

Cropping by the sun, with a ute

MICHAEL Inwood developed his ideas for an electric ute in response to a Central West Catchment Management Authority move to encourage on-farm innovation (see adjacent story).

With support from his wife, Therese, and parents, Jim and Elizabeth, Mr Inwood explored how to fix, manage and sustain natural resources on the Inwood superfine Merino operation, "Toulon", by asking the question, "What can nature do for us?"

"We're trying to use the 80/20 principle," Mr Inwood said. "We do 20 per cent of the work, and nature takes care of the other 80pc."

Strategies have included managing grazing to boost groundcover and soil fertility, fencing off unproductive paddock corners for revegetation plots, and slowing destructive water flows down gullies by using rock groynes and other structures.

Then Mr Inwood came around to the farm's use of energy, and what nature might supply via the sun.

Helped by a long list of supporters, starting with the donation by Mitsubishi of a Triton 4WD ute, Mr Inwood set about mating the two-tonne vehicle with an 11-inch WARP DC electric motor used in electric drag racing in the US.

He has a wish-list of technology he would have liked to include in the modified ute – including an AC motor, and regenerative braking that uses braking energy to recharge the battery bank – but that would have blown the cost out to well over \$50,000.

Even so, the substantial cost of conversion made him realise that more than just a ute would have to be involved.

Inspired by Narromine farmer, Bruce Maynard, who dry-sows crops using a conventional ute, and Gulgong pasture cropping pioneer, Col Seis, Mr Inwood realised he could carry out an extremely low-energy form of cropping powered by the sun.

While that ideal has been difficult to translate to practice – present limitations of battery technology and costs only allow about five hectares of sowing on a charge – Mr Inwood believes it's a concept that will fly with tweaks to efficiency and new power technologies.

And it may not stop there: he's already sketched out a feasibility study for a low-energy harvesting method that would transport the crop to a central point for winnowing.

– MATTHEW CAWOOD



Take 10 innovative thinkers ...

THE electric ute, designed by Michael Inwood, (pictured), involves several collaborators, but the most prominent is the Central West CMA, which funded a process to tease out innovation and then helped fund the innovation itself.

Rather than spread funding thinly across the landscape, the CMA's Adam Hook explained, the authority undertook an exhaustive process to identify landholders with innovative ideas for change, and the ability to communicate those ideas.

From an early culling, 10 landholders were chosen to undergo a paradigm-busting 20 day training regime spread across several months.

They heard presentations from a broad range of thinkers that included Stuart Hill, Professor of Social Ecology at the University of Western Sydney; soil carbon campaigner, Dr Christine Jones; former Land and Water Australia director, Andrew Campbell, and Peter Aapt, manager of Future of Australia's Threatened Ecosystems (FATE).

They also had a reading list of 10 books to digest which included Allan Savory's *Holistic Management*, Tim Flannery's *The Weather Makers* and *The Future Eaters*, Chris Williams' *Old Land, New Landscapes*

and Richard Koch's *The 80/20 Principle*.

Mr Hook said the reading and listening provoked intense debate among the 10 landholders, and few came out of the process "looking at the farm as they had always done".

Mr Inwood's project was chosen after the judges, who included some of the speakers, assessed his written and spoken presentations.

Two other innovative projects had been selected through the same process in previous years.

The first of several field days to be held on Mr Inwood's farm is today, and will feature a talk by Professor Flannery.



VALUE BY THE TRUCKLOAD



**Standard Scheduled Service Parts
for the first 200,000km's included
at no extra cost when you purchase
your new manual Canter truck.***

Offer ends 30 June 2009.



PARTICIPATING MITSUBISHI FUSO DEALERSHIPS: **METRO:** BLACKTOWN: Mercedes-Benz Commercial Vehicles, 10 Decker Place, Huntingwood. Ph: 8822 4800. NARELLAN: Tri-City Trucks, 10 Dunn Rd (off Camden Valley Way), Narellan. Ph: 4647 4488. **MILPERRA:** The Truck Centre, 20 Ashford Ave, Milperra. Ph: 9771 5500. **REGIONAL: ALBURY:** Border City Truck Centre, 490 Young St, Albury. Ph: 6041 3134. MD12209. **COFFS HARBOUR:** K&J Trucks, Lot 1 Pacific Hwy, Boambee. Ph: 6652 7218. **DUBBO:** Swanes Truck Centre, Newell Hwy, Dubbo. Ph: 6882 4433. **GOSFORD:** Atchison Truck Sales, 1 Bowen Crescent, West Gosford. Ph: 4324 5358. **MURWILLUMBAH:** Murwillumbah Truck Centre, 250 Tweed Valley Way, Murwillumbah. Ph: 6672 3677. **NEWCASTLE:** Mercedes-Benz Commercial Vehicles, 2 Glenwood Drive, Thornton. Ph: 0409 163 795. **ORANGE:** West Orange Motors, 32 Forbes Rd, Orange. Ph: 6361 1000. **QUEANBEYAN:** Hartwigs Trucks, 156 Uriarra Rd, Queanbeyan. Ph: 6297 2888. **TAMWORTH:** JT Fossey, 30 Dampier St, Tamworth. Ph: 6762 2555. **TAREE:** Taree Truck Centre, 136 Manning River Drive, Taree. Ph: 6551 2900. DLMD21136. **WAGGA WAGGA:** Thomas Bros. Mitsubishi Trucks, 65 Dobney Ave, Wagga Wagga. Ph: 6925 3499. MD8246.

fuso.com.au
For your nearest dealer
call 1800 22 32 35

FUSO
Financial
Slip into something more comfortable.

