

Biogas Workshop outcome from 27th August 2015

(Europe in my region: responding to our global challenges in the Border Midland and Western Region)

Biogas Opportunities in the West of Ireland

Introduction to Biogas Open Day workshop 27th August 2015

The objective of the Biogas Workshop was to target interested industry groups, local political representatives and policy decision makers. However the timing of our workshop did not coincide with the majority of these groups due to individual circumstances. However the resulting group though small in numbers provided a more focused discussion on the opportunities for Biogas development in our Western Region.

By an-aerobically digesting food processing waste and/or animal slurries we can produce biogas, similar to natural gas that can be used for onsite energy – lowering energy costs, recycling valuable nutrients and lowering carbon emissions. We will present detailed examples and discuss the main aspects of building anaerobic digestion plants & utilising local resources that produce waste. This waste can be processed on site where the gas is extracted and used to supplement energy use.

Summary of presentations

1. Operating an Anaerobic Digestion using Waste Water Sludge Presenter Patrick Moran (Executive Engineer - Tipp County Council)

Patrick presentation showed how a Local Authority collected biogas from a waste treatment uses this gas to operate the process and generate electricity via a combined heat and power unit. The Biogas displaces fossil fuels by extracting gas from the waste material and benefiting by exporting electrical energy to the grid. The final digestate rich in nutrients is still a waste product and under licence is injected into land. This site has transferred to Irish Water and run by Local Authority under service agreement.

The Opportunity

This waste processing facility installed a CHP unit in 1990 to use the Biogas collected from the plant, but was not used until 2007 due to lack of operational knowledge in the natural gas extraction process. In the mean time the digester was heated using CNG and digester gas was flared off.



Following a meeting with technical staff a number of upgrades were carried out and the CHP unit was operational and providing biogas to the boilers and generating electricity for export. (REFIT tariff available in Republic of Ireland between $\in 0.10$ - $\in 0.15$ per kW where as in the North of Ireland it is $\in 0.22$ - 0.28 per kW).

Process Upgrades required

The gas extraction process required the following upgrade to increase dry solid in the supply sludge. The existing sludge tank used a 3 stage gravity filtering to remove the water was not successful as the filter system was blocking up and water did not filter through. To address this issue new de- water beds with decanting doors and covers were installed on site and supply sites to provide a dry solid content of 8%.

Process operation key elements

- Consistent sludge at 8% dry matter and operating temperature between 37.8 & 38.0 Degrees is critical for efficient operation of the plant.
- Biogas generated in the digester is re circulated to aid with the digestion process
- Boilers are used to regulate heat exchangers to maintain digester temperature between 37.8-38.0°C in conjunction with CHP
- Sludge cake of up to 24% d/s from the final centrifuge is currently transported off site for land injection for agricultural purposes.

Plant Maintenance & Safety

- Maintenance of all components of the plant is critical to optimum Plant performance.
- Bi-annual CHP maintenance required to ensure effective operation.
- Digester cleaned ever three years to prevent blockages from debris that comingle in the treatment process even though inflows were screened.
- Cleaning the digester is a dangerous process and personal gas detectors are required at several levels to ensure the absence of gas.
- Full breathing apparatus and personal gas detector required when working in Digester
- Sludge holding tank cleaned ever five years. The same safety procedure should also apply as for the digester.

Additional Measures to improve Plant Efficiency

- Insulated CHP, boiler room and sludge digester to improve efficiency.
- Use digested sludge to preheat input sludge via a heat exchanger
- Operate sludge centrifuge at night to avail off peak electricity rate.
- Feasibility study to convert waste from the digestion and dewatering processes as useful products e.g. liquid fertiliser-soil conditioner.
- Options for more efficient heat exchangers and upgrade CHP unit.



Overview of biogas operations in Europe – opportunities for Ireland Presenter Christian Jenne (Ph.D. Researcher, UDE - University Duisburg-Essen)

Christian provided examples of the development of Biogas for Transport in the EU and identified the amount of work Ireland has to do to meet our EU targets.

The development of biogas in European was influenced by environmental policy decisions and biogas in Transport varies according to the government incentives in the EU. E.g. Germany biogas use is primarily for Electricity production while in Sweden biogas has a higher use in Transport as electricity prices are low.

EU examples of Biogas Collection and use

- Malmö Sweden with a population of close to 300'000 operate 950 biogas busses on the road, 20 Diesel and 5 electric buses -> 10 contractors, fixed contract for 10 years
- Skånetrafiken manages but not operates those buses (Stockholm example)
- Biogas buses powered solely with biogas from AD plants (100% renewable)
- Electricity price approx. 8-10 €ct/kWh therefore biogas is only financially attractive for mobility (CNG/LNG)

Q. Why not use electric vehicles?

A. Electric vehicles range was limited at the time and biogas was selected as a green Energy solution to utilising a local resource. Electricity rates in Sweden are also half the price compared to other central Europe rates, therefore incentives in mobility was the more financially sensible way to invest.

