Zinc-air secundary batteries for long duration storage

Eurelectric
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Emmanuel BENEFICE, CEO
beneficee@znr.fr

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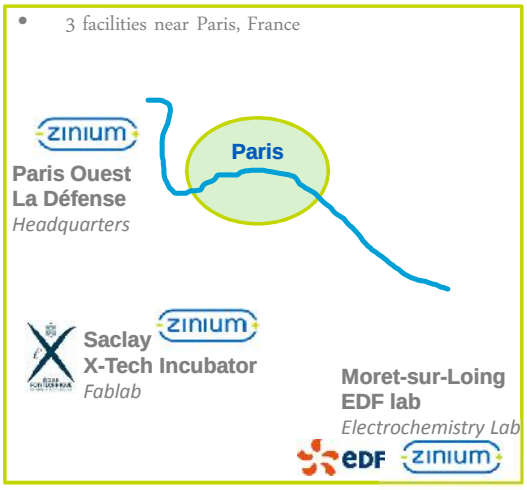
Who is zinium ?

- A French company : **Zn*R* Batteries**
  http://www.znr.fr
- Created in July 2016
- A subsidiary of EDF Group
- Spin-off from the EDF R&D labs
- Dedicated to zinc-air rechargeable batteries technology
- Develops energy storage systems
- A team of 11 salariés (nov. 2017)
  - Including 4 PhD and 5 engineers

- 3 facilities near Paris, France



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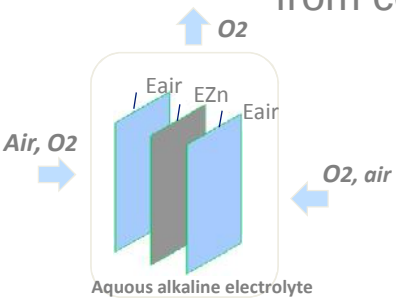
Rechargeable zinc-air by zinium : a breathing battery,

from cell to module



A zinc-air cell from a Zinium battery uses the oxygen of the ambient air for its redox reaction, with the anode zinc, within a liquid alkalin electrolyte.

While discharging, oxygen molecules pass through the selectively permeable membrane of the air cathode.

While charging, the cell rejects pure oxygen in the air.

Embedded electronics at module level pilots the full cycle (native IoT capability)

- The charge or discharge rate is 6 to 10 hours : 1 cycle / day

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WHAT TO EXPECT FROM A NEW BATTERY TECHNOLOGY FOR STATIONARY STORAGE ?

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Concern #1 : **Safety**

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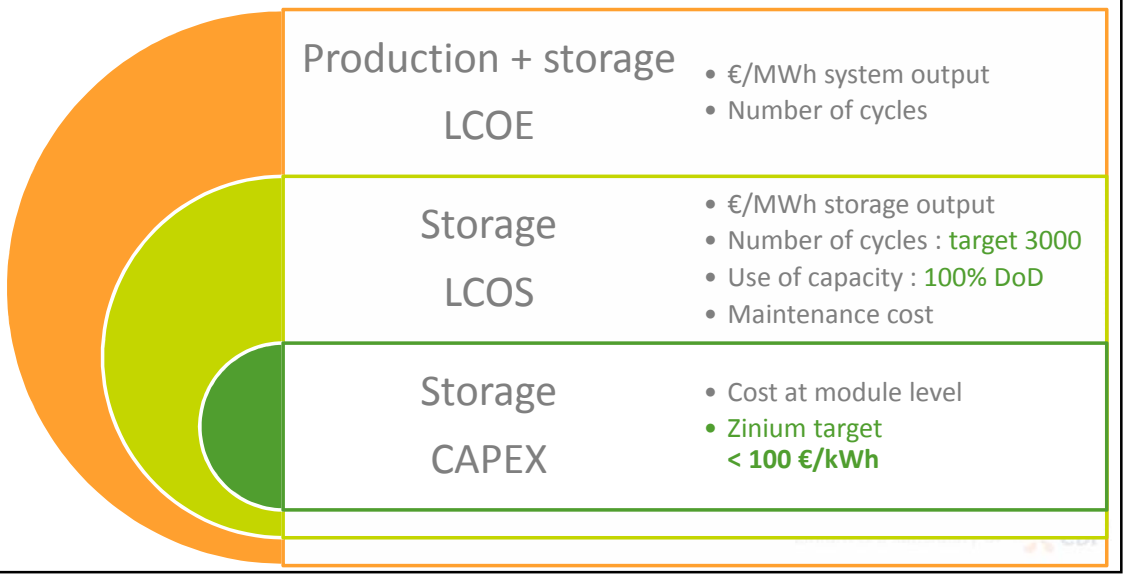
Concern #2 : **Cost**



