



# Formula E is back in action



Happiness—Alejandro Agag’s electric single-seater series is growing rapidly



Da Costa dominates the first round of the 2018/2019 Formula E

# GPTECHNICAL newsletter

Formula E is back in action! It is quite unbelievable that the all-electric series has already commenced its fifth season. The initial pessimistic voices and ill-omened sounds have proved untrue. Formula E is growing with every day passing and its audience is increasing steadily. It manages to entice people who were disbeliever at its birth.

At first, even the giants of the automotive industry were skeptical, but the electrification trend seen over the last years has already enticed manufacturers like Audi, Nissan, Jaguar and BMW while Mercedes is about to join the series next year. Eight of the total of twenty-two drivers have raced in Formula One before which also shows that the current top drivers of the motorsport also find the electric series interesting enough to participate in.

The fifth edition of the Formula E endures a raft of changes. The series is still sanctioned by the FIA and controlled by the founder Alejandro Agag. However, the all-new Gen2 car features significant technological advances over its predecessor. Next to its futuristic and sexy look, the new machine is equipped with a more powerful engine, enabling higher top speeds. With the new car, the series also sees the end of the much hated mid-race car swaps.

The series will be accompanied by the Jaguar I-Pace eTrophy. The inaugural season of the support series will see entrants compete with race-spec Jaguar I-Pace machines. The concept of the series was unveiled at the Frankfurt Autoshow 2017, defining itself as a battery electric zero-emission international motor racing series. The cars are built by Jaguar's Special Vehicle Operations team which works in conjunction with M-Sport. The series will race at the same circuits as the Formula E championship, albeit not on its every single race weekend.

We dedicate the fourth issue of the GPTechnical magazine to the fifth season of the Formula E Championship.

**Balázs Szabó**

Editor

szabobalazsf1@gmail.com



## Race calendar for the 2018/2019 season

- 1 **Ad Diriyah ePrix**-Saudi Arabia-5 December 2018
- 2 **Marrakesh ePrix** Morocco 12 January 2019
- 3 **Santiago ePrix** Chile 2 6 January 2019
- 4 **Mexico City ePrix** Mexico 16 February 2019
- 5 **Hong Kong ePrix** Hong Kong 10 March 2019
- 6 **Sanya ePrix** China 23 March 2019
- 7 **Rome ePrix** Italy 13 April 2019
- 8 **Paris ePrix** France 27 April 2019
- 9 **Monaco ePrix** Monaco 11 May 2019
- 10 **Berlin ePrix** Germany 25 May 2019
- 11 **Bern ePrix** Switzerland 22 June 2019
- 12/13 **New York City ePrix** United States 13/14 July 2019

# DA COSTA shows that he is still capable of greatness

By the start of the race the standing water had cleared, with some areas of damp remaining. The attack mode allocation was announced ahead of the race with drivers required to use the boost twice in the race, each use of the high power mode lasting 4 minutes.

Even before the start Da Costa made a mistake, lining up on his pole slot after a burnout at an angle and facing the outer wall, he managed to retain the lead though as Lopez made a poor start from second - dropping behind Buemi into the first turn. Mortara was again in the wall on lap 1 with what appeared to be a repeat of the braking issue which affected him in practice, losing his front wing but also a lap after he had to pit to replace the front end of his car. Felipe Massa was immediately on the attack after a poor qualifying, passing Abt and Piquet for 10th in a 3-wide move. Lopez' poor start continued as he was passed by the Techeetah's of Vergne and Lotterer, dropping him to 5th.

The first drivers to arm the all new attack mode were the NIO's of Turvey and Dillmann on lap 7, who were both recovering from their respective grid penalties, with Turvey able to pass Guenther. Felix Rosenqvist's Mahindra then stopped on track on lap 8, and ended to a poor weekend including 2 crashes in his swansong before departing for Indycar. Vergne was on the attack, visibly able to carry more speed into the corners he passed Buemi for 2nd around the outside of turn 18, a move he repeated 5 laps later against Da Costa for the lead.

The new HWA team were enduring a nightmare start to their Formula E campaign when Paffett stopped on track with 31 minutes left, Massa was shortly passed

Vandoorne, who had by this point dropped 6 places from his start slot, and would eventually finish last but 1 with Mortara a lap down.

