HBAT

First fuel cell performing as a battery and using water mist for clean energy.

HBAT

Challenges

Energy demand is surging but current batteries ...

× are not sustainable.

Only 5% of Lithium batteries recycled. Classical Lithium battery production emits 74% more CO2 than ICE cars.

× have a low lifecycle.

Current tech limited lifespan of only 4 - 9 years. Mass adoption of batteries won't happen unless lower turnover for ROI and higher ROI.

× can't keep up with new technology.

No to low storage possibilities. Reliability and availability too low. Operational cost too high.

A Gamechanger for the Hydrogen Industry

Our revolutionary invention solves the 3 most important challenges in the hydrogen network build out

✕ Hydrogen is dangerous and explosive.

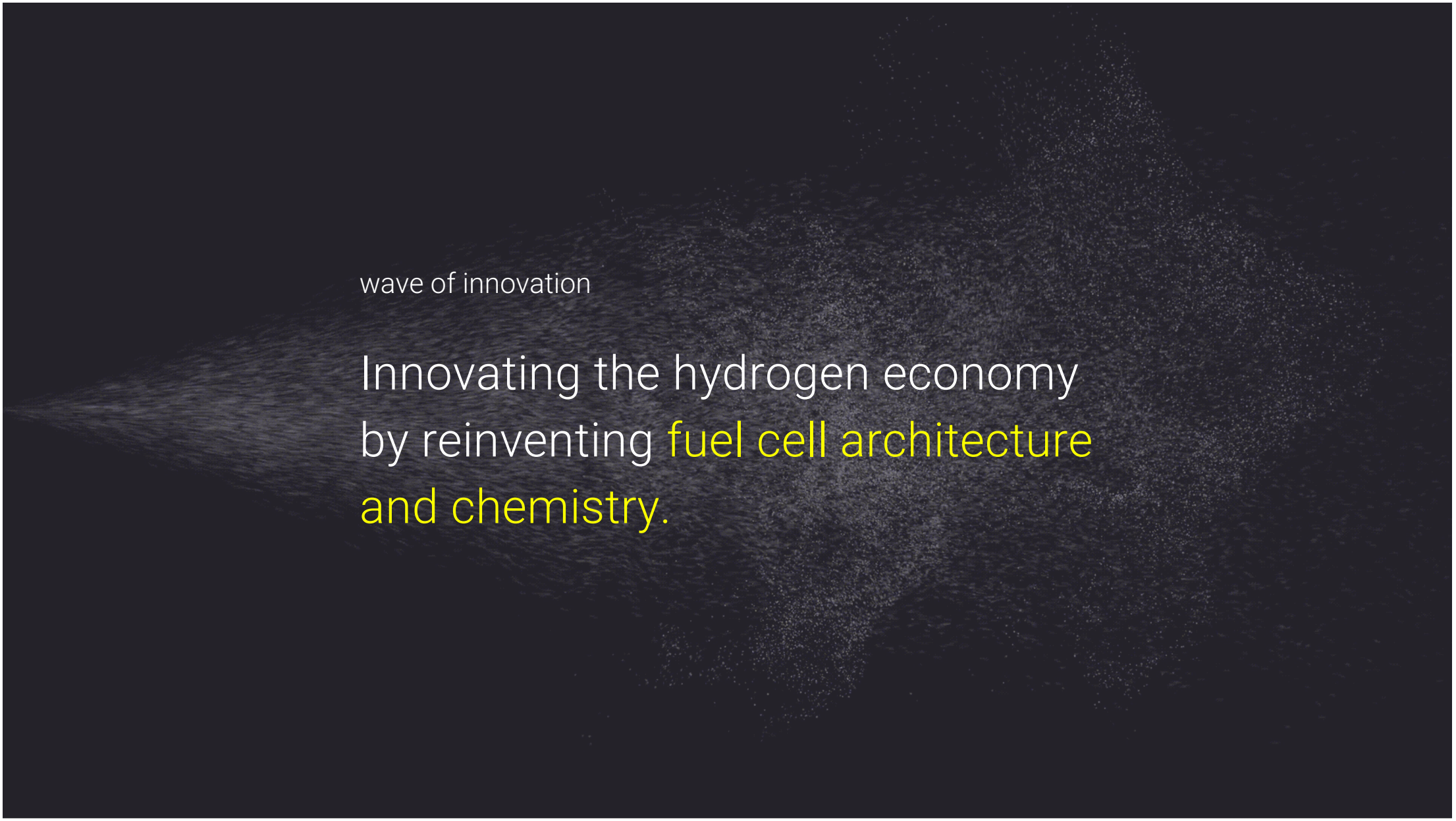
We originated a completely novel way of storing hydrogen in a non-gaseous phase inside the battery so it cannot explode and is completely safe.

