

Project title: Improved energy efficiency in fertiliser production through water treatment resource recovery

Main applicant: CCm Technologies Limited

Technology developer: CCm Technologies Limited

Industry partners: Severn Trent Water

Demonstration capital cost: £2,190,188.67

Funding awarded: £999,023.12

Project timeline: September 2019 – March 2021



Project description: CCm Technologies have developed a technology to process ammonia and organic waste streams found in the waste water industry, utilising surplus heat and the flue gases from existing combined heat and power (CHP) engines. If successful, the project will save the electricity that is currently used to drive the conventional waste treatment processes and will produce a feedstock for high grade fertiliser, a potentially significant revenue stream. This will also displace further energy used in conventional fertiliser production plants.

The demonstration project is being undertaken at Minworth waste water treatment works. This is Severn Trent Water's largest waste water facility and has treatment processes typical of the industry.

The project aims to demonstrate that the CCm process can be operated successfully in the environment of a large waste water facility. The project aims to produce environmental benefits in several ways, including;

- Utilising heat from the CCm Process and waste heat from the flue gases of an existing CHP plant.

- Reducing the electricity used by the traditional nitrification process at the site.
- Recovering CO₂ from the CHP plant flue gases.
- Producing fertiliser using less energy than traditional manufacturing processes.

Size of target market: The technology is being targeted at large waste water treatment works because their sewage sludge waste streams are an ideal feedstock for the process and the use of CHP biogas engines. The waste water treatment industry has a large number of plants that are potentially suitable for the application of the technology.

Barrier to market: The technology is unproven at full scale in an operating environment. The process has been successfully operated at pilot plant scale but there are technical barriers associated with the integration of the heat recovery and the ammonia recovery modules that need to be overcome in a full-scale plant.

Initial TRL: TRL 5

Targeted final TRL: TRL 8/9

Estimated energy and carbon savings: The project expects to demonstrate a 90% reduction in the electrical energy required compared to traditional nitrification processes at a waste water treatment works. Additionally, there should be a 50% reduction in the specific energy requirement of the fertiliser produced.

Why IEEA funding was important to this project:

The primary barrier to adoption of the technology is that it is unproven at scale. The funding provided by the IEEA has allowed CCm Technology and Severn Trent to invest sufficient capital to undertake a full-scale trial of the technology. The credibility of the IEEA programme has also assisted with discussions with the Environment Agency on certification of the fertiliser product for land used for food crops.

Peter Hammond, chief technology officer at CCm

“This is an opportunity that will allow our technology to demonstrate the release of significant plant nutrient resources held by Severn Trent and use them to lock captured carbon back into the soil, paving the way for greater sustainable agriculture in the UK.”

Paul Knuckle, external funding lead at Severn Trent

“We are really excited about being a part of this programme, because it’s a first for Severn Trent and CCm Technologies. We’ve demonstrated how well aligned our wastewater recycling ambition is to the government energy efficiency strategy and how we can support the circular economy with the potential to produce value from waste.”