

Formula E Ends First Season Wheel-to-Wheel

By Lucas Laursen

Posted 29 Jun 2015 | 16:57 GMT



Photo: Lucas Laursen

Formula E (<http://www.fiaformulae.com/>), the electric version of Formula One racing, completed its first season this weekend in London with back-to-back races. NextEV driver Nelson Piquet Jr. (<http://www.fiaformulae.com/en/drivers-club/nelson-piquet.aspx>) came from behind to win the series driver championship and Virgin Racing driver Sam Bird (<http://www.fiaformulae.com/en/drivers-club/sam-bird.aspx>) also came from behind to win Sunday's tight race.

Spectators cheered whenever drivers tried to pass, but few drivers succeeded. At Sunday's race first-time Formula E spectator Fred Turrettini, already a Formula One fan, said he liked that the leafy Battersea Park circuit was so narrow. His wife Laura added that she liked that the race was electric.

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Drivers themselves may have different feelings about the electric aspect: The driver who actually finished the race ahead of Bird, Stephane Sarrazin, used his regulation 28 kWh energy cap before crossing the finish line and suffered a 49-second time penalty (<http://www.fiaformulae.com/en/news/2015/june/bird-wins-in-london-as-piquet-clinches-title.aspx>). Such infractions have occurred throughout the season, showing just how much Formula E depends on energy and electricity management.

The Formula E series has both an overall energy-usage limit and restrictions on the amount of power output drivers can use throughout the race. Drivers can recharge their batteries a little while coasting and braking, and must manage their battery's thermal profile, since power output and charging capacity depend strongly on battery temperature. (For more background see *IEEE Spectrum's* story on the series launch: "[Electrifying Formula One](http://spectrum.ieee.org/transportation/advanced-cars/electrifying-formula-one)" (<http://spectrum.ieee.org/transportation/advanced-cars/electrifying-formula-one>).)

Plenty of non-electronic factors remain important. Chassis tuning, for example: The road in Battersea Park has an unusual amount of camber, and at least one low-riding car burnt part of its chassis against the road during the first practice runs. The circuit conditions matter a lot, too: a crack in the road at the first corner broke the suspension on a Mahindra team car Saturday morning, forcing organizers to cover the crack with concrete barriers during Saturday afternoon's qualifying laps and race. And this being London, a few minutes of rain slicked the track during Sunday's qualifying laps. The track crew also had to use leaf blowers to clear the circuit just before race time.

This weekend's races were the tenth and eleventh in the season, which began with a [crash](http://spectrum.ieee.org/tech-talk/transportation/advanced-cars/formula-e-opens-with-a-crash#) (<http://spectrum.ieee.org/tech-talk/transportation/advanced-cars/formula-e-opens-with-a-crash#>) in Beijing last September. The e.dams-Renault team, whose driver [Nico Prost](http://www.fiaformulae.com/en/drivers-club/nicolas-prost.aspx) (<http://www.fiaformulae.com/en/drivers-club/nicolas-prost.aspx>) took the blame for the Beijing crash, came into this weekend leading the field by a large margin and held onto its lead to win the team championship. Formula E offers separate championships to drivers: Nelson Piquet Jr. snagged it by one point from e.dams Renault's other driver, [Sébastien Buemi](http://fiaformulae.com/en/drivers-club/s%C3%A9bastien-buemi.aspx) (<http://fiaformulae.com/en/drivers-club/s%C3%A9bastien-buemi.aspx>), who won Saturday's race (<http://www.autocar.co.uk/car-news/motorsport/s%C3%A9bastien-buemi-wins-opening-formula-e-race-london>).

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This year all ten teams in Formula E used the same hardware. Amlin Aguri technical director Peter McCool says "That's why we get such good close racing."

Next year, teams will be allowed to choose from different electric powertrains. [Eight manufacturers](http://www.fiaformulae.com/en/news/2015/february/eight-manufacturers-to-enter-fia-formula-e-from-second-season.aspx) (<http://www.fiaformulae.com/en/news/2015/february/eight-manufacturers-to-enter-fia-formula-e-from-second-season.aspx>) have already stepped forward, while some teams have committed to fine-tuning the existing motor.

Batteries, which one mechanic in the pits called "our biggest headache", may come into play in the third season. In the meantime, teams will continue to tweak their race strategies to avoid overheating the existing batteries. And Williams Advanced Engineering, which built the custom batteries on very short notice, will produce new cells for next year's series, says its chief technical specialist for Formula E, [Okan Tur](https://twitter.com/okantur) (<https://twitter.com/okantur>).

The chassis may be the last thing to change. Series founder [Alejandro Agag](http://www.addaxcapital.com/en/services/addax-about-us.html) (<http://www.addaxcapital.com/en/services/addax-about-us.html>) told reporters at a press conference Sunday that if they wanted to see a championship about aerodynamics, they could look to Formula One. "Formula E is to experiment with batteries and electric cars," he said.

Look for more on this season's lessons for Formula E's next season in an upcoming story in *IEEE Spectrum*.



Photo: Lucas Laursen