

# World's Longest Solar Race in SA

On Tuesday 7 October, a fleet of odd-looking vehicles rolled into Pretoria after an epic two-week, 4.175km round-trip across South Africa's heartland and back along its coastline. This was the end of the inaugural South African Solar Challenge, the longest and toughest solar-powered race in the world, and the first sanctioned by the Federation International de l'Automobile (International Automobile Federation, or FIA).



Setting off from Pretoria in Gauteng province on 28 September, the race covered the 530km to Kimberley in the Northern Cape by that evening. The next day they headed to Beaufort West, and the next to the coastal city of Cape Town, where the cars were on display in Canal Walk shopping centre on 1 October.

The route back to Pretoria took the long way, east along South Africa's coastline via Plettenberg Bay, East London, Port Shepstone, Durban and Ermelo.

The South African Solar Challenge is similar to those run in the US and Australia for years, but with the distinction that it is sanctioned by FIA, the body that administers all motor sport including Formula 1 racing.

The Australian and US races predate FIA's interest in alternative-fuel racing, so they have their systems well established. Because the South African Solar Challenge is a brand new event, FIA was on board from the beginning. It's probably only a matter of time until the other big solar races fall into line with FIA requirements, or the association alters its requirements to accommodate the established races.

## Energy Efficiency

While the race is probably the most exciting, and certainly the most visually interesting, part of the event, it is in fact a small aspect of it. What it's really all about is designing and building the cars. These are not production vehicles – every one is designed and built by the team that races it, and most teams are attached to universities or alternative energy technology companies.

Efficiency is more important than speed, as solar cars are effectively electric cars, constrained by battery technology. Batteries have 50 times less energy density than petrol. A litre of petrol weighs a bit less

than a kilogram, and that will take the average car about 10km. One kilogram of fully charged battery, however, will take a car of about the same weight no more than a couple of hundred metres. In order to race an electric car 4 000km, you need to regularly recharge the batteries, hence the solar panels. So the race is not judged on speed, but on distance covered.

Each car is accompanied by a trailer and, if they run out of power, they can opt to get back on the trailer and get credit for the mileage they've done, or they can stop and wait for the batteries to recharge.

The more experienced drivers plan their energy consumption in such a way that they never run out of power, by driving slower, planning their stops and understanding the energy losses in the total system. If the weather is particularly bad or the road conditions unsafe, the organisers can call for all vehicles to be trailered.

All the vehicles, regardless of class, have to have effective brakes and regulation lights. But they aren't actually roadworthy, so each car is sandwiched between two escort cars to protect them from careless fellow road users, and protect other road users from them.

In a previous solar race elsewhere, one of the cars had brake failure, but – fortunately – only crumpled its nose against its escort vehicle. What would be more disastrous is for an 18-wheeler to drive over one. They're hard to see – being close to the ground, streamlined and almost invisible as the top surface is covered in dark, reflective solar panels. The top of some cars wouldn't even reach the wheel nuts of a big truck.

### **Challenge, Adventure and Technology**

The race has three categories: Challenge, Adventure and the rather anomalous but exciting Technology Class, or Green Fleet. This last is open to either production vehicles using alternative fuels, or one-off designs. But the first South African Solar Challenge had only one entry in this class – a hybrid motorcycle from Malaysia.

Winstone Jordaan, the event organiser, said that he hoped that in the next event, scheduled for 2010, commercial vehicle manufacturers would use the race to showcase their alternative-fuel models. By then there should be many more alternatively powered cars on the road, so this class could become seriously competitive.

The Challenge Class is the most demanding, as the cars need to be a bit more “normal”. They must have a sit-up seat, not a reclining one, and generally be something that most people could actually imagine driving. Of the two leading vehicles in the race, that belonging to Team Sunna and designed, built and driven by Divwatt was the only one to qualify for this class.

The Japanese entry, designed by engineering students from Tokai University, is by far the fastest and most efficient car in the fleet. Competing in the Adventure Class, it was the overall winner and an

inspiration to the other competitors.

At 11 years old the vehicle is a solar-race veteran, and the Japanese team exudes an air of professionalism that shows they have been doing this for some time. While most of the other drivers are students, alternative technology buffs or engineers, the Japanese team has a string of five professional race drivers – all capable of doing repairs on the vehicle – as well as a small battalion of engineers.



