



electricity
storage

Guido Dalessi, CEO

Mission

Introducing a new storage technology

- To boost the energy transition
- For stationary industrial applications
- Power range : 100 kW to ... MW
- Based on:
 - Flow battery technology
 - Hydrogen and Bromine
- Patented worldwide



➤ **Targeting the lowest possible storage costs per kWh ('LCoS')**

The demand for storage in a changing world

- **With more energy from sun & wind – and less from fossil power plants – we will need to :**
 - 1) Bridge longer periods of time
 - 2) Increase Capacity [MWh] rather than Power [MW]
- **Conventional storage technologies**
 - Capacity and Power coupled
 - Doubling Capacity implies doubling Power
- **Elestor's Flow Battery**
 - Power and Capacity not coupled
 - Virtually any thinkable MW/MWh combination possible



With this unique property, flow batteries anticipate the world's changing storage needs

Bromine : Global availability at virtually unlimited quantities

Material	Global reserves (kiloTons)	Usage kg/kWh	Supply & Cost constraints
Li Lithium	16.000 ^{1,2}	0,9	<ul style="list-style-type: none"> >90% in Chile, China, Argentina, Australia. Oligopoly → no price pressure from competition Mining creates depletion and pollution of groundwater
Co Cobalt	7.100 ^{3,4,5}	0,2	<ul style="list-style-type: none"> Approx. 60% of global reserves in 1 country (Congo), extreme geographic dependency Mined under torturous labour conditions
V Vanadium	20.000 ^{6,7}	4,4	<ul style="list-style-type: none"> 85% of global supply from China, Russia, S-Africa Cost increased >400% from Dec 2015 to May 2018 90% of Vanadium supply is used for hardening steel
Br Bromine	100.000.000.000	3,2	<ul style="list-style-type: none"> Extracted from sea water Assuming a global 500 TWh capacity need by 2050, only 0,002% of the global bromine reserves are sufficient for a 100% decarbonized electricity supply

¹<https://investingnews.com/daily/resource-investing/battery-metals-investing/lithium-reserves-country>

²<https://www.deingenieur.nl/artikel/lithium-and-cobalt-shortage-by-2050>

³<https://investingnews.com/daily/resource-investing/battery-metals-investing/cobalt-investing/cobalt-producer-cobalt-reserves/>

⁴<https://energypost.eu/the-rush-for-cobalt-and-what-it-means-for-evs/>

⁵www.chemistryworld.com/news/battery-builders-get-the-cobalt-blues/3008738.article

⁶<https://investingnews.com/daily/resource-investing/battery-metals-investing/vanadium-investing/vanadium-reserves/>

⁷<http://www.bushveldminerals.com/wp-content/uploads/2018/11/Energy-Storage-Vanadium-Redox-Flow-Batteries-101.pdf>

Company profile

- 2014 : Founded by Wiebrand Kout (CTO)
- 2015 : MBI Guido Dalessi (CEO)
- International team 17 FTEs + interns/graduates
- 2 PhD at TU/e, 'Membrane Research Group', Prof.Dr. Kitty Nijmeijer
- Member of 'FlowCamp' under Fraunhofer Institute
- 1st financing round Dec 2015 (Dalessi, InnoEnergy, Enfuro)
- 2nd financing round Jul 2019 (Koolen Industries, InnoEnergy)

- Deep tech know-how on:

Catalysts	Electrodes	Membranes
Electrolytes	Cell stacks	Control & Power electronics
System architecture	Compliance	

- 2016 : Recognized with several national awards
- 2017 : European IDTechEx Award, Berlin, for:



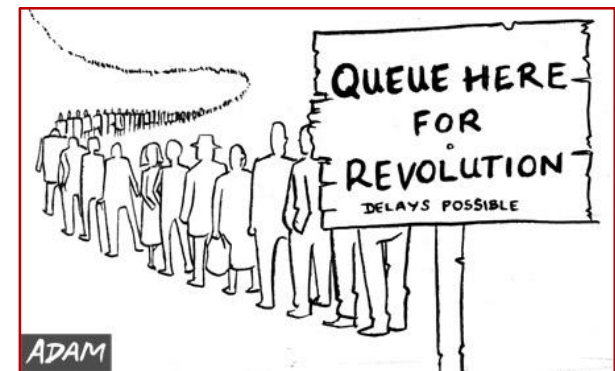
“Best Technical Development within Energy Storage”

(Juried by Fraunhofer, Universität Berlin, Toyota Motors Europe)



5 year's horizon

- 2016-2018 Several field pilots installed to demonstrate the fundamental working principle (limited scale)
- 2019-20/21 Deploy 4 containerized storage systems on large scale (up to 500 kW / 2.500 kWh)
- 2021 Commercial launch (2 projects confirmed)
 - Start production of series
 - Automation stack assembly
 - Outsourcing system assembly
- 2024 Build the first 'Giga-factory' equivalent for Elestor's HBr Flow Batteries



Thank you for your attention



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