

Bridge Energy

Anaerobic Digestion



Introduction

The AD plant is based in Banbridge, County Down approximately 25 miles from Belfast City. Banbridge is classified as a medium size town with a population of approximately 18.000 people.

The AD plant is owed by Bridge Energy (NI) Ltd, a company set up to secure funding, construct and operate a 499kW AD plant on the farm of Mr James Cromie.

James Cromie was seeking to diversify his farm business away from dairy production to energy production through AD to secure long-term government guaranteed incomes. James Cromie, working in conjunction with his brother, Mr Thomas Cromie, and their late father Mr Tom Cromie started exploring the opportunity of on-farm AD in 2002. They travelled extensively in the UK, Europe and USA to view AD technology and operating plants.

After extensive lobbying along with the NI biogas sector to secure adequate government price support, 4no x NI ROC's, obtaining planning permission and electrical grid connection offer and negotiating with AD technology providers and funders with the assistance of their advisors, KPMG, construction of the project commenced in 2014.

Bridge Energy have now been operating for over 20,000 hrs and has averaged an operational electrical output over the 12 months, Apr 16 to Mar 17, of 93%.



Case Study Approach

The data on the market access of renewable energy technologies were collected both from the case studies in different renewable energy technology projects and from the secondary sources. To collect specific project data, a template was established with following subsections:

- **Technology description and a project summary**
 - Innovative characteristics
 - Technology readiness level
 - Available product / service supports from the manufacturer
 - Any standard procedures / requirements for integrating the technology into existing electricity networks, buildings and/or mainstream energy appliances / systems
- **Commercialisation of the technology**
 - Is the technology already a commercial solution?
 - Are there re-sellers of the technology, or is the technology available only from the manufacturer?
 - Identified main market area
- **Cooperation partners and networks**
 - Description of the roles of the co-operation partners and networks in the RE technology project.
 - How have they supported the market access of the technology?
- **Assessment of the technical and economic risks**
 - What kind of procedures have been made for assessing the technical and economic risks of the project
 - Who is bearing the risk of the investment (manufacturer, client, shared between them)?
 - Is the public sector involved in risk sharing? (e.g. co-financing, or platform for technology demonstration)
- **Drivers and barriers in the RE technology project**
 - Main drivers in carrying out the RE technology project
 - Barriers, and how they have been overcome (such as price of energy, availability of resource, specific expertise, policy enabling the technology)
- **Funding and support mechanisms**
 - The financial support received by the project: amount/support rate, type and purpose of the support, agency providing the support, significance of the support for the project
 - Types of soft support/advisories received during the project: the use of soft supports (advisory, training, mentoring etc.) during the technology development or implementation, and how successful these have been
- **Monitoring the performance**
 - How are the technical/non-technical aspects of the RE technology case monitored?
 - Information on the design, installation requirements and procedures, operational performance, and costs/financial arrangements
- **Conditions for the technology transfer & adaptation in different partner regions**
 - What are the main requirements/preconditions for transferring the technology and applying it in other partner regions?
 - Description of the main drivers and barriers for the technology transfer (such as. Energy price, resource needs, certain support etc.)
- **Project results**
 - Benefits & lessons learnt
 - Post- project benefits

Technology Description

Technology detail:

- 499kW AD Plant
- Electrical energy generation
- Fuel Supply; biogas

Energy Generation:

Bridge Energy is contracted to produce a minimum of 4000MWh electricity per year which will be sold into the national grid from the plant. This is the same amount of electricity as 850 households would use in a year.

The contracted minimum operational efficiency of the plant is 91.3% or 8000 hrs/yr. The biogas yield will be equal to around 1.7Mm³/year. There are contracted operational responsibilities to meet these targets with the parties involved in providing AD technology, feedstock, operational and maintenance services. Should the electricity generation be less than planned, a penalty must be paid by the party responsible. This contractual arrangement ensures that Bridge Energy can secure a minimum guaranteed income to meet the project's obligations to its funders. Therefore, knowing the outputs is paramount with respect to the funding. Over the 12 months, Apr 16 to Mar 17 Bridge Energy achieved an electrical output of 4065MWh

Fertiliser:

The plant will produce digestate, which the farmers will use as fertiliser.

