



Deep Dive Battery Storage | 3. July 2023

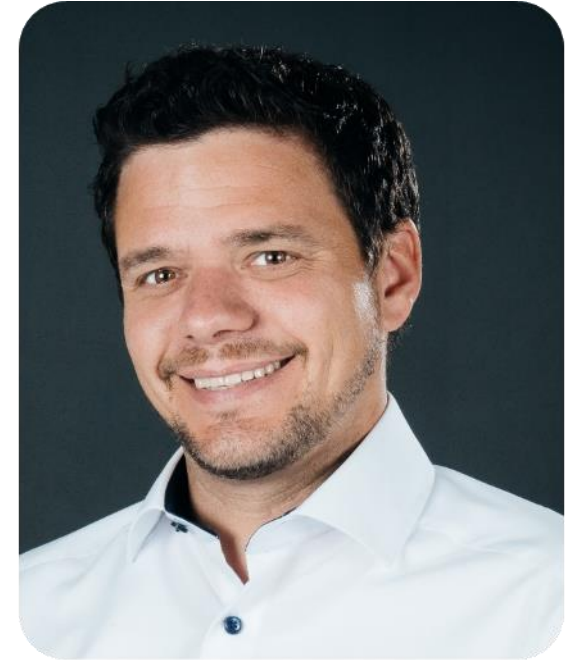
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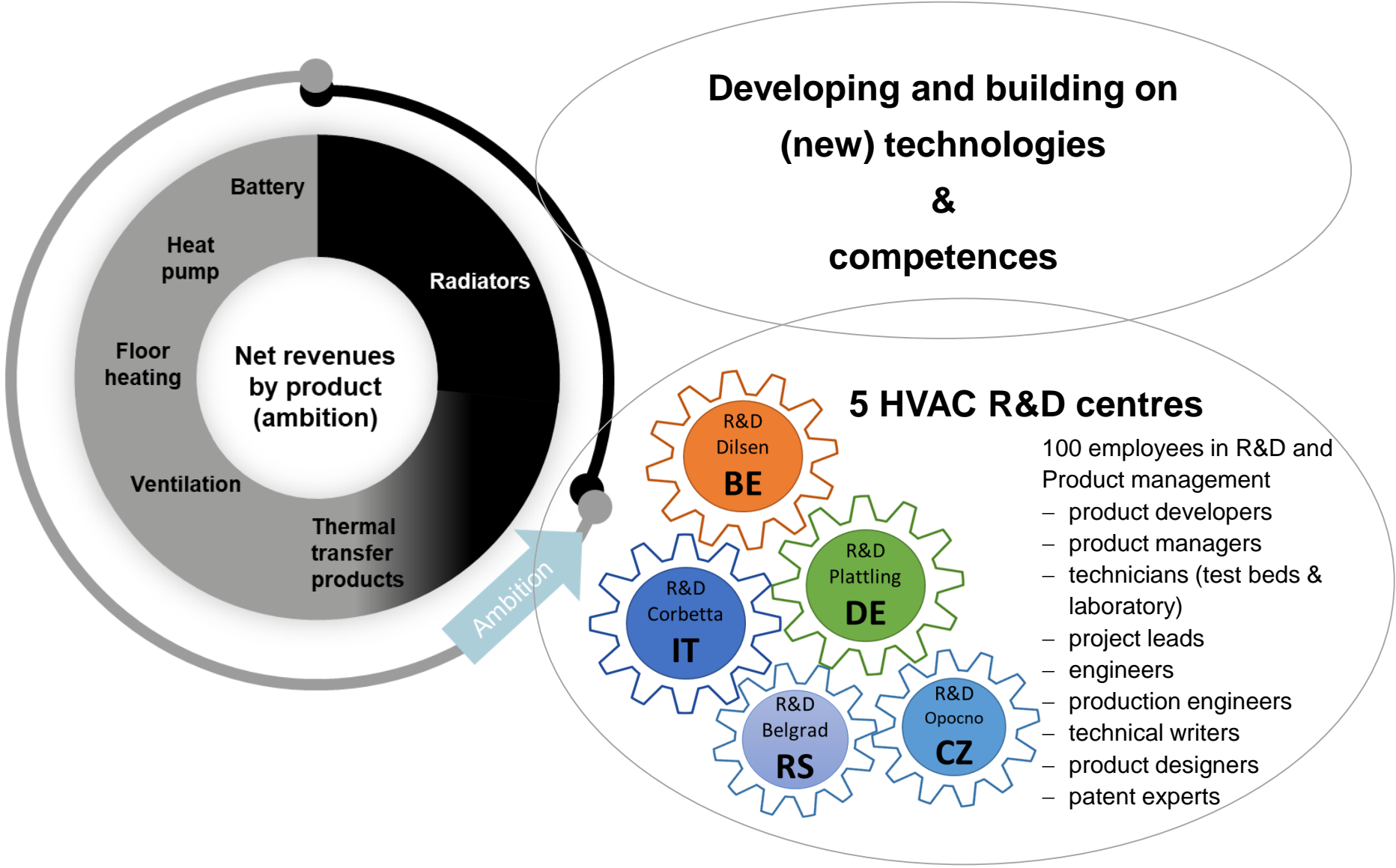
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Head of PM and R&D
Control Technology & Battery Storage

