The Power Behind Irish Dairy Farms: A Survey

Information Sheet

My name is Lia Freitas, and I am a researcher based at University College Dublin (UCD). I work within the School of Chemical and Bioprocess Engineering and I am conducting a research project titled: “Energy Consumption and Sustainable Practices in Irish Dairy Farming"

The aim of this study is to quantify the direct and indirect energy consumption on Irish dairy farms and assess the feasibility of reducing energy use through the adoption of more energy-efficient and sustainable practices.

What will happen if you take part?
You will be asked to complete a survey that includes the following sections:
- A: General farm information
- B: On-farm energy consumption
- C: Off-farm energy consumption
- D: Policy support
The survey will take approximately 10-15 minutes to complete.

How will I protect your privacy?
Your responses will remain strictly confidential. No identifying information (such as your name or farm name) will be linked to your answers. All data will be anonymised and stored securely on UCD-approved servers in line with GDPR and UCD ethics protocols.

What are the risks of taking part?
There are no known risks associated with taking part in this study.

Can you withdraw from the study?
Yes. Participation is entirely voluntary, and you may withdraw at any time without giving a reason. If you withdraw, any data you have already provided will not be used.

What are the benefits of taking part?
Your input will help build a clearer understanding of energy use in Irish dairy farming as well as help map the energy transition in this sector. This research may inform future supports, incentives, or policy development in the sector.

What are the benefits to the researcher?
The study forms part of my PhD research and will contribute to academic knowledge on agricultural energy systems, with potential real-world impact for Irish farmers and policymakers.

Further context

In 2023, 81.5% of Ireland's energy came from fossil fuels (SEAI.ie). Farming only uses about 3% of the country's energy, but because many farms still use traditional methods, they are affected by rising energy prices during events like wars or pandemics. Moving to renewable energy could make supply more stable and protect farm income. But before that happens, we need to understand how much energy farms use and if farmers are open to making changes.

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Confidentiality & Consent

* 1. I have read and understood the Participant Information sheet (previous page).

- ◯ Yes
- ◯ No

* 2. I understand that my participation is voluntary and that I can withdraw at any time without giving a reason.

- ◯ Yes
- ◯ No

* 3. I understand that the survey is anonymous, and that no personal information will be collected.

- ◯ Yes
- ◯ No

* 4. I understand how my data will be used for research purposes.

- ◯ Yes
- ◯ No

* 5. I agree to take part in this research survey.

- ◯ Yes
- ◯ No

* 6. I understand that I cannot withdraw from the study after the survey has been submitted as the data will be anonymous.

- ◯ Yes
- ◯ No

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A. General Farm Information

* 1. Farm Location (County):

* 2. Farm size

- ◯ Less than 10 hectares/ Less than 25 acres
- ◯ 10 - 20 hectares/ 25 - 50 acres
- ◯ 20 - 30 hectares / 50 - 75 acres
- ◯ 30- 50 hectares / 75 - 125 acres
- ◯ 50 - 100 hectares / 125 - 250 acres
- ◯ More than 100 hectares / More than 250 acres

* 3. Primary Farm Activities (Select all that apply)

- ☐ Dairy production
- ☐ Beef production
- ☐ Cattle rearing

* 4. Which systems do you implement on your farm? (Select all that apply)

- ☐ Grass-Based / Pasture-Based System
- ☐ Hybrid System
- ☐ Organic Dairy System
- ☐ Spring-Calving System
- ☐ Year-Round Calving System
- ☐ Other (please specify)

* 5. What is the average size of your herd?

- ◯ Less than 50 cows
- ◯ 50-100 cows
- ◯ 101-150 cows
- ◯ 151-250 cows
- ◯ 251-500 cows
- ◯ More than 500 cows

* 6. What is your average daily milk production during **peak** months (Spring & Summer)?

- ◯ Less than 1,000 litres per day
- ◯ 1,000 -2,000 litres per day
- ◯ 2,001-3,500 litres per day
- ◯ 3,501-5,000 litres per day
- ◯ 5,001-7,500 litres per day
- ◯ More than 7,500 litres per day

* 7. What is your average daily milk production during **off-peak** months (Autumn & Winter)?

- ◯ Less than 1,000 litres per day
- ◯ 1,000 -2,000 litres per day
- ◯ 2,001-3,500 litres per day
- ◯ 3,501-5,000 litres per day
- ◯ 5,001-7,500 litres per day
- ◯ More than 7,500 litres per day

* 8. To what extent is milk processed on your farm? (Select the option that best describes your situation)

- ◯ No milk is processed on the farm — all of it is sold off the farm as raw milk
- ◯ A small amount is processed into products for home use or local sale (e.g. farmers' markets, small batches)
- ◯ A moderate amount is processed for regular commercial sale (e.g. local shops, direct to consumer)
- ◯ Most or all of the milk is processed on the farm into dairy products (e.g. cheese, yoghurt, pasteurised milk)

* 9. Which age group do you fall into?

