



Smokin'

JOHN CAREY

DESIGN, ENGINEER AND DEVELOP A BATTERY-ELECTRIC DRIVETRAIN THAT WILL FIT NEATLY INTO A COMMODORE, AND THEN BUILD SEVEN EXAMPLES OF THE FINISHED PRODUCT, ALL IN JUST 15 MONTHS? NO TIME TO WASTE, THEN. EV ENGINEERING – EVE FOR SHORT – BEGAN WORK IN MARCH 2011, JUST DAYS AFTER THE FEDERAL GOVERNMENT DECIDED TO

support the project with a \$3.55 million grant. The 'production' cars are scheduled for delivery in June 2012. They'll go to the consortium of businesses, most of them automotive component suppliers, who are EVE's other source of support, for long-term and carefully logged use in the real world.

The EVE Commodore project, just 16 strong when I visited its workshop (in space borrowed from component maker Futuris), has been a magnet for engineering talent. There was never any need to advertise, says chief executive officer Ian McCleave, formerly a senior Holden exec. One of the project objectives, he stresses, is to demonstrate Australia's readiness to compete in the new world of electro-mobility.

Robert Dingli takes a break from tinkering with drivetrain parameters to talk about how an EV is different. The senior powertrain systems engineer has worked for both Ford and Holden, and will soon also have a PhD from Melbourne University after his name. An electric motor is

"We try to double, triple, quadruple the safety features," says Jens Birkan, who masterminded the design of the 400kg, 30kWh battery pack. The German with an engineering PhD worked on hybrids at BMW before moving to Australia and a powertrain validation job at Holden. "Should have done it sooner," he says quietly. At EVE, he's helped come up with a new way to attach busbars, the rigid metal bars that serve as the electrical links between the individual cells, by modifying their terminals for threaded fasteners. "This seems to be something unique," he adds. That would be why the innovation has been patented.

Cameron Hudson, recent Melbourne University mechanical engineering graduate, is fascinated by the motorsport potential of electric tech. At EVE, he's been given big responsibilities; design work on the quick-swap connector between swappable battery pack and vehicle, packaging the power electronics module, devising a rig to compress the battery cells into dimensionally stable modules



Voltswagon?

There's no reason one or more of the EVE Commodores (Wheels, January) couldn't be a wagon. While both the development mules are sedans, chief engineer Tim Olding says the battery electric drivetrain will slot into a Sportwagon just as easily.

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easier to manage than an internal combustion drivetrain, with its spark timing, fuel delivery, cam angles and multiple gear ratios, he explains. "Controllability is so much easier," says Dingli, "but managing the battery is much more complex than managing a fuel tank." One cell is simple, but the 210 individual lithium-ion cells that make up the EVE Commodore's battery pack, well, that's a different matter. Good management is essential, for obvious reasons. "If you keep a battery in its comfort zone," says Dingli, "it will last a long, long time."

for assembly into the completed pack.

There are reasons to be concerned about the future of car manufacturing in Australia. Right now, things are very tough. The factories of Ford, Holden and Toyota are all running below capacity. Imports, thanks to the strength of Australian dollar, are less expensive than ever. EVE demonstrates Australians can accelerate quickly up to speed with new drivetrain technology, no problem. But it's also a reminder of the high-grade know-how that would surely disappear, in time, if our car industry dies.