Product development HVAC

Redox Flow – the alternative
technology approach

Product portfolio and organisation





We are offering perfect solutions
comfortable – energy efficient – sustainable – safe

... for new construction



... and for renovation



e.g. underfloor heating
for comfortable indoor climate



e.g. residential ventilation
for healthy air



e.g. electronic radiators
for quick heat generation



e.g. battery storage
to increase self-sufficiency



e.g. heat pumps
for sustainable room temperatures



e.g. thermal storage
for more energy efficiency



e.g. design radiators
for a nice ambience



e.g. steel panel radiators
for low flow temperatures



THE REDOX FLOW STORAGE FOR THE GREATEST DEMANDS



No loss of capacity.
Continued operation with full capacity.

After 10,000 charging cycles and 20 years, the STORAC has almost the same capacity as a new unit. Self-discharge? Impossible.



Non-flammable.
Safe by nature.

High reliability in operational safety and the use of the non-flammable and non-explosive electrolyte vanadium allows for a maximum of safety.



Sustainable.
Sound social, ecological and economic design.

By forgoing the use of rare earths, the STORAC poses no social or ecological risks. The electrolyte vanadium is fully recyclable.

Product development HVAC

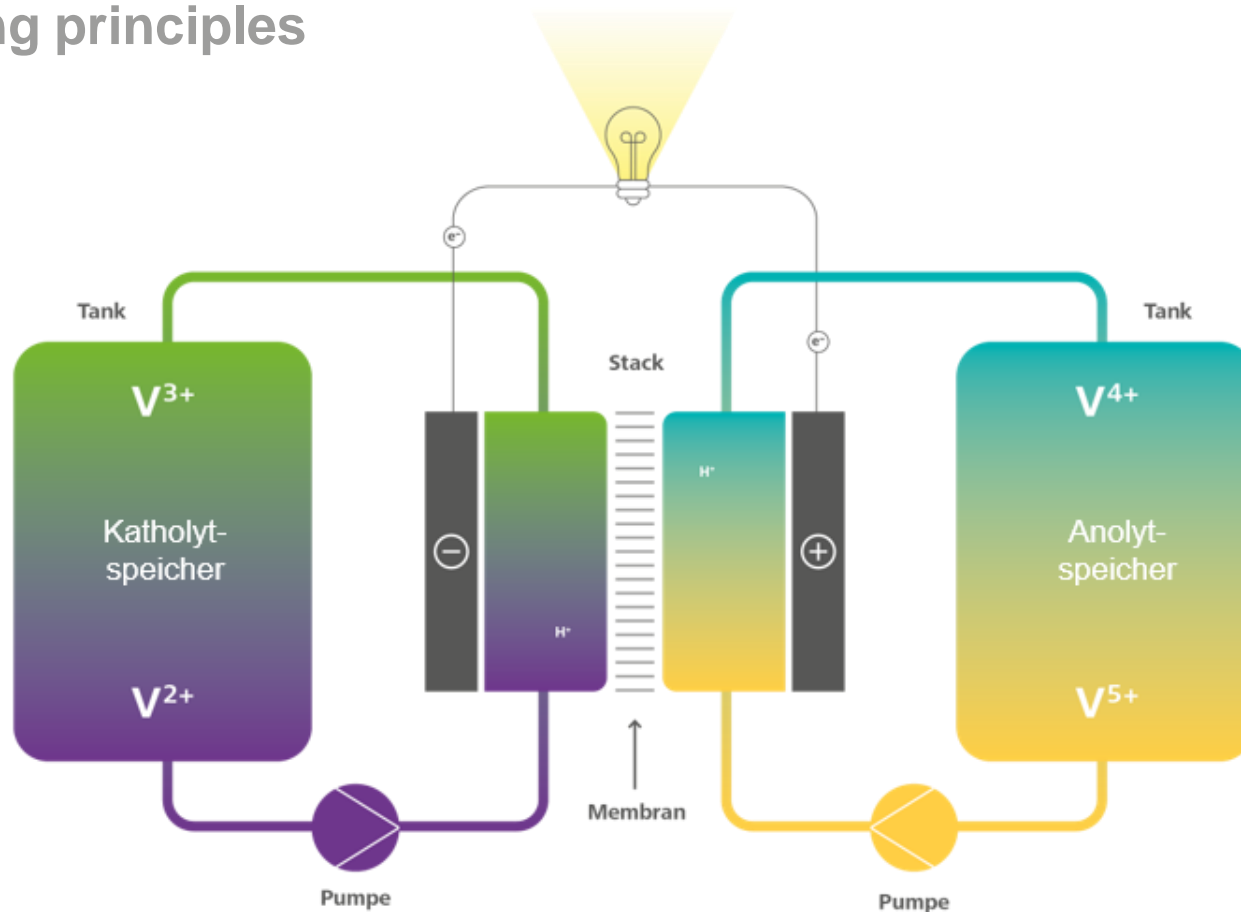
**Redox Flow – the alternative
technology approach**

