



Energy Proofing Irelands Poultry Sector

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Energy efficiency in poultry

- Lighting
- Cold weather ventilation
- Record & monitor
- Insulation & building sealing
- Ventilation system maintenance
- Replacement policy fans
- Variable Speed Drives for electric motors
- Farmhouses

LED Lighting

Cost of LED Lighting and fitting €71 + €4	€75
Energy used by LED light	25 W
Energy used by double fluorescent tubes	116 W
Hours of light per day	14
Saving in electricity (116W – 25W)	91 W
At 14 hours per day (14 x 91W)	1274 Wh
For 365 days	465 kWh
At 18 cent per kWh / unit of electricity = 465 x 0.18	€84
Accelerated Capital Allowances (TAX)	

Potential opportunities in Renewable Energy

- Biomass - heating, electricity, transport
- Hydro - electricity
- Solar - heating, electricity
- Geothermal – heating
- Wave/tidal - electricity
- Fuel cells/Hydrogen – electricity, heating, transport
- Wind - electricity

Photovoltaics



- One kilo Watt Photovoltaic, produces 822 kWh in year one with output declining by 0.7% per year.
 - Average output of 764 kWh per year over 20 years
 - Requires RESS in form of REFIT to support.
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- Using 100% in the business
 - 764 kWh (18.0 cent per kWh) = €137 payback/yr.
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- At a cost of €1,000 per kW installed gives a simple payback of **7.3 years**

PV cuts your Carbon Footprint

- Each kWh of electricity generated by fossil fuels produces around 0.47 kg of carbon dioxide.
- A 20 kW PV system will produce about 20 x 800 kWh per year (16,000 kWh)
- This reduces the carbon footprint of the business by $16,000 \times 0.47 \text{ kg} = 7,520 \text{ kg}$ of **7.5 tonnes**



100 kW – Wind Turbine cutting the Carbon Footprint

- Each kWh of electricity generated by fossil fuels produces 0.47kg of carbon dioxide.
- A 100 kW wind turbine will produce on average 245,000 kWh per year depending on the site.
- This reduces the carbon footprint of the farm business by 115,150 kg or over 115 tonnes each year



Heat Pump Technologies

- ASHP – 300 – 400% efficient
- GSHP – Generally more efficient than
ASHP

What is the SSRH?

- Govt. scheme
- Financial support to renewable heat generators
- 15 year period
- Administered by SEAI
- Technologies – Solid Biomass Boilers & Heat Pumps
- Non-domestic sector

How does SSRH work

- A hybrid scheme of;

Investment aid - a grant of up to 30% for

- air source heat pumps
- ground source heat pumps
- water source heat pumps

Operational aid based on eligible heat use

- a tariff which is tiered (reduces as heat output increases)
- on-going quarterly payments for 15 years
- for biomass heating systems & anaerobic digestion heating systems

Points to Consider With Alternative Heating

- Alternative heating can reduce running costs by 75%
- Heating with hot water via an indirect system can increase animal performance
- Capital costs can be relatively high
- Some systems may produce heat when you don't need it
- Some systems have longer warm up times than others.
- Some systems require considerable maintenance and topping up with fuels.
- Under-floor heating will be slow to respond to sudden changes in ventilation.

Sustainable Support for Renewable Heat (SSRH)

- The Irish Government expects the SSRH to make a significant contribution towards their 2020 ambition of having 12 per cent of heating coming from renewable sources.

Phase one of the SSRH:

- Phase 1: the introduction of the SSRH for non-domestic installations in the industrial, business and public sectors.

How will SSRH be regulated?

- SEAI will administer the scheme
- SEAI will produce documentation that sets out requirements for a project.
- SEAI will make payments to acceptable applicants and ensure compliance

Key Questions?

- What if I've already installed a biomass boiler?
- Will payments be cut? Inflation adjusted?
- When does it start?
- Is a BER or energy efficiency documentation required?
- How long will a project take to get approval?

