

SUPPER

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INFORMATION ON THE ECO-INNOVATIVE SOLUTION PROVIDER

This eco-innovative solution is the output from the project titled “Sustainable Poultry Production through Environmental Recycling” co-funded by the European Commission within the framework of the Competitive and Innovation Program. This solution has been developed by a team coordinated by the Irish Biomass Heating Solutions Ltd (BHSL) in partnership with 4 organisations in Ireland, the Netherlands and the UK.

SHORT DESCRIPTION OF THE ECO-INNOVATIVE SOLUTION

SUPPER provides an on-site conversion system for poultry manure, which can be used as a sustainable renewable fuel in compliance with European Legislation. SUPPER uses fluidised bed technology to recycle poultry litter into a high-grade fertiliser and recovered heat to be used in poultry sheds as well as electrical energy generation. The establishing of an on-site biomass solution enables a poultry farmer to eliminate the need for disposing of by-products off-site (thereby increasing bio-security) and creates a new fertiliser. The combustion plant is a bio-secure ‘stand-alone’ building, separated from poultry production sheds, where fuel is produced and transferred from storage to furnace via automatic equipment. Its performance is automatically controlled and monitored.

INDUSTRIAL SECTOR – MARKET SEGMENT AND ACTUAL APPLICATION IN INDUSTRY

20 Food and Kindred Products

INDUSTRIAL CLASSIFICATION - NACE CODE;

32 Other manufacturing

1. DESCRIPTION OF ECO-INNOVATIVE SOLUTION

Technical aspects of the eco-innovative solution

In a Fluidised Bed Combustion (FBC), poultry manure can be treated with a thermal efficiency of over 86%. The power plant can vary in size and is designed to produce from 200kWh to 2mioWh of heat in a unit which is small enough to be located on the site where the fuel is generated – ideal for agricultural and by-product applications with high heat demands. BHSL's FBC 500 boiler has a capacity of 500 kWh thermal output. This is sufficient to provide hot water at 90 °C required for distribution to poultry sheds for rearing broilers from day-old to fully grown.

One emerging application of FBC is the potential to connect an Organic Rankine Cycle (ORC) power generator to a biomass hot-water source. ORC technology uses hot water to heat a compressed working fluid that has a lower boiling point than water. In this manner, electricity can be produced from low-temperature (approximately 85°C and greater), low-pressure sources such as biomass hot-water boilers.

Litter from one batch provides clean, dry, renewable heat. Poultry litter is a valuable fuel. Once a house is cleared of birds, the litter is loaded into a bio-secure fuel storage that has an automatic handling system called Toploader. The air required for the FBC is drawn from this storage structure, creating negative air pressure and ensuring no leakage of odors or pathogens. Fuel handling is fully automated so farm staff have no further contact with litter after loading it into the energy centre. Litter is conveyed to the FBC unit at the rate of 5 tonnes per day. The system is remotely monitored and managed 24/7.

Smallest unit starts from 1 ton per day (75,000 poults). Larger units for 2, 5, 10, 20 tons/day for farms with poultry numbers up to 450,000 birds on the floor.

Economic and environmental benefits of the eco-innovative solution

Benefits: There are environmental benefits in this sustainable solution, such as fossil fuel substitution and on-site direct use of energy and fertilizer, eliminating the negative impacts of the off-site, land-spreading of poultry manure. Ammonia and CO₂ released in the poultry rearing house is dramatically reduced, improving productivity and the health conditions of the animals in the growing sheds. Because the solution applies a combustion process at high temperatures of over 850° for two seconds, according to the EU Regulation 592/2014, pathogens are eliminated and the residual ash is safe to transport and use.

Costs of the solution depend on the size of the farm: Min. investment 500,000€ (heat & steam); ORC technology for electricity generation requires additional investments of 250,000€, including maintenance for 20 years; average payback (economics): <6 years.

2. AVAILABILITY OF THE ECO-INNOVATIVE SOLUTION AND BUSINESS PARTNERSHIP

Market readiness, Trade mark, existing market coverage, commercialization strategy

Trade mark available: FBC 500,FBC 1200 CHP

The FBC 500 /FBC 1200CHP is certified by the Carbon Trust and qualifies for Enhanced Capital Allowances (ECA). The system has already been rolled out in the UK, the US, Italy and other countries.

The system is the only approved boiler under EU 592/2014 (regulation regarding the use of animal by-products and derived products as a fuel in combustion plants) and foresees regular emission testing.

Requirements to adapt the solution to the local market and potential applications/market size

No particular requirements. The entire system requires a building that stores manure (200-300to), a storage facility and plant room

On-site after-sales services support and the technical assistance requirements

Covered from Ireland, with local support

Targeted local business partners

Local engineering companies to supply chicken farms

Type of local business partnership sought

1. ESCO financing model providing financing for the turn-key solution, selling the produced heat, steam and electricity to the poultry farm.
2. Sell the entire equipment with a 20 years maintenance contract