

CAN YOU AFFORD NOT TO INVEST? PROVEN TECHNIQUES FOR FIGHTING RISING ENERGY COSTS

By Patricia Dean, VP Wadsworth Control Systems

The USDA has published a new computer program called the Virtual Grower. It helps you calculate your energy use and costs. The program is already powerful, and enhancements are constantly being made to improve its accuracy, best of all its available free of charge <http://www.ars.usda.gov/services/software/download.htm?softwareid=108>

With Virtual Grower, you can simulate different options for reducing energy consumption: replacing film, fixing leaks, or installing an energy curtain or a new environmental control. You can use the data from your Virtual Grower analysis to calculate your return on investment for curtains, controls or new film. Simply plug in the information and you can see how much money you'll save.

We assumed the following for our case study:

- **Greenhouse location: Colorado Springs**
- **Greenhouse Size: 60x96 gutter-connected two-bay greenhouse**
- **Covering: double poly covering, slightly leaky.**
- **Production: September 1 – June 1**
- **Set point temperature: 70 degree**
- **Fuel: natural gas @ \$0.60 per therm**

Virtual Grower estimates that the cost to heat our sample greenhouse would be \$5,702, \$1.06 per sq ft. with 548308 BTU/hour.

Wadsworth has some solutions to help reduce those greenhouse heating figures. We used the Virtual Grower to determine the payback.

How much can a climate control reduce my energy costs?

It's tempting to lower the temperature to save money, but that can lengthen the crop cycle time. However research has found that most crops will be ready on schedule with a lowered night temperature. Since 80% of heating occurs at night this can result in a significant savings, but how much?



The Virtual Grower tells us that if our day set point is 70 and we drop it to 65 at night using a simple staged control like Wadsworth's STEP Up we will save \$699 per year plus improved crop quality. These controls start around \$1,000 for a complete package.

The STEP Up is Wadsworth's newest staged control and it has many enhanced features that set it apart from the traditional Wadsworth staged controls like the STEP 50A. The STEP Up is a computerized control that knows when the sun is going to rise and set in your area, it adjusts the day and night set point start time accordingly. It also has ramp which works like a highway ramp allowing the temperature to gradually increase and decrease between the day and night set point periods. The STEP 50A uses a photo cell and changes the temperature as soon as the light level changes, which reduces the energy savings.

The Virtual Grower doesn't take into account the many other benefits that we receive from using a good control but it does show us that investing in a quality environmental control makes sound business sense.

How much can an energy curtains reduce my energy costs?

We've all heard that curtains can save 30-40% on energy consumption but this program actually calculates the savings factoring in things like the average outside temperature for the specified location.

We ran an analysis adding an energy curtain. The heating costs decreased \$1,736. The Virtual Grower assumes that the curtain is covered at night and uncovers in the morning and remains that way for the entire day.

Energy curtains cost varies depending on the greenhouse size and design. But for this sample greenhouse Wadsworth estimates that the system costs would be approximately \$10,500 plus installation. With rising energy costs the payback will offer tremendous savings for decades to come.

Would I save \$2,400 if I installed both systems?

Not quite, if you install multiple energy saving systems you can't simply total up all of the various savings. Luckily the Virtual Grower allows us to analyze multiple improvements and determine the savings. For our example if the grower installed a control and an curtain the savings would be \$2,187. Experts suggest that making this investment in improving your business is much wiser than continuing to pay for the higher rate of energy consumption.

Greenhouse in Colorado Springs, CO

Set point temp 70 no night set back temp no curtain	Set point day temp 70 Set point night temp 65 no curtain	Set point temp 70 no night set back temp has energy curtain	Set point day temp 70 Set point night temp 65 has energy curtain
Total Heating Costs: \$5,702 Heating Cost per Sq Ft: \$1.06 Maximum BTU Draw on All Heaters: 548308 BTU/hour	Total Heating Costs: \$5,003 Heating Cost per Sq Ft: \$0.93 Maximum BTU Draw on All Heaters: 512235 BTU/hour \$699 savings if you install an environmental control that has day and night settings. And you reduce the night set point to 65.	Total Heating Costs: \$3966 Heating Cost per Sq Ft: \$0.73 Maximum BTU Draw on All Heaters: 512235 BTU/hour \$1,736 savings if you install an energy curtain	Total Heating Costs: \$3,515 Heating Cost per Sq Ft: \$0.65 Maximum BTU Draw on All Heaters: 486684 BTU/hour \$2,187 savings if you install an energy curtain and an environmental control that has day and night settings. And you reduce the night set point to 65.

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