

**Global Green Challenge notes, Simon Hackett interview, ABC 891,**

*This is an abridged version of the interview that was broadcast on ABC 891 after 2.30pm on Monday, October 19, 2009*

**Sonya Feldhoff**

This Sunday, kicking off for many revheads, is the Global Green Challenge event, from Darwin to Adelaide. To find out a little more about it is Simon Hackett, our green leader and gadget man, to tell us more about it. Hello Simon.

***Simon Hackett***

Hi Sonia, how are you?

**Sonya Feldhoff**

You're also managing director of Internode, but this must be your playtime bit.

***Simon Hackett***

Yes, correct. It is definitely good fun.

You described it as a revhead event. It's kinda not and kinda is. This is an "eco revhead" event. This is where revheads go when they get over the V8 noise and decide to do something different for high performance.

**Sonya Feldhoff**

I must say that I've been told – as a mantra – that you can never replace the throb of a V8.

***Simon Hackett***

Yes, it is interesting what you get used to.

I must say that, having driven this car around a racetrack a while already, it's a lot of fun and you get used to it. It's got its own sound - it's got a sound like a quiet jet engine. It's a kind of whining noise that spins up like a supercharger coming from the electric engine. It's a lot of fun.

**Sonya Feldhoff**

When we say "this car" we better describe what this car is. This car is an electric vehicle which is part of the Global Green Challenge, which is like the Solar Challenge gotten bigger, isn't it?

***Simon Hackett***

Let me put it in context.

The World Solar Challenge has been around for decades: It's a race from Darwin to Adelaide in solar-powered vehicles. What this event has done is to broaden its ambit. It is now called the Global Green Challenge.

The World Solar Challenge is still in there, and there's a second event which is called the Eco Challenge. The aim is to connect all those esoteric solar cars with the real world by running cars that you would actually see on the road and you could actually drive.

**Sonya Feldhoff**

So they are not these things that look like space machines.

***Simon Hackett***

No, these are real cars, they are hybrids, they are various sorts of high efficiency cars: Mine is a pure electric vehicle, a sports car, called a Tesla Roadster.

**Sonya Feldhoff**

Simon has brought in a picture of a red roadster and I reckon anyone who has thought that an electric car was a bit frumpy would have to change their mind when they saw this particular car.

***Simon Hackett***

Right. This car is the only production full-electric vehicle in the world at the moment. I literally bought this car in California, from Santa Monica Boulevard, from the Tesla store, put it on a jumbo jet and flew it out here.

To give you a scale, this is not a golf buggy: This can go from 0 to 100 kph in 3.9 seconds.

That's faster than anything south of half a million dollars in a conventional car.

**Sonya Feldhoff**

I don't think anyone thinks of that sort of performance when they think of electric cars.

***Simon Hackett***

That's the whole idea. This car is built as a paradigm-buster. It's Silicon Valley's answer to the golf cart image – which is to bust it completely.

**Sonya Feldhoff**

From 0 to 100 km/h in 3.9 seconds – that from go to whoa – from a standing start.

***Simon Hackett***

It's amazing - it's an enormous push in the back – from a standing start. There are no gears to change, it has got a single gearbox, so it doesn't change gears. So it just pushes and it doesn't stop. It's an amazing beast.

It's driven off the energy equivalent of 1000 laptop batteries. It really is Silicon Valley's answer to the motor car. It has got lithium ion batteries in it, the same sort that a laptop uses, so you just plug it in at night and in the morning you have 390 km of range and you go driving.

**Sonya Feldhoff**

So when you say you plug it in at night, this is into a normal power plug?

***Simon Hackett***

You can use a normal power plug and it takes a bit longer to charge. Or you can use a big fat power plug and it charges a bit quicker. But either way it's full by morning.

**Sonya Feldhoff**

That's amazing.

***Simon Hackett***

Yeah, isn't that cool.

I'm a fan of electric vehicles from way back in the mid 80's. I drove them in the States 10 years ago in the last coming of them. And so I want to get people to see this thing to see that they're real.

**Sonya Feldhoff**

Where you a car person before you got into the electric cars?

***Simon Hackett***

That's a good question. Yeah, I sort of was. Ten years ago I bought an old Ferrari that I used to lust after as a university student. A 1985 Ferrari. This thing beats the heck out of it. And so it's changed my view on what a sports vehicle can be. It's an amazing beast.

**Sonya Feldhoff**

Now Simon, you're taking this particular car, the Tesla, in the Global Green Challenge. So you're going to be driving from Darwin to Adelaide, along with a lot of other cars in the Global Green Challenge.

***Simon Hackett***

Correct.

