

FACT SHEET XXL ROUND 2 FORMULA E MARRAKESH

NOVEMBER 12, 2016

SCHAEFFLER



PREMIERE IN AFRICA

ABT Schaeffler Audi Sport has the next trophy in its sights at the season's second round in Marrakesh



FIA
Formula-e
CHAMPIONSHIP

INNOVATIVE

Many details improved:
the ABT Schaeffler FE02

p. **10**



HISTORIC

Electric mobility in
automotive design

p. **20**

EDITORIAL



Jörg Walz
Vice President
Communications and
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Automotive

After the electrifying opener in Hong Kong, Formula E holds its second race in a new continent: Africa. With the UN climate conference taking place in Marrakesh at the same time, ideas, concepts and innovations for an environmentally friendly "mobility for tomorrow" will be put forward to the world with

an even stronger effect. As the exclusive technology partner of the ABT Schaeffler Audi Sport team, we here present some background information about the series, the drivers, the technology and our involvement.

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VIDEOS



Racing for a reason



Down to the wire

Electrifying Team ABT Schaeffler Audi Sport



WELCOME TO THE FUTURE!

Electric, in the heart of cities, all over the globe – this is Formula E. Forget everything that you knew about motorsport, and experience the world of the first ever fully-electric international race series

Formula E offers a number of distinct motor racing specialties. The most obvious feature is that, unlike conventional internal combustion engines (as in the DTM) or hybrid drives (as in the WEC), Formula E race cars are one hundred percent electrically-powered. The development of the electric motor as well as the transmission and subsequent software is unrestricted. Schaeffler and the team joined forces to design the entire powertrain, and this successful combination laid the foundation for clinching the vice-championship in the second season. The energy for all teams comes from identical batteries weighing approx. 320 kilograms and positioned in the rear of the car.

A second special feature is that Formula E races are not contested on conventional, permanent racetracks, but rather on

temporary courses set up right in the heart of major cities. So, rather than the fans having to travel to events, racing is brought straight to the fans. Competing in these unusual locations is possible thanks to the low noise level of the Formula E racing cars and their zero emissions. Even the electricity that is used to charge the batteries is generated at the track using a glycerine-powered Aquafuel generator.

ELECTRIFYING AROUND THE WORLD

In the motor racing scene, the venues are unique and exotic: Hong Kong, Marrakesh, Buenos Aires, Paris, Berlin and New York are just some of the metropolises where the ePrix are held, with backdrops such as Les Invalides, the Alexanderplatz, the skyline of Manhattan or the Statue of Liberty. The grid

line-up is studded with interesting names, including Nelson Piquet Jr, Nico Prost, Nick Heidfeld and, of course, the defending champion Sébastien Buemi.

As the sole German team, ABT Schaeffler Audi Sport again tackles the series with its regular drivers Daniel Abt and reigning vice-champion Lucas di Grassi. The other nine squads include outright factory teams such as Renault, Jaguar and DS Virgin as well as other top international teams from China, the USA and India.

The Formula E format is clear and concise: The practice, qualifying and race are all run on a single day. The race itself takes about 50 minutes – with pilots coming into the pits at around halftime to switch cars. ■

AROUND THE GLOBE

The Formula E race calendar offers one highlight after the other over ten months and on four continents. Five new metropolises, Hong Kong, Marrakesh, Brussels, New York and Montreal, host the fully-electric race series for the first time this season



1 **KICKING OFF WITH A PODIUM**
HONG KONG CHINA

October 9, 2016
Lucas di Grassi made an almost perfect start to the new season with a second place finish – and this from second last on the grid. A tactical masterstroke.

2 **PREMIERE IN AFRICA**
MARRAKESH MOROCCO

November 12, 2016
With the first race in the “Red City”, Formula E visits a fourth continent: Africa. A picturesque setting for Formula E.

3 **GUARANTEED ACTION**
BUENOS AIRES ARGENTINA

February 18, 2017
Argentinean motorsport enthusiasts have already been treated to two action-packed Formula E races at this venue. To be continued ...

4 **AIM HIGH**
MEXICO CITY MEXICO

April 1, 2017
Mexico City hosts the only race to run on a permanent racetrack, and at an altitude of 2,500 meters, it's the highest venue. Fans witnessed a spectacular debut here last season.