The Nissan of Buemi looked to be struggling to maintain speed as he dropped off the back of Lotterer, forming a 3-way fight for 4th with Lopez and d'Ambrosio. The three-time WTCC champion attempting to pass Buemi into the turn 18 chicane, but overshot almost losing out to d'Ambrosio in the process. The Argentinean made it past the Nissan a lap later, with d'Ambrosio opportunisticly following through. Lotterer was the first of the lead group to arm the attack mode as he copied his teammate in passing Da Costa for 2nd, but it was then that drama hit for a number of cars, Vergne, Lotterer, Sims and Massa all being given drive through penalties for exceeding 250 kW on regen. Da Costa regaining the lead with Lopez and d'Ambrosio filling the podium as the penalties were taken.

Lopez then was the first driver to fail when arming attack mode, missing the activation line by some distance. By driving so far off line without getting any benefit he was passed by d'Ambrosio. The next lap both attempted to arm attack mode, d'Ambrosio successfully, while Lopez again missed - this time Lopez lost a place to Vergne, who had already recovered to 4th after his penalty. Lopez then compounded his mistakes by breaking his rear left suspension on a wall which for-

ced him to retire. The full course yellow, and then full safety car had to be called to remove his damaged Dragon car, with just under 10 minutes + 1 lap of the race remaining.

When the safety car pitted there was just 3 minute 50 seconds + 1 lap remaining in the race, Da Costa, Vergne, Evans, Lotterer, Abt, Piquet, Sims, Massa, and Mortara all armed their final use of attack mode as the safety car signalled to pit. What followed was a mad-dash to the finish with various power strategies at play. Vergne went on the attack, passing d'Ambrosio for 2nd and catching Da Costa at a rate of 0.7s per lap. Evans and Lotterer both passed Buemi, with the other Nissan of Rowland defending furiously from Abt for 7th, while Piquet and Di Grassi fought hard over 9th and 10th.

In the end it was Da Costa who held out for victory, using his fan boost on the penultimate lap and defending from an aggressive move from Vergne into his favoured T18 on the final lap - where he only just slowed the car without contact. BMW carrying on their impressive form from testing, but it was anything but a simple lights to flag victory, even if Da Costa returns from Al Diriyah with 28 points for victory and pole.

# That is new in the 2018/2019 season



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**BRAND-NEW CHASSIS:** the Gen2 car features a futuristic-looking chassis. The new chassis developed by Spark Racing Technology incorporates a raft of bravely-designed aerodynamic devices which result in the sci fi-looking form.

**NEW BATTERY:** the Gen2 car is equipped by a new standardized battery. The new battery produced by McLaren Applied Technologies has to last the whole race instead of half distance as it was previously.

**HELLO, HALO!** The 2018/2019 season of the Formula E championship will see the arrival of the 'halo' head protection system. It is not surprising, though, as FIA intends to introduce the driver crash protection system in all its single-seater series by 2020.

**NEW BRAKES:** Brembo is the sole brake supplier for the series. The Italian, Bergamo-located company will supply the whole braking system for the Gen2 car, including the discs, calipers, pads, bells and tandem pump.

**MODIFIED RACE LENGTH:** Previously, the race length was set in a certain number of laps. From the fifth season, races will run forty-five minutes plus one more lap after the time has expired.

Through the **new attack mode**, drivers will receive an additional 25kW of power by driving through a designated area of the circuit off the racing line

## THE GEN2 CAR

**Total weight (including driver):** 900kg.

**Weight of the battery:** 385kg.

**Bigger batteries** supplied by McLaren Applied Technologies. No more mid-race car swap.

**Maximum qualifying power:** 250kW, equivalent to 335bhp

**Maximum race mode power:** 200kW, equivalent to 270bhp

**Maximum speed:** 280km/h (174mph)



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# RACE CALENDAR

## of the 2018/2019 Formula E season



### ROUND 2— Marrakesh ePrix

Formula E will start the new calendar year with the Marrakesh ePrix. This will be the third appearance of the event on the race calendar. In the 2016/2017 championship, Sebastien Buemi won the race while the 2017/2018 race victory was clinched by Felix Rosenqvist. In the first two years, drivers had to complete the 2.99km-long track 33 times during the race, but, in 2019, the race will be contested against the clock. With an estimated population of 928.850 habitants, Marrakesh is the fourth biggest major city of the Kingdom of Morocco.

