

Case study



Growth that doesn't cost the earth

Fife Anaerobic Digestion Plant – Solving legislative requirements sustainably



To meet the new statutory requirement to collect domestic food and garden waste, Fife Council undertook analysis of the technologies available to treat organic matter whilst reducing disposal costs and improving sustainability.

Key Facts

- Led by the Sustainability Team at Fife Council;
- Involved the development of Dry Anaerobic Digestion technology to treat food and garden waste;
- Capital cost of £15.5 million;
- Forecast revenue savings of £1.2 million per annum;
- Will generate electricity (1.4 megawatts peak output) which will be supplied to the grid;
- Supply heat (900 kilowatts) to a local district heating system;
- Carbon savings of 18,000 tonnes CO₂e per annum compared to landfilling the waste

Background

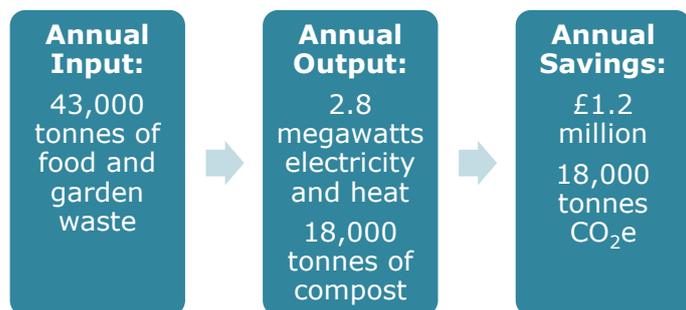
Fife council, which is Scotland's 3rd largest authority, has an energy strategy that aims to reduce council energy use through rationalisation of buildings, improving energy efficiency, and the development of council owned renewable energy sources. The council's waste strategy is geared towards improving recycling rates and reducing waste to landfill. Following the introduction of a legislative requirement to provide a food collection service, the council set out to ensure that this was done as cost effectively and sustainably as possible. Their answer was the deployment of dry anaerobic digestion technology to treat both food and garden waste.

Anaerobic digestion technology involves a series of processes in which microorganisms break down biodegradable material in the absence of oxygen. The technology can be used to manage waste and produce fuels (biogas) at a domestic and industrial level. A by-product of the process is the digestate, which can be used as a fertiliser. Dry anaerobic digestion technology is used to process materials with a solids content of between 25 and 40% and is designed to work without the addition of water.

The process on site

Construction

The cost of building the plant was £15.5 million, which included a large amount of groundworks to ensure site stability (the plant is situated above a former landfill site and over mined coal measures which increased the development costs). The payback time for this capital investment is predicted to be 12 years.



Inputs

The feedstock for Fife’s dry anaerobic digestion plant is comprised of household food and garden waste collected by Fife Council. Collections to fuel the plant currently take place from 120,000 homes with plans and available capacity to extend the scheme to 165,000 homes by autumn 2014. The current collected material makes up all of the 43,000 tonnes treated at the plant; 3,000 tonnes of which is Category 3 waste.

Outputs

The site has the potential to produce 2.8 megawatts of combined electricity and heat. The electricity produced totals 1.4 megawatts and will be sold to the grid to raise additional revenue. Of the 1.4 megawatts of heat that is produced; just less than 65% is used to supply heat to an existing local heat network. The provision of heat

to the local network has led to a reduction in the requirement for fossil fuel derived heat for 230 homes and five public buildings. The remaining heat is used by the plant. The council is examining the potential to extend the network by 2km to include a hospital and 550 additional homes, further reducing the reliance on fossil fuels. In addition to energy and heat, the plant will produce 18,000 tonnes of compost to be sold or used on the council’s estate; this compost has the potential to be PAS 100¹ certified in the future.

Savings

By running this plant Fife council will make a forecast saving of £1.2 million per year, based on a comparison with the commercial alternative. As well as a financial saving, there is a significant carbon saving of 18,000 tonnes CO₂e compared to sending all of the waste to landfill.

Process/methodology

Key Steps

The key steps undertaken in this project were:

1. Optioneering with technical consultants to find the most appropriate technology to digest horticultural and food waste, which was a two year, interactive process;
2. Consultation with the regulator, elected members of the council and other stakeholders;
3. Production and approval of the business case;
4. Tendering process for the design and build contractor;
5. Submission of planning application;
6. Appointment of contractors to carry out the design and plant build;
7. Planning application updated according to the exact design and site permit;
8. Construction of the dry anaerobic digestion plant;
9. Testing of the plant;
10. Operation

Stakeholder Engagement

Stakeholder engagement was a key part to the success of this project. The Sustainability Team began the engagement process with colleagues within the council; key participants were the

¹ PAS 100 is the national compost benchmark which defines the minimum requirements for the process of composting and the selection of materials from which compost is made.

property services and energy management teams. As well as these teams, the early involvement of elected members of the council ensured that there was early buy-in.

The next group of stakeholders to be consulted were the neighbours to the site, who were engaged prior to the planning application stage. This ensured that they were fully informed of the project during the early stages which resulted in zero objections to the Council's plans for the site.

The regulator was communicated with throughout the process to ensure that any barriers were overcome efficiently and with little disruption to the project.

"Early planning...enabled the project to happen smoothly" **Chris Ewing, Senior Manager for Sustainability, Fife council**

This was a key factor in avoiding barriers and challenges.

Key Outcomes

The initial drivers for the project were to ensure that costs were reduced and that the requirement to undertake food and garden waste collections were fulfilled.

Top Tips

1. Fully understand what you want to get out of the process: Ensure that you have a detailed understanding of the requirements and of what you are trying to achieve;
2. Engage a technical expert at an early stage: It should be one that you have confidence in and one which is credible;
3. Engage with key stakeholders at an early stage: These include neighbours, other relevant council and non-council services, elected council members and regulators;
4. Keep the regulator informed and make them aware of all the project details so that they can facilitate the process rather than cause delays.

Chris Ewing, Senior Manager for Sustainability, Fife Council

The Benefits

The benefits realised through this project include:

- Compliance with the requirement to undertake household food collections;
- Enables co-mingled waste collection of food and garden waste, which would otherwise have to be done separately;
- Supply of heat and power to the grid, which further reduces the reliance on fossil fuels;
- Production of compost for agricultural use;
- Long term financial savings resulting from diversion of waste from landfill;
- Carbon savings of 18,000 tonnes CO₂ per annum

Next Steps

The council plans to expand the food and garden waste collections for plant feedstock from 120,000 homes to 165,000 homes during 2014; this will amount to over 94% of houses in the area. Further to the expansion of the waste collection process, Fife council is evaluating the potential to expand the resulting heat network to a further 550 homes and an NHS hospital, plans for this are currently at the business case stage.

