

Anon. 1976. Die heutigen Möglichkeiten zur Energieeinsparung im Gewachshaus. Zierpflanzenbau. 26(6):544-547. Aug. 4, 1976. (Translation by Dr. Bruno Klinger, Prof. Emeritus, CSU).

Increases in oil prices have raised heating costs from 10 to 20% of the production cost. On the other hand, a quality reduction of 10% makes a 50% heat saving illusory. An increase of productivity by 10% can reduce heating cost by 50%. Saving energy makes sense only if product quality is not sacrificed. About 57.8% of the energy demand in Germany occurs in December and January. Reducing the night temperature can achieve a respectable energy saving. But, one has to consider the effect on crop quality. There is no sense in following an overcast day with a warm night temperature. Eighty percent of the energy requirement in greenhouses occurs during the night. The optimum plant temperature varies with light, age and many other factors. It is possible to automatically regulate night-day temperatures in accordance with crop requirements. Automatic regulation is superior to manual regulation, and growers can try a light actuated ventilation and heating control system.

The temperature gradient from inside to outside, which influences energy loss, is modified by several factors such as the heating system, nature of the enclosure, inside humidity and possible temperature stratification. An elevated pipe system is less desirable than a system under the benches. Large greenhouses have smaller transmission coefficients. A high inside humidity leads to more intense condensation on the glass, thus raising the heat transmittal value. The following economies were achieved at Hannover over loss from single glass layers:

Double glass:	36%	
PVC film, inside:	31%	
"Noppenfolie" inside:	41%	(a type of cloth-film)
Shade cloth inside:	16%	
Styrofoam inside:	60%	
PVC film outside:	37%	
Cloth film outside:	45%	
Shade cloth outside:	11%	

As a guide, use materials which do not reduce light intensity drastically, nor materials which absorb important wavelengths. Glass surfaces should be kept clean. Be careful of raising humidity excessively due to lower infiltration.

Equipment manufactured by the Gysi Co. consists of aluminum sheeting with an air space between sheeting and roof above the sheeting. The sheeting covers 50% of the roof area, under alternate panes. Moveable sheets cover the remaining alternate panes, according to an automatic system that monitors light intensity. Plants can be successfully grown under such a system, and is economically feasible. Poinsettias and geraniums have been grown successfully. We sometimes mistake poor quality light for too low intensity, or confuse it with other minimum requirement factors. Tolerating dirty glass differs from reducing the area of clean glass through which light is received.