### ROUND 3— Santiago ePrix

Chile will host a Formula E ePrix for the second time in succession. After the success of the 2018 race, the event will change its location from Parque Forestal to a bespoke circuit in O'Higgins Park. This location is the second largest public park of the city, and host of, among other events, annual music festival Lollapalooza Chile. The Techeetah team celebrated its first double victory in 2018 when Jean-Eric Verge won the race on the 2.46km-long track in front of his team-mate André Lotterer.



### ROUND 4— Mexico ePrix

The Mexico City ePrix joined the calendar in the second season of the Formula E Championship. The event is held at the Autodromo Hermanos Rodriguez track which is currently the only permanent racing facility on the calendar of the electric single-seater series. The event on the 2.093km-long track has seen three different winners so far with Jerome d'Ambrosio winning the first race and Audi's pair of Lucas Di Grassi and Daniel Abt clinching the victory in the following two years.



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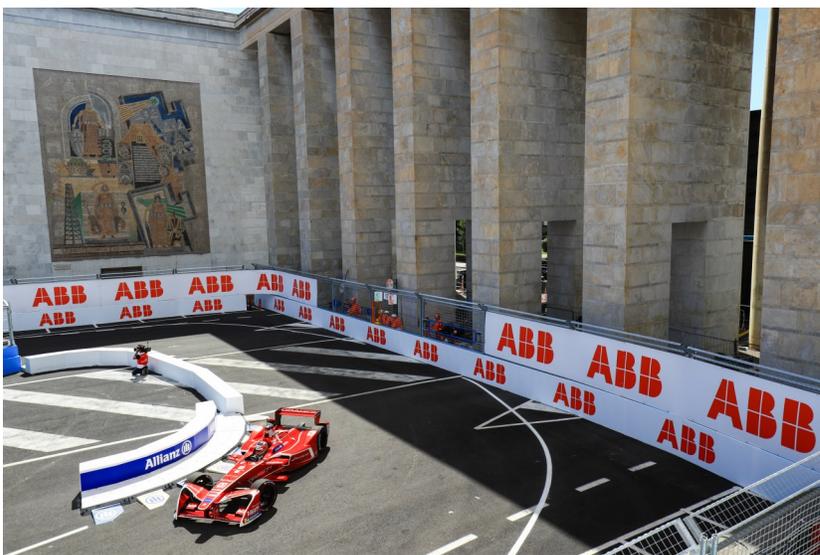


## ROUND 5— Hong Kong ePrix

Round 5 of the 2018/2019 Formula E Championship will be held in Hong Kong. The ePrix will take place on the 1.860km-long Hong Kong Central Harbourfront Circuit which made its debut in 2016. In its inaugural year, Sebastien Buemi clinched the victory while the following year saw two different winners, being a double-header event. Sam Bird won the first race for Virgin-Citroen while Felix Rosenqvist was victorious in the second race, driving for Mahindra. Some landmarks of Hong Kong such as the International Finance Centre, Hong Kong Observation Wheel and Hong Kong City Hall provide a spectacular backdrop.

## ROUND 6— Sanya ePrix

Following the inaugural race of the Formula E Championship in Beijing back in September 2014, the series will return to China. The Sanya ePrix will be held on the 23rd March as the sixth round of the 2018/2019 Championship. Sanya is the southernmost city on the Hainan island. The only China race was won by Renault's Nicolas Prost, making him the first ever Formula E victor.



## ROUND 7— Rome ePrix

The beautiful capital of Italy, Rome first hosted a Formula E race last season. The series will return to the ancient ruins of the city in the 2018/2019 championship campaign where drivers will battle it out on the unforgiving streets to clinch the victory. The Circuito Cittadino dell'EUR is 2.84km in length, with a total of 21 turns. The futuristic looking Gen2 cars will race against the backdrop of the iconic Colosseo Quadrato.



## ROUND 8— Paris ePrix

Paris, home of the FIA missed the inaugural season of the fully electric single-seater series, but has hosted race in every year since. The 1.93km-long circuit features 14 bends and goes clock-wise around Les Invalides with the tomb of Napoleon. The electric cars race on charming cobbled streets and breeze past iconic architecture during the 45-minute-long race.

## ROUND 9— Monaco ePrix

The Championship will return to the beautiful and unforgiving streets of Monaco for Round 9 of this year's title campaign. The Principality will host a Formula E race for the third time. The Principality will host a Formula E race for the third time. The series has hosted two races so far and missed the calendar in 2016 and 2018. On both occasions, the series raced on a shorter circuit instead of the Grand Prix layout, missing the hill, the Casino square, the iconic hairpin and the famous tunnel. Both Monaco ePrix were won by the Swiss Sebastien Buemi, starting both races from the pole position.