Plan Projects Carefully

- Ascertain what type of fuel suits you best.
- Solid fuel (manual handling), pellets or chip (automated)
- Fuel supply, storage and delivery
- Eligibility of boiler, installer and final use of heat
- Boiler sizing
- Biomass must be the primary fuel source
- Installers will be very busy – unforeseen setbacks
- Look at track record of supplier, manufacturer and installer

Eligible Use of Heat

- Inefficient drying practices in order to maximise payments.
- Grain drying
- Wood-fuel drying
- Swimming Pools – (Municipal or Commercial)

Rules should not stifle innovation – open to change

SSRH is designed to off-set use of fossil fuels

Process of drying is major consumer of fossil fuels in our maritime climate.

Fuel Requirement

- Rule of Thumb – Biomass boilers require about 1t of dried woodchip a year (30% moisture) for every kilowatt installed.
- Logistics is key – transport is expensive
- Woodchip has a range of moisture contents
- Quality Assurance

Fuel Storage Requirements

Boiler Output	80 kW	350 kW	1,000 kW	2,000 kW
Fuel input	25 kg/hr (100 kW)	100 kg/hr (400 kW)	300 kg/hr (1,200 kW)	600 kg/hr (2,400 kW)
1 m ³ / 150 kg storage	6 hrs	1.5 hrs	Too small	Too small
4 m ³ / 600 kg storage	24 hrs	Too small	Too small	Too small
16 m ³ / 2,400 kg	4 days	24 hrs	8 hrs	Too small
48 m ³ / 7200 kg	12 days	3 days	24 hrs	12 hours
55 m ³ / 8250 kg	14 days	3.4 days	28 hrs	14 hours
500 m ³ / 75,000 kg	Too big	31 days	10 days	5 days

SSRH proposed tariff levels (Cent for each kWh of heat produced)

Tier	Lower Limit (MWh/yr)	Upper Limit (MWh yr)	Biomass Heating Systems Tariff (c/kWh yr)	Anaerobic Digestion (c/kWh yr)
1	0	300	5.66	2.95
2	300	1,000	3.02	2.95
3	1,000	2,400	0.5	0.5
4	2,400	10,000	0.5	0.0
5	10,000	50,000	0.37	0.0
6	50,000	N/A	0.0	0.0

Market Opportunities

- Does not contain banded sweet spots like UK – 199kW or 999kW
- Leisure centres, hotels, hospitals, nursing homes where 1,000 MWh of heat are covered by the two first tariffs.
- Running installations of around 300kW to 400kW at 3000 full load hours – securing €38,000

Comparing fuel costs

- 1,000 litres of oil contains 36.68 GJ of energy or 10,190 kWh of energy.

Oil at €0.76 litre = €760 / 10,190 kWh = **7.4 cent per kWh**

- Wood chip at €120 per tonne @ 30% moisture content
3,400 kWh per tonne = **3.5 cent per kWh**

Poultry House Example

- 320 kW boiler – cost €240k
- Eligible heat output 1250 MWh (45% load)
- SSRH support €39,370

- Bulk LPG was €80,625
- Wood chip cost €49,600
- Fuel saving €31,025
- Total saving €70,395 (€39,370 + €31,025)
- Payback 3.4 years

CO2 emission factors 2017 data

Energy Source	CO2 emission kg/kWh
Grid electricity	0.437
LPG	0.2293
Natural Gas combustion - Heating	0.205
Coal - combustion	0.340
Kerosene	0.257

