CENATE SILICON NANO COMPOSITES

Your key to a smaller, lighter and cleaner battery

Werner O. Filtvedt & Erik Sauar

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Cenate develops and produces silicon based nano composite for the use in energy storage applications

Has developed **world leading and patent pending silicon-based materials** to replace graphite in **lithium-ion batteries**, mainly for the rapidly growing EV battery market.

Building on Norway's **strong silicon industry competence**, being a spin-off company from Dynatec (Norwegian equipment producer, with co-founders from REC and IFE (Norwegian Inst. for Energy Technology).

CENATE

Management team with extensive industry and scale-up experience

Dr. ERIK SAUAR
Chief Executive Officer

CEO and co-founder. 25 years of international experience in bringing more than 10 new silicon-based technologies from idea to industrial commercialization.

PhD in physical chemistry
MSc Chemical Engineering
MA Anthropology
Norwegian University of Technology and Science

Dr. WERNER FILTVEDT
Chief Operational Officer

COO and co-founder. 15 years of experience in equipment and process development.

PhD in silane processing from the Telemark University College.

Dr. MARTIN KIRKENGEN
Chief Technology Officer

CTO and co-founder. >13 years of experience in silicon for energy purposes. Former head of the battery department at IFE (Norwegian Institute for Energy Technology).

PhD in Physics from the University of Oslo.

PEDRO GARCIA CRUZ
Senior Project Manager

20 years of international experience in project management for large scale energy, O&G and industrial projects including renewables, green H2 to ammonia and thermal power plants.

MSc is Civil Engineering from the University of Porto.

OLAV LEREN MOEN
Chief Strategy Officer

>10 years of strategy & business development experience – mainly from materials industries.

MSc in Finance and Executive MBA in Strategic Management, both from Norwegian School of Economics.

Backed by strong owners/sponsors and a highly skilled board

KEY INVESTORS

Bonheur ASA

Vianode
an Elkem company

DYNATEC®

Must as

Sauar Invest

nysnø
Climate Investments

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Owner of Must Invest

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Investment Director
Nysnø Climate Investments

CENATE

A smaller, cleaner and lighter battery with enhanced capacity increases commercial value

HIGHER ENERGY DENSITY

Cenate's new & unique product can **increase battery energy density by up to 40%.**

1 kg Cenate nano-structured silicon **replaces 5-7 kg graphite.**

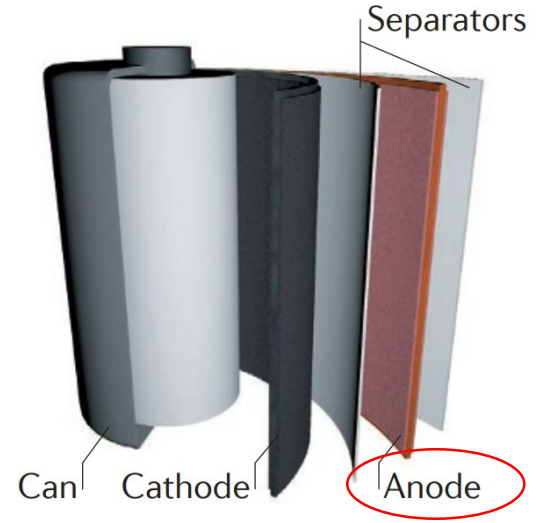
Higher energy density batteries demand **higher market prices.**

INCREASED PRODUCTION CAPACITY WITH LIMITED INVESTMENTS

The overall capacity of batteries produced in a battery factory increases when Cenate's drop-in replacement materials are used, leading to a **higher total number of GWh produced/yr without** requiring significant **capital investments**.

LOWER BATTERY PRODUCTION COST

The battery **production costs decrease on a per kWh basis** due to higher output from each battery plant and Cenate's efficient production process.



Internal tests and customer feedback from leading international cell producers indicate that Cenate has a world leading silicon anode product for use in EVs.

Illustration from Choi 2016, Nature Rev.Mat.