Product portfolio and organisation



Redox Flow – the alternative technology approach

Operating principles



- two tanks with vanadium electrolyte (volume determines capacity)
- two hydraulic circuits supply the stack via pumps
- the stack stores energy by separating charge carriers

Redox Flow – the alternative technology approach

Construction

Construction:

- compact design
- lower part (roughly 2/3) contains two tanks with the storage solution (vanadium electrolyte) incl. pumps (special chemical speed-control pumps)
- upper part (roughly 1/3) electronic components incl. stack and inverter

Innovation of Prolux:

- downsizing an established and durable technology incl. all necessary components
→ making new development efforts necessary
- connectivity between battery storage and heat pump via a common gateway
- focus on easy installation and serviceability



Redox Flow – the alternative technology approach

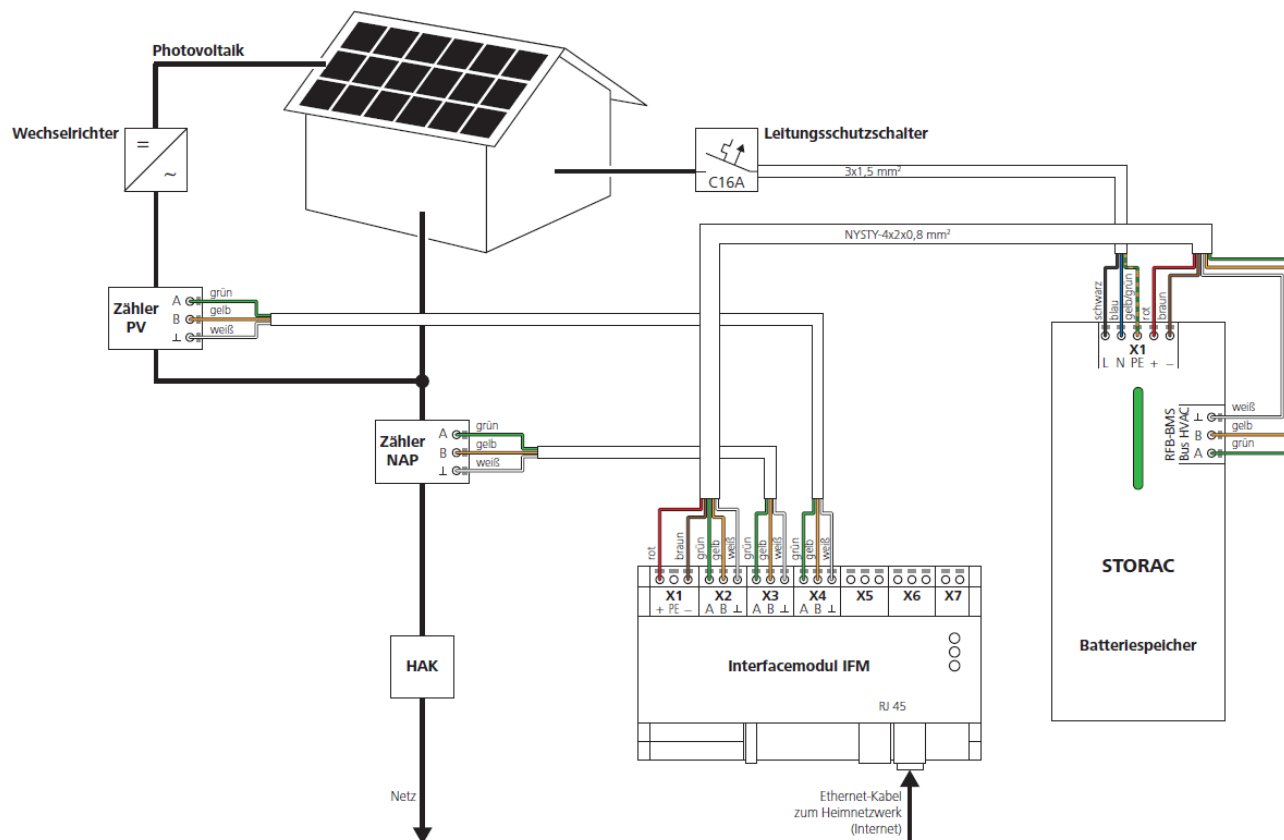
Technical specifications



	STORAC AC 2/6	STORAC AC 4/10
Dimensions	2000 x 600 x 600mm	1850 x 1200 x 740mm
Empty weight	174kg	310kg (divisible)
System configuration	AC coupled	AC coupled
Capacity	6kWh	10kWh
Standby power	9W	9W
Nominal loading-/unloading power	2000W	4000W
Peak power	3000W	5000W