## ROUND 10— Berlin ePrix

Berlin has been a fixture on the Formula E race calendar. The Tempelhof Airport hosted the first race in 2015, but the race moved to the Karl-Marx Allee Circuit, located in the downtown of the German capital, because the airport housed refugees in 2016. The venue returned with a double-header in 2017 and with a single-day event last year. Sebastien Buemi is the only two-time Berlin ePrix winner.





## ROUND 11—

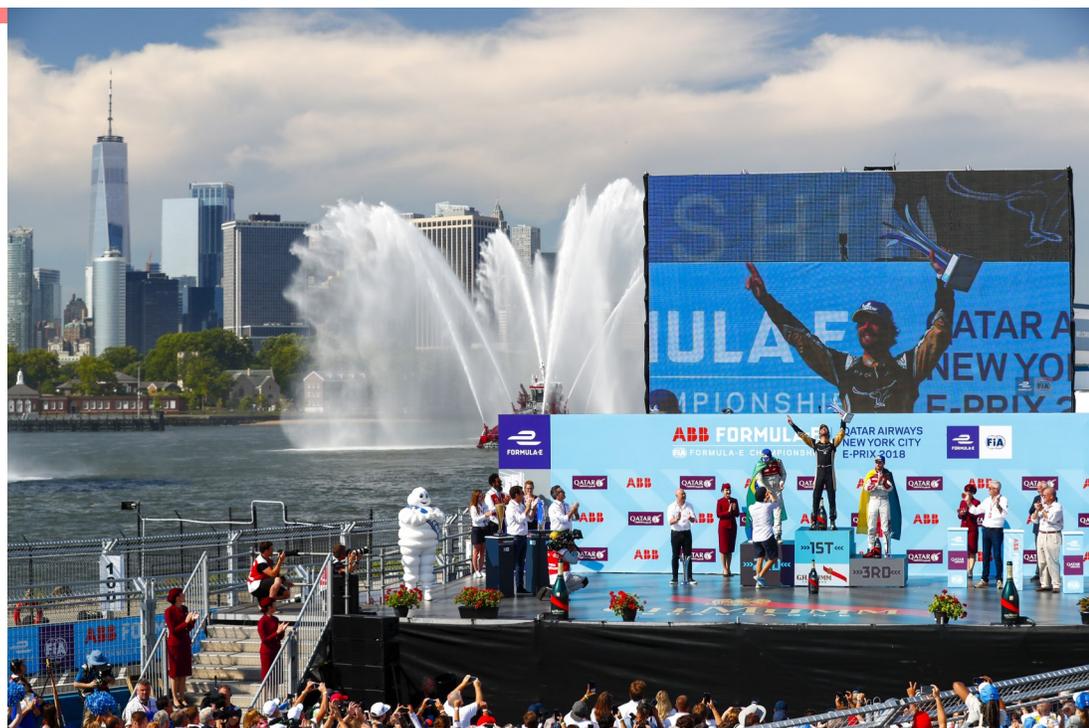
### Bern ePrix

Formula E returns to Switzerland in 2019 for the second time. Last year, it was the country's financial centre, Zürich which hosted the electric race. However, as city officials expressed concerns about the ability of the city's infrastructure to handle such a large-scale event, the race will move to Bern, capital of Switzerland in 2019. However, the option to return to Zürich in the future is alive. In last season's race in Switzerland, it was Audi's Lucas di Grassi who took the victory.

## ROUND 12/13—

### New York ePrix

New York first appeared on the Formula E calendar in 2017 as a two-race event. The 2018 race weekend also presented a double-header, both events were held in Brooklyn. Sam Bird is the most successful driver with two wins both of which he collected in 2017. In 2018, Lucas Di Grassi and Jean-Eric Vergne were the victors of the New York ePrix.



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# TECHNICAL AND SPORTING REGULATIONS



## Points

The point system is the standard one, used in other FIA-sanctioned racing series. The top ten finishers are awarded points: 25 – 18 – 15 – 12 – 10- 8 – 6 -4 – 2 -1.

Unlike in Formula One, the pole-sitter receives additional 3 points. If finishing inside the top ten, the driver who sets the fastest race lap is given one championship point.

## Race format

Apart from the double-header round, the event takes place within one single day which is always Saturday. Each event has two practice sessions, the opening one lasts 45 minutes while the second session has a duration of 30 minutes. In both practice sessions, drivers are allowed to use the maximum power unit of their cars (250kW).

