elestor

electricity storage
at an unrivalled cost level

Project MELODY – membraneless hydrogen bromine flow battery

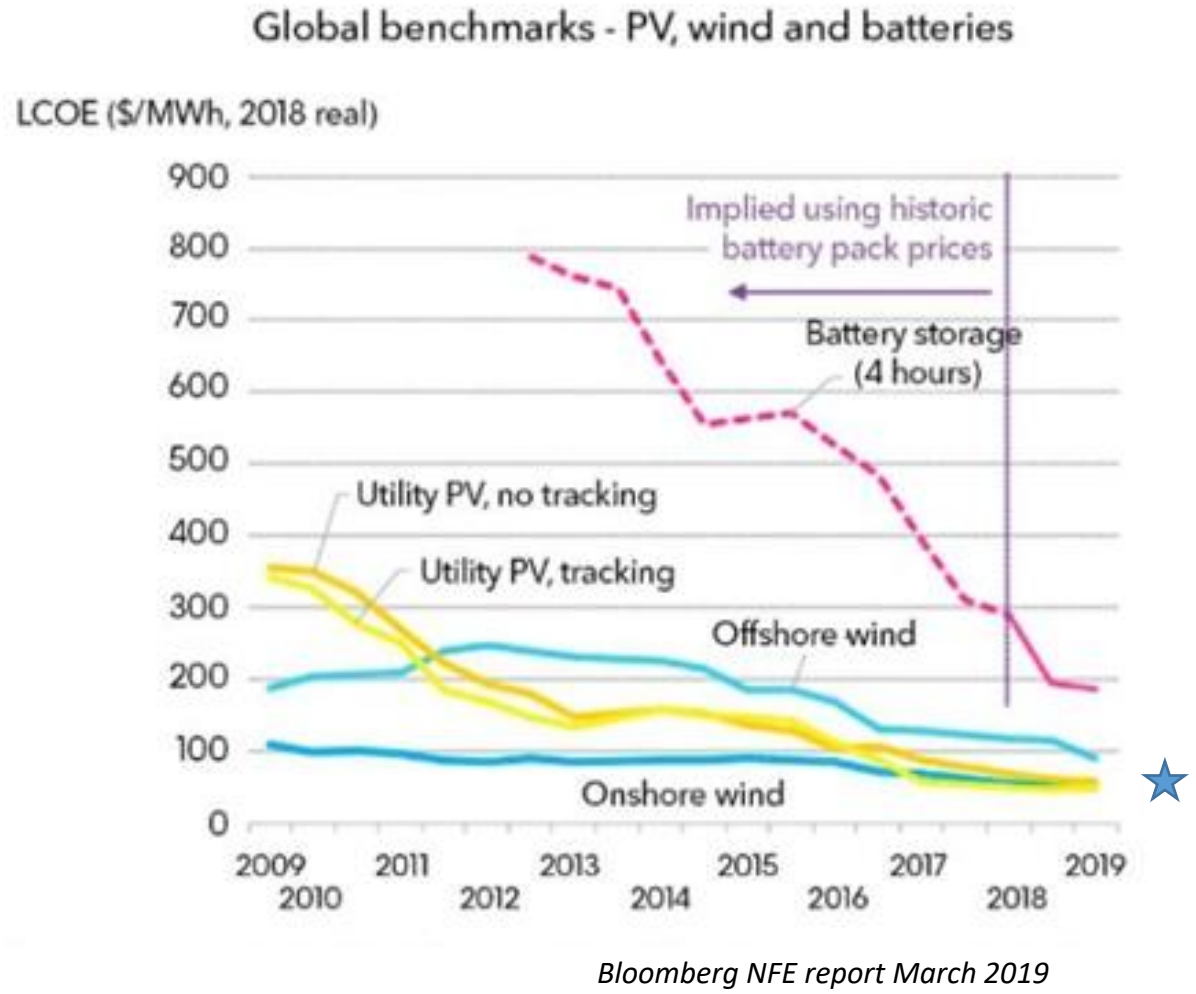
Wiebrand Kout

CTO Elestor BV

The race to the bottom…

- Wind & solar are cost competitive
- Storage is not (yet)
- Push for <€50/MWh.cycle LCoS
- Lithium-ion cell prices:
  - €110/kWh now, 500 GWh/y
  - €75/kWh in 2024

