

**Energy is a significant cost on most farms. Energy bills can be reduced by up to 30%, often with minimal capital outlay.<sup>1</sup>**



## Here are some tips that can help reduce your energy bill.

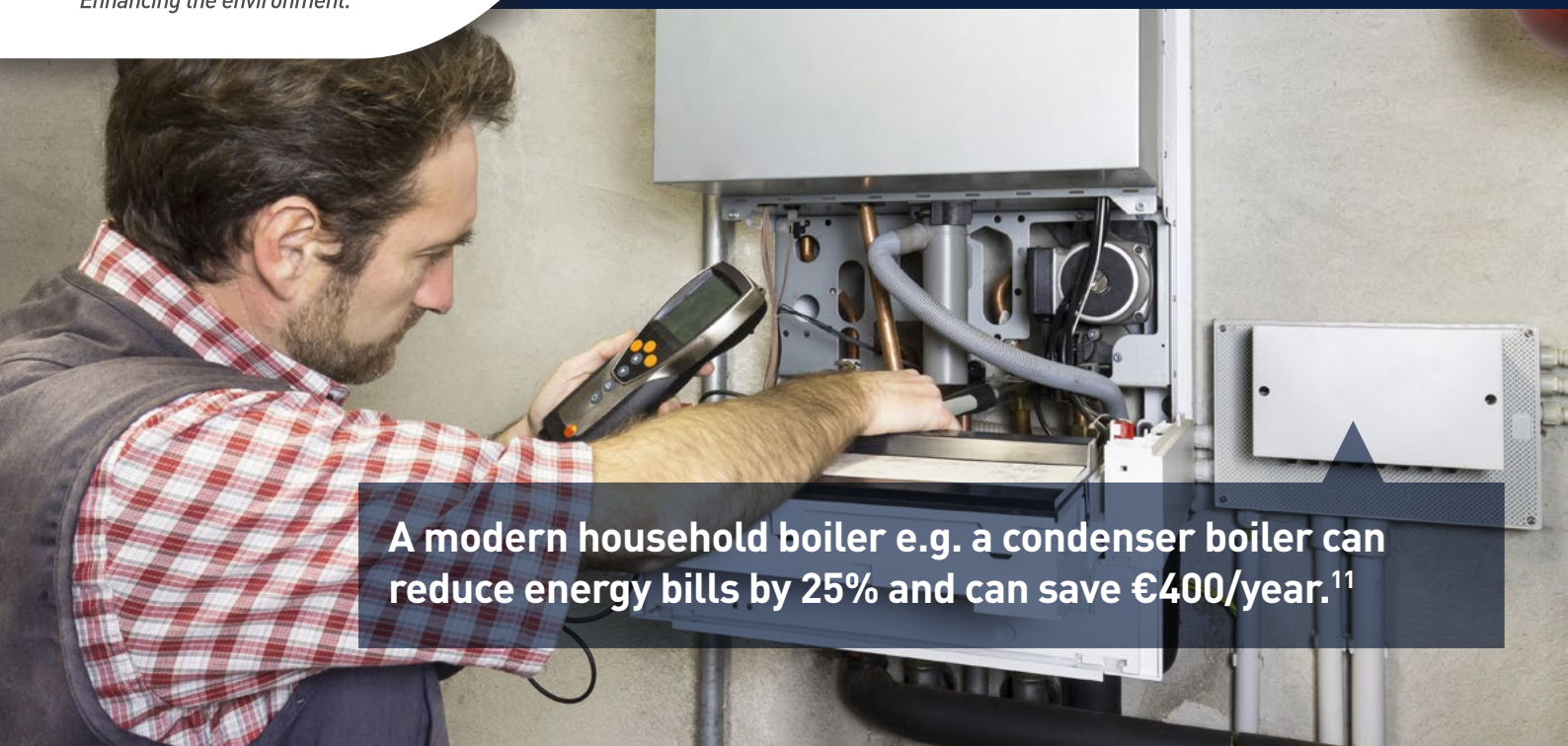
- Identify the areas of energy demand around the farm.
- Check the condition and operation of equipment and monitor power consumption over a period of time.
- For example, review last year's electricity bills, divide the total amount by the farm output or number of animals.
- Use this to compare with the average figures in the table below.

Production system	Average cost of electricity per unit of production
Dairy <sup>2</sup>	0.49c /litre of milk
Pigs	€5.40/head/year
Poultry	0.1c/bird/year
Grain drying <sup>3</sup>	€12.3/ tonne

- Identify where energy is used on the farm and take action to reduce where possible.
- Compile an energy checklist by walking around your buildings at different times of the day and seeing where energy is used.

### Energy Checklist:

- ☒ Building insulation.
- ☒ Lighting systems.
- ☒ Heating systems.
- ☒ Pumps.
- ☒ Ventilation.
- ☒ Water heating.
- ☒ Milk cooling.
- ☒ Grain growing.
- ☒ Grain drying.