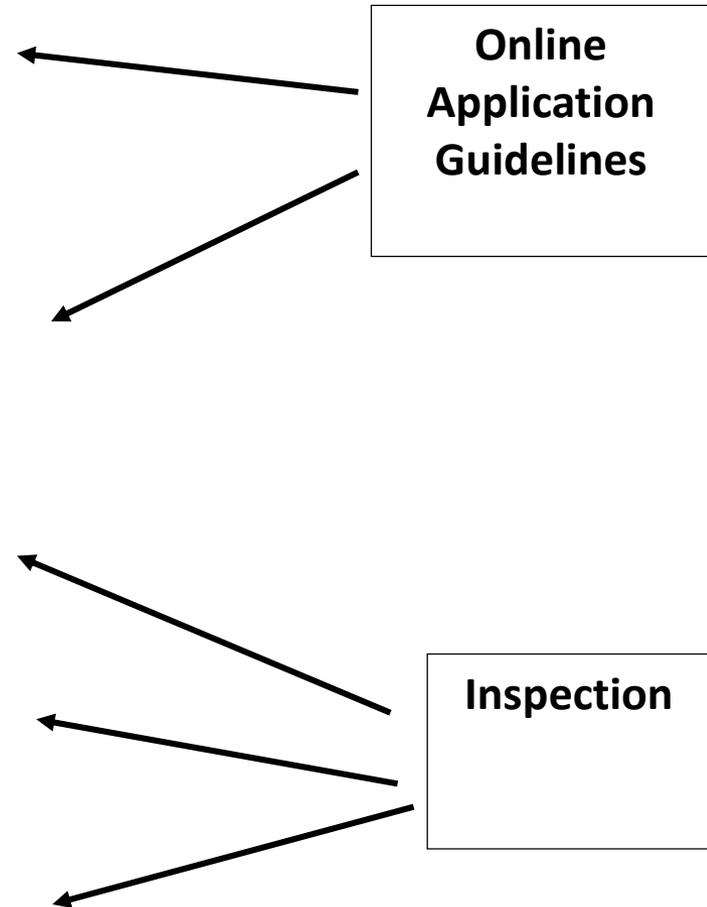
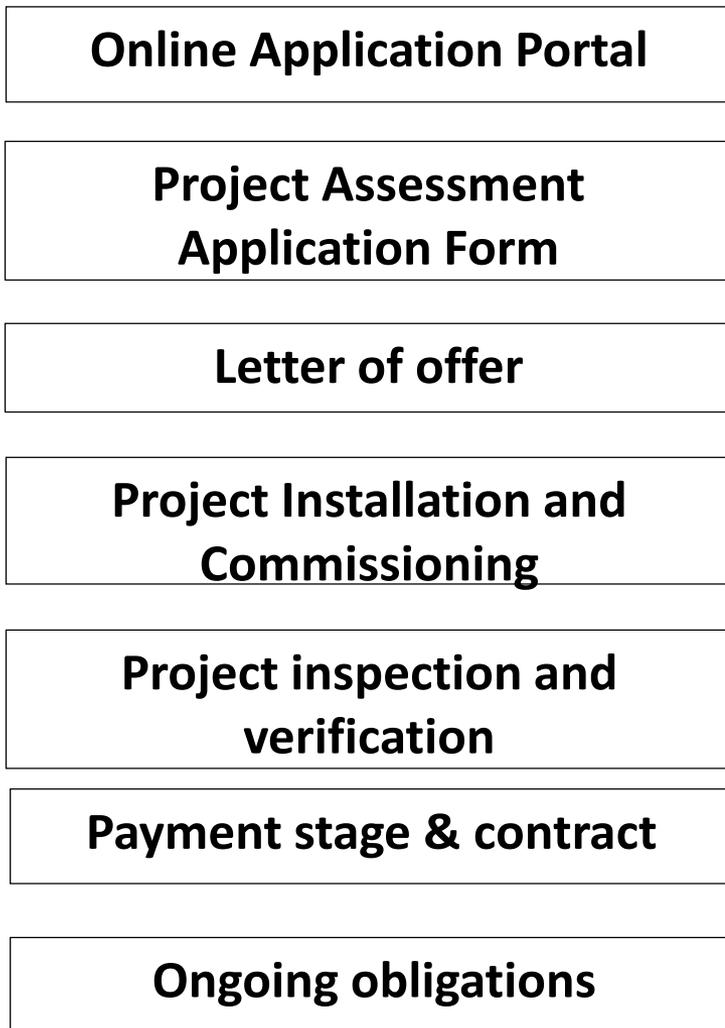
Carbon reduction

If the poultry unit previously ran on LPG

LPG emission factor = 0.2293 kg per kWh

1250,000 kWh x 0.2293 kg = 287 tonnes of CO₂

SSRH - Application Process



Take Home Message

ENERGY EFFICIENCY IS PARAMOUNT

GET TO KNOW THE FUEL YOU'RE GOING TO USE

- Understand the fuel you're going to use, it's pros and cons, key design considerations, availability - and stick to it.

DESIGN YOUR FUEL STORAGE AND RECEPTION AROUND YOUR FUEL CHOICE

- Think about lifecycle costs, practicalities of fuel delivery and storage.

USE PROVEN TECHNOLOGIES

- Don't try to reinvent the wheel.

SSRH

- Presents a range of new business and financial opportunities for the commercial and agricultural sectors.

Thanks
for your attention