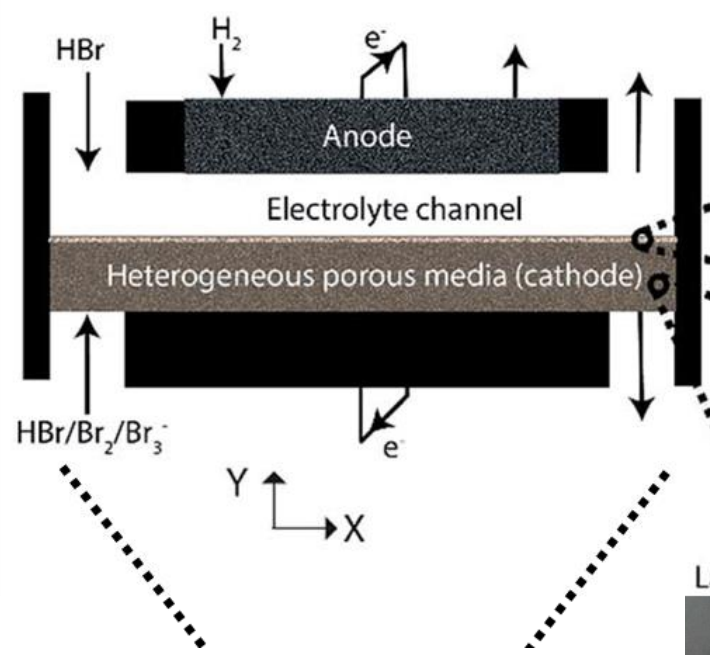
- Flow battery should be low-Capex AND long lifetime

