO

ENEL GREEN POWER – Micro-Grid System

FZSoNick
GREEN & SAFE SALT BATTERY

Location: Ollagüe Chile

UNIT: 1 Energy Spring 132
(32 ST523 620V 23.5kWh)

ENERGY: 560 kWh

POWER: 200 kW

With ENEL GREEN POWER

- Micro-Grid
- Combination with PV, Wind Gen and diesel Power Gen

REFERENCES

FZSoNick

GREEN & SAFE SALT BATTERY

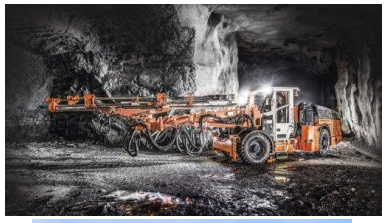
FZSONICK References

FZSoNick
GREEN & SAFE SALT BATTERY

FZSONICK has consolidated a wide list of high standing clients in its reference markets

Energy Backup

Sustainable Mobility



Energy Storage

Some Clients

T-Mobile
国家电网公司 STATE GRID CORPORATION OF CHINA
ERICSSON
at&t
IVECO
mine master Rigs for your needs
Enel Green Power
ines INSTITUT NATIONAL DE L'ENERGIE SOLAIRE
telcel
PETRONAS
MOTIV
ITAIPU BINACIONAL
Globe
TIM
VimpelCom
verizon
sarawak energy
a2a
الشركة السعودية للكهرباء Saudi Electricity company
Zamtel
CenturyLink
BOFINET
SANDVIK
ELTEK
Schneider Electric
Terna
SBB CFF FFS
BOMBARDIER the evolution of mobility

FZSONICK References

FZSoNick
GREEN & SAFE SALT BATTERY

Telecom

TIM
Zamtel
CenturyLink
ERICSSON
NOKIA
Globe
T-Mobile
VimpelCom
BOFINET
at&t
telcel
verizon
MTN
nbn

Mining

SANDVIK
mine master
Rigs for your needs

Oil&Gas

Chevron
ارامكو السعودية
Saudi Aramco
PETRONAS
eni
ExxonMobil

Railways

SBB CFF FFS
bls
BOMBARDIER
the evolution of mobility
Puzhen Bombardier
Transportation System

Utilities

Enel Green Power
a2a
Terna
ITAIPU BINACIONAL
sarawak energy
الشركة السعودية للكهرباء
Saudi Electricity company
国家电网公司
STATE GRID
CORPORATION OF CHINA

Integrator

Schneider Electric
GUTOR
by Schneider Electric
ELTEK
VERTIV.

FZSoNick
GREEN & SAFE SALT BATTERY

Location HQ: Finland

SANDVIK JUMBO DRILL

D422iE:
Battery-driven tramming
full electric

SANDVIK DOZER

LZ101LE
Battery powered dozer

FZSoNick
GREEN & SAFE SALT BATTERY

Location HQ: Poland

MINE MASTER

Face Master: Battery-driven Drilling Rigs

FZSoNick
GREEN & SAFE SALT BATTERY

Location: USA

Together with **SAMINCO**
Worldwide leader in Drivelines
for MINING equipment

BATTERY ELECTRIC LHD's

BOMBARDIER - Transportation

FZSoNick
GREEN & SAFE SALT BATTERY

Brazil – Sao Paulo INNOVIA 300

Saudi Arabia – KAFD Riyadh INNOVIA 300

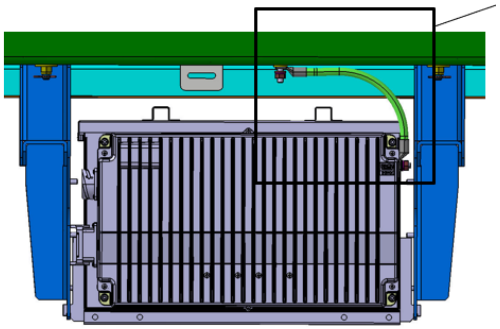
Canada – Skytrain Vancouver INNOVIA ART 300

