

ENERGY DATA FOR GLASSHOUSE NURSERIES

Introduction



There is potential to make savings in all aspects of the glasshouse business.

Energy usage in glasshouse nurseries is a significant total of overall input costs. Of this energy, 60-80% is normally used in the management and production of the crop itself, with the remainder associated with packaging, storage and transportation of both product and people.

It is important to remember that in most cases, the carbon dioxide produced in heat generation is cleaned and used

immediately in glasshouses, making this form of crop production extremely efficient. While reduction in energy usage for the production of certain crops can lead to a reduction in yield and quality, there is the potential to make savings in energy usage in all aspects of the business. Most of the energy used in producing crops is energy for heating, mostly from gas, with some nurseries also using oil.

However, newer systems, based on biomass and combined heat and power generation are also becoming more popular. With regards to improving energy efficiency, the following series of questions may help growers identify processes on farm, in production, packaging and storage, which may help. The data has been obtained from www.thecarbontrut.co.uk.

Energy-saving opportunities in horticulture

1. Glasshouses

Glasshouse heating is highly energy intensive. Large savings can be made through energy efficiency.

Do your glasshouses have lap-sealing?

☐ Yes ☐ No

Lap sealing reduces wind damage and pane slip is reduced. More effective with older glasshouses.
Likely saving 5%.

Do your glasshouses have poly-/bubble-lining of sides/ends?

☐ Yes ☐ No

Greatest savings with smaller houses. Some light loss near sides and ends. Lining has a two-to-three-year life.
Likely saving 3-5%.

Do you have natural or artificial windbreaks?

☐ Yes ☐ No

Newly planted natural windbreaks not effective for four to five years.
Likely saving 5%.

Do your glasshouses have gutter insulation? ☐ Yes ☐ No

Polystyrene fixed internally to Venlo. Less saving with more widely spaced gutters.
Likely saving 5%.

Do you use a temporary "fixed" screen?

☐ Yes ☐ No

35% savings when in use for first five weeks.
Overall likely saving 10%.

Does your boiler have a flue damper?

☐ Yes ☐ No

Likely saving 5%.

Is there secondary glazing on the ends/sides of your glasshouse?

☐ Yes ☐ No

There will be some light reduction but likely energy savings of 5%.

Is your glasshouse environment computer controlled?

☐ Yes ☐ No

Gives much improved environmental control. Alarms and monitoring facilities provided.
Likely saving 5%.



A computer-controlled glasshouse environment offers much improved environmental control.

16: Energy Data for Glasshouse Nurseries

2. Short term fruit/vegetable storage

For heat removal, cool chain transit, etc. Low utilisation or frequent restocking increases consumption. Heat removal from ambient product, etc., can increase consumption massively and savings may not be proportionate.

Additional options to be noted.

Does the store have air curtains/flexible doors?

☐ Yes ☐ No

Critical for this type of store with frequent access.

Saving 5-10%.

Does the store have forced ventilation?

☐ Yes ☐ No

More efficient cooling.

Saving 5-10%.



Avoid unnecessary heating of large areas that are sparsely staffed.

3. Pack areas and workshops

Do you limit the space heated?

☐ Yes ☐ No

Avoid unnecessary heating of large areas that are sparsely staffed. Localised and radiant heating can save energy and provide better working conditions in large grading and washing operations. The use of partitioned enclosures increases staff comfort and retains heat.

Savings up to 70%.

Do you avoid product heating?

☐ Yes ☐ No

Unnecessary warming of produce as it passes

through a warm pack house should be avoided, as energy will be required to re-cool the product.

Savings up to 10%.

Do you only heat during occupancy?

☐ Yes ☐ No

Space and water heating should be controlled to only operate during occupancy by staff (apart from frost protection).

Savings up to 50%.

Is warm air recirculated?

☐ Yes ☐ No

Warm air heating systems should be ducted with point outlet diffusers.

These systems should always recirculate the air within the pack house area. Ventilation of the building should be controlled independently.

Savings up to 50%.

Do you have temperature redistribution fans?

☐ Yes ☐ No

Slow moving open paddle type fans mounted in the roof will even out distribution of rising warm air.

16: Energy Data for Glasshouse Nurseries

Are the boilers and warm air heaters regularly serviced?

☐ Yes ☐ No

They should be serviced at regular intervals and combustion efficiency checked frequently.

Savings up to 50%.

Do you have thermostats checked against a thermometer?

☐ Yes ☐ No

Savings up to 7% per 1°C excess.

Is equipment only operated when necessary? ☐ Yes ☐ No

Avoid having all the product lines operating and running empty when only part of the system is required. Fit isolator switches to all individual components.

Is process/line speed optimal?

☐ Yes ☐ No

Adjust the forward speed of grading lines to ensure that the product completely fills the line. Avoid bottlenecks in the process that result in part of the line running empty or at fractional capacity.

Savings up to 10%.

Is the line switched off during breaks?

☐ Yes ☐ No

During work breaks, switch off as much of the equipment as possible.

Savings up to 12%.

Are process requirements minimised?

☐ Yes ☐ No

Analyse product requirement for any particular process. Review this regularly internally and with the customer.



Where heated or cooled water is used, recycle this as much as possible.

Is waste production minimised?

☐ Yes ☐ No

Avoid over processing, which increases volume and waste content of effluent. Waste treatment and disposal consumes more power.

Savings up to 50%.

Is process water recycled?

☐ Yes ☐ No

Where heated or cooled water is used, recycle this as much as possible. Allow adequate time for water to be drained from produce.

Savings up to 50%.

Have you considered low-tech processing?

☐ Yes ☐ No

For example, simple trimming tables with produce and waste collection bins are likely

to be just as effective as stations on conveyor systems.

Are your buildings insulated?

☐ Yes ☐ No

It is important to insulate to minimise heat losses, particularly roofs.

Do doors have plastic strip curtains or heated air curtains?

☐ Yes ☐ No

Savings up to 10%.

Is process heat recycled?

☐ Yes ☐ No

For large heat consuming and heat rejecting processes, e.g., frying or blast freezing, consider using heat recovery or utilisation of rejected processed heat.

Savings up to 70%

Further information

For further information please contact Dr Michael Gaffney, Horticulture Development Department, Teagasc Food Research Centre, Ashtown, Dublin 15 at:
☎ +353 (0)1-805 9500
✉ michael.gaffney@teagasc.ie

The information displayed above was sourced from:

🌐 www.thecarbontrust.co.uk

Fact sheet produced by Dr Michael Gaffney, Horticulture Development Department, Teagasc Food Research Centre and Barry Caslin, Teagasc, Rural Economy and Development Programme.

www.teagasc.ie/ruraldev


AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY
🌐 www.teagasc.ie