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## Should you upgrade or replace your greenhouse facility?



By John W. Bartok Jr.

**G**reenhouses become obsolete. With the rapid technology changes in the greenhouse industry, I consider 10-15 years as a useful life for a greenhouse. A structure may still be sound and have many more years of life, but the heating, cooling, benching and control systems may need to be upgraded. Remember you are competing with growers that have new facilities equipped with the latest improvements.

### Benches

Increased growing space can be obtained by remodeling a benching system. Conventional fixed benches can be replaced by peninsular or movable benches that will add 10-20 percent to a production area. Ebb-and-flood benches or a flood floor system may also be a good choice and will reduce watering labor.

### Heating systems

Efficiency and operation of a heating system should be checked on a regular basis. Fan-jet systems should be replaced with a more efficient horizontal air flow system that will improve heat distribution and air circulation at less cost.

Consideration should be given to installing a root zone heating system. Hot water for the root zone system can be supplied by a hot water heater or small boiler. Being able to maintain a lower greenhouse air temperature helps to pay for the system. To reduce heating costs, high efficiency, condensing-type heating units should be considered. Alternate fuels such as wood, coal, corn, waste oil or biofuel are another option that may lower the heating bill.

### Ventilation

Many greenhouses can be adapted to natural ventilation. Roll-up sides or roof vents can be added. Open-roof designs can provide an indoor temperature within a couple of degrees of the outside air. A site with a good summer breeze is desirable as most of the effect of natural ventilation comes from the wind.

Some fan ventilation is desirable for early spring and late fall operation. Savings can also be made by replacing inefficient fans with those having a ventilation efficiency rating of 16 or higher.

### Electronic controls

An electronic controller or a computer system should be considered when upgrading a greenhouse. These devices have greater accuracy that helps to reduce heating and electricity costs. They also integrate the heating and cooling systems to avoid overlap of operation.

Most contain day-night operation, DIF (difference between night and day temperatures) and an alarm system. Aspiration of thermostats and sensors should also be done to get more accurate air temperature sensing.

### Energy conservation measures

With energy costs on the rise, payback on energy conserving measures is very short. Infrared inhibitor (IR) polyethylene film, perimeter and sidewall insulation, thermal blankets, pipe insulation and windbreaks can save significant fuel costs.

### Watering systems

Although hand watering can't be eliminated completely, much of the labor that is now used can be replaced with a modern irrigation system. Boom and drip systems are available that will water whatever crop you grow.

There have been many advances in watering systems in the past few years. Local suppliers carry a large selection of equipment. Add a \$100-\$300 controller and you can save many hours of labor time.

### Materials handling

The greatest return on your investment dollars will probably come from improving the way you handle materials. Equipment is available for all size growers. Use production data from your current methods to compare the payback of alternate equipment systems. A payback of

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three years or less is desirable.

Areas to look at include container filling, transplanting/potting, labeling and moving plants into and out of production areas.

Picking up a flat, walking 10 feet, setting it on a bench and returning adds about 2 cents to the production cost. Conveyors and carts are inexpensive ways to reduce plant handling costs.

### Replacement considerations

If you have old glass, wood frame greenhouses or old hoop houses, the bulldozer may be your best solution. These houses can be very inefficient in the use of space, labor and energy.

If you have limits on the area for expansion, replace existing free-standing houses with a modern, gutter-connected range. I have seen many growers start by replacing one or two greenhouses at a time. Be sure to plan for replacing all structures and in-

stall adequate electrical and water service for the whole range. Incorporate as much of the latest technology as you can afford. It can save enough labor to pay for the new facility in a short time.

I worked with a grower a few years ago that replaced a series of hoop houses with a gutter-connected range. The \$1 per flat savings in labor he realized over the old system helped pay for the new greenhouse in less than three years.

Technology important to any new facility includes a high light level for good winter production, an energy/shade screen for winter heat retention and summer temperature control, efficient space utilization, a multi-stage heating and ventilation system, an automatic watering system and a low labor input materials handling system. Evaluate the many alternative systems available for either free-standing or gutter-connected houses.

### Grant/loan programs

Considerable funding for greenhouse improvements is available through federal, state and utility sources. A comprehensive listing of these incentive programs by state is available at the Database of State Incentives for Renewables & Efficiency web site ([www.dsireusa.org](http://www.dsireusa.org)). The site lists the incentives noting funds available, eligibility, purpose and authorized uses.

Upgrading or replacing can be a difficult decision. Having information on present cost of production, labor and energy inputs, space utilization and other factors makes the process easier. Also input from greenhouse suppliers, your accountant, a consultant, extension specialists and other growers will help to formulate your decision. 🌱

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