

ENERGY-EFFICIENT MAGNETIC HEATER WITH HIGH TEMPERATURE SUPERCONDUCTORS BY THEVA

BMWi approves project proposal for joint research project – high energy savings in metal hot forming are expected

Ismaning, 15th May, 2019 – Thousands of megawatt hours of energy are consumed every year in the production of metal semis and products. The associated CO₂ emissions also need to be taken into account. With more than 70% efficiency, high energy savings can be achieved by a new “robust and low maintenance magnetic heater (RoWaMag)” to be developed by THEVA together with Bültmann GmbH, Beck Maschinenfabrik GmbH and the Karlsruhe Institute of Technology (KIT) / Institute for Technical Physics (ITEP) over the next few years. Now the BMWi (German Federal Ministry for Economic Affairs and Energy) approved the project proposal.

It is not a new idea. In 2009, Petra Bültmann-Steffin and Dr. Carsten Bühner won the German environmental award for their new induction heater based on high temperature superconductivity (HTS) technology. However, due to the insolvency of the company driving the project, Zenergy Power GmbH, a market breakthrough was never reached.

Now the project has been resurrected. THEVA CEO Dr. Werner Prusseit said, “With experience in series production of high temperature superconductors (HTS), we are sure we can address the difficulties encountered in the previous demonstrator. The issues arose from a too low magnetic field, weaknesses in the coil design and the cooling system, and as a result downtimes. All these problems have been solved in the meantime, as we have proven in several other projects.”

RoWaMag's goal is to develop a billet heater for extrusion plants. The furnace's magnetic field is generated by an HTS magnet made of 2nd generation HTS wires. Its compact design, durable and robust cooling system and continuous operation during maintenance and repair of the cooling system are promising design aspects. The project partners are optimistic that this induction heater is a viable solution for the future, from both the technical and economic points of view.

The 160 extrusion presses in the German aluminum industry could save 55,000 MWh energy annually while processing 800,000 tons of aluminum, which means a reduction of 30 %. This translates into the annual output of 14 medium-sized wind power plants. Thus, CO₂ emissions in this sector could be reduced by 30,000 tons per year.

THEVA is responsible for producing the high temperature superconductors and for

developing the magnet coil in the project. Dr. Werner Prusseit: “We are happy to be a part of this promising project. It can increase production efficiency massively, resulting in a drastic reduction of energy consumption and CO₂ emissions.”

Induction heaters are used for the industrial production of aluminum, copper, brass and titanium sections and tubes. These products are widely used, e.g. in lightweight car bodies or for copper conductors in e-mobility. Raising the temperature makes the material soft and malleable, so it can be shaped into components with lower physical effort. Induction provides more uniform heating through the material than other heating methods. This enables the best results and faster cycle times in production.

Induction heating is currently quite energy-intensive. About half of the energy is consumed by the AC current used to create the magnetic field in copper coils. With the new magnetic heater, this will change as the efficiency will be increased from less than 50% to more than 70%.

About THEVA Dünnschichttechnik GmbH:

With 20 years' experience in coating technology and equipment engineering, and patented production technology, THEVA manufactures high-temperature superconductors (HTS) for the loss-free transmission of extremely high electric current. Today the company stands for a unique approach in superconductor production.

THEVA has invested over fifteen years in development to build Germany's first commercial HTS production plant. Thanks to its very high energy density, THEVA Pro-Line superconductor can replace conventional copper wire in high-performance applications. It opens entirely new scope for the design of electrical components. Manufacturers of cables, power switches, large electric drives and power rails can rely on the high quality and performance of the material. THEVA provides high-end solutions in coating technology and equipment engineering.

THEVA Dünnschichttechnik GmbH was founded in 1996 and today has around 50 employees. Headquartered in Germany and with representatives in Asia and the USA, the company has a global presence for its customers.

In 2012, with Target Partners and BayBG two powerful VC partners came on board. Since 2016 eCapital and Bayern Kapital have also been supporting the growth of the company. As of the third financing round in 2017 EnBW New Ventures is also among the investors.

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