Low carbon energy – the new farm enterprises after 2013.

Like it or not it appears certain that after 2013 the world will dramatically change for Australia's farmers. The greenhouse gas emissions – particularly of carbon dioxide, methane and nitrous oxides - given off by conventional agriculture will be taxed in some way that will impact on every grazier and cropping farmer. But they can take some small comfort that it also began to change for farmers in Scandinavian countries from the mid 1980s and they have come through it well. It's true that they faced increasing costs as a direct carbon tax on fossil fuels for transport and stationary energy production, but in effect this came to the same thing as a tax on industrial emissions indirectly increasing costs of agricultural production.

But with the policies in Sweden for example farmers found they could make money out of a low carbon economy in the same ways that Australian farmers will be able to. Here state and federal government policies are in place to increase renewable energy to 20%, to pay a premium for green electricity, and to encourage sequestration of atmospheric carbon. Farmers can earn revenue from this by taking advantage of their space, their need for better shelter, and by the need to plant offsets to balance their existing GHG emissions. It boils down to well-located farm forestry strip plantings, utilising forestry and agricultural wastes and residues for green energy production, and growing more of the perennial crops that require a lower energy input to establish and harvest.

In Sweden this last includes growing short rotation coppice (SRC) willow to produce wood chip for fuelling bioenergy plants. The stand lasts for 20-25 years and is harvested every three or four years in a similar way to the proposed oil mallee coppice harvesting system. Yields work out to about 8-12 tonne dryweight/ha/yr, and it is usually planted on wetter sites. In 2008 the net returns to Swedish farmers from SRC willow were equal to or better than returns from cereal crops. In Finland many farmers grow a native perennial phalaris on their drained peat bogs, and bale the straw for a fuel in bioenergy plants. In Denmark they do the same with cereal straw, with about 1.6 million tonnes a year of straw bales and pellets fuelling furnaces in large and small plants across the country providing heat only, or both heat and electricity, for towns and cities. A significant extra amount of straw is used on farms as fuel to produce heating.

In Denmark, Sweden and Germany almost all of the putrescible waste – the sewage, manure and wash down water, food processing waste, fresh silage material and slaughterhouse waste – is anaerobically fermented to produce biogas. This is often upgraded by removing the carbon dioxide and used to fuel buses trucks and private cars. Alternatively biogas produced in smaller volume in farm digesters can be utilised to for heat, or to fuel a gas motor driving an alternator to produce electricity, with the valuable heat produced utilised for some energy-intensive farm business such as greenhouse vegetable production. The sludge that remains after the biogas is produced is a low-cost fertiliser, high in nitrogen, phosphorus and potassium, that in Scandinavia is applied by travelling irrigator, is injected, or is spread as a semi-dry material.

Australian farmers of course already know about the use of canola oil for producing biodiesel and about producing ethanol from cereal grains and sugar cane. However

the fact is that neither is likely to stack up as a good enough option long term, as the energy involved to plant, harvest and process these annual crops to produce the biofuel is too close to the energy content of the biofuel. Without massive incentives and subsidies it does not rate against the other high-tech biofuel options, though it does have the advantages of requiring relatively lower cost plant. The international bodies looking to regulate sustainability of biofuels are as concerned about the displacement of food production by growing biofuels feedstock as they are about the clearing of tropical forest for the planting of massive areas for producing palm oil. Neither of these activities is likely to earn a tick as being sustainably produced biofuels.

Instead the effort is being directed at developing the processes for producing biofuels from agricultural and forestry residues, and other previously valueless wastes – the straw, forest residues and thinnings, and the wet and dry municipal and industrial wastes. The complex carbohydrate (hemicellulose) of straw can be broken down with heat and dilute acid to become simple carbohydrates and these are then fermented to produce ethanol, with the lignin residue pelleted to become a solid fuel or a feedstock for biorefining. The same process exactly can be done with woody material. It does require expertise and some expensive equipment and is best done on a commercial scale. But it means the the farmer will have another market for straw and wood wastes.

Overall however the money may be in the carbon that is tied up or sequestered in every stem of every tree in farm woodlots. About a quarter of the green weight, or half the dryweight, of a tree is carbon. With each cow producing methane equivalent to up to 2 tonnes of CO2 a year this means that to offset each cow will require production of up to 2 tonnes of green timber annually, or up to a hectare of timber per every four cows in the 600 mm rainfall zone. Putting 10% of the farm under dispersed strategically-sited strip woodlots should offset all the stock and give some offsets or carbon credits able to be traded. How complex this will be in practice is the issue. Managing it all could be a good earner for the state farmer and tree-grower associations, in their new entrepreneurial form post-2013.
In addition the shelter from properly designed and configured windbreaks of well-chosed species will mitigate the impacts of climate change, and the plantings will imporve the habitat of the farm and will overall add to the farm value without reducing production or run-off.

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