28th March 2017



Green Farm Project Workshop John Toner Group Chairman & CEO



KNOWLEDGE



PARTNERSHIP



INNOVATION



Williams Industrial Services

Established in 1983, WIS is Northern Ireland's largest provider of process control, automation, instrumentation and environmental engineering solutions.

WIS has currently in excess of 180 engineers, technicians and support staff with a wealth of experience and skills.

Our long-standing partnerships with the world's leading process engineering manufacturers allow us to tap into a global hub of cutting edge knowledge, technological innovation and design.





Our Core Engineering Skills

- Design, Build, Commission and Operate in the areas of
- Electrical Engineering
- Mechanical Engineering
- Process Engineering (Biological and Chemical)
- Materials Engineering (Composites)
- Factory Automation (Robotics, PLC's etc)

Fundamentally we are

Measurement and Control Engineers

Sustainable Energy has been a key Driver for the past 8 years

















Williams Industrial Services







Anaerobic Digestion - Agriculture

KEY FACTS 2015

| | NI | UK | ROI | EU15 |
|--------------------------------|------------------|------------------------|---------------------|----------------------|
| GROSS VALUE ADDED (GVA) | | | | |
| Agriculture as % of total GVA | 1.0 ^P | 0.61 | 2.5 ¹ | 1.6 ² |
| EMPLOYMENT | | | | |
| Agricultural employment ('000) | 26 | 350 | 1101 | 4,9441 |
| As % of total civil employment | 3.2 | 1.1 | 5.71 | 2.81 |
| LAND USE | | | | |
| Agricultural area ('000 ha) | 998 | 17,2591 | 4,4771 | 155,766 ³ |
| As % of total area | 74 | 71 ¹ | 63 ¹ | 46 ³ |
| LESS FAVOURED AREAS (LFA) | | | | |
| LFA as % of agricultural area | 69.1 | 47.5 ¹ | 75.0 ³ | 60.6 ³ |
| FARMS | | | | |
| Number ('000) | 24.9 | 222.41 | 140 ² | 5,608 ³ |
| Average agricultural area (ha) | 40.1 | 77.6 ¹ | 32.5 ² | 27.8 ³ |
| ENTERPRISES | | | | |
| Average enterprise size: | | | | |
| Dairy cows | 88 | 831 | 58 ² | 43 ² |
| Beef cows | 17 | 271 | 14 ² | 22 ² |
| Sheep | 209 | 4421 | 148 ² | 169 ² |
| Pigs | 1,628 | 4441 | 1,254 ² | 382 ² |
| Laying hens | 16,000 | 1,2371 | 280 ² | 557 ² |
| Broilers | 44,000 | 47,4701 | 14,300 ² | 2,200 ² |
| Cereals (ha) | 13.9 | 60.5 ¹ | 24.1 ² | 19.6 ² |
| Potatoes (ha) | 7.3 | 15.5 ¹ | 7.8 ² | 3.1 ² |



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GECO AD Project 2.7MWe

Location – Dungannon, Co Tyrone Full CAT3 AD Process 90K Tonnes per Annum Odour Control Plant Waste Water Treatment Pasteurisation.

Full EPC Wrap Contract

Ongoing Technical Support

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Greenville AD Project 500kWe

Location – Ardstraw, Co Tyrone Dairy Farm – 800+ Cows Built 2011 Operational 4 + years

Uptime > 96%

Full EPC Wrap Contract

Ongoing Technical Support









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WH Energy AD Project 500kWe

Location -Newtownstewart, Co Tyrone Built 2015 Operational <1 years

Uptime > 96%

Full EPC Wrap Contract

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Ongoing Technical Support





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Evergreen AD Project 500kWe - Location – Ardstraw, Co Tyrone Arable Farm – 600+ Acres - Built 2013 Operational 2 + years Uptime > 97% Feedstocks – Grass Silage, Cattle Slurry and Full CAT3 Waste Full EPC Wrap Contract



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Our Farm Scale AD Technology

- WIS Group has designed, built and commissioned a 150kW on-farm anaerobic digestion (AD) plant at Finvoy, Ballymoney, Co. Antrim The plant has enabled the farm enterprise to generate electricity that is both used on site, and exported to the grid at greater than 95% energy efficiency levels.
- The plant operates on a combination of feedstocks including poultry litter, cattle manure, dairy waste and energy crops(grass silage) It is suited to local (UK and Ireland) conditions, climate and crops.
- The WIS AD Process is a true multi-feedstock AD System that is capable of receiving a wide variety of inputs including any organic matter. It is the first of its kind on the island of Ireland and has enabled WIS Group to design, construct and commission a further 8 AD plants using the Finvoy model.



WIS Modular 150kWe AD Plant



Williams Industrial Services











Williams Industrial Services

- Modular Construction
- **Containerised Control and** Pump Room
- Off Site Build
- Reduced Build Time
- **Re-Locatable Assets**
- Improved Fundability
- **Proven Components**
- Superior Backup / Support









Williams Industrial Services

- Modular Construction
- Off Site Build
- Reduced Build Time
- Re-Locatable Assets
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- Proven
 Components
- Superior Backup / Support







- WIS Group has undoubtedly developed a bespoke Renewable Energy Technology that successfully meets the energy demands of agricultural, industrial and municipal organisations within Ireland & UK.
- In addition, WIS personnel are a highly trained and skilled local workforce that are able to deliver each AD Plant from the procurement, design, construction, and commission phase right through to the plant operation and plant maintenance stages. (Full EPC wrap)
- We also and the provide ongoing technical assistance and support 24/7 for users and clients long after the completion of each plant .