✕ Hydrogen uses expensive platinum catalysts in its fuel cells

We invented a revolutionary new catalyst that is carbon based, drastically reducing the cost of fuel cells.

✕ Hydrogen is very difficult to transport and needs temperatures of -250°C and pressures up to 700 bar.

Our technology allows hydrogen to be stored at room temperature and at pressures between 1 to 50 bar making it affordable and easy to transport.


wave of innovation
Innovating the hydrogen economy
by reinventing fuel cell architecture
and chemistry.

HBAT

Solution

Reinventing fuel cell architecture and chemistry.

01. fueled with hyperfine water mist

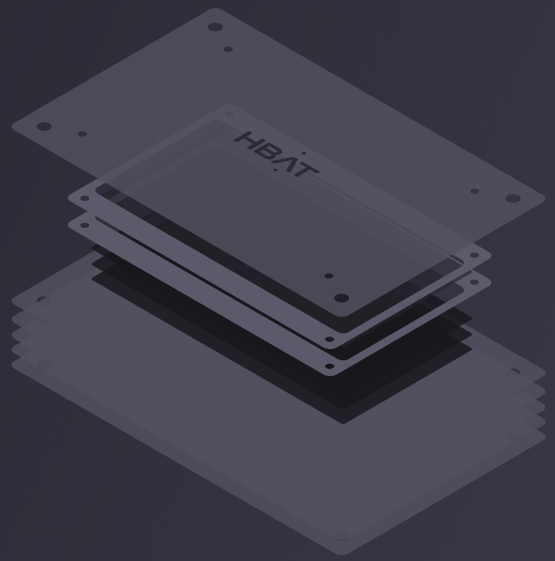
Clean. Metal free. Eco-friendly. Water electrolyte.

02. safe storage material

HBAT hydrogen-based energy storage is non-gaseous, therefore completely safe.

03. environmentally friendly catalysts

Non-toxic. Non-platinum group metals. 80% recyclable and 100% possible.



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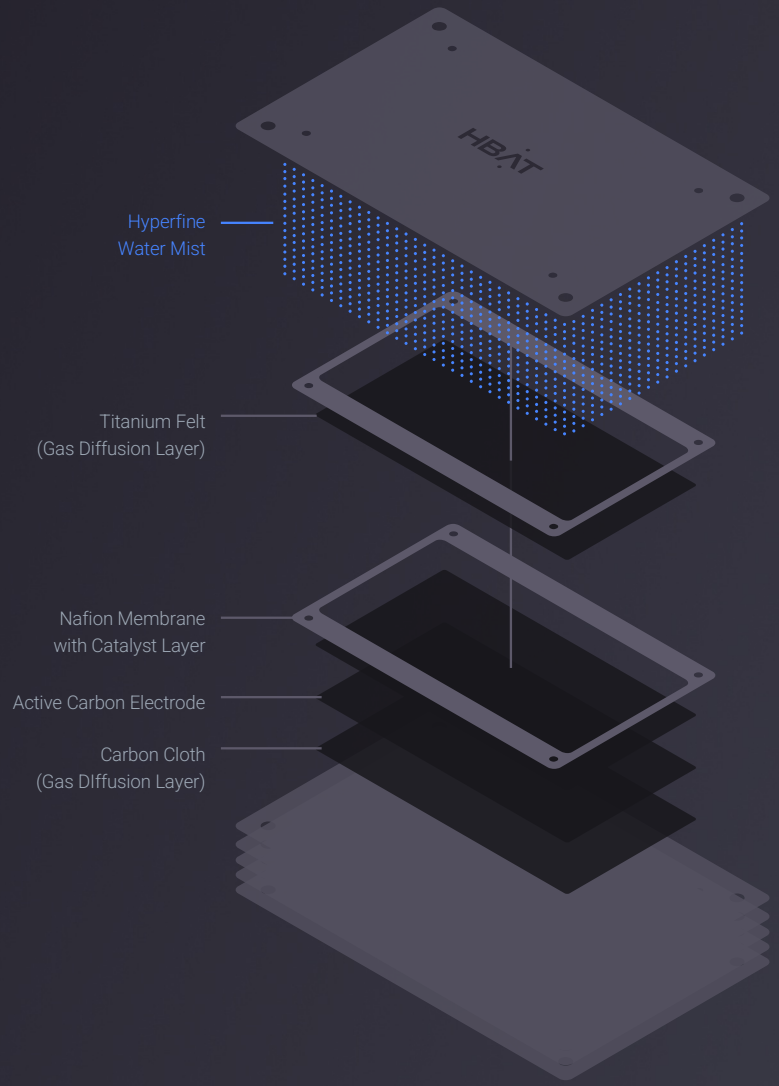

