

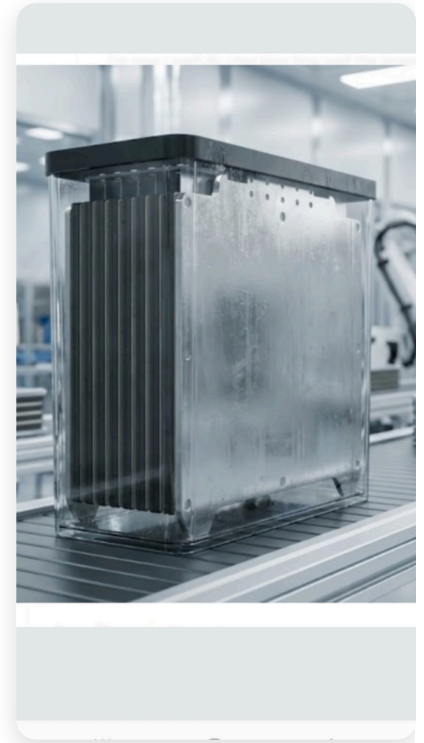


Membrane-Free Zinc-Manganese Flow Battery

Energy storage has never been so safe, efficient, and affordable.

□ The Opportunity

The world loses **\$256-506 billion annually** due to inefficient energy storage. Our membrane-free zinc-manganese flow battery offers: **70% lower cost than Li-ion, zero fire risk, 100% recyclable.**



Working MVP Prototype
Stage I: 100W Module

70%

Lower Cost vs Li-ion

25,000

Target Cycles

100%

Recyclable

Zero

Fire Risk

□ The Problem

Current Technology Limitations

- **High costs** — Li-ion: \$120-180/kWh installed
- **Safety risks** — Thermal runaway, fires, explosions
- **Short lifespan** — 6-10k cycles, mid-life replacements
- **Poor recycling** — Only 5% materials recovered
- **Rare materials** — Lithium, cobalt supply constraints

Market Urgency

- **7,448** grid connection refusals in Poland (2023)
- **55%** EU renewable target by 2055
- **260 GWh** EU storage capacity needed by 2030
- **27%** annual market growth
- Grid instability from intermittent solar/wind

□ Our Solution

Water in Salt has developed a **zinc-manganese membrane-free flow battery** using breakthrough electrode technology and innovative cell design:

□ Technology Advantages

□ Current MVP Performance

- **Membrane-free design** — 40% lower production cost
- **Non-toxic, non-flammable** — Aqueous electrolyte
- **Abundant materials** — Zinc, manganese, carbon
- **Simple recycling** — 100% material recovery
- **All-climate** — No cooling systems needed
- **Scalable** — From kW to MW installations

Coulombic Efficiency	96%
Energy Efficiency	67% → 79% target
Volumetric Capacity	20 Wh/l → 80 Wh/l target
Verified Cycles	500 → 25,000 target
Cell Voltage	2V (Zn/Mn)
Electrode Surface	200 m²/g (from 1.4)

□ **Materials & Chemistry**

<p>Zn Zinc</p> <p>Anode material Abundant, low cost</p>	<p>Mn Manganese</p> <p>Cathode material Safe, recyclable</p>	<p>C Carbon</p> <p>Electrode base 200 m²/g surface</p>
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Electrochemistry: $Zn^{2+} + 2e^- \rightleftharpoons Zn$ (anode) | $Mn^{2+} + 2H_2O \rightleftharpoons MnO_2 + 4H^+ + 2e^-$ (cathode) | **Cell: 2V**

□ **Market Opportunity**

<p>\$70B</p> <p>TAM Global 2031</p>	<p>\$25B</p> <p>SAM Europe 2030</p>	<p>\$4B</p> <p>SOM RES Integration</p>	<p>27%</p> <p>CAGR</p>
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✘ **Competitive Advantage: 30-Year Total Cost of Ownership**

We don't compete on peak efficiency — we compete on **lifetime cost**. Over 30 years, our flow battery delivers up to **4x lower total cost** than lithium-ion.

Parameter	Water in Salt	Li-ion (LFP)	Vanadium Flow	Fe-Air
Safety	☐ Non-flammable	⚠ Fire risk	☐ Safe	☐ Safe
System Efficiency	70-80%	88-94%	70-80%	40-60%
Installed Cost	\$80-120/kWh	\$120-180/kWh	\$200-350/kWh	N/A
Cycle Life	20-25k cycles	6-10k cycles	20k+ cycles	20+ years
30-Year TCO	\$650/kWh	\$2,300/kWh	~\$1,000/kWh	TBD

☐ **Business Model & Projections**

Unit Economics (1MW / 4MWh)

Production Cost	\$325,000
Sale Price	\$520,000
Gross Margin	37.5%
Price per kWh	\$130/kWh
Operating Margin	~30%

Revenue Projections

Year	Units	Revenue
2030	25	\$13M
2031	50	\$26M
2032	100	\$52M
2033	200	\$104M
2034	250	\$130M

☐ **Development Roadmap**

<p>Stage I ✓ 100W Module TRL 4-5 Complete</p>	<p>Stage II 10kW Demo TRL 5-7 Pre-Seed</p>	<p>Stage III 100kW Pilot TRL 6-8 Seed</p>	<p>Stage IV 1MW System TRL 8-9 Series A</p>
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Pre-Seed: €2M (Stage I-II) → Seed: €5-7M (Stage III) → Series A: €15-20M (Stage IV)

☐ **Intellectual Property**

Know-how: ☐ Actively protected through comprehensive documentation and trade secrets

Patents: ☐ 3 core patents in preparation (cell design, electrolyte, electrode manufacturing) — Filing Q2 2025

☐ **Team**

Paweł Bartlewski

CEO & Founder (85%)

6 years experience, 5 completed projects in energy tech commercialization

Piotr Przybył

COO & Co-Founder (15%)

Product implementation, sales process management, tech-to-market expert

Research Partners: Politechnika Warszawska (Energy) • AGH Kraków (Chemistry) • UMK Toruń (Flow Machinery)

□ **Investment Ask**

Seeking: €2 million Pre-Seed

Stage I-II R&D & Team Expansion (18 months)

Use of Funds: Team (35%), Equipment (25%), Materials (20%), IP/Legal (10%), Operations (10%)

Milestones:

- 10kW demonstration module
- 3 patent applications filed
- 75%+ energy efficiency
- Ready for Seed round (€5-7M)

Water in Salt — Safe, Affordable, Sustainable Energy Storage

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