**Sonya Feldhoff**

What are you expecting from it? What kind of speeds will you go, how long will it take?

**Simon Hackett**

The challenge takes place over six stages of between 300 to 700 km each day. The idea is to demonstrate that if you can approach having the appropriate recharging infrastructure, and you have that infrastructure on the highway system, you can drive at normal highway speeds and treat it just like any other car. So to make it work in this event, we're simulating the recharging infrastructure: We've actually got the generator on the back of the truck and we're taking it with us. We're sending that out ahead of the car to be at the recharge point we want.

So what we're saying is, imagine a world where people have put the recharging infrastructure out there. And companies like Better Place, an Israeli company, are actually going start doing that in next Australia in the next couple of years. Given that recharging infrastructure is available, can the cars cut it? Can you drive one from Darwin to Adelaide and make it? My aim is to prove that point. And this is the perfect event for it. This event is about proving whether you can do that with alternative energy cars.

**Sonya Feldhoff**

We'll go back to the event in a minute but let's talk about that. Imagine we're 10 years down the track, 20 years down the track, would this be like a petrol station? We would have recharging facilities at various substations.

**Simon Hackett**

Yeah, just like a petrol station.

**Sonya Feldhoff**

And you would pay for the power that you use.

**Simon Hackett**

Yeah, just like you pay for petrol now. This interesting Israeli company is doing this. And they'll put charging stations in your house and in your office, but more importantly if you're really caught short, they'll be building a network of battery-swapping points. So the cars that're going to use this will literally have the batteries under the belly of the car and we drive to the equivalent of a McDonalds drive through and 35 seconds later it has swapped the batteries over.

**Sonya Feldhoff**

Sort of like SWAP'n'GO with swapping your gas bottles over.

**Simon Hackett**

Precisely like that. You got it. It's the answer to your recharge problem if you get caught short. Most of the time, it's not a problem because it's full if you plug it in at night like your mobile phone and drive out in the morning with it full. But if you do get caught short or you want to go a long way, you either need a recharging place with a lot of power - which is what I've brought on the back of the truck - or swapping the batteries like the SWAP'n'GO. All those things are all coming.

**Sonya Feldhoff**

Phenomenal, isn't it? Now the event itself, the Global Green Challenge, is one of those things we see it when it comes in, but we don't think about it till it's here. What do you see that it's achieved over the years? And hopes to achieve in the future?

**Simon Hackett**

Right, the Solar Challenge has been running for decades and it's been there to prove that solar electric energy can do efficient things. But the actual solar cars racing in it are still not practical road vehicles for everyday use. There's a mass of panels under a very aero shape body. This new part of the event. this expansion with the Global Green Challenge, is designed to drag conventional manufacturers into the frame here and encourage them to connect that "esoteria" into something that you can really drive.

**Sonya Feldhoff**

Are they that open to that do you think do you think manufacturers are moving towards that?

***Simon Hackett***

Absolutely. Tesla has set the manufacturing world on its head. And every major manufacturer has now rushed off to go dust off their old plans for electric vehicles. So in the next five years, you'll have 10 companies you can get an EV from in Australia. What has changed is batteries. In the last 10 years, it's literally laptops that have made the batteries cheaper that have got the range to work properly. And now they just go.

**Sonya Feldhoff**

So if we could the efficiency, though what about the affordability?

***Simon Hackett***

That, again, is an exercise in... in fact, the battery swapping stuff is one of the ways to solve that problem. People think batteries are expensive, they're not if you compare it to the lifetime cost of petrol. But people aren't used to thinking about the total cost of ownership: They just think about what the car costs up front. The batteries and the power used for them is way cheaper than the petrol money you spend. So that swapping model is literally you're paying for kilometres.

You buy the car but you borrow the batteries, that's the model, so you shield that cost and correctly represent it. To give you a sense of scale, it costs about \$3 to charge this car from empty on today's power costs.

Current power prices because electricity is so much more efficient than petrol. Most of the petrol you put in goes away as heat, so that massive difference ...backs against the expensive cost of batteries and it actually works out cheaper over all

**Sonya Feldhoff**

Chris rang and said the Tesla featured on TV's Top Gear a little while ago and Jeremy Clarkson and his mates weren't all that happy with the battery endurance, didn't give many hours of motoring. What do you think about it Simon?

***Simon Hackett***

Yeah, it was interesting that particular segment is a subject of much contention, the BBC have - to cut a long story short - they agreed in the end it was done for entertainment rather than reality. They simulated it running out of energy.

Which if you listen to Jeremy's words he was actually explaining what it would feel like if you did run out of electricity and the answer to that is, of course, the same as if you run out of petrol. But it was simulated.