**A modern household boiler e.g. a condenser boiler can reduce energy bills by 25% and can save €400/year.<sup>11</sup>**

## The Farmhouse & Farm Buildings

### Insulation

- Farm buildings and the farm house can vary in age, use and construction materials.
- These factors and the amount of insulation will determine the overall energy consumption.
- Upgrading the insulation in your home and in heated buildings will reduce your energy costs.



**Upgrading insulation in the family home from 100mm to 300mm can save you €250 each year.<sup>4</sup>**

**Upgrading insulation on your electric hot water tank can save you €130 each year.<sup>5</sup>**

### Lighting

- Lighting can be responsible for up to 40%<sup>7</sup> of a building's electricity use.
- Lighting costs can be reduced by up to 60%<sup>8</sup> by providing the right amount of light, in the right place at the right time with effective lighting equipment.
- The new energy efficient standard is the T5 fluorescent tube.
- T5 fluorescent lights can last 20,000-30,000 hours and can save 45% in energy costs compared to T8 and T12 tubes.
- Changing to T5 tubes can save you €17/year/tube.

**For yard lighting, LEDs are the best option. They can be set with motion and daylighting sensors or timers.**


### Heating

- In the farmhouse set your thermostat as low as is comfortable.
- Check timers, bleed radiators and service boilers annually.
- Set your hot water thermostat to between 60-65°C to make sure that you do not overheat your water.<sup>11</sup>
- If the temperature setting is out by 10°C, it can mean an increase in energy consumption of 15%.<sup>12</sup>

## Dairy Farms

### On Dairy Farms to save money on energy use:

- Ensure that all pipes and tanks are well insulated.
- Minimise the distance that hot water has to travel.
- Make use of night rate electricity.
- Make sure that timers are set for the right time and are keeping time.



Fix leaks – a small leak of 1 litre/hour can waste 8,500 litres of hot water per year. Fixing a small leak of 1 litre/hour can save you up to €760/year.<sup>10</sup>

### Milk cooling costs are typically 40% of the overall costs of milking

- Pre-cooling is passing the hot milk through a Plate Heat Exchanger (PHE) before entry to the bulk tank.
- Cold water is pumped through the opposite side of the PHE. The cold water absorbs a portion of the heat, thus pre-cooling the milk and contributing to hot water supply.

Correctly sized plate heat exchangers can reduce the energy costs for cooling milk by up to 50%, which can give a saving of €9/cow/year.<sup>16</sup>

Use of mains or bore-hole water to pre-cool the milk before it enters the tank will save about 30% of milk cooling costs – an energy saving of €5/cow/year.<sup>16</sup>

Installing a plate cooler can save €1000 on an annual basis and has a payback period of 3 years.<sup>17</sup>

- Consider installing a variable speed drive (VSD) to a vacuum pump. It can result in savings of over 60% on vacuum pump running costs per year.<sup>18</sup>
- A VSD can give a 60% reduction in pump running costs, equivalent to €4/cow/year.<sup>18</sup>


## Poultry Farms

### Heating Systems

- On a poultry farm, indirect heating systems via a radiator system are more efficient than direct systems.
- New systems typically offer 93% efficiency, compared to 60% from older box heaters.
- Biomass boilers are now more attractive since the introduction of the Support Scheme for Renewable Heat (SSRH), which gives a relatively short payback.
- Heaters should be interlocked with the fans, so that heating is switched on only when the ventilation system is running at minimum. This is known as modulated heater output.

Savings of 50-60% are achievable by converting to a modulated heating output system.<sup>15</sup>

- Upgrading the insulation in heated buildings such as poultry units can also reduce your energy costs.
- Fitting “bell-mouths” to fans or “cones” to outlet fans increases aerodynamic efficiency by typically 10%.



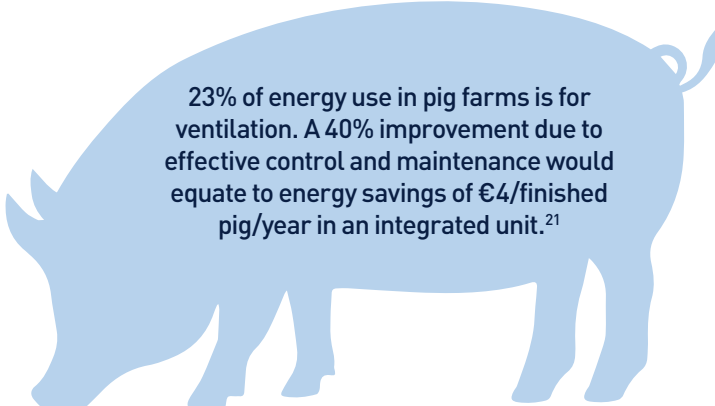
Savings of 10-15% are achievable by using heat recovery to pre-heat incoming air with warm extracted air.<sup>14</sup>



## Pig Farms

### On pig farms consider the following:

- Carefully designed enclosed creep with an automatically controlled heater lamp could save up to 45% of energy costs.
- Proper insulation around the creep could save a further 13% in energy costs if it is well sealed.
- On pig farms, installing variable speed pumps to wet feed and waste equipment can cut costs by 30-50%.
- Energy savings can be made on ventilation systems through better controls, more efficient air movement and less reliance on mechanical systems.
- The careful choice of fans, the design of ducts, regular maintenance and cleaning reduce the energy costs and improve efficiency.