- ◯ Under 18
- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65+

* 10. Are you a:

- ◯ First-generation farmer (you are the first in your family to run a farm)
- ◯ Second-generation farmer
- ◯ Third-generation farmer or beyond
- ◯ Not sure

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B. On-Farm Energy Consumption
B.1. Electricity Use

* 1. What is your average monthly electricity cost in:

	Less than €200	€200 - €400	€401 - €600	€601 - €800	More than €800	Not sure
Spring/Summer (March-August)	◯	◯	◯	◯	◯	◯
Autumn/Winter (September-February)	◯	◯	◯	◯	◯	◯

* 2. If your electricity costs vary through the year, what do you think causes the change? (Select all that apply)

- [ ] More milk produced in summer
- [ ] More lighting needed in winter
- [ ] More heating during housing periods
- [ ] Not sure
- [ ] Electricity use stays about the same all year round

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B.2. Diesel Use

* 1. On average, what is your monthly expenditure on diesel during:

	Less than €150	€150 - €300	€301 - €500	€501 - €700	More than €700	Not sure
Spring/Summer	◯	◯	◯	◯	◯	◯
Autumn/Winter	◯	◯	◯	◯	◯	◯

* 2. If your diesel costs vary through the year, what do you think causes the change? (Select all that apply)

- ☐ More tractor work during silage or spreading season
- ☐ More transport during feeding or calving periods
- ☐ Feeding and cleaning during housing
- ☐ Not sure
- ☐ Diesel use stays about the same all year round

* 3. Do you hire contractors for fuel-intensive tasks such as silage harvesting, slurry spreading, or fertiliser application?

- ◯ Yes, for most fuel-intensive tasks.
- ◯ Yes, but only for a few specific tasks.
- ◯ No, I handle all major tasks myself.

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B.3. Heating for milk processing and equipment cleaning

* 1. What is your main **heat source** on the farm (e.g. for water, shed, or milk processing)?

- [ ] Electricity (e.g. immersion heater, electric boiler)
- [ ] Natural gas
- [ ] Kerosene (oil boiler or burner)
- [ ] LPG (gas heater or boiler)
- [ ] Heat pump (air-to-water or ground source)
- [ ] Peat/coal burning
- [ ] Solar thermal system
- [ ] Not sure
- [ ] Other (please specify)

2. What is your typical **monthly cost** for the following fuel types during **Spring/Summer?**
(If you do not use a fuel type, select "Not applicable")

	Less than €50/month	€50–€100/month	€101–€200/month	More than €200/month	Not sure	Not applicable
Kerosene	○	○	○	○	○	○
LPG	○	○	○	○	○	○
Natural Gas	○	○	○	○	○	○

3. What is your typical **monthly cost** for the following fuel types during **Autumn/Winter?**
(If you do not use a fuel type, select "Not applicable")

	Less than €50/month	€50–€100/month	€101–€200/month	More than €200/month	Not sure	Not applicable
Kerosene	○	○	○	○	○	○
LPG	○	○	○	○	○	○
Natural Gas	○	○	○	○	○	○

4. If your costs for LPG, kerosene, or natural gas vary through the year, what do you think causes the change? *(Select all that apply)*

- [ ] More water heating during milking season
- [ ] More heating during housing period
- [ ] Heat used for on-farm processing
- [ ] Fuel price changes with the season
- [ ] Not sure
- [ ] Fuel use stays about the same all year round

* 5. Is your farm infrastructure (e.g. milking parlour, storage areas) insulated for heat retention?

- ◯ Yes, most buildings are insulated
- ◯ Some buildings are insulated
- ◯ No, none are insulated

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C. Off- Farm Energy Consumption

C.1. Feed Source

* 1. How much of your land is actively used for grazing or forage production (i.e. grassland that supports your dairy herd)?

- ◯ Less than 10 hectares / Less than 25 acres
- ◯ 10 – 20 hectares / 25 - 50 acres
- ◯ 20 – 30 hectares / 50 - 75 acres
- ◯ 30 – 50 hectares / 75- 125 acres
- ◯ 50 – 100 hectares / 125 - 250 acres
- ◯ More than 100 hectares / More than 250 acres

* 2. On average, how much of your **usable land** is used for each of the following purposes? *(Select one percentage range per row. Your total should add up to roughly 100%)*

	0%	1-10%	11-25%	26-50%	51%-75%	More than 75%
Grazing land (grass grazed directly by cows)	◯	◯	◯	◯	◯	◯
Grassland for silage or hay (cut and stored)	◯	◯	◯	◯	◯	◯
Maize silage	◯	◯	◯	◯	◯	◯
Other grazed forage crops (e.g. beet, kale, brassicas)	◯	◯	◯	◯	◯	◯

Other (please specify)

* 3. How is your home-grown forage used? This includes silage, hay, maize, or other grazed forage crops. *(Select all that apply)*

- [ ] Used to feed only the dairy herd
- [ ] Shared with or sold to neighbouring farms
- [ ] Used to feed other livestock on my farm (e.g. beef, calves, sheep)
- [ ] Stored for later use or as reserve forage
- [ ] Other (please specify)

* 4. Do you purchase any forage or crops from neighbouring farms?