HE'S

A UTE is a ute is a ute – well not this one. Michael Inwood's 4WD Mitsubishi electric-powered farm work horse gets plugged into a "green" power source every evening, then is flogged around the farm and into town in a typical day to expend about half its "petrol" – while covering the role of a zero-emission farm tractor.

MATTHEW CAWOOD reports.



GOT THE POWER



Sunpower solar panels from the Inwoods' roof.

By day, it plays all the roles that fossil fuel-powered utes perform on farms around Australia, typically using less than half its power reserves during a day's work.

There are handicaps: driven at 100 kmh, it has only an 80km range, and can't be driven through deep water.

Mr Inwood said the only barrier to doubling the range was money: at a conversion cost of about \$40,000, the vehicle is already well out of the price range of any farmer considering doing a similar conversion.

But as a proof of principle, his electric ute opens doors to innovations

that are not possible using oil-age thinking.

With power to spare – towing the fully-laden two-tonne seeder uphill draws about 170 amperes from a motor capable of producing 1000 – the chief limitation of the concept is the need to refuel, Mr Inwood said.

"At the moment we can only get about five hectares of sowing done on a charge, and because of the cost of the battery packs and recharge times, we can't just refill it like you might with a tractor," he said.

"But this is essentially an alternative energy platform – it doesn't matter what you hook it up to, so long as it provides 144 volts.

"So when the new lithium-ion oxide batteries that can dump-charge in a minute become available, we could hook them up. If hydrogen power packs become viable, we can hook them up, too."

The compact electric powerplant and its ability to accept different power sources also opens up new considerations for the role of the farm vehicle.

Mr Inwood said some time in the

future it may be that instead of having a single vehicle for a single purpose, the electric vehicle will be modular – in various guises serving as the town car, a form of tractor, a source of mobile power to run electric tools or shearing gear, or as an off-peak power bank to run a house.

"It may not be commercially viable right now, but it's also unacceptable to be doing nothing in this area," Mr Inwood said.

"I've stood on the shoulders of others to get this far, and hopefully somebody else will use what we've done here to take it further."

The exercise has already stimulated innovation from the implement manufacturer Agropawl, which had a brief to create a seeder that could work with the ute.

Agropawl's response was the one-off "AD Hybrid", a seeder that instead of having several rows of discs has been engineered with a single row so it can be turned on headlands without the energy-intensive requirement to hydraulically lift the discs out of the ground.

Hydraulics for lifting are provided through an "electric hydraulic" pack fitted to the ute.

The result is a seeder that gets the job done with minimal energy.

"When it's hooked up to the tractor, we can use it at an idle," Mr Inwood said.

"I'd now say that I wouldn't advise people to pull a disc seeder with an electric vehicle until the technology is a little further advanced – but the pieces are all there. It's not far away."

Electrifying Alliance

Key supporters of the electric ute project:

- Central West Catchment Management Authority
- Country Green
- Mitsubishi
- NSW Farmers Association
- Agropawl
- Bathurst Welding and Bodywork
- Sunpower
- Wesfarmers Federation Insurance
- Woolworths (via Landcare)
- ARB

Biodiesel best health bet: CSIRO

BLENDED petrol with 10 per cent ethanol is generally worse for the environment than regular unleaded petrol, but a five per cent biodiesel blend is better than straight diesel, according to an ABARE study.

The study bases its conclusions on analysing the impact of the manufacture and use of the fuels on greenhouse gas emissions and on release of pollutants that affect human health.

With E10 (10pc ethanol) petrol, except where the ethanol component is made from molasses using co-generation, it's the human health impact that lets it down rather than greenhouse gas emissions.

ABARE concludes that E10 fuel results in lower tailpipe emissions from vehicles than unleaded petrol but when the production process is taken into account net emissions are higher.

"The production of ethanol, including the production of feedstocks used, has been found to require more energy than the production of petrol for each unit of fuel produced," the study says.

Ethanol made from wheat, and waste wheat starch that is a residue from flour production, sorghum, and molasses using non-renewable electricity also comes out on the negative side.

The biggest difference is in emissions of particulate matter (PMs), with E10 petrol producing less tailpipe emissions of PM than ULP, but much more when it is manufactured, except with molasses and co-generation.

"Ambient air pollutants have been found to have adverse effects on human health and life expectancy," the study says.

With biodiesel it's a different story, according to the paper by ABARE research economist, Clara Cuevas-Cubria, which was presented at a conference run by the Australian Agricultural and Resource Economics Society in Cairns in mid-February.

The study found net emissions from a five per cent biodiesel blend were lower than for ultra low sulphur (ULS) diesel, regardless of the feedstock used.

The paper suggested policy interventions through an emissions tax, or a subsidy for avoided emissions could be justified to avoid market failure.

- ALAN DICK



We're committing billions to help Australian business keep fighting.

Business is taking a beating at the moment. But at Bankwest we're not curling up into a little ball and hoping it goes away. We're continuing to support businesses just as we have for the past hundred years. That's why we've created the Bankwest Business Fighting Fund designed to really back your business in these tough economic times.

With a renewed commitment to new business lending at competitive rates and locally based business bankers, we'll provide the support and smart solutions your business needs.

So call us on 13 7000 or log on to bankwest.com.au/fightingfund to find out how we can help your business.

4.99%
p.a.

12 month variable interest rate.

The Bankwest Business Fighting Fund

bankwest