

# LOW-COST ENERGY SAVING TIPS FOR GREENHOUSES

Energy Trust of Oregon is dedicated to helping you identify options for continuous energy improvement. Below are some low-cost tips:

## Greenhouse shell

Upgrades to the shell can maximize greenhouse productivity and significantly reduce heating costs.

- Retrofit hoop houses that have a single layer of polyethylene to an inflated double-polyethylene covering to reduce heat loss.
- Upgrade a hoop house that has a double-polyethylene cover to a double-layered infrared (IR) inhibiting polyethylene to further decrease heat loss by up to 20%.
- Replace corrugated fiberglass on the end walls of hoop houses with double-wall polycarbonate material, which reduces heat loss and provides a flat surface that may enable a better seal against air infiltration.
- Upgrade glazing on rigid-framed greenhouses from fiberglass or corrugated polyethylene to double- or triple-polycarbonate to reduce heat loss by as much as 30%.
- Seal cracks and holes in the greenhouse shell against air infiltration.

## Unit Heaters

Today's unit heaters offer better performance and efficiencies than models installed just a few years ago. Return on investment for high-efficiency unit heaters can be as little as one year, and a typical simple payback period for an upgrade to a new unit heater is one and a half to four years.

- Install high-efficiency condensing unit heaters. Today's condensing unit heaters can have efficiencies higher than 90%—considerably better than the 80%-efficiency models.
- Upgrade existing gravity-vented unit heaters to power-vented unit heaters or to separated-combustion unit heaters to take advantage of higher seasonal efficiencies.

## Controls

Modern digital control systems automate greenhouse processes and reduce energy waste by better coordinating energy-using systems. For example, controls can ensure heating systems don't run while vents are open, which results in heated air being exhausted outdoors.

- Replace dial thermostats that control heating systems with programmable digital thermostats to improve coordination of heating and ventilation processes.
- Install digital control systems to regulate temperature, humidity, ventilation, lighting and irrigation using a weather station interface, sensor feedback or digital timers. Additional capabilities, such as data logging and energy use optimization, also may be included in the control system.
- Program digital control systems for a nighttime setback to slightly reduce heating while still maintaining adequate temperatures.
- Calibrate sensors that work with control systems to ensure accurate assessment of the conditioned space and proper system adjustments.



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