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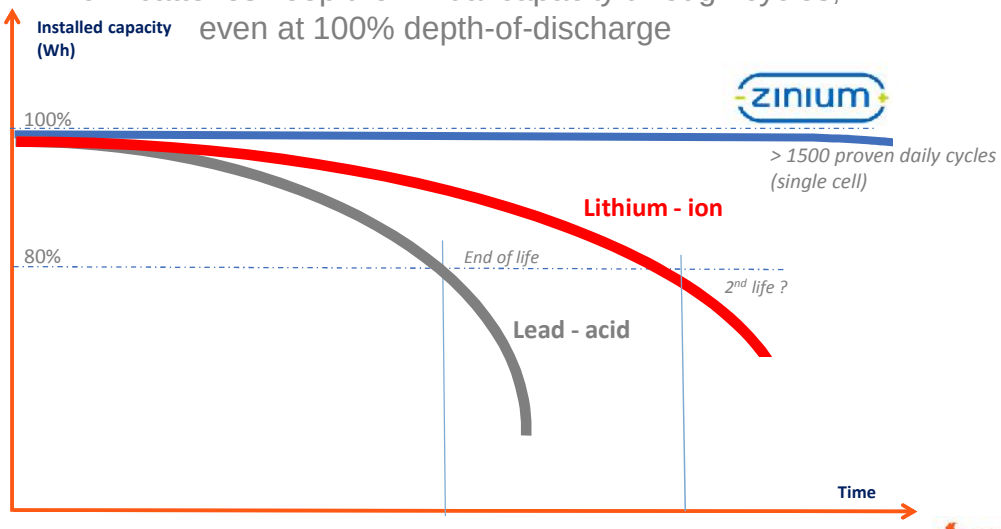
Concern #2 :
Lifetime cost - LCOS

Zinium batteries keep their initial capacity through cycles, even at 100% depth-of-discharge



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Concern #2 :
Cost structure

Bill of materials	Manufacturing	Shipping
• Low cost materials : ⑩ Zn ⑩ Carbon • No scarcity nor risk of shortage • No strategic risk	• Process similar to Lead-acid batteries • No need for clean rooms • Low investment • No need fo gigafactories	•Manufacturing process suitable for near-market small to medium-sized factories

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Concern #3 : Environment

CO2 impact	Pollution / health impact	Material access conditions
• Manufacturing • Shipping • PV charging	• Low inherent toxicity • Low need for anti-theft devices	• No extraction condition problems

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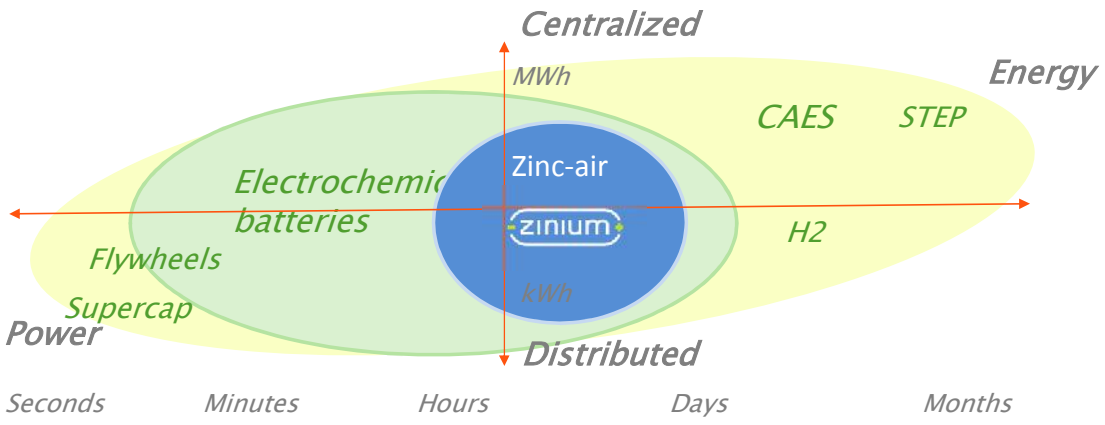
Concern #4 : Power vs. Energy



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WHAT USE CASES FOR ZINIUM BATTERIES ?

