



# Increasing Renewable Energy Use on Irish Farms

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# Presentation

- Renewable Electricity Support Scheme (RESS)
- Support Scheme for Renewable Heat (SSRH)
- On-Farm Renewable Technologies
- Microgeneration

# Renewable Electricity Support Scheme (RESS)

- Successful applicants to RESS have secured 15 years guaranteed price for renewable electricity
- RESS competitive auction based scheme
- Scheme is designed to get large amounts of renewable electricity on the system
- First auction results published at beginning of August 2020
- Developments range from 0.5MW to 119MW

# First RESS Auction

- Total of 114 projects applied
- In the end 82 solar and onshore wind as well as seven community projects were successful
- Equates to 160 new wind turbines (479 MW)
- 63 successful solar farms
- Average weighted offer price was €74.08 per MWh
- Developments range from 0.5 MW to 119MW

# RESS - Successful Solar

County	Projects	Offer MW	Area (ha)
Cork	14	72.1	158.43
Wexford	12	191.9	421.78
Kildare	7	46.5	102.15
Meath	7	291.1	639.81
Tipperary	5	45.8	100.65
Kilkenny	3	12.0	26.35
Waterford	3	23.0	50.44
Wicklow	3	27.0	59.34
Galway	2	8.0	17.58
Dublin	1	5.0	10.88
Kerry	1	4.0	8.79
Limerick	1	50.0	109.88
Longford	1	8.0	17.58
Louth	1	4.0	8.77
Mayo	1	4.0	8.79
Offaly	1	4.0	8.7
Total	63	796.3	1750

# RESS- Successful onshore wind

County	Projects	Offer MW
Donegal	3	71.2
Mayo	3	102.3
Clare	2	23
Cork	2	19.6
Offaly	2	109
Carlow	1	0.5
Cavan	1	23.06
Galway	1	0.9
Monaghan	1	21
Roscommon	1	4.95
Tipperary	1	73.326
Waterford	1	30.4
Total	19	479.236

# Community Initiatives

- The first RESS auction included the mandatory contribution to community benefit fund.
- Involvement is heavily encouraged
- Deliver €4.5m a year to sustainable community initiatives
- These projects will be owned in the majority by communities.

# RESS – Successful community projects

Project	Technology	Technology output MW	County
Davidstown Solar	Solar	4.95	Wexford
Ballytobin Solar PV	Solar	4	Kilkenny
Barnderg Solar Farm	Solar	4	Galway/Mayo
Lisduff Solar Park	Solar	4	Clare
Lurrig Solar Farm	Solar	4	Cork
Dooleeg More Windfarm	Onshore wind	2.5	Mayo
Clooncon East Single WTG	Onshore wind	0.9	Galway
<b>Total</b>	<b>7</b>	<b>24.35</b>	



# Solar PV & Basic Payment Scheme

- If the reduction is greater than 70% the area will be considered ineligible
- If the impact on the eligible area is less than 70% an appropriate reduction must be made by applying a reduction co-efficient as per section 10 of 2015 Land Eligibility booklet.
- In all cases the parcel is ineligible if agricultural activity is hampered by the presence of solar panels.

# Sustainable Support for Renewable Heat (SSRH)

- The Irish Government expects the SSRH to make a significant contribution towards 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.

## SSRH 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

# SSRH Payback Example

- Poultry Unit
- 400 kW boiler – cost €180,000
- Run 1,700,000 kWh/yr (50% load)
- Oil Displaced = 160,500 litres
- Oil Cost pa = €105,930 (0.66 c/litre)
- Wood Chip cost pa = €76,500 (4.5c / kWh)
- Saving pa = **€29,430**
- Payback without SSRH = **6.1 years**

$$\begin{aligned} \text{SSRH extra income} &= 300 \text{ MWh} \times €56.6 = €16,980 + \\ & 700 \text{ MWh} \times €30.20 = €21,140 + \quad = \mathbf{€40,120} \\ & 400 \text{ MWh} \times €5 = €2,000 \end{aligned}$$

Heat Saving from wood chip €29,430 + SSRH €40,120 = **€69,550** or payback 2.6 years

# Poultry Units



- Typical bird house size 25 – 27,000 birds.
- 6.5 week turnaround and 7 to 7.5 batch cycles
- Benchmark 1.27 kWh per bird produced
- $1.27 \times 25,000 \text{ birds} \times 7.5 \text{ cycles per shed} = 238 \text{ MWH}$

# Agricultural Supply Chains

- Opportunity for farmers to sell renewable heat.
- Biomass Trade Centres – Solid link between grower and consumer of biomass.
- Agricultural feedstocks: Pulpwood, Straw, Purpose Grown Energy Crops, Grass Silage for Biogas - Anaerobic Digestion

# Value of Straw Compared to Oil

<b>Bale Type</b>	<b>Bale Weight</b>	<b>Kilo watt hours (kWh) per bale</b>	<b>Oil equivalent (litres)</b>	<b>Oil Value equivalent (€0.66 c/L)</b>
4 x 4 Round	150kg	690	66	€44
5 x 4 Round	250kg	1,150	110	€73
8 x 4 x 4 Square	500kg	2,300	220	€145







# Microgeneration

- Large shed roofs are perfect locations for solar PV panels
- Max electrical output 50 kW
- Rather than having farmers punished for their carbon footprints microgeneration can empower them to earn carbon credits to offset their emissions.
- Great opportunity to support farm level electricity generation
- Deliver a route to market for citizens and communities to generate their own electricity and receive a fair price when they sell the excess to the grid.
- CEG and CEP export payments