5 **BACK ON THE CALENDAR**
MONACO

May 13, 2017
In its very first season, Formula E raced through the streets of the Monegasque Principality. Now, in season three, the electric race cars are making a comeback. The course is a shorter version of the traditional world-famous Grand Prix track.

6 **HISTORIC**
PARIS FRANCE

May 20, 2017
At just 1.9-kilometers in length, the racetrack around the historic Les Invalides is very short – ideal for the masses of fans. Lucas di Grassi won last year's race here.



7 **HEART OF EUROPE**
BRUSSELS BELGIUM

July 1, 2017
The last three ePrix are held in cities in which Formula E has never raced before. First up is Brussels – the seat of the European Union parliament.

HOME RACE
BERLIN GERMANY

June 10, 2017
Last year, the ABT Schaeffler Audi Sport team clinched a maiden double podium for Lucas di Grassi and Daniel Abt on home turf in Germany's capital. Repeat performance welcome ...



8 **CITY OF DREAMS**
NEW YORK USA

July 15/16, 2017
This is the first time a FIA automobile race is held in the middle of New York ... with not only one but two races – on Saturday and again on Sunday – in the legendary port district of Brooklyn.

9&10 **GRAND FINALE** **MONTREAL CANADA**

July 29/30, 2017
Just like in New York, Montreal hosts a double-header at the final weekend of the 2016/2017 season. The multicultural metropolis on the St. Lawrence River, where French is the official language, is crazy about motor racing.



DRIVER RANKING

P	DRIVER	TEAM	PTS
1	Sébastien Buemi (CH)	Renault e.Dams	25
2	Lucas di Grassi (BR)	ABT Schaeffler Audi Sport	18
3	Nick Heidfeld (D)	Mahindra Racing	15
4	Nicolas Prost (F)	Renault e.Dams	12
5	António Félix da Costa (P)	MS Amlin Andretti	10
6	Robin Frijns (NL)	MS Amlin Andretti	8
7	Jérôme D'Ambrosio (B)	Faraday Future Dragon Racing	6
8	Oliver Turvey (GB)	NextEV NIO	4
9	Nelson Piquet Jr. (BR)	NextEV NIO	3
10	Maro Engel (D)	Venturi	2
11	Stéphane Sarrazin (F)	Venturi	1
12	Felix Rosenqvist (S)	Mahindra Racing	1
13	Daniel Abt (D)	ABT Schaeffler Audi Sport	0
14	Jean-Éric Vergne (F)	Techeetah	0
15	Sam Bird (GB)	DS Virgin Racing	0
16	José María López (RA)	DS Virgin Racing	0
17	Adam Carroll (GB)	Panasonic Jaguar Racing	0
18	Loïc Duval (F)	Faraday Future Dragon Racing	0
19	Mitch Evans (AUS)	Panasonic Jaguar Racing	0
20	Ma Qing Ha (CN)	Techeetah	0

TEAM RANKING

P	TEAM	PTS
1	Renault e.Dams	37
2	ABT Schaeffler Audi Sport	18
3	MS Amlin Andretti	18
4	Mahindra Racing	16
5	NextEV NIO	7
6	Faraday Future Dragon Racing	6
7	Venturi	3
8	DS Virgin Racing	0
9	Panasonic Jaguar Racing	0
10	Techeetah	0

CES: SCHAEFFLER AND FORMULA E IN VEGAS
LAS VEGAS USA

January 7, 2017
Wager in Vegas: The 20 Formula E pilots pit themselves against 10 gamers for a total purse of a million US dollars. This greatest spectacle in Simracing is held during the CES, the largest trade show for entertainment electronics, where Schaeffler is also represented.



A CITY OF CONTRASTS

With the express train to Casablanca or by horse-drawn carriage through the pedestrian zone – mobility in Marrakesh, “The Pearl of the South”, offers many facets

“The Red City” Approximately one million inhabitants live in Marrakesh, which is located just south of the High Atlas mountain range

The Kingdom of Morocco has the most developed railway network in North Africa. Marrakesh, the country’s fourth-largest city with just under a million inhabitants, has an important function with its central location. The clean, state-of-the-art traditionally oriental styled railway station is a real highlight. Though the timetable can change spontaneously, the trains can take people in all directions around the country, which is about the size of Spain, even faster.