- ◯ Yes — occasionally, depending on the year
- ◯ Yes — regularly every year
- ◯ No — I produce all my own forage and do not buy from neighbours
- ◯ Not sure

* 5. Do you know if the feed you purchase contains any of the following imported ingredients? (Select all that apply)

- [ ] Soya
- [ ] Palm kernel
- [ ] Rapeseed
- [ ] Citrus Pulp
- [ ] Maize gluten
- [ ] Molasses
- [ ] I'm not sure
- [ ] Other (please specify)

* 6. How do you typically purchase supplementary feed or concentrate for your dairy herd?

- ◯ 25 kg bags
- ◯ Tote bags (500–1000 kg)
- ◯ Bulk delivery (loose feed)
- ◯ I do not purchase any additional feed or concentrates for my cattle
- ◯ Other (please specify)

7. If you purchase supplementary feed in bulk (loose delivery), roughly how much do you receive in **one delivery**?

- ◯ Less than 2 tonnes
- ◯ 2–4 tonnes
- ◯ 5–7 tonnes
- ◯ More than 7 tonnes
- ◯ Don’t know
- ◯ Other (please specify)

* 8. How **often** do you typically purchase supplementary feed or concentrate for your dairy herd?

- ◯ Weekly
- ◯ Every 2 weeks
- ◯ Monthly
- ◯ Less than once a month
- ◯ Seasonally/Irregularly
- ◯ Other (please specify)

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C.2. Fertilisers

* 1. Where does the fertiliser used on your farm primarily come from? *(Select all that apply)*

- [ ] On-farm sources (e.g., manure, compost).
- [ ] External purchases (e.g., chemical fertilisers, organic fertilisers).
- [ ] Both on-farm and external sources.

2. How do you typically purchase the following fertiliser products? (Select **one option per row**. If you do not use a product, select *"Do not use this product.")*

	25 kg bags	Tote bags (500 - 600 kg)	Bulk delivery (Loose)	Liquid Fertiliser	I do not use this product
18-6-12 (general-purpose blend)	○	○	○	○	○
10-10-20 (grazing blend)	○	○	○	○	○
Urea / protected urea	○	○	○	○	○
CAN (Calcium Ammonium Nitrate)	○	○	○	○	○
Organic fertiliser (e.g. compost, digestate)	○	○	○	○	○

3. **If you answered that you purchase fertiliser in bulk in the previous question,** how much of each product do you usually buy **per order or delivery**? (Select one option per row. If you do not use a product, select "I do not use this product")

	Less than 0.5 tonne	0.5-1 tonne	1-3 tonnes	I don't know	I do not purchase in bulk
18-6-12 (general-purpose blend)	○	○	○	○	○
10-10-20 (grazing blend)	○	○	○	○	○
Urea / protected urea	○	○	○	○	○
CAN (Calcium Ammonium Nitrate)	○	○	○	○	○
Organic fertiliser (e.g. compost, digestate)	○	○	○	○	○

4. How **often** do you typically purchase the following fertiliser product? (Select one option per row. If you do not use a product, select "*I do not use this product*")

	Weekly	Monthly	2-3 times per year	Once a year	Never
18-6-12 (general-purpose blend)	○	○	○	○	○
10-10-20 (grazing blend)	○	○	○	○	○
Urea / protected urea	○	○	○	○	○
CAN (Calcium Ammonium Nitrate)	○	○	○	○	○
Organic fertiliser (e.g. compost, digestate)	○	○	○	○	○

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D. Policy Support and the Path to Energy Transition

D.1. Equipment upgrades for energy efficiency

* 1. When would you be most likely to adopt the following equipment upgrades?
If you don’t plan to adopt a certain upgrade, please select “Never / Not interested”.