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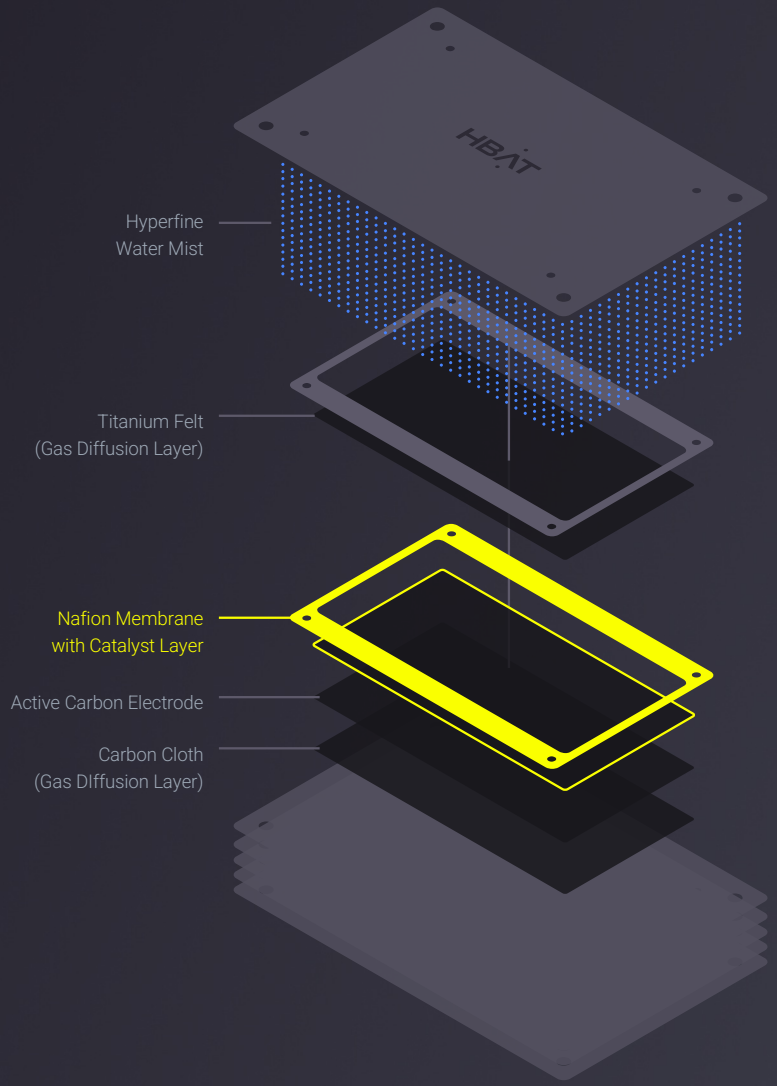

