team

Thomas van Dijk
MSc

Thomas invented the chemistry and founded E-stone Batteries.
He studied Physics in Amsterdam and Sustainable Energy Technology at the TUDelft and followed several business courses. He is charged to bring iron batteries to as many applications as possible.

Jon Davies
pHd

Jon is an experienced electrochemist with a proven track record in securing funding and delivering programs, on-time and to budget, at the commercial, academic and European levels, with a a particular interest in catalysis and energy storage. He is also inventor on a number of patents and is familiar with the process of developing this IP through commercialization programs.

Leon Sturkenboom
MSc

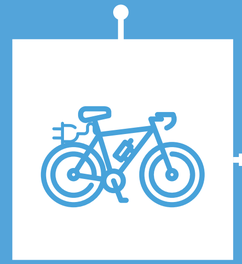
Leon developed the innovative fabrication method of the electrodes E-Stone uses today and built the foundations of E-Stone. With an education in environmental sciences at Wageningen University and Energy sciences at the University of Utrecht, Leon ensures E-Stone combines environmentally-friendly materials with cost-effective scaling.

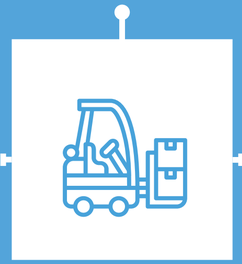
applications

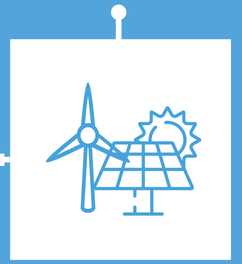
The initial applications we target are fork-lift trucks, e-scooters, and smaller electric vehicles. Our technology allows for fast charging during lunchtime, allowing you to size your battery system twice as small as your conventional lithium-ion or lead-acid solution.They perform under full depth of discharge and at high c-rates. In the second and third phase we will make battery systems for on and off-grid storage for e.g. solar and wind energy. This is where the biggest demand for energy storage will come from.

Our ultimate aim is to make iron batteries the number one technology for global sustainable energy storage.

If you have an interesting application and want to explore a collaboration, don't hesitate to contact us! We would like to take on the challenge of providing you with a cleaner, cheaper and better performing battery.







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E-STONE

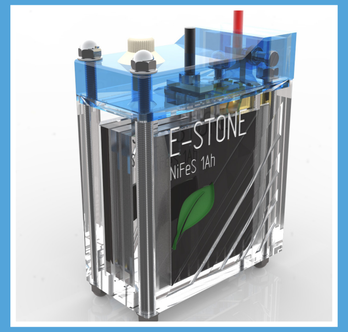
Clean and affordable energy storage

technology

Affordable and reliable energy storage is the holy grail of clean energy. E-Stone is developing a rock-solid technology, which is low-cost and environmentally friendly. Our technology combines an easy innovative fabrication method and uses a patented electrode formulation, making it possible to utilize the tremendous potential of iron. Just take a look around you, from building materials to your body, the world runs on iron!

The abundance, direct availability and global utilization of iron makes it ideally suited ***as the an affordable clean-energy storage material****, enabling energy storage for everyone, everywhere.*

Our first flooded Ni-FeS battery prototype, which we call “the IRON-IC”, will have a replaceable ‘circular economy’ design. The Nickel-based counter electrodes we will use for this prototype have an astonishing lifetime of more than 100.000 cycles. As the iron is cheap and degrades first, we will offer the service of replacing your iron electrodes and give you another 300 cycles (plus the cycles our R&D team has added in the meantime) whenever you need it.



- Fast charge/discharge (<15 min)
- 100% DoD
- 75% round trip efficiency
- Low cost, non-toxic and environmentally benign
- Revolutionary electrode-swappable cell design
- < 0.01€ / kWh for our iron electrode

benchmark

low-cost is our biggest advantage, clean energy is the consequence

Lithium and Lead are the two battery technologies which currently dominate the market. Iron is 7 times cheaper than lead and over 50 times cheaper than lithium. The energy density of our iron electrodes approaches lithium performance. However, due to the amount of electrolyte required and the use of relatively heavy (and costly) commercial nickel electrodes our first NiFeS-batteries will be between lead acid and lithium ion both in terms of performance and cost.

We are currently working on solid state and gel electrolytes to increase our weight and volume density and searching for alternative counter-electrodes to pair our anode with. Traditional iron electrodes are known for their extraordinary long lifetime of 10.000 cycles. Due to our adjustments, we have increased the capacity and the efficiency but limited its lifetime. With our current R&D efforts we are on our way to combine our achievements with its long cycle life promise. In terms of material cost and availability, no existing technology can beat iron and air. Iron-air batteries is our bet for the future.

	Pb-acid	Li-Ion	Ni-Cd	Ni-FeS (stage 1)	Ni-Fes (stage 2)	FeS-air (stage 3)
LCOE (€ per cycled kWh)	0,28	0,12	0,16	<0,125	0,08	<0,025
Capital cost (€ /kWh)	<100€	<150€	<250€	<150€	<100€	<50€
Cycle life	1000	1200	1000	300 - 500	2500	5000
Recyclable	+	-	+/-	+++	++	++
Weight	--	+++	-	+	++	+++

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