In Marrakesh, locals and tourists have a wide range of opportunities to travel. The urban bus network is widely branched and cheap to use. It is recommended to negotiate a price with a taxi driver beforehand.

Adventurers plunge themselves into Marrakesh’s traffic with rental cars. Cyclists, mopeds and cars creep along at walking pace. Outside of the center it is possible to travel faster. But be careful when driving in the dark: there is often a lack of road lighting in the countryside, and not all road users travel with headlights here.

DECENT ALTERNATIVES

The most traditional means of transport in Marrakesh are the horse-drawn carriages. Especially in the angular alleyways of Medina, the old town, the agile horse and cart proves to be not only a tourist attraction but convenient transport too. ■

18.50 €

(200 Moroccan dirhams) is the cost of an hour’s carriage ride through the old town of Marrakesh

1,907 KM

is the total length of the railway network in Morocco. In Germany it is 41,896 kilometers



HIGH VOLTAGE

WORLD-CLASS MOTORSPORT WITH FULLY ELECTRIC DRIVE

In our Tech Talk series we give technical insights behind the scenes of Formula E and the ABT Schaeffler Audi Sport team. In this episode: basics about the electric drive

#What makes Formula E as a racing series with electric drive so special?

It is the first professional global racing series that exclusively uses electric drive. As a result, the races can take place in the city centers of large metropolises, for which racing series using combustion engines would not be granted a permit.

#How does a battery work?

Atoms consist of neutrons and positively charged protons in the nucleus. The outer shell of the atom consists of negatively charged, orbiting electrons. By means of a chemical reaction, a deficiency of electrons is produced at the positive pole of a battery, and an excess at the negative pole. This state, called voltage and measured in volts, does not “please” the nucleus of the atom, the ion or the electrons. The electrons begin to move from the minus pole to the positive pole in order to restore a balance a current starts to flow. The more the electrons move, the stronger the current, which is measured in amps. On the positive pole, electrons are always cleared away so that the voltage is

maintained. A depleted battery loses voltage and, as a result, will not work anymore.

#What kind of batteries are used?

They are produced by Williams Advanced Engineering (WAE), a sister company of the Williams Grand Prix Formula 1 racing team. Lithium-ion batteries are being used, just like conventional smartphone batteries – but with an elaborate cooling system for each individual cell. For comparison: the pure lithium-ion cells of the Formula E battery weigh 200 kg (total battery 320 kg), which corresponds to the batteries in 300 laptops or 4,000 smartphones. The resultant engine performance in Formula E is limited to 200 kW (272 hp) in the qualifying, while a maximum of 170 kW (231 hp) is currently allowed in the race. The maximum voltage of the battery is about 700 volts, the usable energy is limited to 28 kWh. A very simple comparison: 280 individual 100 watt incandescent bulbs can be illuminated with the amount of energy in the battery of a fully charged Formula E race car for one hour. Or you could drive with

this on a usual motorcycle with 28 kW power (equivalent to about 38 hp) for exactly one hour at “full throttle.” Compared to gasoline, this corresponds to the energy volume of about three liters. The greatest challenges in the design of the Formula E batteries are their cooling, durability and robustness for use in racing cars that are exposed to many forces. In addition, Williams must ensure that equality of opportunity is ensured by “equal” batteries for all drivers at all times. In two years’ time (2018/2019), McLaren Applied Technologies, a sister company of the F1 racing team McLaren, will supply the new generation of batteries. These are supposed to provide twice as much energy with the same dimensions and thus make the usual vehicle change in the middle of the race obsolete.

#How are the batteries charged?

In line with the philosophy of Formula E, to see electric mobility as an essential step towards a more environmentally conscious and sustainable use of energy on our planet, the energy for race cars on the race track comes from a sustainable source of energy. This is achieved by the British company Aquafuel Research Ltd., which has modified conventional diesel generators to be transported in containers to the races around the world and deliver the electricity for the 40 racing cars with virtually zero-emission glycerol as the source of energy. Aquafuel has a patent on this principle. In fact, it has been shown that the transparent and tasteless glycerin not only protects the generators better, but also burns more efficiently. The battery of a Formula E racing car is fully charged in this way within roughly 45 minutes.

#Is there energy recovery?

Yes, the motor in the back can also be used as a generator. Now 150 kW of energy recovery is possible – up to now it was 100 kW. A strategic tool that drivers can use with an intelligent driving style.

