

Project title: Reduced energy shredding for solid recovered fuel production

Main applicant: Magnomatics

Technology developer: Magnomatics / Donasonic / ATB Group UK (Laurence-Scott)

Industry partners: Ellgia

Demonstration capital cost: £1,142,214

Funding awarded: £625,950.68

Project timeline: October 2019 to February 2021

Photo:



Project description:

The project will install a shredder using a novel direct-drive magnetically geared motor at Ellgia's Scunthorpe waste management site. The site produces over 80,000 tonnes per year of refuse derived fuel and solid recovered fuel, an important fuel source for industry and electricity co-generation and the new shredder will be used for the production of solid recovered fuel. By removing the need for inefficient gearboxes and pulley systems commonly used in this sector the project will demonstrate the energy savings available from this novel motor technology compared with currently used IE3 motors equipped with gearboxes and pulleys.

The application selected allows for demonstration of the magnetically geared motor in harsh operating conditions where the motor will experience high torque, speed fluctuation and vibration in service. Additional benefits of the technology are the predicted reduced maintenance times due to the removal of gearbox components, and the improved ability to deal with high torques caused by abnormal loads by having the drive pole slip harmlessly should anything become lodged in the rotor.

The shredder will be installed alongside an existing processing line, allowing for comparisons to be made against a traditional processing route, giving the additional ability for various feed materials to be trialled.

Size of target market:

The short-term market size is ~£400M for shredder sales in the recycling industry, including pre-shredders and secondary shredders. This is immediately addressable following the industrial testing carried out in this project. Long term market size (3 to 5 years to commercialisation) is based on expanding the reach into different sectors such as cement mills and cereal production.

Barrier to market:

The magnetically geared motor is potentially a disruptive technology, a first of its kind within the recycling industry, and end users may be reticent to engage until it has been proven in service, in particular its ability to operate with high torque loads and demonstrate reliability in an aggressive environment. Additionally, as Donasonic are an SME, they do not have the stature that other more established shredder manufacturers have, and hence strong marketing of the technology based on the demonstrated energy savings will be essential. Identified sales targets from both recycling and other industries (cement, food production) will be invited to see the shredder operating on site at Ellgia to demonstrate its performance.

Initial TRL: 5/6**Targeted final TRL: 8/9****Estimated energy and carbon savings:**

The demonstrator project is expected to deliver energy savings of approximately 16% utilising the novel motor technology compared with currently used IE3 motors equipped with gearboxes and pulleys. This efficiency uplift results in a saving of over 61,000 tonnes CO₂ after 5 years for a UK market penetration of 40%.

Why IEEA funding was important to this project:

Working in isolation will not yield commercially exploitable results quickly. IEEA funding will provide the partners with the necessary financial support to enter into this project by diminishing some of the financial risk. It allows all parties to collaborate with each other and draw on their own expertise in a commercially constructive manner. It will allow the effectiveness of the technology and its carbon/energy saving advantages to be demonstrated in the real-world with a consortium that includes both a vendor and a buyer for the shredders, enabling a route to market that would not otherwise be accessible due to the financial constraints of the partners. The development of yet another key energy saving magnetic drive technology would further cement Magnomatics' position as the world leaders in this technology so they can continue to attract business from international "blue-chip" OEMs, and develop significant UK based non-recurring engineering revenues.