COST PAYBACK OF SYSTEMS FOR ENERGY CONSERVATION

Allen C. Botacchi
Regional Extension Agent — Horticulture

A number of energy conserving techniques and procedures have been covered in this issue. Grower acceptance and adaptation of any of these systems will be determined by range layout, type of houses and the cost payback.

Let us assume that, after weighing the many factors, a grower considers several systems which would work in his range. How does he select the best system, economically speaking? Each grower will have to calculate his "Cost Pay Back Period." Simply stated, how long will it take to recover the cost of the system as a result of the cost of the energy saved?

One note of caution--major greenhouse improvement costs should be paid off in a maximum of six years in today's economy. If the inflation rate and fuel oil or other energy prices continue to rise, the payback period will be significantly reduced.

Now that we have defined cost payback period--how do you use it?

For example, take a hypothetical greenhouse range of 10,000 sq. ft. of glass located in an open unprotected area. Crops are maintained at 60°F at night. Present fuel and electric power consumption costs $3.00/sq.ft./yr.

Example #1

An installed thermal curtain costs $2.00/sq. ft. Calculated energy savings of 33% should be realized annually, or $1.00/sq.ft./year.

$$\frac{\text{System Cost/sq.ft.}}{\text{Energy Cost Saved/sq.ft./yr.}} = \text{years to payback}$$

$$\frac{\$2.00 \text{ (Curtain System)}}{\$1.00 \text{ (Ave. Energy Savings)}} = 2 \text{ year payback}$$

Example #2

An estimated cost of installed lap seal is $1.00/ sq. ft. Calculated energy savings of 15% annually should be realized, or $0.45/sq.ft/yr.

Following the above formula:

$$\frac{\$1.00}{\$\ .45} = 2.2 \text{ years payback period}$$

These are only examples. The best figures are your own. Keep consistant, accurate records and calculate your actual savings.

To be more exact, a grower should add a maintenance, operational, and/or replacement cost to any system used. In the above examples, the thermal curtain may need to be replaced every five years and the lap seal is guaranteed for 10 years. These are additional factors and costs which must be included.

Anticipated energy savings from different conservation methods are found in the following table taken from Badger & Poole (1979)

Method	Annual % Saving Range
Glass	0 (Base)
Major Modifications Continuous	
Double plastic film over glass	40-60
Glass lap sealants	5-40
Single plastic film over glass	5-40
Double layer plastic film	30-40
Periodic	
Curtains	20-60
Polystyrene pellets	60-90
Liquid foam	40-75

Other Modifications	
Sidewall insulation	5-10
Foundation insulation	3-6
Insulating ventilation fans	1-5
Heating systems	
Automatic fire tube cleaners	6-20
Turbulators in flues	8-16
Stack heat recovery unit	?
Maintenance	
Structure	3-10
Heating system	10-20
Miscellaneous Factors	
Windbreaks	5-10
Greenhouse orientation	5-10

The above table will serve as a guide to determine expected savings. These can be inserted into the formula discussed earlier.

Do not just complain about high energy costs. DO SOMETHING. Do it intelligently and economically.

REFERENCES

Badger, P.C. and H.A. Poole. 1979. Conserving energy in Ohio Greenhouses. O.A.R.D.C. spec. Cir. 102, Ext. Bul. 651, p. 1-42.

Ball, V. et. al. 1979. Energy--A Growing Concern. Grower Talks, Vol. 42, No. 12:1-5, 60-62.

Bloom, T. et. al. 1978. Energy Conservation in Ontario Greenhouses. Publication 65, AG DEX 290, p. 1-18.

Correll, P.G. & J.G. Repper. 1977. Energy Conservation in Greenhouses. The Longwood Program. University of Delaware, p. 1-98.

1978. Energy Audit for Growers. A Self-inspection guide to Reduce Energy Costs. Growers Division, Soc. Amer. Florists, p. 1-94.