

Energy Conservation = \$ Savings

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In 1989 the U.S. will import 8 percent more petroleum than last year while domestic oil production continues to decline. This greater dependence on foreign energy can result in volatility in supply and cost. Conservation is one means which we have that can reverse this trend.

In taking a long-range view of conservation, we must emphasize those tasks that once completed or incorporated into our greenhouse operation continue to contribute toward reduced energy usage. Also, developing good conservation habits such as turning off lights, reducing room temperature and using less hot water can save money while helping to achieve America's energy independence. Here is a checklist that may suggest other ways.

Conserving Heating Energy

Providing heat in the greenhouse during the winter months consumes a large quantity of fuel oil or gas. There are many ways to increase heating efficiencies to reduce this consumption and reduce fuel costs. The following are ways in which heat conservation savings can be realized:

1. Reduce Air Leaks

Keep doors closed—use door closer or springs.

Weatherstrip doors, vents and fan openings.

Lubricate louvers frequently so that they close tightly. A partially open louver may allow several air changes per hour. Additional fuel is needed to heat this air.

Repair broken glass or holes in the plastic covering.

Close holes under the foundation of plastic houses.

2. Double Covering

Line sidewalls and ends of greenhouse inside with polyethylene or fiberglass for thermo-pane effect.

Use a double layer of plastic with air inflation to gain a 1 to 4 inch insulative dead air space.

Add a single or double layer of plastic over glass and fiberglass houses and inflate to get double covering.

Line houses with plastic to get double covering. (In heavy snow areas, caution should be exercised in lining roof because snow will not melt as quickly, causing greater loading.)

3. Blanket Systems

Manual and motorized systems are available.

Tight closures should be maintained where curtains meet sidewalls or gutters. Use a U-shaped heat trap.

Heat and water lines should be insulated or placed below the blanket.

4. Foundation and Sidewall Insulation

Place 1-2" polyurethane or polystyrene board to 18" below the foundation to reduce heat loss. This can increase the soil temperature near the sidewall as much as 10 degrees during the winter.

Use 1-2" of insulation board on concrete walls of glass greenhouses

Use aluminum-faced building paper behind heat pipes to reduce radiation losses but leave air space next to wall to prevent wall freezing.

5. Site Location

Locate new greenhouses in sheltered areas to reduce wind-induced heat loss if this does not reduce available light.

Use windbreaks on the north and northwest sides of the greenhouse area.

6. Efficient Heating Equipment

Have furnaces cleaned and adjusted at least once a year.

Use thermostats with 1 degree F accuracy.

Aspirate thermostats for more uniform temperature control.

Check the boiler, burner and backup systems to make sure they are operating at peak efficiency. Boiler efficiency drops for both underloaded and overloaded conditions so a boiler-efficiency test should be run by your boiler supplier.

Clean heating pipes and other radiation surfaces often.

Use horizontal air flow (HAF) or fan tube systems for more even heat distribution.

Insulate distribution pipes in areas where heat is not required.

Insulate the boiler itself if it isn't heating a work area. Check and repair leaks in valves or pipe.

Conserve Electricity

Many uses of electricity either reduce the labor needed or increase the productivity of the present labor force. Electricity has the advantage of being a willing and available worker at all times. This section will review ways to make electric usage more economical.

1. Wiring Systems

Have the wiring system inspected by a competent electrician for overloading, corroded parts and faulty insulation.

Losses of electric energy to heating of the wires can be reduced by using larger wire sizes.

2. Motors

Install new energy efficient motors.

Motor size and type should be selected on the requirements of the equipment it is to operate.

Turn motors off when they are not needed.

Keep proper belt tension and alignment.

Use larger diameter fans with smaller motors. Example: a 36" fan with 1/3 hp motor will give the same output as a 30" fan with 1/2 hp motor with a saving in electricity cost of \$3.00/month. Both have 7800 cfm output.

3. Lighting

Keep light bulbs and fixtures clean.

Use the correct size light bulb for the job.

Turn lights off when not needed.

Use fluorescent or high intensity discharge lights to save energy.

Conserve Water

A large supply of water is needed to operate a greenhouse. The cost of this, whether it be in the form of a monthly water bill or operation charge of an individual water system, adds to the production cost of the plants. Conservation of water as well as the energy to move it can be made in several ways.

1. Pumps

Service the pump at least twice a year.

Provide adequate wire size for the pump motor to reduce heat loss from the wire and to provide sufficient voltage.

2. Tanks

Use large pressure tanks to eliminate frequent starting of the pump.

Drain tanks when needed to avoid a "waterlogged" condition.

Hot water tanks should be located as close as possible to the most frequent hot water use.

Heat water to the lowest temperature that is needed for the job. Most hot water heaters should be set at 120 F.

3. Pipes

Use pipe large enough to supply necessary water at minimum pipe friction loss.

Insulate hot water pipes to reduce heat loss.

Eliminate all water leaks. A faucet dripping at 60 drops per minute will waste 113 gallons per month. If this is hot water it will cost about \$4.00 per month to heat it.

Conserve Gasoline and Diesel Fuel

Gasoline and diesel fuel are essential to operate the trucks, tractors and other engine powered equipment used to run the greenhouse operation. Savings can be made by observing the following:

Keep motors tuned and in good repair.

Shut off engine rather than let them idle.

Use the smallest size motor that will do the job properly.