#Which kinds of electric drives are available in Formula E?

As the exclusive technology partner, Schaeffler developed the powertrain for the ABT Schaeffler

FE02 together with ABT Sportsline. The ten Formula E teams have opted for different solutions. ABT Schaeffler Audi Sport combines an electric motor with a three-speed transmission. However, there are also teams that use only one or two gears and thus two electric motors or a “larger” one.

#Is Schaeffler researching and developing other electromobile drives?

With more than 85,000 employees in 50 countries worldwide, Schaeffler is one of the world’s leading companies in drive technology. Electromobility includes purely electric driving as well as hybrid solutions as a combination of two drive technologies. Schaeffler, with a wide product range, offers a large variety of solutions for the automotive industry, ranging from micro hybrid (12 volts), mild hybrid (48 volts) to high-voltage (>200 volts) concepts in the form of full or high-voltage plug-in hybrids and range-extender variants.

THIS IS HOW IT WORKS ...

AN ELECTRIC MOTOR

The electrical energy of the battery is converted into mechanical energy to power the rear wheels via drive shafts. While there are different types of electric motors, they all use power from a magnetic field. The rotor and/or stator are fed with electric current, which generates this magnetic field. Now the current in the stator is always switched precisely in a way that causes its magnetic field with the North and South Poles to behave in exact opposition to the rotor’s magnetic field, thus repelling the stator – and causing the rotor to turn a little farther. Afterwards, plus and minus on the rotor are reversed, and the rotor and stator repel once more. A major difference in the drivability of electric motors versus internal combustion engines lies in their torque characteristics. An electric motor always delivers full torque immediately when starting from rest – which is one reason why particularly starting from rest and accelerating an electric vehicle comes as a pleasant surprise to any rookie. Formula E race cars accelerate from zero to 100 km/h in about three seconds.

HIGH-TECH FOR THE RACETRACK

The Abt Schaeffler FE02 is a purebred racer packed with high-tech. While most of the components, including the battery and the entire aerokit, are identical for all contenders, Schaeffler and ABT have developed the entire powertrain

TIRES

18-inch wheels with Michelin control tires (same tread as for production cars)

BRAKES

Hydraulic dual-circuit braking system, adjustable brake force distribution

DIMENSIONS

Length 5,000 mm
Width 1,800 mm
Height 1,250 mm
Weight min. 880 kg including driver

POWER OUTPUT

Practice and Qualifying 200 kW (270 hp)
Races 170 kW (231 hp) plus FanBoost

STEERING WHEEL

Standardized steering wheel with paddles for shifting and recuperation, controls for various engine settings and a display for all key information