Ireland Opportunities

- REFIT security, reimbursement
- Job opportunities in the green energy sector
- Own indigenous energy and fuel supply
- Contributes to the 2020 renewable energy targets
- Problem solver for waste reduction and disposal
- Extended business model for farmers, 2nd enterprise beside traditional farming

Ireland Challenges

- Lack of incentive for grid injection/transport
- Focus mainly on wind energy and less on biogas
- Agriculture and Waste policy does not support biogas production
- Lack of public knowledge on biogas/CNG



3. Opportunities for AD Development in the Region (Small Scale) Presenter Noel Gavigan (Irbea – Irish Bio Energy Association - Representative)

Noels presentation was based on an EU project Biogas³ with 7 EU partners that focused on small scale Biogas production from agro-food waste for energy self-sufficiency. Examples of small scale AD plants operating in Europe providing heat & electricity for onsite use.

Biogas³

Under the Biogas³ project (<u>www.biogas3.eu</u>) the Biogas Equipment Handbook will be developed specifically for smaller scale anaerobic digestion plants (circa under 100KWe or equivalent). Entries in this handbook are free and the handbook will be distributed across the 7 partner countries in the project and beyond. <u>http://www.irbea.ie/index.php/biogas-3</u>

Biogas plants are usually AD type and run at between 35 – 38 degrees. The closer the feedstock temperature is to operating temp the more efficient the plant. Small scale AD plants provide gas depending on the availability of feed stock and the quality of this feed stock. A single source feedstock such as slurry will provide a consistence volume of gas and the system will run with minimum control and maintenance. If alternative feedstock materials are used the system requires greater control and maintenance.

Examples of low cost AD plants operating in Europe and in particular Austria generated great interest from the group. The key issues associated with AD in an Irish context are the availability of feedstock and the legislation governing waste.

4. Ian Brannigan - Regional Policy Development & Jobs (WDC - Western Development Commission Head of Regional Development)

Ian outlined the role of the WDC as a state agency in developing regional policy and job creation opportunities for the Region. Examples of development projects such as Look west, Tourism, Creative Economy, Renewable Energy & Organic Agri-food developed and supported by through the WDC Investment Fund.

The WDC can provide support for a comprehensive study of Biogas options for the Region based on demand for biogas and the potential opportunities to supply. This study will be based on the strategic long term Biogas options that are sustainable and create local economic activity. The WDC through their EU BioPAD project produced the Biopad Energy Flows and Carbon Emissions: Anaerobic Digestion in October 2014. <u>http://www.biopad.eu/wp-content/uploads/BioPAD-Carbon-Story-for-Anaerobic-Digestion-October-2014.pdf</u>





The WDC can facilitate

Information sessions Knowledge Transfer Potential Biogas (AD) Mapping Development Plans for Region

Key items identified for AD deployment are:

- Regional Waste Management Strategy
- Brown Bin Roll out
- Feed stock availability
- Knowledge and benefits of Biogas process
- Coordinated approach to all stakeholders in development the Bio-energy sector.

The WDC can facilitate the collaboration between various stake-holders agencies such as Irbea, Regional Waste Coordinator, **Cré** (Composting and Anaerobic Digestion Association of Ireland) and farmers and other organic waste producers that can feed into Biogas development for local heat/ transport & electric use.

The WDC can also facilitate:-

- Business concepts for business that produce high energy waste e.g. fish processing & cheese production industry for conversion into biogas production and use.
- Information & Training workshops
- Facilitate site visits to commercial viable & affordable AD plants in EU
- Facilitate Networking seminars

<u>Summary</u>

All agreed the main issues for Biogas development is information about the pros & cons of Biogas followed by legislation on the use of waste as an input material fuel for Biogas production and the control of digester waste products.

WDC as a state agency will support a comprehensive study of Biogas options for the Region based on demand for biogas and the potential opportunities to supply. This study will be based on the strategic long term Biogas options that are sustainable and create local economic activity.



Pictures from Presentation day in Castlebar, County Mayo, Ireland on 27th Aug. 2015









Venue statement:

West of Ireland Region, local event will focus on how the region is increasing its engagement with the European Union and how we can benefit from learning from other EU regions. The event will showcase some examples of regional projects and initiatives that are tackling key European challenges, sharing best practice and improving local service delivery.

This one-day event will bring the Brussels Open Days back to the region, building on the themes debated in our Brussels event in October 2015. We will look at successful projects and opportunities to learn from partners from other European countries. We will raise awareness about how West of Ireland Region is represented within the European institutions and the advice and support organisations which can be contacted locally.

The event will be designed to engage the audience including people who have little or no previous experience of European work and funding, in order to raise their awareness of the opportunities available.