I've run that car around race tracks all day without running out of juice. It actually works very very well and, not surprisingly, if you drive it hard, it doesn't go as far - just like a petrol car. But if you drive it normally, it does almost 400 km.

**Sonya Feldhoff**

After a night's charging?

***Simon Hackett***

Yeah, on a full charge.

**Sonya Feldhoff**

That's not too bad.

***Simon Hackett***

Most of us don't drive that far in a day.

**Sonya Feldhoff**

What damage does the manufacture of these batteries do to our atmosphere in comparison to the pollution the petrol produces?

**Simon Hackett**

Yeah, it's a really interesting question, and there's a whole conversation about the relative efficiency of these things versus petrol. The long and the short of it is that these things generate - in the worst way to measure it - about half the carbon that driving a car does in terms of distance you cover, even if you charge it on nasty brown coal. And if you use a renewable energy source it generates none at all.

So it starts as twice as good in terms of the cycle end-to-end the amount of carbon you put in the atmosphere driving a certain distance and goes down to zero once you find other ways to generate the power. So the difference is, it starts good then gets better.

**Sonya Feldhoff**

But what about producing the batteries?

**Simon Hackett**

For batteries, you mine the minerals and you produce the battery. The cool thing about the batteries is the esoteric stuff they're based on is actually recyclable. So once the batteries degrade to the point where it won't behave itself properly, you can actually start again. Just like you recycle an aluminium can, you can actually build new batteries from them.

**Sonya Feldhoff**

So you're not denying that it does pollute to create the batteries, but what you're saying is that once they're already there...

**Simon Hackett**

Right, you can keep re-using the lithium to make new batteries. The same sets of batteries. It's a complicated issue, but the other thing to say is that we're at the very start of the use of electricity to power cars directly and we're at the very end of using petrol power. So it's already good and it'll get better. It's the early days of this stuff.

**Sonya Feldhoff**

Marty asks us; how many kilos of batteries does it have and what voltage is it running?

**Simon Hackett**

This particular car is quite interesting: It uses 450 kilos of batteries. The car has been built as a lightweight car with carbon fibre panels all over it. That 450 kilos of batteries go in to the totals 1250 kilos for the car, which is a little bit heavier than the equivalent sports car of it size. Those batteries are actually 6831 little cells of the same sort that goes into laptops, all put into a big pack and it does the job, it does the job perfectly well.

**Sonya Feldhoff**

Does this car have all the normal sports car features like stability control, ABS traction control, is it front or rear drive? And how much does it cost?

**Simon Hackett**

It has all the creature comforts of a conventional car so, cruise control, stereo, ABS, heated seats - it comes from America where they care about that sort of thing - air conditioner, all of the usual stuff. If you go to [www.tesla.com](http://www.tesla.com) you can see a list of the specs.

The answer to what they cost is US\$110,000, so call it A\$160,000. Which sounds expensive till you realise it outperforms a \$500,000 Ferrari, so, in its league, it's actually dramatically cheap. The key thing is Tesla has made this car to change people's perceptions.

The next car they'll start making in two years time is a sedan. The sedan will be about US\$55,000, seat five people, do 500km and have more storage space than Tribeca I currently own.

**Sonya Feldhoff**

So this is the sexy one to grab people's attention?

**Simon Hackett**

Right and the next one, the sedan, will cost about as much as the Tribeca I own and actually outperform it in every regard. They'll be making that in about two years from now. That's the one where they start reaching real people and really changing things.

This is the sharp end of the spear.

**Sonya Feldhoff**

Rob's given us a call. Hello Rob.

**Rob**

Our mid-term alternative energy sources are really only oil, coal or electricity. Electricity has a good distribution network, Solar Challenge proves you can make the stuff for free if you put the effort in, but where are we going to get all the base load of electricity to charge up your car - because everyone seems to be anti-coal power stations and nobody likes the idea of nuclear. which seems to be the alternative to me

**Simon Hackett**

It a great question. And it's got a really interesting answer which is because electric cars are generally charged at night, you go home and plug them in and in the morning they're full, you're actually charging them almost all on off-peak overnight electricity. Now the reason that's cheaper is because even when it's coal-fired that's actually produced with spare capacity in the generators.

Generators can't be spun down at night because they take to long to spin up during the day. So at night, they're actually wasting an enormous amount of power and burning an enormous amount of coal just to keep them warm. So you're charging up overnight with otherwise wasted electricity. So believe it or not, even with dirty brown coal, you're not actually making the carbon footprint worse if you charge overnight.

