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How to Minimise the Effects of Carbon Pricing on Nursery Production Systems

On July 1 2012, the new carbon price policy – *Clean Energy Future* – was introduced by the Australian Government. While the nursery industry will not be directly involved in the carbon price mechanism, it is expected that the carbon price will result in cost increases for key agricultural inputs with the most significant costs relating to energy and energy intensive inputs such as fertilisers, chemicals and machinery.

In this month's Nursery Paper NGIA Environmental & Technical Policy Manager, Dr Anthony Kachenko provides an overview of strategies that can be applied within production systems to minimise the impact of the carbon price policy.



How to Minimise the Effects of Carbon Pricing on Nursery Production Systems

Introduction

The new carbon price policy – *Clean Energy Future* – is the Australian Government's plan to reduce the emissions intensity of the economy.

There are four main elements to Clean Energy Future:

- A carbon price
- Renewable energy
- Energy efficiency
- Action on the land.

The starting carbon price of \$23 dollars per tonne of CO_{2-e} is planned to increase by 5 per cent (2.5 per cent price increase, 2.5 per cent inflation) per year from 2015 until 2020. At this stage, the nursery industry is not directly involved in the carbon price mechanism; however the potential impact of the carbon price is likely to raise the costs of farm inputs such as energy, fertilisers, freight charges, packaging and chemicals.

A recent report titled "The impacts of the carbon price on Australian horticulture" authored by Lena Knudsen et al.

(2012) funded by Horticulture Australia Limited through the Across Industry Program suggests that electricity costs will increase by 9.8 per cent at a carbon price of \$23 and by 13.1 per cent at a carbon price of \$30.82 which is the projected carbon price in 2020. The projected carbon price in 2020 is calculated by assuming an annual increase of 5 per cent (2.5 per cent price increase, 2.5 per cent inflation) per year from 2015 until 2020. It should be noted that the actual carbon price in 2020 may differ pending government policy. Other increases relating to cost items in nursery production are summarised in Table 1.

Table 1: Summary of cost increase (%) for key cost items with a \$23 carbon price (2012) and \$30.82 carbon price (2020). Summarised from Lena Knudsen et al. (2012).

Cost Item	% Cost increase*	
	CO _{2-e} at \$23 per tonne (2012)	CO _{2-e} at \$30.82 per tonne (2020)
Fuel	5.4 #	7.3
Freight	1.1 (from 2014)	1.5
Fertiliser	0.54	0.73
Chemical	0.54	0.73
Packaging	1.5	2.0

* Cost increases assume businesses have taken no management actions to minimise exposure to the carbon price

Cost increases from non agricultural sectors will flow through to other farm inputs

It is evident from this data that significant opportunity exists to reduce the impact of the carbon price through improvements in energy efficiency as well as better managing inputs.

Improving Energy Efficiency

Production nurseries can implement a number of measures to increase energy efficiency and thereby lower overall electricity needs. A useful place to begin is to determine the carbon footprint of a business. A reduction in the carbon footprint of a business is directly linked to other management practices that improve farm business efficiency. Many of the steps that can be used to reduce a farm's footprint (improved energy efficiency, reduced on-farm traffic, less fertiliser) will also result in reduced input costs. Consequently, a small footprint can be used as an indicator of production efficiency.

The industry developed carbon footprint calculator referred to as *NurseryFootprint* is available on the NGIA website to assist businesses identify emissions reduction opportunities. The calculator includes a simple cost-benefit analysis function that allows businesses to compare the emissions generated per dollar spent on selected inputs (i.e. electricity, fuel and fertiliser) or emissions generated per dollar of income across a product range. It can be downloaded and used on any computer using Excel. This calculator works best when used in conjunction with accounting records (e.g. MYOB).

To further investigate direct on-farm energy use, costs and the greenhouse gas emissions associated with diesel, petrol, LPG and electricity consumption, an online calculator referred to as *EnergyCalc* is also available on the NGIA website. This calculator can also examine energy use across key processes within a production system and can be used to evaluate farming practices such as heating, spraying, irrigation etc.



Improving irrigation efficiencies and reducing irrigation and water demand can reduce energy cost

By using the above calculators, a business may identify simple measures, such as minimising unnecessary consumption and waste, or converting to more efficient lighting as options to minimise energy use and hence reduce costs. More complex measures, such as those listed below, may require significant capital investment.

Renewable Energy Options

On farm renewable energy may reduce consumption of grid electricity and in some cases; businesses may be able to feed excess electricity back to the grid. For businesses considering renewable energy, a *Renewable Energy Calculator* has been developed by industry to provide businesses with a simple to use tool for the assessment of solar and wind energy options on a case by case basis.

The calculator is a web based tool and can be assessed by visiting www.energycalc.ngi.org.au By entering 12 months of electricity bills, or by using *EnergyCalc* as discussed previously, this calculator can determine the feasibility of replacing some or all of a business's energy requirements. To accompany this industry has developed two fact sheets available on the NGIA website relating to solar and wind energy opportunities for the Australian nursery industry.



The *NurseryFootprint* User Manual is available to download from www.ngia.com.au

Irrigation Management

Much of the energy use in production nurseries is dominated by irrigation demands. By improving irrigation efficiencies, and reducing irrigation and water demand, a business can reduce energy costs. The industry has developed a whole suite of resources over the years to assist businesses address on farm irrigation management. These resources range from workshops (e.g. Waterwork) right through to textbooks (e.g. Managing Water in Plant Nurseries).