BATTERY

Developed by Williams Advanced Engineering, charging time: approx. 45 minutes

AERODYNAMICS

Adjustable front and rear wing

SUSPENSION

Optimized suspension with increased stiffness and improved kinematics

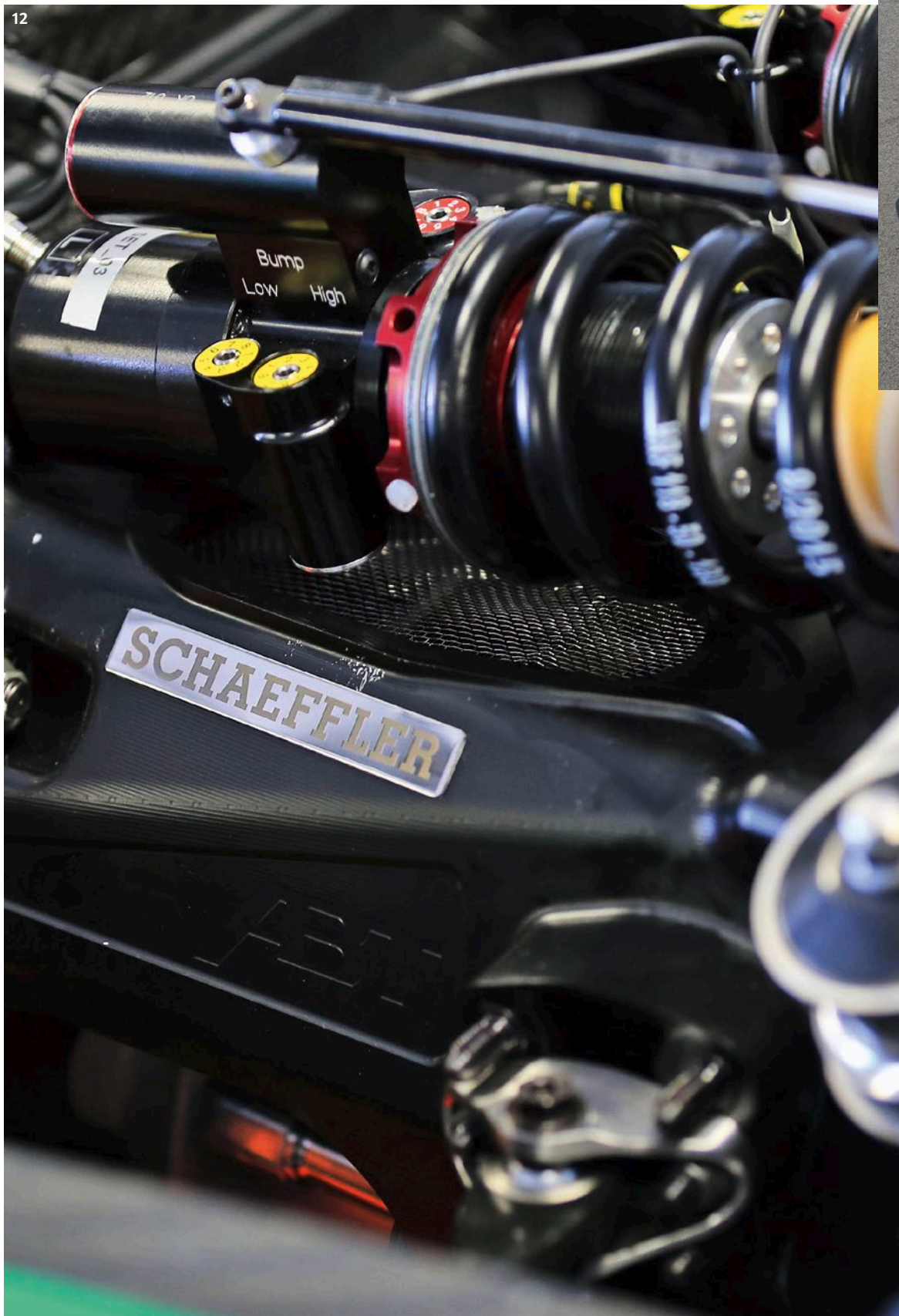
POWERTRAIN

Electric motor ABT Schaeffler MGU 01+, three-speed transmission

CHASSIS

Specification carbon fiber-aluminum chassis from Dallara





Extensive tests
ABT Schaeffler Audi Sport is perfectly prepared for the 2016/2017 season

WELL EQUIPPED

The basic concept for the powertrain of the ABT Schaeffler FE02 remains identical to last year. For the 2016/2017 season, the engineers focused on improving many details

ABT Schaeffler Audi Sport heads off on the Formula E tour around the world with a powertrain that has been improved in many aspects. ABT Schaeffler MGU01+ – even the name makes it clear that the powertrain is based on the combination of the electric motor and transmission from the successful season two model; in ten races the two pilots Daniel Abt and Lucas di Grassi scored ten podium positions, three of which were victories.

IMPROVED DETAILS

The engineers of the exclusive technology partner, Schaeffler, have focused on further improving the torque and drive efficiency. Moreover, the weight has been further reduced. The transmission

features three gears and has also been further optimized in its efficiency and gearshift times.

“We feel well equipped for the challenges of the third season,” says Prof. Peter Gutzmer, The Chief Technical Officer and Formula E project leader at Schaeffler. “In its first season, our powertrain played an important role in our many successes. So, it quickly became clear that we should not only continue to focus on our proven concept, but also to further develop all aspects of our components.

I would like to thank all the engineers who have worked with complete commitment in parallel to our fight for the title, so that we stay competitive and are preferably winning in the future as well.”

3,959
test kilometers were covered by the team in preparation for the season

Eternal ice? Formula E made a strong and spectacular statement in Greenland against global warming



SPECTACULAR STATEMENT AGAINST CLIMATE CHANGE

In an unparalleled event, Formula E, Schaeffler and Lucas di Grassi have made a strong statement against global warming. In his Formula E car, the Brazilian turned laps on a glacier in Greenland

“Global warming is an issue that affects us all. The electric mobility can and will continue to play an important role against climate change in the future,” says Schaeffler’s CTO, Prof. Peter Gutzmer. “We regard Formula E with its innovations and new ideas as a driving force for mobility of the future and hence we were pleased to support this spectacular event.”