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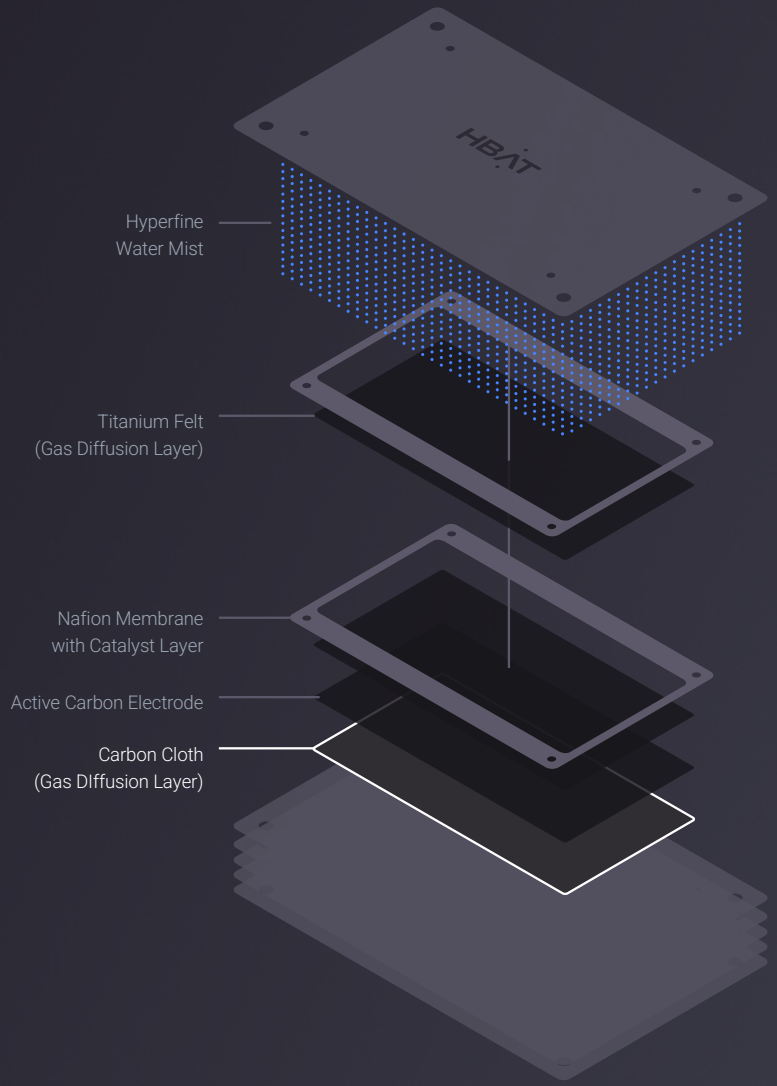

HBAT

Solution

Reinventing fuel cell architecture and chemistry.

View technical animation

HBAT

Background

We are bringing space technologies down to earth.

"The first NASA application for nickel-hydrogen batteries was the low-earth-orbit Hubble Space Telescope satellite launched April 24, 1990."

"[...] nickel-hydrogen batteries have become the primary energy storage system used for geosynchrounous-orbit communication satellites."

NASA Handbook for Nickel-Hydrogen Batteries

HBAT

Performance

Cost efficient and powerful.

	HBAT	LI-ION
Power per kg	190 - 360W	245 - 430W
Energy Density per kg	360 - 800Wh	150 - 250Wh
Cost per Kwh	40 - 80$	150 - 205$
Discharge Efficiency	100%	80%

HBAT

Performance

Flexible, safe and sustainable.

	HBAT	LI-ION
Customization	**adaptable to user needs** can increase voltage or amperage per user needs through BMS	**limited adaptation** complex BMS systems limit customization
Modularity	**modular architecture** grow with the user's energy consumption and fail safe	**modular cell packages** difficult to repair due to only cylindrical cell packages being "modular"
Health Risk / Danger	**no toxics, fire retardant** no toxic chemicals used in manufacturing or recycling	**toxic compounds** li-ions are becoming safer, however their manufacture includes carcinogenic and toxic compounds
Sustainability	**80% recyclable, aiming for 100%** 80% carbon based material	**25% - 50% recyclable** 25% - 50% recyclability, however with low profit margin

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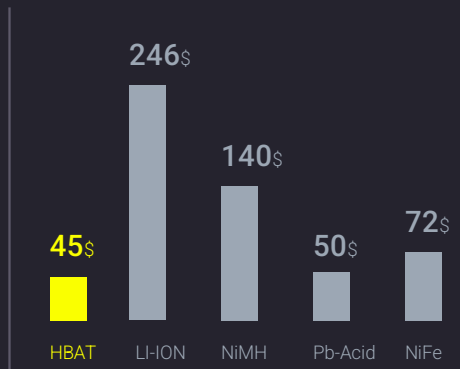
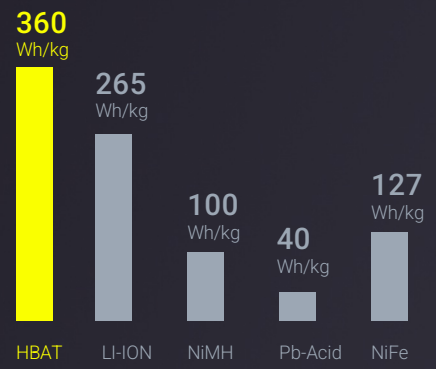
Market Comparison