I've seen a report that suggests that in the US as an example, if all the cars were magically electric overnight, 75 per cent of them could be charged without building one more power station in the US, and I'm sure the same is true in Australia, because you're charging them overnight when there's almost no demand on the power grid.

This is actually a superb example of time-shifting in terms of energy, The power network is actually built for two hours in the middle of summer when its 47 degrees outside. Overnight, it's idle, it's wasting its capacity, it's sending most of it up the chimney as smoke.

**Sonya Feldhoff**

So what voltage is the Tesla running at?

**Simon Hackett**

The Tesla winds up at about 375 volts that come out of the batteries. It's converted into an alternating current, it's an AC motor because AC is the most efficient way to run these cars. I'll give you another sense which is amps. When you put your foot down hard and accelerate, it draws about 700 amps, which really is quite a lot, and when you press the brake pedal down hard, it actually slows the car down by charging the batteries up again, it puts 90 amps back in the battery, so it hardly uses its own brake disks.

One of the things the service industry hates about electric cars is that the brakes don't wear out and there's no oil to change. Really, all you've got to do is make sure you change the windscreen washer fluid occasionally. They're incredibly reliable because there's almost nothing to break.

**Sonya Feldhoff**

I was always told the light globe, they could actually make one that would break before it ran it out, it's just that there wouldn't be any money in it. Let's go to Bob now

**Bob**

You say that they can travel 390 kilometres on a full charge: Is that with or without the air conditioner on. And also what travelling speed would that be?

***Simon Hackett***

That's the US EPA standard driving cycle number for it, so it's whatever the US EPA uses for determining the standard range of a car, so it includes a variety of speeds and positions.

It's with the air conditioner off. If you run the air conditioner, it will get shorter range - just like a petrol car: If you drive it slower, you'll go further: If you drive it faster, you'll go less of a distance - just like a petrol car.

**Sonya Feldhoff**

So what is your experience with just driving round the tracks and things like that?

***Simon Hackett***

Driving it hard around the track, it doesn't go nearly as far - just like a petrol car. What's going to be fun about driving it from Darwin to Adelaide is answering exactly this question by driving in the real world, driving at highway speeds, covering a lot of distance, what you really achieve? That's the fun of it

**Sonya Feldhoff**

What do you estimate from your experience driving already?

***Simon Hackett***

From a performance curves it generates, the optimum speed of travel is about 100km/h, then this car can be charged at three hours from dead flat with the mobile generator I'm using.

So you can drive at 100km an hour till its empty. Go on a slightly long lunch break and then drive another 300km after that. So you know 6-700 km in a day seems realistic to do without stretching the point too much.

**Sonya Feldhoff**

How do you spell it Tesla for people who want to look it up?

***Simon Hackett***

T-E-S-L-A. Tesla Motor. The website is [www.Teslamotor.com](http://www.Teslamotor.com). Tesla is named after a physicist, Nikola Tesla, who invented the concept of alternating current power

**Sonya Feldhoff**

And Luke wanted to ask what future safeguards are in place to ensure future power supplies don't get ridiculously expensive burdening recharge costs?

***Simon Hackett***

Interesting question, isn't it? The nice thing is we live in a world now where there is huge pressure to find alternative ways to produce power, including literally generating it off your own roof with wind or solar panels. So the good news is the renewable energy industry is the cost control on the conventional energy industry because the renewable energy industry is more expensive to generate power that way today. But it represents a level above which the conventional industry can't rise otherwise they'll lose business to renewables.

So there's already a ceiling that may be twice what the currently power cost is, which, in that incredibly worst case, will would make it dramatically cheaper than petrol.

**Cedric**

With the solar panels, I feel that we haven't even scratched the surface in regard to how much power we get generated from them. I suggest we could be using them with a series of mirrors with magnifying glasses to intensify the sun's rays to explore a deeper evolution of knowledge that would power a car a lot further than it does today.

***Simon Hackett***

Yeah, it's a good point. As I mentioned earlier, the petrol industry and the use of petrol powered cars is the far end of 100 years of development. The industry to develop electricity from other sources is really, in a sense, at its very start. It really does just get better from here.

**Sonya Feldhoff**

Fantastic well Simon, thank you for coming in. There's obviously a great deal of interest and it might be worth us getting you in again after the event.

***Simon Hackett***

Well I was talking to the producers here, what we're actually going try to do is when the event is on, I'll try to call in on the satellite phone out on the track and tell you how I'm going.

**Sonya Feldhoff**

Wonderful, well good luck and enjoy.

***Simon Hackett***

Thank you.

**Sonya Feldhoff**

Simon Hackett, managing director of Internode, who is going to be part of the Global Green Challenge.