- Farming 320 Acres and milking 160 Holstein Friesian cows plus 130 young stock, with cows housed all year round and milked twice daily
- Cows are fed 1st and 2nd cut silage, whole crop, wheat and dairy blend
- 2 No Broiler Units housing producing 256,000 birds per year.
- Objective with AD was to provide an ON-FARM diversification project
- Farmers want a long term reliable income 20 years plus





- The plants has been operational for over a year and is currently processing the following feedstocks on a daily basis:
- 3 tonnes Poultry Litter
- 2 tonnes Farm Yard manure
- 2 Tonnes 3rd Cut Silage can vary from 15% to 25% Dry Matter
- 25 Tonnes Cattle Slurry
- Man hours required to check and operate the plant are 1-2 hrs / day





- The plants has been operational for over a year and is currently achieving on a daily basis:
- 150kW of electricity per hour
- 195kW of thermal heat per hour
- 30 cubic meters of high nutrient digestate per day
- Digestate is separated into liquid and solid fraction for easier storage and handling
- Man hours required to check and operate the plant are 1-2 hrs / day



Plant Performance – D&A Taylor 150kWe AD



Last 12 Months

£ 198,285



D and A Taylor

Financial Summary

| Last 3 | Months | | | |
|----------|--------|--|--|--|
| £ 48,809 | | | | |

| Period | ELEC (£) | LEC (£) | ROC (£) | Total (£) |
|----------|----------|---------|-----------|-----------|
| Jan 2015 | 3,804.48 | 503.04 | 16,518.79 | 20,826.31 |
| Feb 2015 | 4,011.30 | 471.60 | 15,289.81 | 19,772.71 |
| Mar 2015 | 3,977.82 | 513.52 | | 4,491.34 |
| Apr 2015 | 3,826.60 | 526.30 | 16,131.00 | 20,483.90 |
| May 2015 | 4,130.30 | 570.62 | 17,400.40 | 22,101.32 |
| Jun 2015 | 4,005.12 | 531.84 | 16,131.96 | 20,668.92 |
| Jul 2015 | 3,701.28 | 487.52 | 15,040.96 | 19,229.76 |
| Aug 2015 | 4,248.14 | 556.77 | 17,097.06 | 21,901.97 |
| Sep 2015 | 4,169.00 | 554.00 | 17,176.00 | 21,899.00 |
| Oct 2015 | 4,297.16 | 570.62 | 17,613.00 | 22,480.78 |
| Nov 2015 | 3,941.52 | 487.52 | | 4,429.04 |







Energy and Non-Energy Benefits from the project

Energy Benefits:

- Zero dependency on fossil fuels on farm
- Excess heat from CHP used to heat 2 x broiler units saving £20K PA
- Exported electricity provides additional renewable energy onto grid

Non-Energy Benefits:

- Diversified farm income from exported electricity revenue
- Commercial fertiliser usage and cost reduced by 70%
- Digestate is an exceptional organic fertiliser with high nutrient values
- AD Plant did not require planning permission as modular construction is classed as "Permitted Development"







Future :

- 8 additional plants won using Finvoy model, including a prestigious
 Demonstration Plant for Teagasc at Trim in Co Meath
- Market opportunity in excess of £150M over the next 3 years to build plants from ranging 150kWe to 6MWe
- Other active R & D Projects currently ongoing
- Securing of existing jobs and creating new jobs
- Raising level of Ireland competitiveness in Clean Tech Sector





- Located in Ballybofey Co Donegal
- 4MWe AD Plant processing approx 90,000 tonnes per annum
- Animal Slurries
- Poultry Litter
- Food Production Waste
- Biomethane purification.
- Biomethane compression.
- CO2 recovery.
- Project has commenced and due for commissioning Jan 2017



































































- Located in Finglas Co Dublin
- 6MWe AD Plant processing approx 90,000 tonnes per annum
- Brown bin waste
- Poultry Litter
- Straw
- Thermal Hydrolisys
- Biomethane purification.
- Biomethane compression.
- CO2 recovery.
- Digestate dewatering.
- Effluent treatment.

























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- Located in Inchera, Little Island Co Cork
- 6MWe AD Plant processing approx 90,000 tonnes per annum
- Brown bin waste
- Poultry Litter
- Straw
- Thermal Hydrolisys
- Biomethane purification.
- Biomethane compression.
- CO2 recovery.
- Digestate dewatering.
- Effluent treatment.

























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POSSIBLE OPPORTUNITIES FOR AD IN ROI



| | NI | UK | ROI |
|--------------------|-------|--------|--|
| FARMS | 25000 | 222000 | 140000 |
| NO of AD PLANTS | 48 | 350 | >220 & <270 |
| % DENSITY | 0.192 | 0.157 | SOMEWHERE BETWEEN 0.157% AND 0.192% |







THANK YOU

Any Questions Please ?