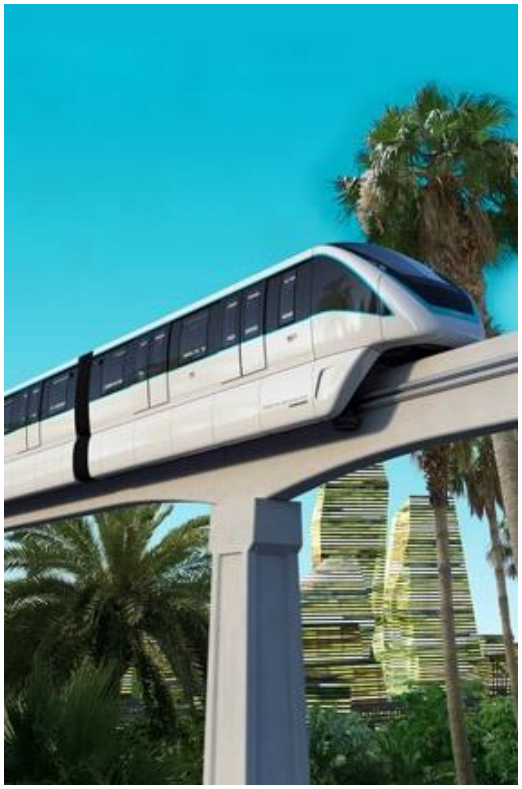
Malaysia – Kuala Lumpur INNOVIA ART 300

Riyadh – Riyadh INNOVIA METRO

China – Wuhu INNOVIA 300

Thailand – Bangkok INNOVIA 300



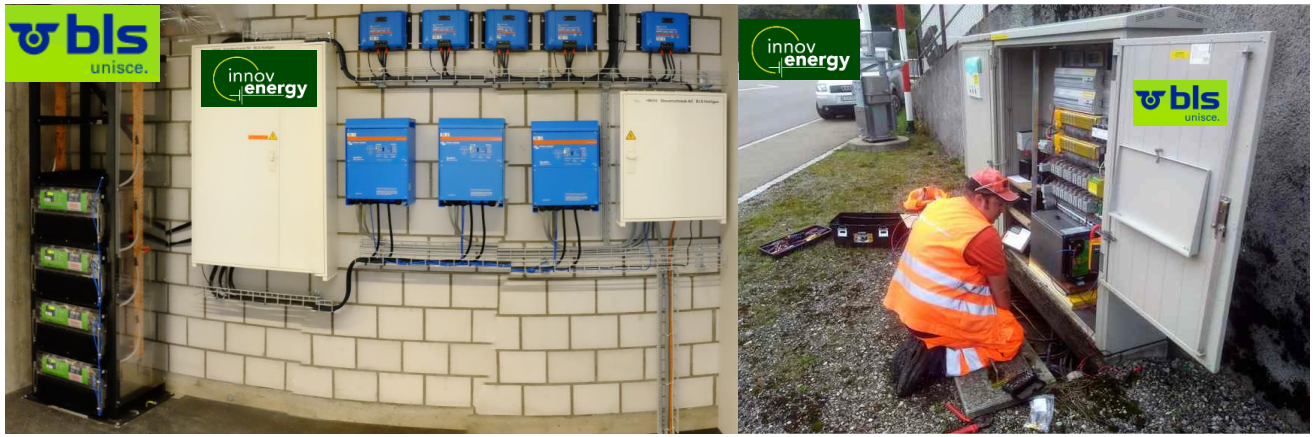


Railways – Signaling (South Africa, Switzerland and USA)

FZSoNick
GREEN & SAFE SALT BATTERY

Key Benefits:

- Harsh environment
- No Maintenance
- Theft deterrent
- Monitoring



Telecom MSC

T Mobile

AT&T

Vimpelcom (Russia)

Globe (Philippines)

Schneider – Villaya Emergency

- *Storage Voltage* 48VDC
- *Storage Energy* 10 to 60 kWh
- Output Voltage 230Vac or 400Vac
- Output power 24h/7d 1kW to 6 kW
- PV size 7-35kWp
- *Size* 10ft container

Schneider Electric Villaya Emergency
Mobile Hybrid microgrid

The solution is designed for critical applications including emergency response, humanitarian / NGO, rural electrification, remote mining and construction, island and defense.