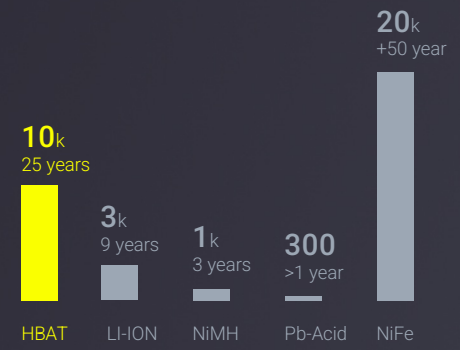
Vast potential through low cost, high specific energy and longevity ...



Cost per kWh



Specific Energy



Longevity (in cycles)

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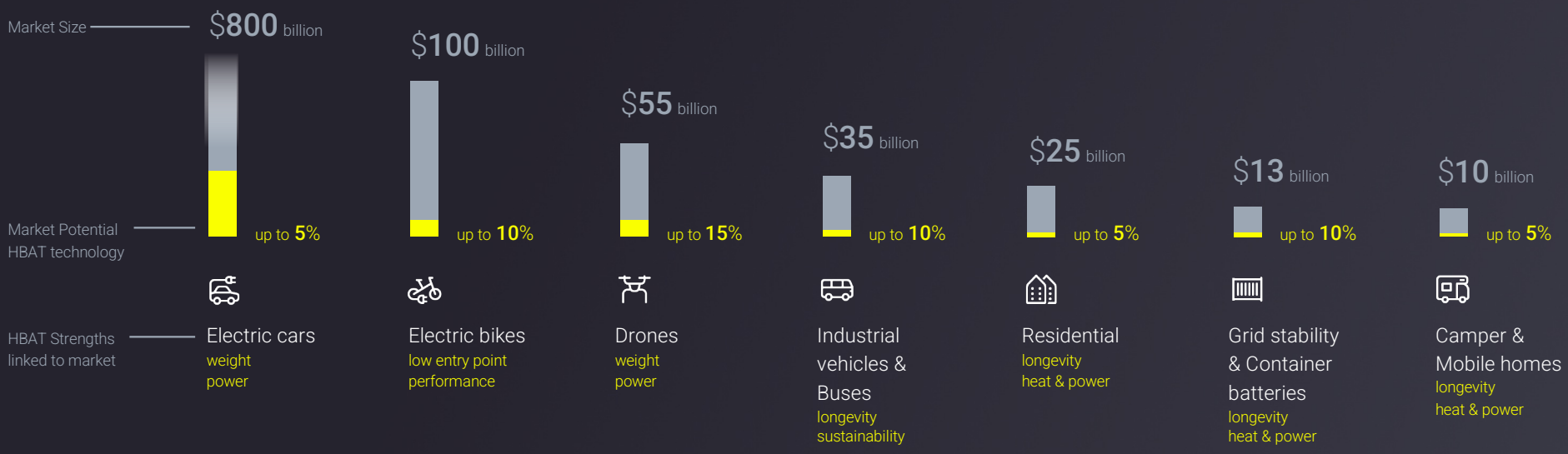
Market Potential by 2027

… providing us the possibility to succeed in markets that link to our strengths.



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Business Model

Building revenue streams through product licensing and joint development partnerships .

By securing our IP through a patent of various solutions, we can then build up revenue streams

01. product licensing and / or joint development partnerships

Licensing the overall products and its variations.