# Photovoltaics



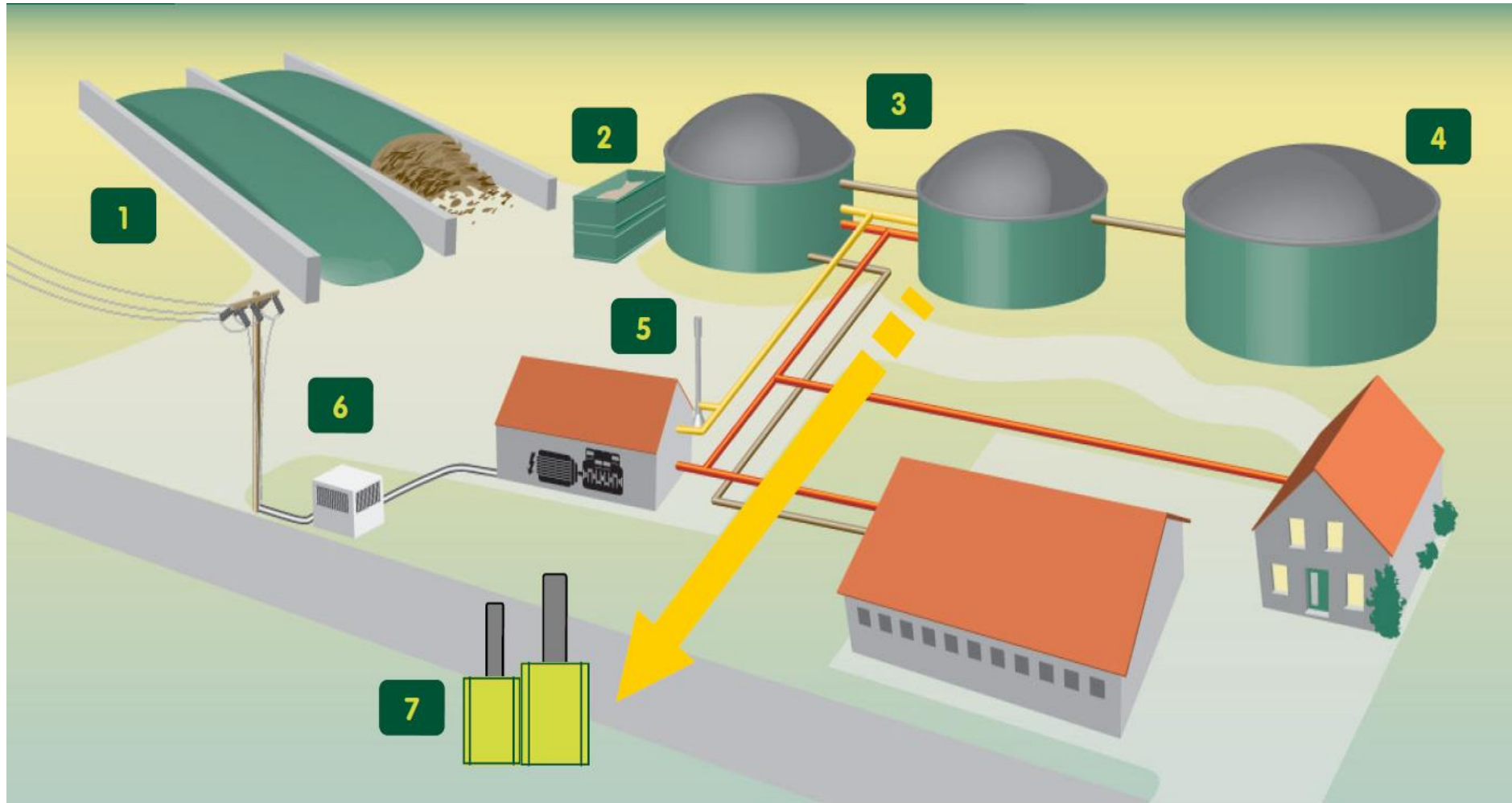
- One kilo Watt Photovoltaic, produces 822 kWh in year one with output declining by 0.7% per year.
  - Average output of 764 kWh per year over 20 years
  - Requires RESS in form of REFIT to support.
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- Using 100% in the business
  - 764 kWh (18.0 cent per kWh) = €137 payback/yr.
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- At a cost of €1,100 per kW installed gives a simple payback of **8.0 years**
  - **TAMS Grant available 40%**
  - **60% for Young Trained Farmers**

# 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**



# Biogas Plant



# A.D Biogas Challenges

- Planning permission
- No support mechanism
- Grid connection
- Explore technologies available
- Funders
- Technical consultant?
- Choose technology
- Timetable
- Form a new company?
- Upgrading biogas



# Teagasc Research AD

- SEAI Research & Development Fund – FLEET identifying economic implications of farm supplied AD feedstocks
- Gaseous emissions for sustainable production of AD Feedstocks
- Teagasc / NUIG – Optimising the AD process to improve biogas/biomethane yields

# Take Home Message

**FARM-BASED RENEWABLES** offers widespread environmental benefits – but more sensitive economics require incentives.

**ENERGY EFFICIENCY SHOULD BE THE FIRST FUEL OF CHOICE**

**GET TO KNOW THE TECHNOLOGY YOU'RE GOING TO USE**

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

**RURAL COMMUNITIES CAN REALISE FARM DIVERSIFICATION OPPORTUNITIES** – Renewables will help Ireland meet its renewable / decarbonisation targets

**USE PROVEN TECHNOLOGIES**

- Don't try to reinvent the wheel.