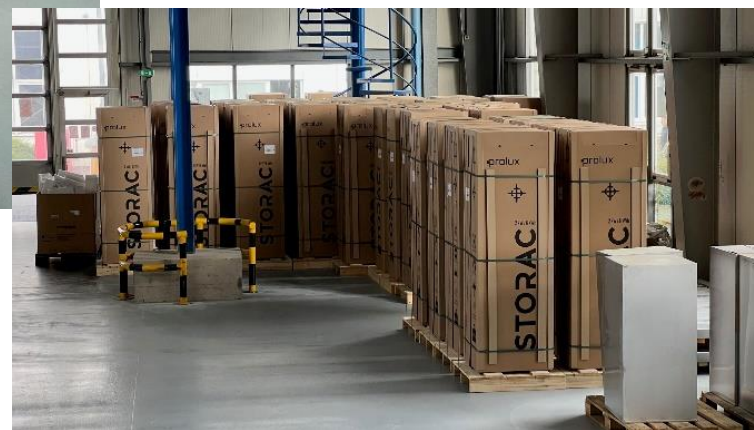
Redox Flow – the alternative technology approach

Operating principles



- interface module as central control unit
- electric meter measures usage of grid power and feeding the grid at the mains transfer point
- STORAC balances the mains transfer point

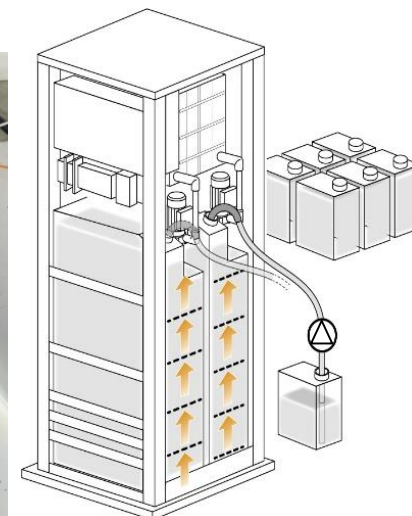
Redox Flow – the alternative technology approach Manufacture



→ site: Kermi Stříbro (CZ)

→ current capacity: 40 units / month on a single production line in a one-shift operation

Redox Flow – the alternative technology approach Installation



- delivery: 1VE → STORAC / 1VE → Vanadium Electrolyte
- mounting STORAC and electric installation
- filling with electrolyte (10l – canister)
- start-up / initialisation



Product development HVAC

**Redox Flow – the alternative
technology approach**

Product portfolio and organisation



Product portfolio **STORAC**

Types and features

- **2022: STORAC 2/6** ✓
(6 kWh)
- **2023: STORAC 4/10**
(10 kWh)
- **2024: STORAC 4/15**
(15 kWh)
- **+ features:**
 - back-up power**
 - DC coupling**
 - cascading**
 - connectivity for E-mobility**



Development and organisation

Success factors Business Unit Battery Storage

What are the 5 essential success factors?