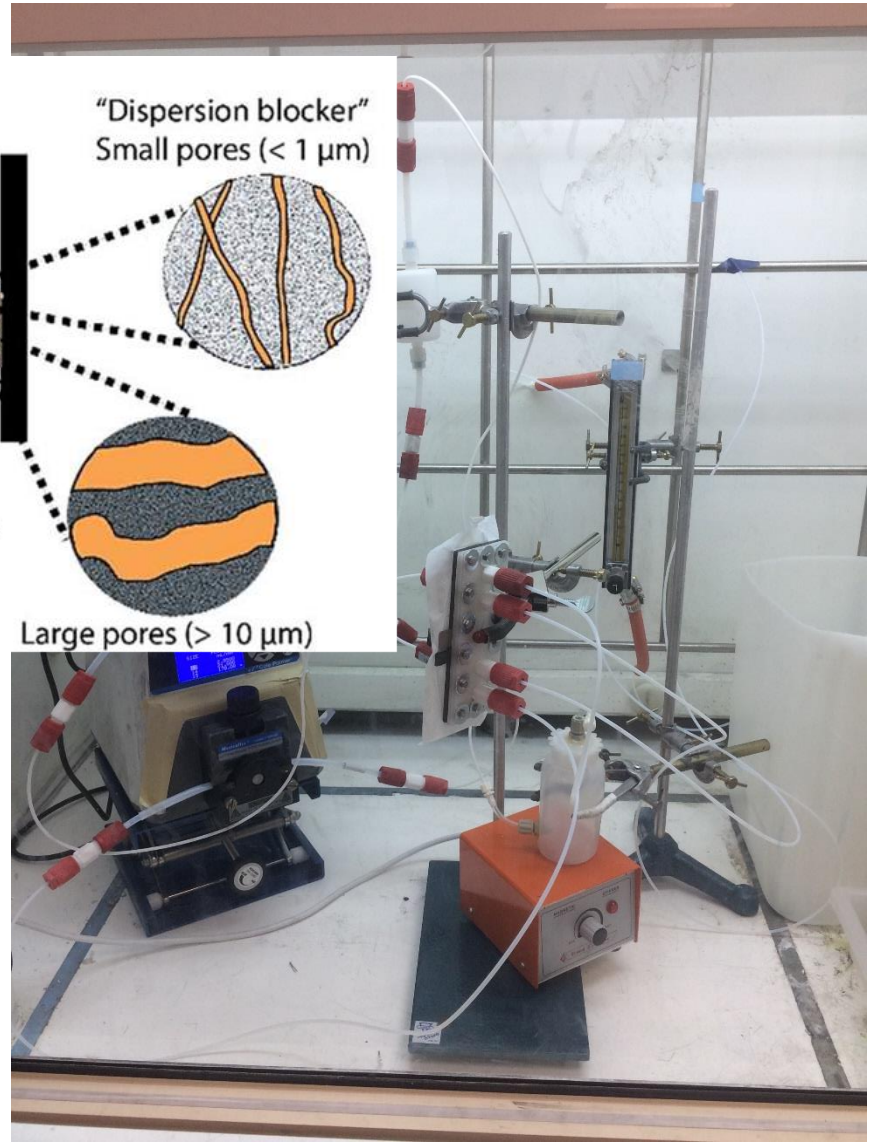


Bloomberg NFE report March 2019

MELODY project targets

- Membraneless
  - Gas-Liquid battery
  - Dispersion blocker
  - First ever stack
- Low cost
  - >20kW/m^2 cells
  - <€25/kWh electrolyte
- High energy density
  - >300 Wh/l
  - 200 Bar H_2 pressure
  - 'All-in-one' tank





MELODY

MEmbraneless LOw-cost high DensitY RFB

Research challenges

Electrolyte additives

Stack design

MELODY

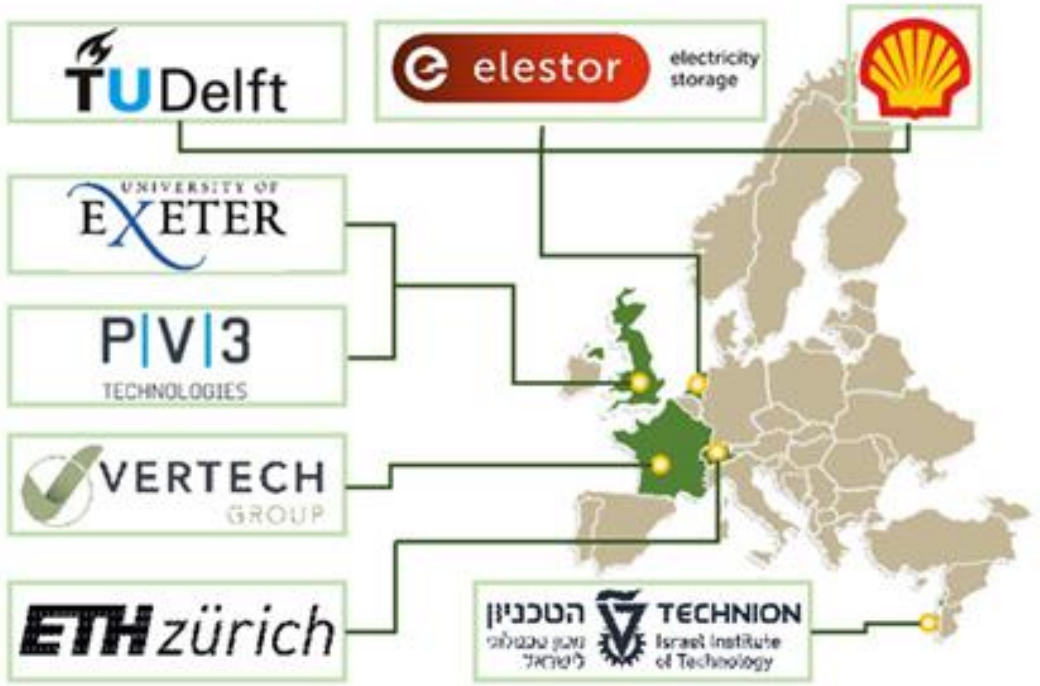
MEmbraneless LOw-cost high DensitY RFB

Coulombic efficiency
Managing the flows

Electrode
Charge transfer

Catalyst
Durability in Br_2

Recycling



System design
HBr purification
Safety

Regular updates at:
www.melodyproject.eu

Cell design, *resistance*

To win the race to the bottom…

- >70% ‘round trip efficiency’ is enough
- 10,000 cycles are enough
- 12h storage time is (usually) enough
  - Charge time shorter than discharge

Most flow battery chemistries can do this

AND

- CAPEX must be <€80/kWh installed
- Lifetime must be >25 years
- Materials must be available for 500 TWh

This is where the challenge is!

Thank you for your attention

This project has received funding from the European Union's Horizon 2020 programme under Grant Agreement No. 875524.