The qualifying sessions lasts one hour. Due to the shortness of the Formula E city circuits, the field is divided into four groups. These are defined by their position in the championship. For the first round, the decisive factor was the order how they ended the 2017/2018 championship. Each qualifying sessions lasts six minutes. The top-six drivers proceed to the Super Pole shoot-out to decided the order of the first three rows for the 45-minute-long race.

This year, the New York event features a double-header with the first race day taking place on Saturday while the second on Sunday. The format of the second day mirrors the normal race programme, with only one 45-minute

practice session before the qualifying session.

## Shakedown

Prior to the race day, drivers can test the reliability of their machines in a sessions called 'shakedown'. However, the performance of the cars are restricted to 110kW. This session also give a chance to the organisers and the FIA to check the kerbs and the track layout before the action starts on the following day.

## Fanboost

Fans are able to have a word in how races pan out. They can vote for their favourite drivers in the six day prior, and leading up to 15 minutes into, each race. The five drivers who get the most votes, receive a burst of power which they can use for five seconds in the second half of the race.

## Tyres

Tyres for the Formula E Championship are supplied by the French manufacturer Michelin. In each event, drivers can use up to four new front and rear tyres.

## E—Licence

Drivers have to acquire a specific e-Licence in order to participate in the Formula E Championship. They have to conduct a training sessions with a focus on electrical safety and the technical features of the Formula E series. They also must have received at least Super Licence 20 points in the past three years.

# Teams and drivers



## Envision Virgin Racing



### Sam Bird

31

AGE

*British*

NATIONALITY

46

RACE STARTS

7

RACE WINS

15

PODIUMS

### Robin Frijns

27

*Dutch*

22

0

1

## Panasonic Jaguar Racing



### Nelson Piquet Jr.

33

AGE

*Brazilian*

NATIONALITY

46

RACE STARTS

2

RACE WINS

5

PODIUMS

### Mitch Evans

24

*New Zealander*

25

0

1

# Teams and drivers

## HWA Racelab



### Stoffel Vandoorne

26

AGE

*Belgian*

NATIONALITY

1

RACE STARTS

0

RACE WINS

0

PODIUMS

### Gary Paffett

37

*British*

1

0

0

## Geox Dragon Racing



### Maximilian Günther

21

AGE

*German*

NATIONALITY

1

RACE STARTS

0

RACE WINS

0

PODIUMS

### Jose Maria Lopez

35

*Argentinean*

21

0

2

## NIO Formula E Team



### Tom Dillmann

29

AGE

*French*

NATIONALITY

11

RACE STARTS

0

RACE WINS

0

PODIUMS

### Oliver Turvey

31

*British*

34

0

1

# Teams and drivers

## Audi Sport ABT Schaeffler



### Lucas di Grassi

34  
*Brazilian*  
46  
8  
27

AGE  
NATIONALITY  
RACE STARTS  
RACE WINS  
PODIUMS

### Daniel Abt

25  
*German*  
46  
2  
8

## Venturi Formula E Team

### Felipe Massa

37  
*Brazilian*  
1  
0  
0

AGE  
NATIONALITY  
RACE STARTS  
RACE WINS  
PODIUMS

### Edoardo Mortara

31  
*Swiss*  
10  
0  
1

## Nissan e.dams



### Oliver Rowland

26  
*British*  
1  
0  
0

AGE  
NATIONALITY  
RACE STARTS  
RACE WINS  
PODIUMS

### Sebastien Buemi

30  
*Swiss*  
44  
12  
21

# Teams and drivers

## DS Techeetah Formula E Team



### Jean-Eric Vergne

28  
*French*  
44  
5  
16

AGE  
NATIONALITY  
RACE STARTS  
RACE WINS  
PODIUMS

### Andre Lotterer

36  
*German*  
13  
0  
2

## BMW i Andretti Motorsport



### Alexander Sims

30  
*British*  
1  
0  
0

AGE  
NATIONALITY  
RACE STARTS  
RACE WINS  
PODIUMS

### Antonio Felix da Costa

27  
*Portuguese*  
42  
2  
2

## Mahindra Racing Racing



### Pascal Wehrlein

24  
*German*  
0  
0  
0

AGE  
NATIONALITY  
RACE STARTS  
RACE WINS  
PODIUMS

### Jerome d'Ambrosio

32  
*Belgian*  
46  
2  
7

# DID YOU KNOW

The series was conceived in **2011** and was called into being in September **2014** when the first race of the inaugural season was held in *Beijing*.

