



CLIMATE SCREENS FOR ENERGY SAVING AND MORE



Words by Elly Nederhoff : Crophouse Ltd



Two Luxous screens

Climate screens

Retractable climate screens are a key tool for glasshouse climate control in many parts of the world. The first screens were developed for energy saving after the energy crisis in the 1970s. Today, there are many types of screen materials, designed for energy saving, shading, light diffusion, blackout or insect control. Some screens serve several purposes in different seasons. Using a suitable climate screen greatly reduces the peak heating demand and can also alleviate problems in summer.

Economics

Return time on energy saving investments depends on many factors. For instance: How cold is it? How many cold nights, or days, will there be in a year? Is enough peak energy available? How much damage is caused by not meeting the target temperature?

Other important parts of the equation include the investment and maintenance costs, as well as energy prices and product prices in the future. The economics are different for each situation. Screens that are purely meant for energy saving are only useful when it is cold, but a suitable screen can be used for other purposes too – such as improving growing conditions, even in summer.

Screens for different purposes

Retractable energy screens were first introduced some 40 years ago by pioneering manufacturer, Ludvig Svensson, in Sweden. Svensson now produces more than 100 types of climate screen materials, each with a particular combination of qualities, for instance a certain percentage of energy saving (up to 70%), combined with a certain percentage light transmission (up to 89%), plus certain percentages of light diffusion, humidity transfer, and more. The screen materials are divided into six product families:

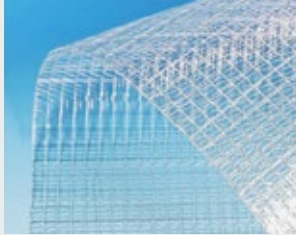
- 1 Luxous: Energy saving combined with maximum light transmission
- 2 Tempa: Energy saving in winter (especially at night) and light reduction in summer
- 3 Harmony: Light diffusion
- 4 Obscura: Light restriction and total blackout
- 5 Solaro: Ultimate solar protection
- 6 Xsect: Insect control while allowing ventilation.

RETRACTABLE ENERGY SCREENS WERE FIRST INTRODUCED SOME 40 YEARS AGO

CLIMATE SCREENS ARE ABLE TO SAVE UP TO 70% OF ENERGY



Luxous 11 47



Tempa 51 55



Tempa 86 72



Harmony 50 20



Screen material from Svensson. The first number is percentage of light reduction. The second number represents percentage of energy saved

Energy saving

An energy saving screen not only saves money, but it also keeps the temperature up throughout cold nights, even with a significantly lower heating capacity. Screens save energy in three ways: By separating the warm air in the plant zone from the cold air in the top zone (reducing convection); preventing the air in the plant zone from flowing along the cold roof (reducing conduction); and blocking the heat emission from the plant (reducing heat radiation).

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Without an energy saving screen, plants radiate their warmth to the cold glass roof and the sky

When and how long the screens are closed for is also important for energy saving. Transparent screens can be closed several hours before sunset to lock in the heat collected throughout the day. After being closed at night, the screens can be opened several hours after sunrise. The opening and closing of an energy saving screen is often based on the air humidity inside the greenhouse, the outside temperature and radiation (or light).

Warmer plant heads

Without an energy saving screen, plants radiate their warmth to the cold glass roof and the sky. A screen prevents this energy loss, so the plants stay warmer. One effect is that warm plants attract less condensation (dew), meaning the plants stay drier, experience less mould and fungal infections and require less spraying. The growing point in the top of the plant stays warmer too. This increases the development rate, meaning that the growing point produces more new leaves (and in tomatoes more new trusses) per week, compared to plants grown without screens. While this latter effect is not easy to see, it is there, and has a significant, positive impact on the plant's balance.

Previous humidity problems

Energy screens were often associated with problems with high humidity, condensation, water dripping and light loss due to wetness – especially when outside conditions were dull and damp. To combat this, many growers left screens partially open during the night to allow moisture to escape. By doing so, they greatly reduced their energy saving results.

Modern day climate screens incorporate new designs, new technology and use more innovative materials that overcome these problems. Woven screens are warmer on the underside and attract less condensation. The Svensson climate screens are designed to allow moisture through by capillary action, so that it disappears up into the top compartment of the greenhouse. The most effective remedy, however, is the use of mechanical or forced ventilation that replaces humid greenhouse air with drier outside air. A 'screen gap' is no longer needed or can be small (just 1%). Remember, it always depends on the conditions (e.g., outside temperature and inside humidity) as to whether it is useful and effective to close a screen.

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Climate improvements in winter

Climate screens have an impact on the air humidity, air and leaf temperature and light conditions. In winter, screens can improve growing conditions by equalising humidity. A problem occurs when there are small plants in the greenhouse and the weather gets cold or frosty. The absolute humidity will be low and the relative humidity can get dangerously low due to heating. These are stressful growing conditions for young plants. Screens help to increase the humidity and make the conditions milder. Note that this scenario contrasts with the high humidity problems experienced by mature plants under a screen on a damp day. Screening during the day requires a screen with good light transmission.



Luxous screen used for shading. Photos; Svensson

Many benefits in summer




Using a transparent screen during a summer’s day has many potential benefits, when done correctly: A transparent screen reduces plant temperature and plant stress; avoids sunburn and similar damage; prevents wilting; improves radiation diffusion, in turn increasing photosynthesis; reduces peak water uptake and improves working conditions for greenhouse staff. It is very important to install a screen that is suitable for the key purposes, either energy saving in winter or improving the conditions in summer, or perhaps both.

In colder countries, growers now install two screens. A transparent screen is used in summer, while both screens can be closed for energy saving in cold winter conditions.

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Using a transparent screen during a summer’s day has many potential benefits, when done correctly

Energy saving and light transmission percentages

Swedish company, Svensson, have over 130 years of experience in engineering textile-based solutions for climate control and energy efficiency. Svensson’s Luxuous screens can save up to 47% energy when closed. Made of transparent polyester strips, they have high light transmission of up to 89%, making them suitable for energy saving during the day too. When the screens are retracted, they are packed tightly to minimise the shade. Luxous screens can also be used to soften the sunshine in summer.

 <p>TEMPA SCREENS SAVE 52% TO 70% ENERGY</p>	 <p>LUXOUS SCREENS SAVE UP TO 47% ENERGY</p>	 <p>HARMONY SCREENS SAVE UP TO 47% ENERGY</p>
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Screens from their Tempa product group are made of 4mm wide strips, alternating aluminium and polyester, ranging from a third aluminium to full aluminium. Energy saving ranges from 52% to 70% and light reduction from 50% to 95%. In winter, Tempa screens are perfect for energy saving at night, but less suited for energy saving during the daytime due to poor light transmission. In summer, Tempa screens can be closed partially or fully for moderating the incoming solar radiation during the day.

Harmony screens also provide up to 47% energy saving, but they are primarily meant for scattering sunlight. Scattered or diffused light is better for plants than strong direct light. The diffusing harmony screens block 30 to 40% of the light. ●

Visit <https://www.ludvigsvensson.com/en/climate-screens/> for more information.