Why iron flow batteries fail, and what actually makes them work?

R.Flo

Andrii Bondar
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Cost of energy

- Electrolyte price is 10 €/kWh.

AIRFB passes all three filters

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Electrolyte imbalance

- parasitic side reactions;
- ion crossover.

No cyclic stability - no way you will find a client.

Why the stack cost “breaks”?

Low power density

less than
50mW/cm²

It means:

1. **A lot of stacks;**
2. **A lot of materials;**
3. **Higher CAPEX.**

Why the stack breaks?

Efficiency degradation

1. Hydrogen evolution
2. Local pH rise
3. Iron hydroxide formation
4. Stack clogging
5. IR rise (VE drop)

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Capacity degradation

1. Hydrogen evolution
2. Ferric-ferrous ions imbalance
3. Capacity drop

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pH sensors fail often

Fe^{3+} ions penetrate sensor membranes and poison the reference electrode.

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Rebalancing cycles

A rebalancing circuit is not optional, it is the difference between a system that runs and a system that degrades.

Stack problems become system problems. In iron flow batteries, it all falls like dominoes.

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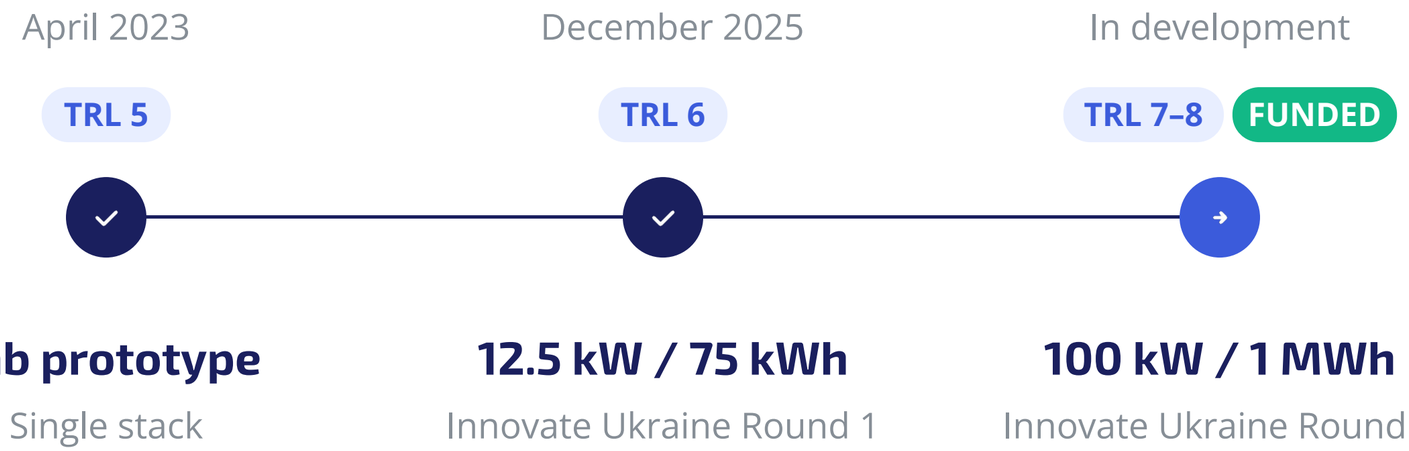
Stack clogging	→	Rebalancing algorithm	→	20+ cycles at 12.5kW

None of these are chemistry innovations.
They are engineering decisions and we have proven them in a 12.5 kW pilot.

Where we are, and where we're going



8 patents filed · 4 published
covering stack design, system architecture, electrolyte management, and control systems

Supported by:
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The path for IFBs exists.
It's just not the fancy way.

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