This solution is preassembled, transportable and plug&play

PETRONAS – Oil & Gas

Key Benefits:

- Safety
- Weight & Space savings
- Temperature range
- Extended life in harsh environment

Onshore

Offshore

ENERGY BACKUP

OIL&GAS – Saudi Aramco

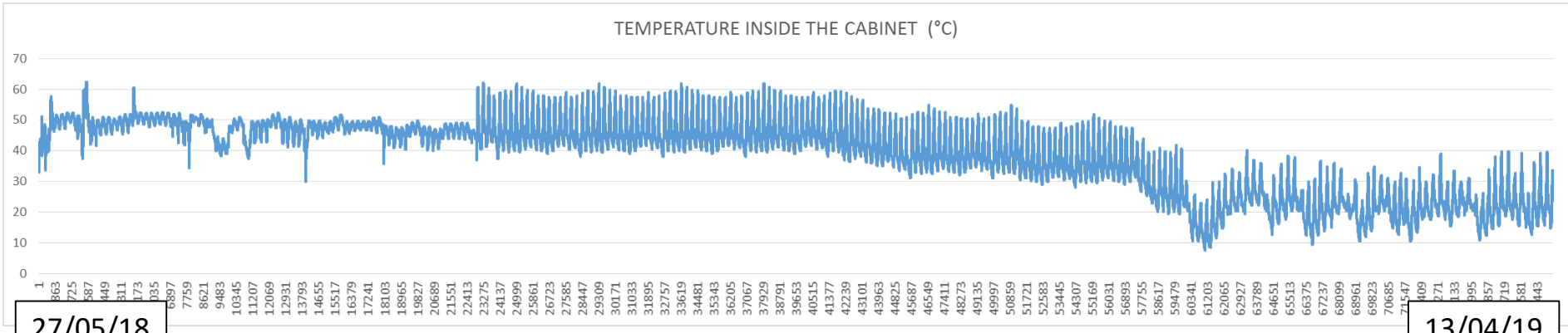
FZSoNick

GREEN & SAFE SALT BATTERY

Field test : 1 year in Dhahran, Saudi Aramco HQ.

Key Benefits:

- Safety
- Extreme temperature
- Space reduction
- No Maintenance
- Theft deterrent
- Monitoring

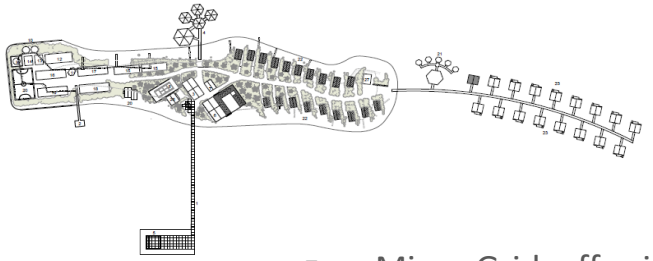


27/05/18

13/04/19

PV EPC – Micro-Grid System for a Luxury Resort

Location: Maldives Islands Island



- Micro-Grid, off-grid
- Diesel PowerGen + High penetration of Photovoltaic system
- Energy Management system

System main datas:

3 Diesel Gen-SETs (400-640 kVA)

PV: 850 kWp

ESS: 1,2 MWh

Storage PCS: 600 kW - 800 kVA

Load profile of design: 7000 kWh/d

TERNA - Grid Services (Storage LAB)

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

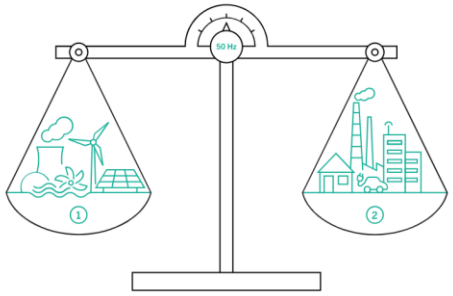
With TERNA

The reduction of the global emission needs coordinated actions from different actors.

Batteries are an enabling technolgy.

The demand of energy storage is wide and diversified. There is not an unique solution that cover all the needs.

Sodium Nickel Chloride batteries can cover the demand for specific mobility applications, as heavy duty or professional vehicles or in hard climatic conditions.



As well Sodium Nickel Chloride batteries can be used to provide ancillary services to the electrical grid and favorite the penetration of renewables sources.

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