- large and experienced development and service department
→ using the existing network for sales
- formation of a separate Business Unit Battery Storage
- start-up character in the existing group structure
→ new, dynamic processes
- establishing multiple new departments
→ not pressed into existing structure
- know-how in organisation, markets and product services
→ ability to serve numerous clients at the same time
(pre-existing organisational structure and logistical processes)

Development and organisation

Market access

Market launch

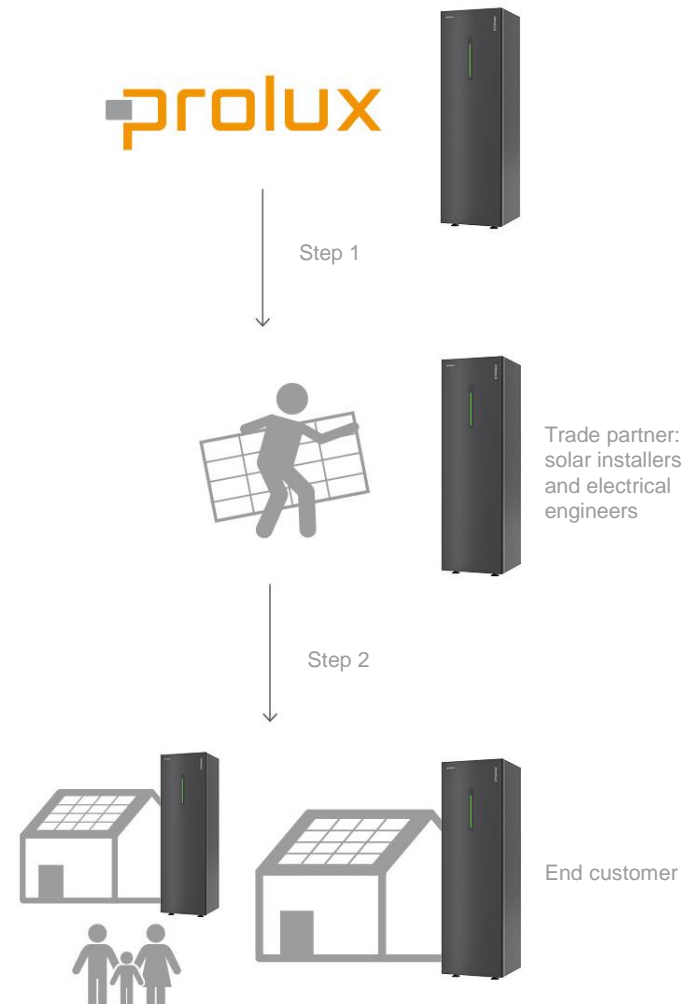
- pilot market: 07/2022 to 12/2022
- official market launch DE: Q1 2023
- market launch CH: Q3 2023

Market access

- 2-step sales channel for Prolux battery storage
→ sale directly to: solar installers and electrical engineers
- positioning under the brand for installers and final customers (push & pull)

Delivery capability

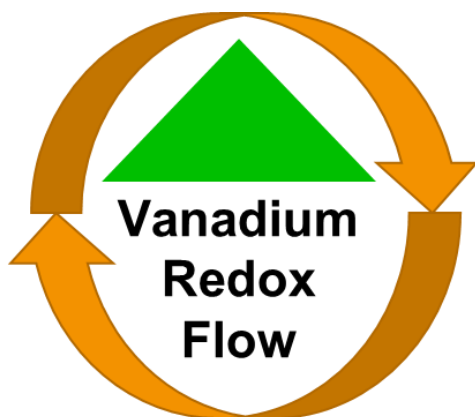
- assured in 8 weeks
- in special situations also faster



Development and organisation

10 reasons for STORAC

- **tried and tested technology** proven for decades
- limited installation effort allows for **easy integration**
- **Made in EU** / developed in Germany
- repair onsite possible thanks to **service and spare parts concept**
- limited space requirements allow for easy integration
- worldwide **access via app** or browser
- **visual display of operating state** through the LED indicator (without extras)
- **capability for remote maintenance** thanks to the interface module
- good transportability and handling thanks to filling after the initial mounting
- **usage of the full storage capacity** (no deep discharge protection necessary)



Thank you



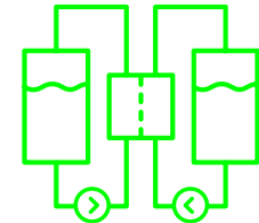
Safe
Non-flammable
raw materials



Lasting value



Vanadium is a **by-product of the steel industry** and available in large quantities.



Redox Flow is a **decades long tried and tested** technology in the industry.



Lasting full capacity
<5% in 20 years



The battery storage solution **for your home**



Highest lifetime
in the market



2 kW / 6 kWh
[power] [capacity]

4 kW / 10 kWh*
[power] [capacity]

* available shortly



Repair-friendly



No
lithium, cobalt or
nickel



The vanadium contained within the electrolyte is **recyclable**



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