02. catalysts

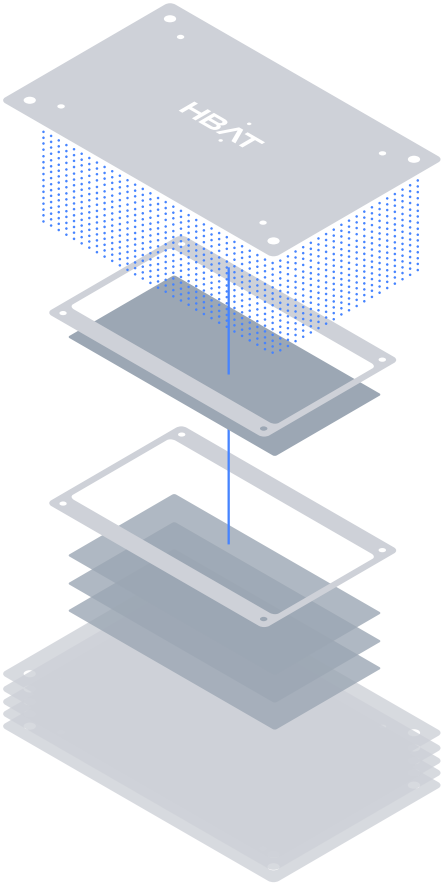
Our catalyst can replace any expensive platinum catalysts in current fuel cells. Moreover specialized catalysts are viable products for agriculture/ food, textile/fabrics, petroleum and plastics manufacture, industrial chemical synthesis, water reclamation and water treatment.

03. storage material

Hydrogen storage materials are viable products for other battery manufacturing and fuel cell technologies, and food industry (hydrogenation of oils).

04. carbon support

Carbon support materials are viable products for chemical synthesis, other energy storage technologies, electronics, plastics, textiles.



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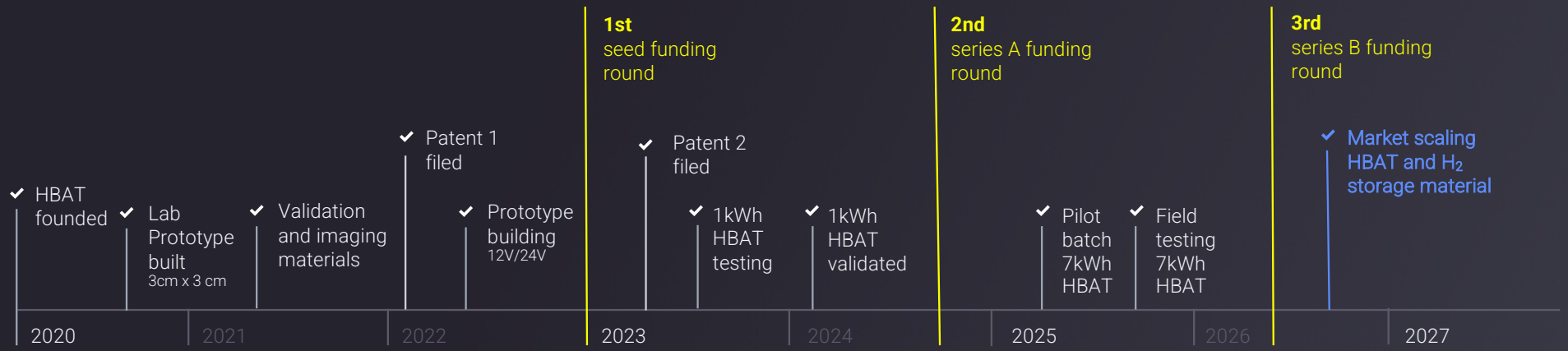
Long Term Goals

First H_2 Storage Material and Battery pilot batch after 2 years.



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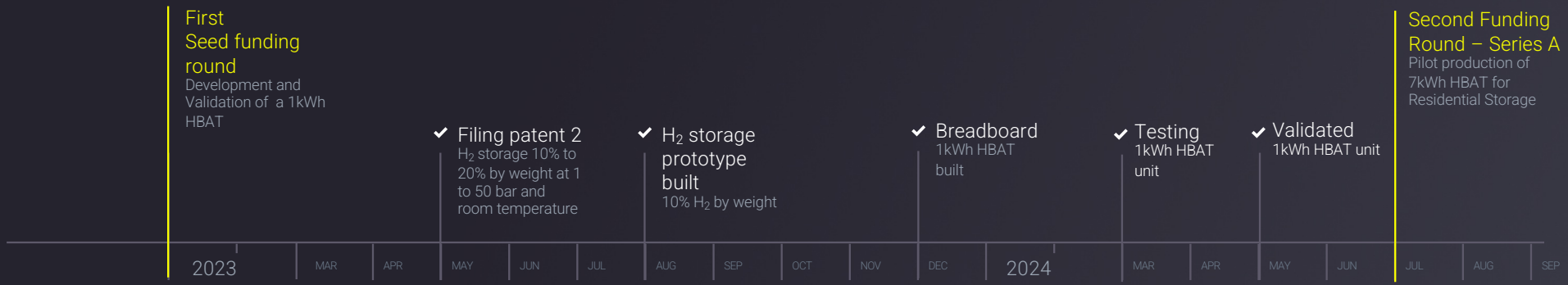
Next Steps

Developing two MVP products within the next 24 months.