Fuel supply:

The feedstock will be grass silage and animal slurry secured within Cromie family landholdings. 7,500tonnes grass silage, 5,000tonnes slurry, 3,500tonnes of poultry Litter

Environmental impact:

There are environmental benefits to using anaerobic digestion. Firstly, it reduces the carbon footprint of farm operations because the digestate from anaerobic digestion can be used as a substitute for fertiliser and because the AD process captures the greenhouse gases emitted by animal slurries and manure under the standard farming practice of lagoon or tank storage. Secondly, the more renewable energy is produced, the less reliance there will be on fossil fuels.

Reduction in greenhouse gas emission of >2,250tonnes CO₂/yr for each plant. This is the equivalent to taking 1000 cars off the road a year for each plant.

TRL and Technology Scale

TRL 9

Cooperation partners and networks

The AD plant is owned by Bridge Energy (NI) Ltd, on the farm of Mr James Cromie in conjunction with his brother Thomas Cromie. 100% project secured equity investment from the UK Green Investment Bank (GIB)/Foresight. Bridge Energy was one of the first two on farm AD plants to be funded by GIB.

Bridge Energy AD project: £1.7 million from Foresight's UK waste Resources and Energy Investment Fund (cornerstones by the UK Green Investment Bank) and £1.7 million from Williams Industrial Services.

As this was one of the first AD plants in Northern Ireland, this project was used as an example to help promote the update of AD plants across Northern Ireland. This project was open to the public via appointment to come and view the anaerobic digestion technology to see how it works, size and cost etc.

Risk assessments and supports received

The total cost of the Bridge Energy AD plant was £3.5 million

Funding Mechanisms:

100% project secured equity investment from the UK Green Investment Bank (GIB)/Foresight. Bridge Energy was one of the first two on farm AD plants to be funded by GIB.

Investors:

Bridge Energy AD project: £1.7 million from Foresight's UK waste Resources and Energy Investment Fund (cornerstones by the UK Green Investment Bank) and £1.7 million from Williams Industrial Services.

Non-financial support:

With James and Thomas Cromie having a strong knowledge within the AD and agricultural sector, they dedicated much of their time and effort to the project. This is one of the reasons why the project was so successful and highly recommended throughout Northern Ireland.

Drivers and barriers

The considerable number of AD plants in NI and the high operational output of these plants has created a strong knowledge base in the NI AD sector. This is leading to high levels of innovation in the sector and has created strong export opportunities for the sector.

Issues with funding is a barrier. As it was one of the first AD plants in Northern Ireland to be funded through 100% project secured equity investment, there was significant funding challenges. The challenges and barriers for AD development in NI are the funding scheme, small scale and individual projects, the limited experience of project financing within the NI farming sector, the electrical grid infrastructures and also the diminishing returns in the traditional agricultural sector in the last decade.

Conditions for the technology transfer, adaptation and new market deployment

AD systems range from small-scale digesters to complete mix digesters and other advanced systems. There are multiple designs for AD systems that depend upon the facility's location, feedstock and anticipated outcomes. Anaerobic digester system designs continue to evolve with technology

enhancements. Currently, there are four main types of digesters that could be used in any of the other partner regions, they are: complete mix, covered lagoon, plug flow, and small

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Project Results

Benefits

Bridge Energy AD plant has created 10-15 indirect jobs and there are two full time staff members employed to help with the day to day running of the AD plant.

This project will diversify and improve the economic sustainability of our farming operations, while providing better utilisation of farm wastes and reducing the CO2 footprint of our enterprise.

Lessons Learnt

The AD process is relatively new to NI, so therefore there is a definite benefit to early community, planning and policy engagement and explaining what AD is to highlight its benefits and address any concerns.

