

PO Box 1385, Griffith NSW 2680
T 02 6964 6600 F 02 6964 1605 enquiries@nuffield.com.au www.nuffield.com.au
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Australian biofuels future drives Nuffield Scholar

Last year South Australian grain grower Caroline Brown scoured three continents leading the world's renewable energy revolution before re-evaluating plans for an oilseed processing facility at her family's Maitland property – and her vision for Australia's biofuels industry.

Awarded a Nuffield Scholarship sponsored by the Grains Research and Development Corporation, the seed processor and dryland grain producer planned to adopt advanced oilseed production and processing techniques used overseas on her 2700ha property.

However, after researching best practice systems in Europe, North America, Japan and India, any ambition to implement what she had learned was challenged by what Ms Brown sees as shortcomings in Australia in terms of supportive government policies.

By contrast with other countries, Ms Brown believes Australia has some distance to go in catching up with policies that are conducive to renewable energy advancements, a situation she feels is thwarting opportunities to increase rural wealth and improve environmental sustainability.

“Global warming, increasing dependence on dwindling oil supplies and political turmoil caused by competition to secure resources have set the stage for renewable energy development around the world,” she says.

“But whereas Europe and America have introduced legislation favourable to private investment, and are benefiting from early research and development, the support in Australia for technology based on non-renewable resources leaves us standing alone.”

While local companies have launched breeding programs to develop oilseed crops for biodiesel production – something Ms Brown before her tour believed signified Australia was ready for a biofuels industry – she now says she recognises the use of ‘first generation’ feedstocks based on traditional food crops as a stepping stone, not the start of a viable new industry.

“Efficient energy production is imperative, therefore the future of biofuels lies with new ‘second generation’ technologies such as biomass to liquid (BTL) and cellulosic ethanol,” she says.

“Overseas research indicates this is where Australian farmers will enjoy longer-term security.”

Biomass comes from purpose-grown crops, agricultural waste and wood by-products that can be gasified and reconstituted into liquid fuel (diesel) or converted into fuel using chemical or enzymatic processes (ethanol).

“This practice allows farmers to maximise grain harvest residue from food crops (such as wheat) providing value-adding opportunities and reducing land use competition,” Ms Brown says.

For information

Jim Geltch
CEO Nuffield Australia
0412 696076
E enquiries@nuffield.com.au

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“Second generation technologies are cheaper than conventional biofuels in terms of energy balance and carbon saving, but production requires huge investments beyond the reach of most farming entities.”

While current production costs are prohibitive in Australia, global investment is well advanced, with a second generation biodiesel plant coming on-line in Germany, and new technologies being developed in Europe and the United States to produce biofuels from a wider range of biomass feedstocks.

“These moves are largely testament to political strategies that have been effective in subsidising energy production overseas,” Ms Brown says.

In Europe, support for market creation is part of a broader vision for biofuels to constitute one quarter of the EU’s transportation fuels by 2030. This has been bolstered by the introduction of a biofuels directive demanding a 5.75 per cent biofuel inclusion in all transportation fuel by the end of 2010.

In the United States, the Bush administration aims to replace 75 per cent of oil imports from the Middle East with renewables by 2025 and has set a mandate for 7.5 billion litres of biofuel by 2012, supported by federal tax incentives.

Conversely, the Australian Government has set a non-mandatory target of 350 million litres of biofuel by 2010 (less than 0.01 per cent of transportation fuel). Ms Brown says this is a concern given that Australia’s declining oil supply offers only 42 per cent self sufficiency.

“Australian policies do not foster the industry or set goals for future levels of biofuel consumption compared with many other developed nations, where policies are creating automatic biofuel markets through mandates and strict environmental emission standards,” she says.

“Australian farmers are in an excellent position to capitalise on ownership of biomass feedstock opportunities provided they can work cooperatively to negotiate with big processing companies.

“But development of a viable and successful biofuels industry in Australia is dependent on policy that will stimulate demand and encourage investment in infrastructure.”

In addition to lobbying Government for equitable industry support and tougher emission standards, Ms Brown recommends research into biomass production, including a study of suitable environmental and soil conditions; development of cooperative structures to help farmers negotiate biomass product value; and education to promote biofuels’ benefits.

Contact: Caroline Brown, (08) 8832 2504 or debrown@internode.on.net

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Jim Geltch
CEO Nuffield Australia
0412 696076
E enquiries@nuffield.com.au