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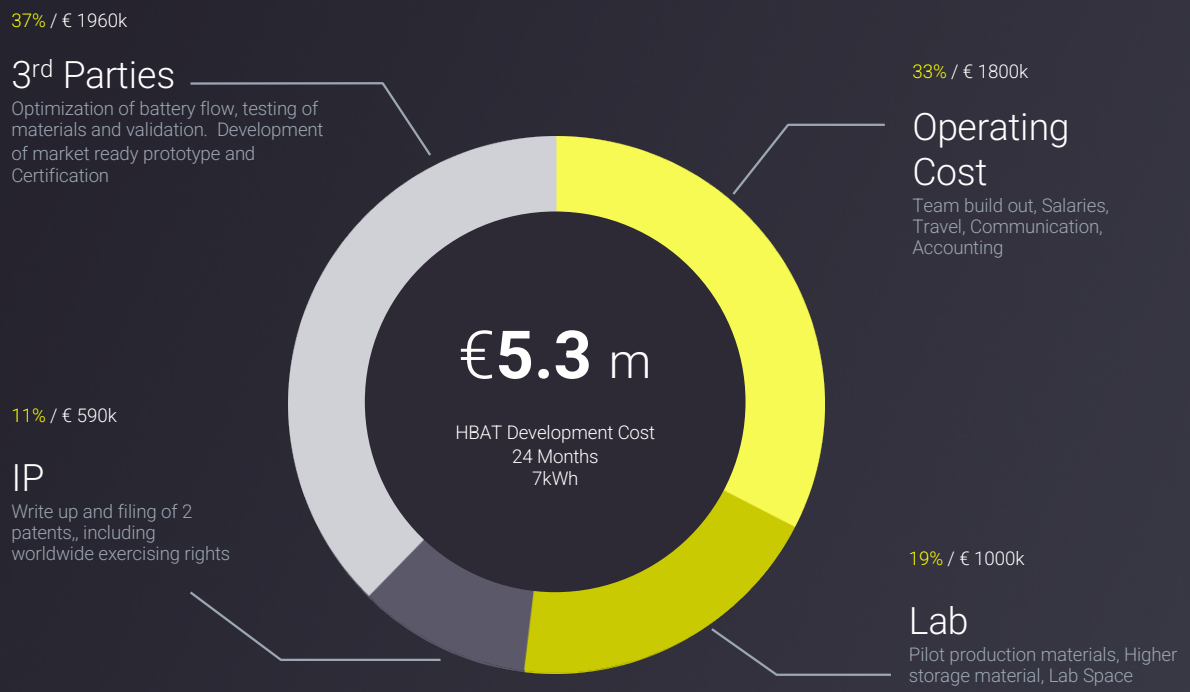
Investment Ask

Investing in the following 24 months development of HBAT and related products.

By securing our IP through a patent of various solutions, we can then build up revenue streams

Year 1	**€2.8 m**
Year 2	€2.5 m



HBAT

Team

Meet The HBAT Team.

Zacariah Heim

CTO

Inventor of HBAT and related systems.

Founder and Shareholder via Prometheon Technologies

Cris Van Cleemput

CEO

Masters in Electrical, Mechanical, and Civil Engineering. Assistant Professor and Head of Department for Electrical Engineering at University of Ghent, then Entrepreneur.

Founder and Shareholder via Prometheon Technologies

Jane McCarthy

Director of Communications

Bachelor in Business and Finance. Worked successfully with Cris for 12 years in Leadership Coaching.

Founder and Shareholder via Prometheon Technologies

HBAT

Support

Advisors and Collaborations.

Potter Clarkson

IP writing and filing. IP valorisation. Legal representation and protection.

University of Ghent

Catalyst synthesis.
TEM and SEM imagery.

Voxdale

Technical support and development partner.

Made

360° design partner.

HBAT

thank you

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Zacariah@h-bat.com

Jane McCarthy
Jane@h-bat.com