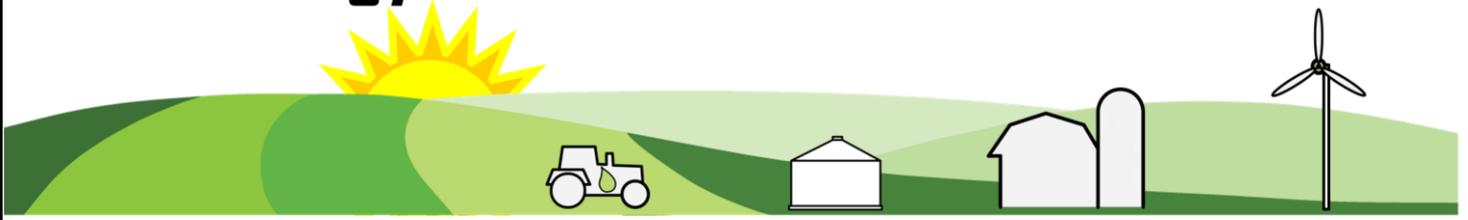


# Farm Energy IQ



## Top 10 Ways to Save Energy in Tree Fruit Production

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### INTRODUCTION

On a typical family-operated fruit farm, refrigeration is the dominate use of electricity, accounting for over half of all electricity used. Irrigation and lighting, which account for a small portion of electricity use, are easily upgraded with quick and easy money-saving solutions. Engine fuel accounts for the majority of all energy consumed; therefore fleet operations have a great potential for energy savings through conservation and efficiency.

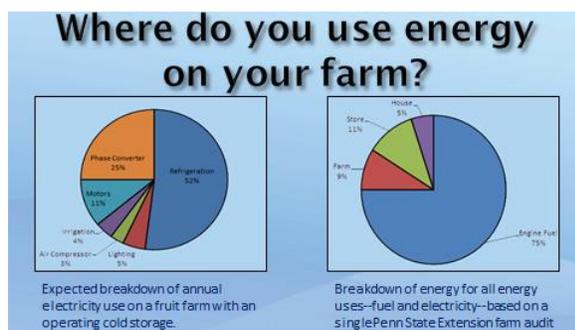


Figure 1. Expected breakdown of electricity (left) and energy (right).

### #10: REDUCE THE PRESSURE OF THE IRRIGATION PUMPS

- ✓ Drip irrigation requires operating pressures between 15 to 25 psi at the pump and 10 to 12 psi at the drip tape. These pressures can be easily monitored by inexpensive pressure

gauges. Adjust the pump pressure to match pumping requirements with operating pressures.

### #9: ELIMINATE LEAKS IN THE IRRIGATION SYSTEM

- ✓ Leaks reduce pressure at the emitter, which reduces the amount of water supplied to the field.
- ✓ Don't increase pump pressure to compensate for leaks. This will increase pumping energy use and water loss, and may not improve allocation.

### #8: MINIMIZE IRRIGATION LINE KINKS AND ELBOWS

- ✓ Simplify your irrigation piping system by reducing the number of elbows, tees, valves and any other unnecessary obstructions.
- ✓ A gentle bend creates less friction losses than does a 90 degree turn!

### #7: INSTALL HIGH EFFICIENCY EMITTERS FOR DRIP IRRIGATION SYSTEMS

- ✓ Drip irrigation systems use a fraction of the water that sprinkler and surface irrigation systems do.
- ✓ Energy efficient emitters use smaller pumps.

- ✓ Filter irrigation water to avoid clogging the small orifices in the energy efficient emitters.

## #6: UPGRADE REFRIGERATION SYSTEMS

- ✓ Upgrade or select compressor/condenser units with energy efficient scroll compressors.
- ✓ Upgrade evaporator fan motors with energy efficient EC motors.

## #5: IMPROVE COLD ROOM INSULATION

- ✓ Doubling insulation reduces conductive heat loss by 50%.
- ✓ Condensation is a sure sign that the floor is not sufficiently insulated.
- ✓ Plan on at least R25 insulation.
- ✓ Make sure there are no gaps in the insulation.
- ✓ Cover insulation from wear and tear.
- ✓ Install strip curtains over doorways and keep them in good working order.

## #4: TUNE UP REFRIGERATION SYSTEMS

- ✓ Regularly check the “sight glass”—a clear glass lens in the line that shows the flow of refrigerant—to make sure that refrigerant pressure is adequate.
- ✓ Clean fan blades and evaporator coils to reduce the work required to circulate cold air into and out of the refrigeration system and the ability to transfer heat to the coil.

## #3: UPGRADE LIGHTING

- ✓ Replace or retrofit 8-ft T12 fluorescent strip lights with high efficiency T8 versions.

- ✓ Replace incandescent bulbs with compact fluorescent lamps (CFL) or LEDs. CFLs and LEDs last longer and use about ¾ less energy to provide equivalent light to incandescent lights.
- ✓ Consider replacing high intensity discharge lights with fluorescents or LEDs, particularly in a refrigerated environment.

## #2: IMPROVE FIELD EFFICIENCIES BY REDUCING FUEL USE FOR FLEET OPERATIONS

- ✓ Regularly tune up and maintain equipment to ensure that it is running at maximum efficiency.
- ✓ Smaller equipment has better fuel economy. Don't take out the big tractor if the small one will do the job.
- ✓ Determine optimum field layout—fields with long rows require fewer turn-arounds compared to orchard blocks with short rows. The more times you need to turn around, the more distance you have to travel, resulting in higher fuel use.
- ✓ Properly ballast tractors to control slip. Ensure tires are properly inflated.
- ✓ Consider color and placement of fuel storage tank. A white-colored tank in a shady spot will evaporate less fuel compared to a dark-colored storage tank in a sunny spot.

## #1: CONSIDER A FRUITING WALL/HIGH DENSITY ORCHARD TRAINING SYSTEM

- ✓ A high density orchard yields more fruit per acre and requires smaller equipment with higher fuel economies than does a conventional orchard layout.

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