

Infosheet #14 Energy Efficiency

This infosheet provides background to Worksheet #14 of the *Environmental Farm Plan Workbook*. It outlines options you could adopt to address problem areas in your operation. In most cases you'll need more information before implementation: please refer to the resource materials listed in the infosheet, and consult OMAF Environmental Farm Plan (EFP) Technical Advisors.

All options are classed as Actions or Compensating Factors. Actions address the areas of concern identified, and will change the EFP rating to (3) or Best (4). Compensating Factors are alternatives that will adequately address the concerns, but will not change the rating in the EFP worksheets.

Field Operations

ISSUE	WHAT CAN YOU DO?
14-1 Use of fuel Fuel is used to propel equipment to prepare soil for planting, cultivation, spraying, pruning, harvesting, etc. Matching tractor size (horsepower) to the implement power requirements will optimize fuel usage as well as prolong equipment working life.	OPTION Evaluate your tractor operation and equipment matching (at least three of five): <ul style="list-style-type: none">• combine operations in travelling across the field to maximize field productivity and minimize fuel use• keep tires on equipment at recommended inflation pressure to minimize soil compaction and/or maximize traction• install radial traction tires to maximize field efficiency and reduce fuel consumption• match tractor used by the power required by the task• practice "Gear up - Throttle Down" to the point that the engine is not lugging. FOR MORE INFORMATION: <i>Tractor Tips</i> , videotape, Independent Study - OAC Access, University of Guelph, Guelph N1G 2W1
14-2 Maintenance of machinery & lubrication Machinery maintenance can not always be seen to pay, but lack of maintenance may cost you in extensive, costly repairs or critical time lost by component failures. A well-maintained machine will operate at peak	OPTION Implement a sound preventative maintenance program for all equipment: <ul style="list-style-type: none">• follow recommended maintenance schedules for various equipment• read all operator's manuals to familiarize yourself with: wear points, fluid change intervals, lubrication schedules, etc.• have a minimum supply of replacements parts for high wear parts• maintain a good supply of: motor oils, hydraulic oils, greases, gear case lubricants, filters,

efficiency, be dependable, and be a source of personal pride.

- coolants, belts, hoses, etc.
- recycle used fluids.

FOR MORE INFORMATION:

Equipment dealer/supplier
Owner manuals

Buildings

14-3 Type of lighting longer than 5 hours per day

When the farm operation has high levels of lighting involved, a switch to a higher efficiency type of lighting system can result in significantly reduced energy usage.

OPTION

Replace lower efficiency with high efficiency lighting:

- use fluorescent lighting where conditions allow
 - electronic ballasts use less power than standard ballasts.
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14-4 Type of lighting 1 - 5 hours per day

Lights are used for a variety of reasons in many locations in farm buildings.

OPTION

Using lights only when necessary will save energy (at least three of four):

- compact fluorescent lights plus dimmers motion sensors turn off when you leave
 - use task lighting when possible to light only the areas required
 - control timers.
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14-5 Yard lights

Yard lights are used to provide illumination for access to buildings, for security and personal preference.

OPTION

- use high pressure sodium lights for yard lighting
 - dusk to dawn sensors will provide light during hours of darkness
 - consider replacing your mercury vapour lights with high pressure sodium lights.
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14-6 Energy bills

Energy costs have risen to a point where they now are a significant input cost. When energy is paid for based only on source i.e., electricity, gas or oil, improvements in efficiency are not readily apparent. Conducting an audit of energy use will allow

OPTION

Determine how much energy is used and where:

- monitor energy use for each part of your operation i.e. separate meters, hour meters, log books
 - inventory energy users and hours of operation
 - calculate power or energy used by various operation components
 - carry out an energy audit.
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for a more sound evaluation of energy efficiency enhancements.

FOR MORE INFORMATION:

Heating fuel supplier
Energy management consultant

14-7 Heated or cooled farm buildings

Insulation in farm buildings will reduce shell heat losses as well as reduce condensation. Air/vapour barrier, installed continuously, is a critical part of a well insulated building. Vapour barriers, poorly installed or omitted completely, can result in shortened building life or possibly structural damage.

OPTION

Reduce shell heat loss and increase air tightness of the building (at least three of six):

- insulate warm buildings to recommended levels
- install a continuous air/vapour barrier
- ensure doors and windows fit tightly
- caulk all building joints
- maintain an active rodent baiting program
- minimize solar heat gain with white walls and roof.

FOR MORE INFORMATION:

Insulation suppliers and contractors

14-8 Refrigerated storage maintenance

Refrigerated storage allows effective long term storage of perishable commodities. Properly sized and maintained cooling systems will be able to remove heat or hold produce at optimum conditions. In addition properly designed systems will optimize the energy used.

OPTION

Maximize the performance of your refrigerated storage (at least three of six):

- implement a routine maintenance regimen to ensure component working life and performance
- ensure the refrigerated storage facility is insulated and sealed to prevent infiltration/exfiltration of air and provide good air distribution in storage area
- have temperature sensing equipment in the storage to monitor conditions and/or trigger alarms
- hot gas refrigerant is recovered
- consider a field heat removal system separate from the longer term refrigerated storage
- use plastic strip door curtain to minimize air exchange when loading door is open.

FOR MORE INFORMATION:

Refrigeration system designer

HVAC contractor

Humidity in Refrigerated Storages for Fruits and Vegetables, OMAF Factsheet Order No. 88-055

Forced-Air Rapid Cooling of Fresh Ontario Fruits & Vegetables, OMAF Factsheet Order No 91-070

Trouble Shooting Cold Storage Problems, OMAF Factsheet Order No. 94-083

Sizing and Laying Out a Short-Term Refrigerated Storage, OMAF Factsheet Order No. 92-124

Crop Drying

14-9 High temperature drying

The energy required to dry similar grains will vary widely using high temperature drying.

Low cost methods can reduce fuel requirements without reducing drying capacity.

OPTION

Improve the drying efficiency by changing to a more efficient system or modifying current system (at least three of eight):

- added heat recovery system to reuse heat from bottom of dryer column
- incorporate dryeration or cooleration into your drying system
- consider deep bed dryer when replacing old tower dryer; install full-floor aeration to allow safe bin storage of "dry" grain
- use good moisture tester and dry grain to recommended levels; install continuous readout moisture tester in the drying system
- use continuous flow bin dryer
- use less than 1600 BTU/pound of water removed
- convert to biomass fuel – no oil or wood
- use heat exchanger.

FOR MORE INFORMATION:

Reclaiming Corn Drying Energy, OMAF Factsheet Order No. 88-003

Heat Recovery in Grain Drying, videotape, Independent Study-OAC Access, University of Guelph, Guelph N1G 2W1

14-10 Low temperature natural air drying

Low temperature or natural air drying of crops is slow but will maintain quality. This drying system has application across Southern Ontario.

OPTION #1

Allow crops to dry down in field or corn crib:

- select varieties that dry down to safe storage moisture contents in field.

OPTION #2

Use natural air to dry crops:

- select varieties which will dry down quickly before harvest in the field
- natural air drying in the bin is an accelerated version of what occurs in the field
- more airflow per bushel is more effective than the addition of supplementary heat.

FOR MORE INFORMATION:

Grain Storage and Component Suppliers

Natural Air Corn Drying Systems, OMAF Factsheet Order No. 86-066

*At the request of the **Ontario Farm Environmental Coalition**, consisting of Ontario Federation of Agriculture, Christian Farmers Federation of Ontario, AGCare, and the Ontario Farm Animal Council, the following people contributed to the development of Infosheet #14:*

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