



AGRICULTURE

Energy Efficiency Guide



HARNESSING LAND, ENERGY AND CIRCULAR PRACTICES FOR SUSTAINABLE FARMING.

OVERVIEW

Agriculture sits at the crossroads of land stewardship, energy consumption, and climate action. Energy costs are rising, input prices are volatile, and pressure to decarbonise is growing. This guide helps farms make smarter use of land, generate their own energy, reduce waste, and future-proof operations.

Function	Description
Crop Storage & Handling	Grain dryers, cold storage, conveyors, fans
Livestock Operations	Ventilation, heating (for piglets, chicks), lighting, milking systems
Irrigation & Water Management	Pumps and filtration systems
Processing & Packaging	On-site milling, bottling, refrigeration, pasteurisation
General Farm Buildings	Lighting, heating, power tools
Transport & Machinery	Diesel/electric tractors, loaders, quad bikes

Many farms use 50-70% of their total energy on three key systems :
Heating, Pumping & Motors

SHORT TERM WINS

- **Switch to LED Lighting**

- Replace fluorescents and halogens in sheds, barns, and workshops
- Use motion sensors in infrequently accessed areas
- Saves up to 70% vs traditional lighting

- **Fix Air Leaks & Draughts**

- In barns and processing areas, prevent heat loss
- Check seals on refrigerated storage and door insulation

- **Use Timer Controls**

- Automate lighting, heating and fans to match operating hours
- Especially useful in workshops, milking parlours, and storage rooms

- **Service Equipment**

- Clean filters on irrigation pumps, fans and blowers
- Well-maintained motors use less energy and last longer

- **Consolidate Cold Storage**

- Where practical, reduce the number of part-filled units running
- Store similar temperature products together to improve efficiency

- **Track Consumption**

- Read meters weekly to spot sudden spikes or leaks
- Use smart plugs to check which machines draw most power

LAND USE FOR ENERGY PRODUCTION

AGRIVOLTAICS: DUAL LAND USE

Concept: Combining solar panels with crop cultivation or livestock grazing.

Benefits:

- Increases land-use efficiency by up to 70%.
- Provides shade, reducing water evaporation and heat stress on crops.
- Generates renewable energy without sacrificing agricultural output.

Implementation:

- Install elevated solar panels to allow machinery and livestock movement underneath.
- Select shade-tolerant crops for cultivation beneath panels

SOLAR INTEGRATION IN FARM INFRASTRUCTURE

Applications:

- Rooftop solar on barns and storage facilities.
- Solar canopies over parking areas or irrigation systems.

Advantages:

- Reduces reliance on grid electricity.
- Lowers operational costs over time.

WIND ENERGY

Suitability: Farms in open plains or coastal areas.

Considerations

- Assess wind patterns and speeds.
- Evaluate potential impacts on local wildlife and landscapes

DECARBONISATION & RENEWABLE ENERGY UTILISATION

ELECTRIFICATION OF FARM EQUIPMENT

Transition: Shift from diesel-powered to electric machinery.

Benefits:

- Reduces greenhouse gas emissions.
- Lowers fuel and maintenance costs.
- Support: Incentives and grants may be available for equipment upgrades.

ENERGY-EFFICIENT TECHNOLOGIES

Implementations:

- LED lighting in facilities.
- Variable speed drives for pumps and fans.
- High-efficiency motors and equipment.

SMART ENERGY MANAGEMENT

Tools:

- Energy monitoring systems.
- Automated controls for heating, ventilation, and irrigation.

Outcomes:

- Optimises energy use.
- Identifies areas for further efficiency improvements.

CIRCULAR PRACTICES IN AGRICULTURE

Anaerobic Digestion

Process: Converts organic waste into biogas and digestate.

- Biogas can be used for heating, electricity, or as vehicle fuel.
- Digestate serves as a nutrient-rich fertilizer.

Example: Digeponics integrates biogas systems with greenhouse cultivation, utilising CO₂ and heat for plant growth.

Composting and Waste Recycling

Practices:

- Compost crop residues and animal manure.
- Reuse water from processing activities.

Outcomes:

- Enhances soil fertility.
- Reduces waste disposal costs.

Integrated Farming Systems

Approach: Combine crop production with livestock and aquaculture. :

- Maximises resource utilisation.
- Diversifies income streams.

Staff Behaviour & Culture

People are central to performance – and they often know where waste happens. Make energy efficiency part of the farming culture.

- Assign a team member to check equipment shut-off at day's end
- Display monthly energy use in the office of break area
- Involve workers in identifying where energy is being wasted or used unnecessarily
- Schedule staff training annually with energy saving walkthroughs

YOUR CHECKLIST

Area	Action	Impact
Energy Awareness	Track meters, fix leaks, train staff	Builds a culture of smart decisions
Quick Wins	Switch to LEDs, timers, check fans & pumps	Immediate cost reduction
Land Utilisation	Use roof space, install agrivoltaics or solar	Generates clean energy on-site
Circularity	Anaerobic digestion, compost, reuse water	Converts waste into value
Decarbonisation	Electrify equipment, use renewable generation	Reduces fuel and future carbon costs
Smart Monitoring	Use smart plugs/meters to benchmark kit	Identifies big and hidden users



Need Support? Let's Talk

Want support optimising your farms's energy performance?
We help operators cut waste, improve control, and reduce
costs – without disrupting operations.

Email :
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