23% of energy use in pig farms is for ventilation. A 40% improvement due to effective control and maintenance would equate to energy savings of €4/finished pig/year in an integrated unit.<sup>21</sup>

## Tillage Farms

**Energy savings can be made on a tillage farm by ensuring the efficiency of the machinery on the field and maximising the effectiveness of the drying equipment.**

- Typical fuel costs for field cultivations on a 50-hectare tillage enterprise are €2500 based on a fuel price of €0.60 per litre.

Over drying by as little as 1% consumes an extra 3.5 litres of fuel per tonne.<sup>24</sup>

- Using equipment that allows multiple jobs to be done with each pass, such as ploughing, seed-bed preparation and drilling. This can cut energy use by 25-40%.
- Using smaller engine tractors where possible can save up to 50% of fuel.
- Sharpening blades on items like balers can reduce power losses by 10%.
- Adding recirculation to existing cross-flow driers can save up to 30% of energy usage.
- A mixed flow drier can save up to 50% compared to a basic cross-flow drier.



**Ploughing trials show that a reduction in tyre pressures from 1.6 bar to 1.0 bar can save 5% in fuel.<sup>24</sup>**





**The SEAI Support Scheme for Renewable Heat grant supports investment in renewable heating systems that use the following technologies:**

- **Air source heat pumps,**
- **Ground source heat pumps,**
- **Water source heat pumps.**

## **The SEAI Support scheme for Renewable Heat<sup>25</sup>**

**The SEAI Support Scheme for Renewable Heat is for farmers involved energy intensive sectors such as grain drying, pigs and poultry.**

The aim is for farmers to convert from using fossil fuels to a renewable energy resource and generate substantial savings while doing so.

- The SSRH provides financial support to convert to renewable heat over a 15-year period.
- The scheme will support an installation grant which provides funding of up to 30% of eligible costs.

The scheme also offers support for new installations or installations that currently use a fossil fuel heating system and convert to using the following technologies:

- Biomass boiler or biomass HE CHP (High Efficiency Combined Heat and Power) heating systems
- Biogas (anaerobic digestion) boiler or biogas HE CHP heating system





**Savings of up 50% can be achieved by converting from oil to a renewable energy resource such as wood chip.**

## Biomass Savings<sup>26</sup>

- Common biomass fuels include wood pellet and wood chip.
- Wood pellet is four times denser than wood chip and therefore wood chip is cheaper.
- Biomass boilers require about 1 tonne of dried woodchip a year (30% moisture) for every kilowatt installed.
- One tonne of woodchip generates 3,500 kWh (30% moisture) and occupies 6m<sup>3</sup>.

- One tonne of wood pellet generates 4,800 kWh (8% moisture) and occupies 1.5m<sup>3</sup>.

Oil costs approximately 7.4 cent per kWh whereas wood chip costs 3.5 cent per kWh.

## Acknowledgments

We would like to thank Teagasc, the SEAI and Tipperary Energy Agency for their help and contribution to this guidance note.

## Footnotes

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4. Figures from Sustainable Energy Authority of Ireland (SEAI) based on a four bedroomed detached house see [http://www.seai.ie/Grants/Better\\_energy\\_homes/homeowner/What\\_Grants\\_Are\\_Available/Ceiling\\_Level\\_Roof\\_Insulation\\_Information.pdf](http://www.seai.ie/Grants/Better_energy_homes/homeowner/What_Grants_Are_Available/Ceiling_Level_Roof_Insulation_Information.pdf)
5. Based on reinsulating a 200 litres water tank heating water from 14oC to 80oC on night rate electricity (10c/kWh) where insulation has deteriorated.
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8. SEAI. Energy Efficient LED Lighting A Guide for Businesses. <https://www.seai.ie/publications/SEAI-Energy-Efficient-LED-Lighting-Guide.pdf>.
9. Replacing a 6ft T12 tube at 95Watts with 6ft T5 tube at 53 Watts = 42Wattsx20 00hrsx20cents/1000=saving of €16.80 per tube, based on manufacturer's data
10. A leak of 1 litre/hour results in a hot water loss of 8,500 litres/year equivalent to 3800kWh/year. Cost: 3800kWh x 20cents/kWh day rate = €760
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16. Savings on plate heat exchangers - Overall dairy energy consumption average is 350kWh/hd/year and cooling costs for milk are typically 40% = 140kWh, [with 70% on night rate of 10c/kWh and 30% on day rate at 20c/kWh]. 140kWh for milk cooling per head = 140x70%x0.1+140x30%x0.2) = €18.20x50% = saving €9/cow/year. Teagasc. 2011. Energy Use in Agriculture. Teagasc, Oak Park, County Carlow
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