Post Project Benefits

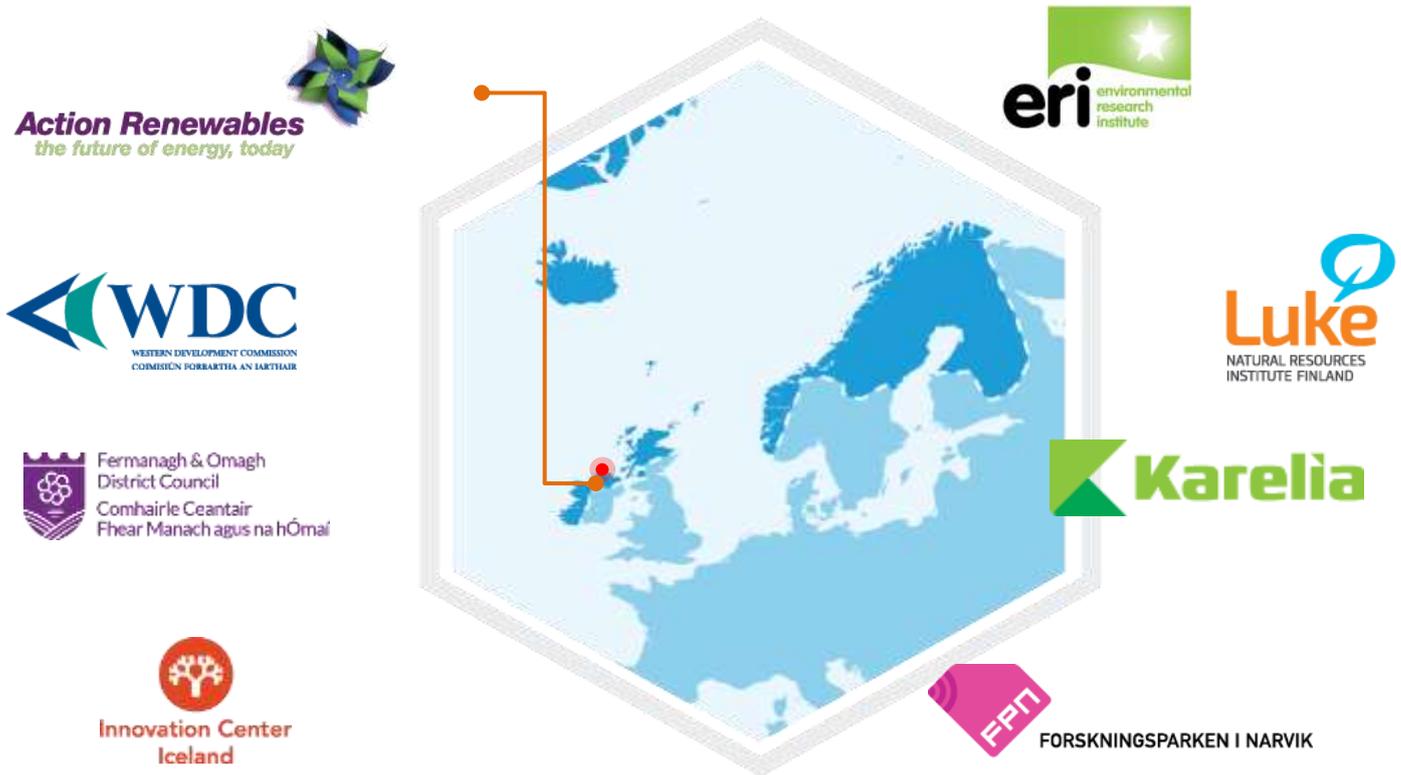
Williams Industrial Services were the main contractor for this project; they were responsible for both construction and the long term maintenance of the AD plant. With Williams Industrial Services securing this project this has allowed them to create employment.

The process also creates digestate, a natural by-product which can be spread on the land as a fertiliser, saving farmers money and returning nutrients to the land.

PARTNERS

GREBE will be operated by eight partner organisations across six regions:

● Action Renewables



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