### **The Spirit of the Race**

While it is an actual race, the spirit of the event is not particularly competitive. There were only six teams and, by the time they had reached Cape Town, only two cars had managed to run under their own steam – or sunshine. Most were plagued by technical or logistical problems.

The two Indian teams were struggling to get their cars through customs into the country in time. In the spirit of the event they were hoping to drive a leg or two, even if they had no chance of winning. Two of the three South African teams had technical problems they were hoping to sort out so that they could, at least, do some of the race.

Hermann Oelsner, the owner of Silver Fox, relates how Georg Brasseur, the FIA technical representative, stayed up until early in the morning trying to help him sort out his technical hitch after his car blew up its controller at the start. A few sparks, a fizz and then a sinking feeling as, after an exhausting resuscitation attempt, the phrase dreaded by every car owner was said: “We need this one small part ...” This particular part had to come from Germany.

It hadn't arrived by Wednesday 1 October and Oelsner decided to take his car back home to Darling, where he runs South Africa's first privately owned wind farm, which supplies electricity to the City of Cape Town. Even though the vehicle had done no actual mileage, he said, he had learned a lot on the race and will come fully prepared in 2010 – probably with a huge box of spare parts in the support vehicle.

Being the first time the event was run, all involved have used it as a learning experience – the organisers and the competitors.

“It's a huge learning curve,” Jordaan said. “We've had no sponsorship so we haven't managed to do much in the way of publicity or marketing, but we're hoping to rectify that in 2010.”

The organisers had hoped for more international competitors, he said, but the top teams stayed away because there was little in the way of exposure or kudos. They'd had a few nibbles but, Jordaan thinks, perhaps the course put them off.

## **Tough Going**

It's not only the longest solar-powered race in the world, it's the toughest. It's mostly downhill from Pretoria to Cape Town, but the Hex River Mountains outside Cape Town pose a challenging barrier, with some nasty climbs. Getting out of Cape Town via the coast means negotiating Sir Lowry's Pass and Houwhoek Pass, both high, steep and twisted.

There are a few bumps and grinds further along the coast, such as the notorious Kei Cuttings in the Eastern Cape. And it's all uphill from the coast back up to Gauteng. So not having much to gain and everything to lose if the terrain proved too taxing, the really competitive teams stayed home.

The event was held as a stage race, with all the teams leaving together and spending each night in the same place. The organisers therefore had to make a call to put the vehicles on the trailers if it looked like they were not going to make the daily target.

Ideally the teams should have all set off and kept going, spending the night wherever they ended up at sunset. But the logistics of this were too complicated with the resources the inaugural race had at hand.

An advantage of this was that all the cars were in one place, so locals could come and have a good look. There was a surprisingly good turnout at Canal Walk in Cape Town, with fascinated onlookers asking the team members all kinds of questions – a good advertisement for alternative energy.

Once the race is more established, and there are more resources, it will be run as a straightforward race, with each team heading off on their own with the leaders quite possibly finishing days ahead of their competitors.

By the afternoon of Friday 4 October, the race was almost in East London, a coastal city in the Eastern Cape. With glorious sunshine to push them on, the Japanese team was ahead of the organisers, who were flirting with speed limits to catch up to them.

“Oh well,” Jordaan said, “it won't be a total disaster if they get there before me, but it would be a bit embarrassing.”



It was later discovered that the Japanese team followed some incorrect road signs and went via Grahamstown instead of Port Alfred. This was a far more complex climb, with worse road conditions, but they completed it like champions.

Sunday 5 October saw the shortest stage – 128km from Port Shepstone to the Gateway shopping mall north of Durban. Not a single sunbeam broke through the clouds and there was heavy rain for most of the distance, but the Tokai University team drove the whole way on battery power, averaging a speed of about 45km an hour – much less than they can do with sunshine. It was good to have one car, at least, drive up to Gateway and through the parking lot with its trailer following empty.

The Indians got their vehicles through customs on Sunday and, after a long night of scrutiny, the Netaji Subhas Institute of Technology car was passed for racing. The other Indian team Delhi College of Engineering was held back because the wiring was not up to standard, and might pose a danger in the case of an accident.

So on Monday four cars headed off towards Ermelo and then, on Tuesday 7 October, continued to Pretoria. That was where the Japanese car – to nobody's surprise – passed the finish line first and, more importantly, registered by far the longest mileage.

Photo: Zealous.co.za

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