The Spanish businessman and former politician **Alejandro Agag** is the founder and CEO of Formula E. The series is sanctioned by the FIA.

The introduction of a city-based single-seater electric car motor racing championship was proposed by the former Ferrari team principal, current **FIA President Jean Todt**. The Frenchman presented his ideas to Alejandro Agag at a dinner at a small Italian restaurant.

The first four seasons of the Formula E Championship saw four different champions. **Nelson Piquet** was crowned champion in the 2014/2015 season, followed by Sebastien Buemi, Lucas di Grassi and Jean-Eric Vergne in the following years.

Only two teams have claimed the Manufacturers' Championship so far. The **Renault e.dams** is a three-time champion while it was the Audi Sport Abt Schaeffler which won the title in the last championship campaign.

Ten drivers drivers have claimed a Formula E win so far. The Frenchman **Sebastien Buemi** is the most successful driver with 12 triumphs, followed by Lucas di Grassi (8 wins) and Sam Bird (7 wins).



Only **Lucas di Grassi** and **Sam Bird** claimed victori-

es in every season of the first four Formula E Championship.

Despite being the most successful driver in terms of race wins, Sebastien



Buemi failed to win in the 2017/2018 season.

Formula E has a series of off-track activities including the **Roborace**. This series is developing the world's first autonomous and electrically powered racing car to launch the world's first competition for autonomously driving vehicles. Former champion, Lucas di Grassi is the official CEO of the Roborace project as of September 2017.

The 2018/2019 Formula E Championship is the **longest season** in its history comprising five seasons. The titles will be contested over 13 races. The season finale will be held in New York with a double-header round. The series will visit five different continents in its fifth season.

Fans are offered with different activities, even when the tracks falls silent. The **FanVillage** has a lot to discover including the Kids Zone, Gaming Zone, Formula E World, Inspire Zone, Meet the Driver session, Drive Zone, Taste Zone and Allianz Explorer Zone.



Boredom? An unknown conception

## Formula E FanVillage

Formula E's shocking compactness lies mainly in its special one-day format. Racing action happens over the course of one single day, excluding the double headers.

A practice session early in the morning is followed by another practice before drivers go crazy in the qualifying session. With a pause of a couple of hours, the race crowns the event. There is only one support series during the day, coupled with a few demonstration laps. The whole day is action-packed.

The Formula E village invites you to an entertainment sector and a showcase of the future which becomes very much our present. There are live concerts, dance shows on the main stage. Car manufacturers like Jaguar, Audi, BMW and Mercedes use the village as a luxurious presentation of their latest road car products, of course all of them are the latest masterpieces of the sweeping electrification across the automotive industry. The Allianz tent welcomes you for having a look into how a future city will look like. Electric skates, electric bikes are free to try out. The best video gamers are invited to take part in the E race where they can measure their talent against the real FE drivers.

The village entices with its cleanness, wide variety of street food stalls, its music, atmosphere. It does not want to be bigger than it is actually, but the series is eager to demonstrate the power of electrification which is gaining ground at mesmerizing speed in the road car industry and it is adamant to lure the youth next to the already motorsport lovers.

## Brief history after four seasons



**The inaugural championship started in Beijing on 13 September 2014.**

However, its origins trace back to much earlier. The proposal for a city-based, single-seater, electric car, motor racing championship was conceived by Jean Todt, the president of world governing body of motorsport, the FIA, to politicians Alejandro Agag and Antonio Tajani at a dinner at a small Italian restaurant in French capital of Paris on 3 March 2011. The idea was to showcase the new trend in automotive industry: the electrification which involves the development of hybrid and electric systems and aims at reducing carbon dioxide emissions.

At first, skepticism revolved around the series, but later big manufacturers recognized that this series provides them with a good racing platform, a first-class marketing sphere and a tolerable cost level. Audi, Mahindra, Jaguar, Nissan, BMW are all already part of the series, Mercedes and Porsche are also on the horizon to join Formula E in the sixth season.



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## Contact Us

Email us for more information.  
Balázs Szabó  
Editor in chief of  
GPtechnical newsletter

Balázs Szabó  
Editor in chief of GPTECHNICAL newsletter  
szabobalazsf1@gmail.com  
Photos: Formula E Media Site  
Lector: Josh Newbon