	Within 1 year	Within 2 years	Within 3-5 years	Beyond 5 years	Never/Not interested
Solar panels	○	○	○	○	○
Wind turbines	○	○	○	○	○
Biogas plant	○	○	○	○	○
Heat pumps	○	○	○	○	○

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D.1.1. Solar Panel Adoption

* 1. What do you think are the main barriers to the adoption of **solar panels**? (Select all that apply)

- [ ] Too expensive to install
- [ ] Not sure if it would pay off in the long run
- [ ] No good place to put it on the farm
- [ ] I worry it might be hard to maintain or break down
- [ ] Not sure of what grants or supports are available
- [ ] Other (please specify)

* 2. What do you think are the main benefits to adopting **solar panels**? (Select all that apply)

- [ ] Reduction of energy costs
- [ ] Environmental benefits (e.g. reduced carbon emissions)
- [ ] Energy independence
- [ ] Protection from future electricity price increases due to war and other factors
- [ ] Positive image or marketing advantage
- [ ] Other (please specify)

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D.1.2. Wind Turbines Adoption

* 1. What do you think are the main barriers to the adoption of **wind turbines**? (Select all that apply)

- [ ] High installation costs
- [ ] Planning permission difficulties
- [ ] Landscape or noise concerns
- [ ] Maintenance complexity
- [ ] Uncertainty about wind resource on the farm
- [ ] Lack of available grants or incentives
- [ ] Other (please specify)

* 2. What do you think are the main benefits to adopting **wind turbines**? (Select all that apply)

- [ ] Reduction of energy costs
- [ ] Environmental benefits
- [ ] Self-sufficiency in electricity
- [ ] Income through export to the grid
- [ ] Long-term stability in energy supply
- [ ] Other (please specify)

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D.1.3. Biogas Plant Adoption

* 1. What do you think are the main barriers to the adoption of **biogas plants**? (Select all that apply)

- [ ] High installation and operational costs
- [ ] Need for large feedstock supply (e.g. slurry, silage)
- [ ] Complex operation or management
- [ ] Limited local support or expertise
- [ ] Uncertainty about permits or grid connection
- [ ] Lack of available grants or incentives
- [ ] Other (please specify)

* 2. What do you think are the main benefits to adopting **biogas plants**? (Select all that apply)

- [ ] Use of on-farm waste for energy production
- [ ] Reduction in methane emissions from slurry
- [ ] Energy independence and self-sufficiency
- [ ] Potential income from energy sale or digestate
- [ ] Contribution to circular and low-carbon farming
- [ ] Other (please specify)

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D.2. Policy Awareness

* 1. Awareness and Willingness to Engage with TAMS 3 Schemes.
For each scheme, please select the option that best reflects your situation.

	I'm not familiar with it	I'm not eligible	I've applied and was accepted/ am waiting to be accepted	I've applied but was not accepted	I'm interested in applying	I'm not interested in applying
Animal Welfare and Nutrient Storage Scheme (AWNSS)	○	○	○	○	○	○
Dairy Equipment Scheme (DES)	○	○	○	○	○	○
Low Emission Slurry Spreading Scheme (LESS)	○	○	○	○	○	○
Nutrient Importation Storage Scheme (NISS)	○	○	○	○	○	○
Organic Capital Investment Scheme (OCIS)	○	○	○	○	○	○
Solar Capital Investment Scheme (SCIS)	○	○	○	○	○	○
Tillage Capital Investment Scheme (TCIS)	○	○	○	○	○	○

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Section 3: Energy Efficiency Upgrades

* 1. How interested are you in adopting the following sustainable practices on your farm? (Rate each on a scale of Not Interested → Very Interested)

	Not Interested	Mildly Interested	Neutral	Interested	Very Interested
Reducing the use of conventional fertilisers	○	○	○	○	○
Sourcing more cattle feed locally	○	○	○	○	○
Changing the diet of your cattle to incorporate more locally produced feed ingredients	○	○	○	○	○

* 2. What are the main barriers preventing you from adopting energy-saving practices on your farm?(Select all that apply)

- [ ] High upfront costs.
- [ ] Lack of knowledge or training.
- [ ] Uncertainty about long-term benefits.
- [ ] Limited availability of technologies.
- [ ] Time constraints.
- [ ] Other (please specify)

* 3. How important are the following factors in deciding whether to adopt sustainable practices?
(Rate each on a scale of Not Important → Very Important)

	Not Important	Mildly Important	Neutral	Important	Very Important
Financial incentives.	◯	◯	◯	◯	◯
Long-term cost savings.	◯	◯	◯	◯	◯
Environmental benefits.	◯	◯	◯	◯	◯
Peer recommendations.	◯	◯	◯	◯	◯
Availability of technology.	◯	◯	◯	◯	◯
Ease of implementation.	◯	◯	◯	◯	◯

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Thank you for your time and participation in this survey. Your insights will contribute to a better understanding of energy consumption in Irish dairy farming and help inform strategies for a more sustainable agricultural sector.

If you have any additional comments or observations regarding on-farm and off-farm energy practices, alternative energy implementation or policy adoption, please feel free to share them below.

Your input is invaluable, and we appreciate your contribution to this research

1. Last words section