Record high energy density – effective, climate friendly production

Record high energy density – record low Li/cathode cost:

- World leading **lithium efficiency** among silicon anode competitors. Thereby less of the costly Lithium and/or a thinner (and lower cost) cathode can be applied.
- Each kg of Cenate's products **replaces 5-7 kg of graphite**. This is tunable.
- Superior **calendaring (compacting) properties** so that the anode becomes as thin as possible, and the energy density of the battery increases further.

Cost effective production process:

- Cenate is producing its drop-in replacement materials in a unique and highly efficient way.
- The result is low capex needs, much lower energy consumption, and low emissions.

From container to pilot plant – next is large-scale factory

SMALL-SCALE REACTOR

- Spin-off from Dynatec w/co-founders from REC and IFE 2017.
- Construction of a small-scale reactor with containers welded together in 2020.
- First 3 product patents.

PILOT PLANT

- Strong results from a smaller reactor, led to the financing and building (completed 2022) of a full-scale pilot plant that shall have 100 tons yearly capacity – equivalent to roughly 1 000 MWh/yr.
- Scale up of processes being done in parallel with customer qualification processes.
- Two last process steps being scaled up in 2023/early ’24 and expansion project by YE 2024.
- 4 additional product patents.

LARGE-SCALE FACTORY

- First commercial large-scale Battery Anode Material (BAM) factory with production capacity of 10k tons p.a. (stepwise increase from 2 k).
- Sufficient for 2 million EVs per year with silicon dominant anode.
- Owners in place to fund Giga scale mass production with Nysnø (gvmt), Must, Bonheur and Vianode (Elkem, Altor, Norsk Hydro).