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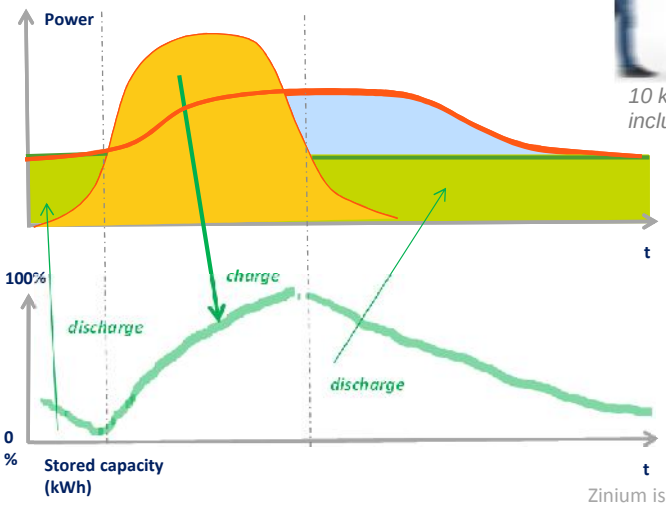
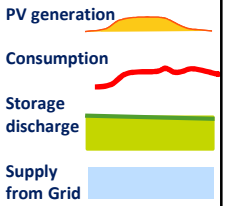
Use case #1 :

House with local PV generation, a robust grid. Zinium solution :

10 kWh, 48V DC or 220V AC including power conversion

- ✓ No loss of power production
- ✓ Less power supply from grid at peak hours





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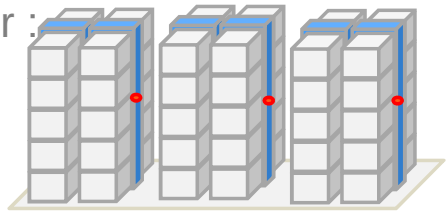
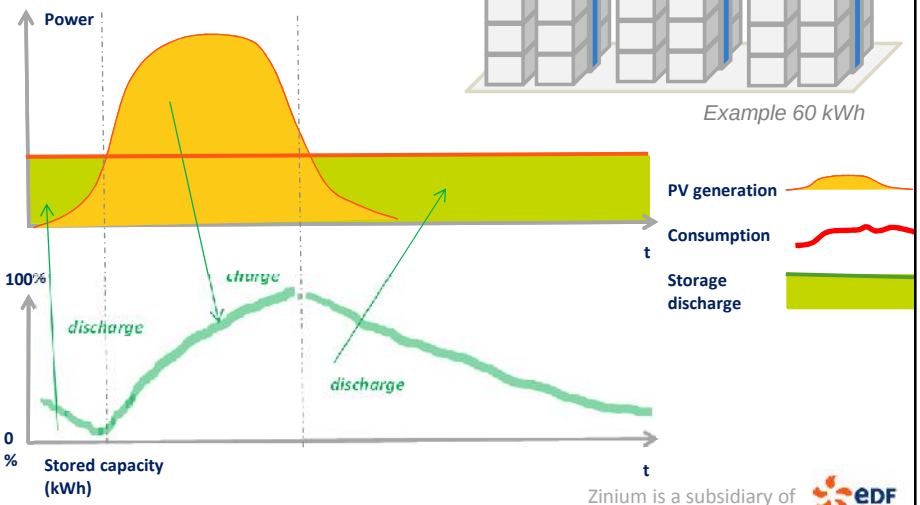
Use case #2 :

Telco operator, off-grid tower : zinium solution



Example 60 kWh

- ✓ No genset
- ✓ No lead-acid batteries
- ✓ Less maintenance cost



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Priority markets for Zinium systems, geographical sectors to be confirmed

5-20 kWh

20-200 kWh

20-200 kWh

Household system on grid

Target markets : advanced energy transition countries

Industrial / Commercial system on grid

Target markets : advanced energy transition countries

Off-grid system or microgrid

Target markets : emerging countries, islands

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Zinium next steps

2017

Generation A zinc-air cell

System and module prototypes

R&D manufacturing process design

2018

Generation B1 high density zinc-air cell

Residential demonstrator

10-20 kWh

Demonstrator pre-production

2019

Generation B2 hybrid cell

Off-grid / smartgrid demonstrators

10-100 kWh

Pilot product line design

2020

1rst target market product

Pilot product line go live

Go market

Thank you for your attention

Questions ?

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