Recently, the industry developed a Water Management Toolbox which consolidates many of the simple to use calculators and tools currently available into one centralised toolbox. This resource is available by visiting <http://www.watertoolbox.ngi.org.au>. All calculators within the Water Management Toolbox are in Excel format and can be saved individually on the user's computer. Alternatively, the entire Water Management Toolbox can be downloaded as a zip file and accessed offline. New calculators were added to the toolbox in June 2012 to assist in measuring water soluble fertilisers in irrigation stock tanks and the quantity of acid to reduce alkalinity in water.

Dispatch Opportunities

There are significant opportunities to minimise costs and save energy during dispatch. Businesses should assess how they pick plants to eliminate wasted fuel costs from excessive and unnecessary travel. For example, high turnover of frequently visited crops should be placed closer to dispatch to avoid easy access. This can save up to 25% in travel and reduce fuel costs. A selection of You Tube videos are available on the NGIA website in the Supply Chain section which provide further information on streamlining processes within dispatch.



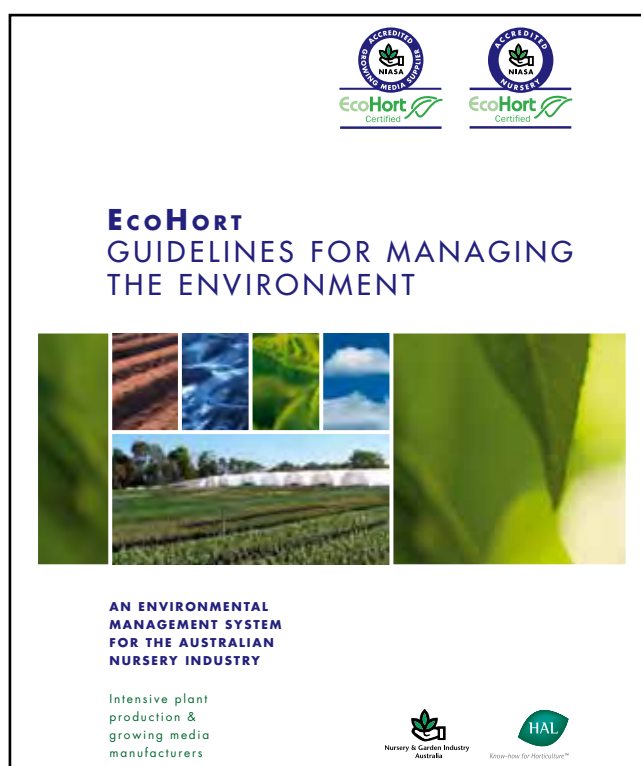
Videos on streamlining nursery dispatch are available by visiting www.ngia.com.au

EcoHort Program

The EcoHort Guidelines which are part of the Nursery Production Farm Management System provide a systematic approach for production nurseries to assess their environmental and natural resource management responsibilities. Parts of these guidelines refer to Efficient Energy Use and detail a number of options in addition to those mentioned already in terms of ways to reduce energy use. These include:

- Select energy efficient equipment when purchasing irrigation pumps, heaters, air-conditioners, potting machines, steam sterilisers, vehicles and so on.
- Where greenhouses are heated or cooled, use multi-span in preference to tunnel greenhouses (heat losses are much less due to less wall area).
- Ensure heated water distribution pipes are well insulated to minimise heat losses.
- Use energy efficient lighting. For example, compact fluorescent bulbs have about one-quarter lower wattage and eight times the life of standard incandescent bulbs. A number of LED options are also available.

Businesses looking at implementing EcoHort must be accredited under NIASA accreditation. More information on EcoHort can be sourced from the NGIA website or by contacting your regional Association.



EcoHort guidelines refer to Efficient Energy Use and detail a number of options to reduce energy

Conclusion

The introduction of a carbon price will see a rise in the cost of production with the single biggest rise attributed to the increase in the cost of electricity. The best opportunity to reduce this rise will be through improvements in on farm energy efficiency. A number of tools and resources that have been developed through industry levy funded research and development have been described in this nursery paper that should be considered. Some of these tools and resources will require a business to change their habits or refine process while others require substantial capital investment. Each business is different and will need to assess the cost-effectiveness of implementing these tools and resources within the context of their own businesses.

References

Knudsen L, Putland D and Strahan R (2012). The impacts of the carbon price on Australian horticulture. Final Report #AH11019. Horticulture Australia Limited, Sydney.



Streamlining nursery dispatch may lead to a reduction in energy

Further Information

For additional information, consult the following nursery papers which are all available electronically from www.ngia.com.au

- **NurseryFootprint – A carbon footprinting tool for the Australian nursery and garden industry.** Issue Number 7. August 2010.
- **EcoHort™ - the environmental management system for Australian nursery production.** Issue Number 12. December 2006.
- **Increasing efficiency in nursery dispatch.** Issue Number 4. April 1997
- **Scheduling irrigation to maximise efficiency.** Issue Number 8. August 2006.

The following websites offer additional information on carbon policy:

- Department of Climate Change and Energy Efficiency <http://www.climatechange.gov.au>
- Department of Agriculture Fisheries and Forestry <http://www.daff.gov.au/climatechange>
- Additional information on the impact of climate change in relation to Australian horticulture can be found on the Horticulture Australia Limited website http://www.horticulture.com.au/areas_of_Investment/Environment/Climate/climate_home.asp