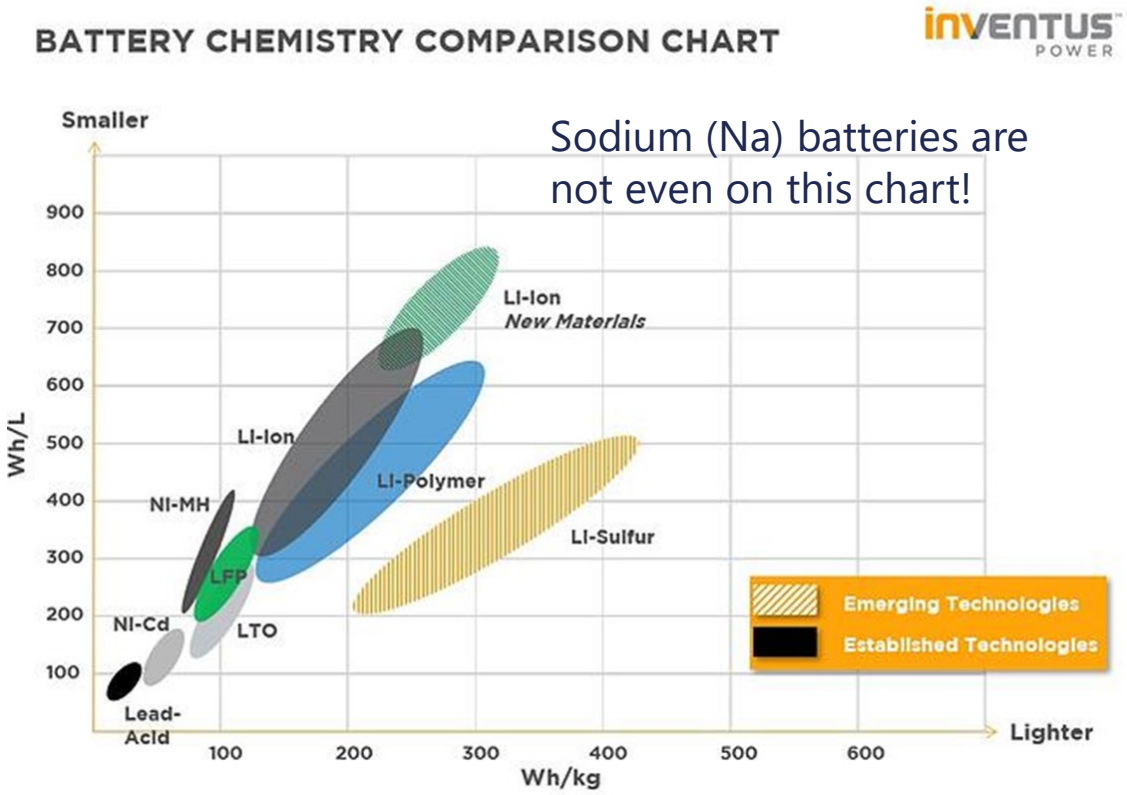
Materials matter - 1

There are a large number of possible battery chemistries

- These offer large differences in CO2 footprint and environmental impact from extraction and processing
- Major material bottlenecks or major negative environmental footprints from a particular material can hence often be avided

Different materials are different in recyclability and use

- Different materials are different in terms of what methods can be used to separate them out from a battery and other materials and recycle them
- The environmental footprint is lower for a non-recyclable material with very low environmental footprint than a material with a 3-10 times larger footprint that can be recycled once….



Sodium (Na) batteries are not even on this chart!

Materials matter – 2
(The thing you should remember from this presentation)

Replacing graphite with Cenate's products

>**93% lowered direct CO_2 emissions** from extraction and production (of the most CO2 emitting part of today's battery)

in addition indirect effects from the increased use of EVs.

Likely potential for recycling of our material.

~~*"Det er utviklet modeler for fremtidsscenarier for råmaterialbruk i batterier.* ***Hovedkonklusjonen er at det største potensialet til å redusere utslipp fra batterimaterialer ikke ligger i teknologiske løsninger****, men i tiltak som oppfordrer til en mer effektiv ressursbruk (endringer I livsstil eller samfunnsstruktur)" (NTVA, 2024)*~~

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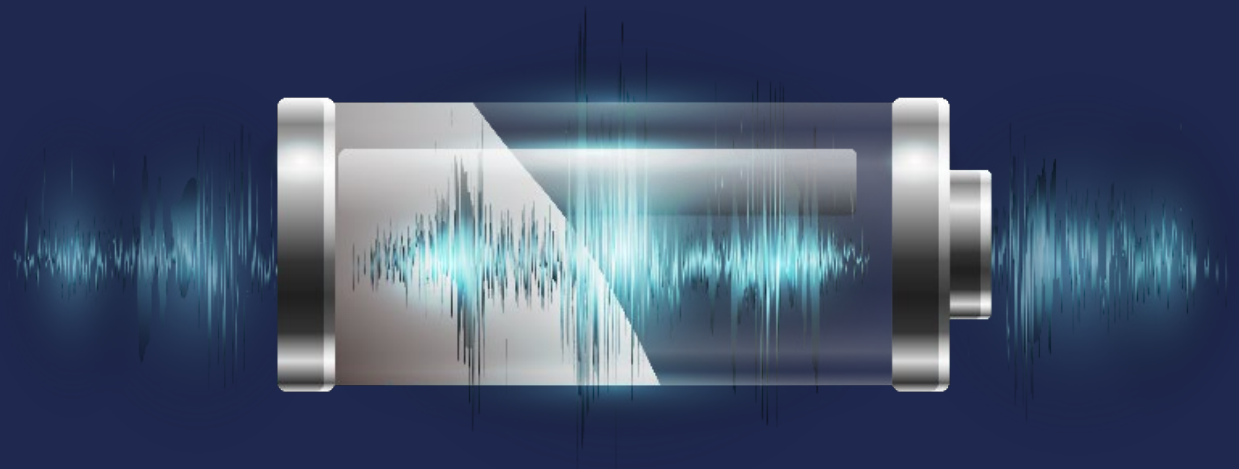
nysnø Climate Investments

Analysis performed by nysnø and partners

CENATE

THANK YOU



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