FØNS transformers

Press Release August 2025

New invention

Green power for high-temperature directly from the electricity grid.
A new Danish invention makes it possible to use green power to produce the very high temperatures that many industries in both Denmark and Europe demand for process heat. This paves the way for phasing out a very large consumption of fossil fuels and displacing large amounts of CO2 - including 8 percent of the world's total C02 emissions from cement production, as well as saving a lot of money on carbon capture.

Many energy-intensive processes in industry require high temperatures. These can only be produced efficiently by coal, oil and gas - or by green fuels produced on green power: hydrogen, methane, methanol, etc. But why don't we save all conversions of the green power, and instead use it directly to produce high temperatures?
- Because it is not technically possible. That has been the answer - at least until now!

The solution

A new invention, e-UltraHeater, opens up the possibility of direct, efficient use of green power for high-temperature processes from 100 °C to over 3000 °C. The solution can also be scaled up and down and adapted to the supply of green power and the current price of electricity.
In addition, e-UltraHeater can be manufactured on a larger scale as a high-voltage solution and connected directly to the high-voltage grid, saving cables and costly transformers and used for balancing the electricity grid.
This has added a new tool to the toolbox of European large-scale industry, which is currently calling for green solutions for energy-intensive high-temperature processes.

The two inventors

Two Danish engineers from the company Føns Transformers in Hobro have invented the solution. Both have many years of experience from both industry and the world of research. Mogens Juhl Føns from the global cement industry and Flemming Buus Bendixen, PhD at Aalborg University with employment in both Vestas and Grundfos.
The two engineers have experienced great interest in their invention from both large Danish and international companies. Scaling is still missing. But the 3 kW prototype is in place. This was done in collaboration with Aalborg University. Test runs have been carried out with a very satisfactory result.
Based on Føns Transformers, the two engineers are now ready to scale up in size. First a 40 kW solution and later 0.5 MW. An application has been submitted to
The Energy Technology Development and Demonstration Program (EUDP), which supports new energy technology that can contribute to achieving the Danish and EU goals for energy and climate.

The technique

The biggest challenge in producing high temperatures using electricity is finding a design and technology that does not burn out transitions and electrical connections. The two engineers have solved this challenge by creating a controlled short circuit in a converted transformer using, among other things, induction in the e-UltraHeater. This allows the heat produced in the system to be transferred without physical contact and without long cables from a traditional transformer to the heating elements. In fact, the e-UltraHeater is simply a special transformer with built-in heating elements.

How is that?

The coils of copper wire in one coil of the e-UltraHeater are replaced by a stack of stainless steel or other material discs, depending on how high a temperature is to be created.

There is a small gap between the discs, which makes it possible to blow air through. This allows the heat to be carried away from the controlled short circuit between the discs.

Depending on how many degrees are desired, the air volume is matched to the electricity consumption in the e-UltraHeater.

Installation and sales

The two inventors from Føns Transformers say that the e-UltraHeater can be easily installed in existing industrial production. It only requires one inlet and one outlet, so it can replace all or part of the fossil fuel consumption for process heat.

The plan is to sell e-UltraHeater globally via partners. An ambition that certainly does not diminish the potential. Especially not when you consider that e-UltraHeater is considered to be particularly suitable for both new and existing production plants, especially for cement, glass, rock wool, brick and steam production.

Introduction of the technology

Right now, Føns Transformers is introducing e-UltraHeater to stakeholders in both Denmark and abroad.

- We are experiencing great interest in our product. Fortunately, our plant is a combination of known materials and technologies, so we are ready to start production as soon as testing of the demonstration models is over, say the two inventors.

- Of course, we would like to make some money from the product. The most important thing, however, is that our technology gets to work. E-UltraHeater is particularly relevant for the most energy-consuming and thus CO2-emitting industries in the world, so each new plant will be a good and positive contribution to the climate fight, conclude Flemming Buus Bendixen and Mogens Juhl Føns from Føns Transformers.

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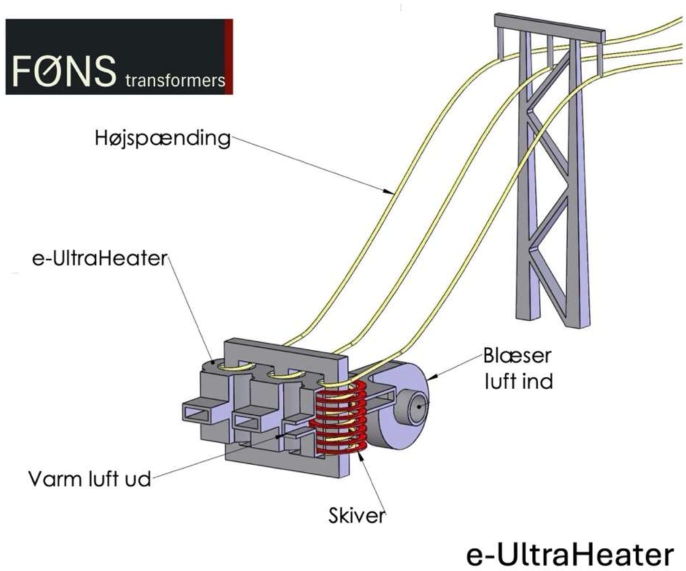


Flemming Buus Bendixen (right) og Mogens Juhl Føns (left)

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About the two inventors:

Mogens Juhl Føns:
• Mechanical Engineer, DTU, 1989
• Previous employments: Rambøll, FLSmidth
• Consultant from 1996 for, among others, Alfa Laval, FLSmidth
• Co-owner CemGreen 2020-2023
• Involved in construction of cement factories in China
• Co-owner Føns Technology International 2010 - developed, produced and delivered over 300 clinker coolers to the global cement industry
• Filed over 20 patent applications
• Co-inventor of e-UltraHeater

Flemming Buus Bendixen:
• High-current Engineer, Aalborg University, 1997
• Ph.D. in motor design and control, 2005
• Specialist in magnetic systems for transformers
• Former employment: Grundfos, Vestas and Sintex
• Consultant since 1999 for, among others, Alfa Laval, B&O, Dali, Nano Nord, R&D Testsystems
• Chairman of the Danish Magnetic Society since 2022
• Filed over 25 patent applications
• Co-inventor of e-UltraHeater