In conjunction with the Greenland government and environmental activists as well as teaming up with other partners such the Monegasque Prince Albert Foundation and the University of Southampton, the event required long and careful planning so that it could be implemented with the least possible input. Stunning images have attracted huge interest worldwide with around

“I WAS SHOCKED TO SEE HOW THE LANDSCAPE CHANGES THROUGH GLOBAL WARMING”

Lucas di Grassi
Formula E vice-champion in the ABT Schaeffler Audi Sport team (right) together with Formula E CEO Alejandro Agag



Unknown territory The Formula E car is lowered onto the glacier

three million visitors on YouTube alone. The images also provided footage for a 48-minute documentary which will be premiered on the occasion of the international climate change conference held in Marrakesh at the same time as the ePrix.

GLOBAL WARMING CHALLENGE

“The Greenland region is such a peaceful place. I was shocked to see how the landscape changes through global warming,” says Lucas di Grassi. “This experience gives me a completely new understanding of the challenge we face and what Formula E can contribute.” ■



#PROJECTICE

A TRADITION OF INNOVATION



Hall of Fame Success not only in single-seater racing

ABT Sportsline – the world’s leading tuner of vehicles from the Volkswagen Group and successful motorsport team in the DTM. Together with Schaeffler, the Allgäu-based squad enthusiastically tackles a new motorsport challenge in Formula E

ABT Sportsline is one of the most successful motorsport teams in Germany and Europe. Its history in racing dates back more than 60 years and began with initial victories scored by Johann Abt in the 1950s. The first recorded success took place in a dirt track race, followed by victories and titles in touring car, sports car and formula racing. 2009 has gone down in the

company’s history as the most successful year to date: Timo Scheider won the DTM, Christian Abt the ADAC GT Masters in the Audi R8 and youngster Daniel Abt was victorious in the ADAC Formula Masters. Previously, in 2007, Schaeffler and ABT had jointly celebrated success as well: with the logos of LuK, INA and FAG on his A4, Mattias Ekström won his DTM title number two.

Founded as a smithy in 1896, the ABT company has been continually developing ever since. Just one thing has never changed: the family still runs the company with about 170 employees and partners in 50 countries around the world. CEO Hans-Jürgen Abt now represents the fourth generation at the helm. For ABT Sportsline, the commitment in Formula E also marks a return to the roots, as the team celebrated success in formula racing as far back as in the early 90s – among others, with Ralf Schumacher in the cockpit back then. ■

MOMENTS

1970



Johann Abt († 2003), father of Hans-Jürgen and Christian Abt, becomes European Touring Car Champion

1999



The **STW Championship** marks the first major title for Christian Abt and the team

2007



Sporting the logos of the **Schaeffler Group**, **Mattias Ekström** becomes DTM champion

2009



Christian Abt, **Timo Scheider** and **Daniel Abt** clinch three titles in a single year

2014



ABT and Schaeffler win the first ever Formula E race

A STRONG TEAM IN THE COCKPIT

In Lucas di Grassi (32) and Daniel Abt (23) the squad of Hans-Jürgen Abt has its dream team filling the cockpits of the two Formula E race cars. The experienced Brazilian and youngster Daniel Abt are not only fast and technically adept but perfectly harmonize with each other off the race track as well







LUCAS DI GRASSI #11

HIGHLIGHTS

- 2005 **1st** in Macau GP
- 2006 Formula 1 Test
- 2007 **2nd** GP2 series, Formula 1 test driver
- 2008 **3rd** GP2 series, Formula 1 reserve driver
- 2009 **3rd** GP2 series, Formula 1 reserve driver
- 2010 Formula 1
- 2013 **3rd** in Le Mans 24 Hours
- 2014 **2nd** in Le Mans 24 Hours, **4th** WEC
- 2015 **4th** in Le Mans 24 Hours, **3rd** FIA Formula E
- 2016 **3rd** in Le Mans 24 Hours, **2nd** FIA Formula E

VITA

Date of birth August 11, 1984
Place of birth São Paulo (BR)
Domicile Monaco (MC)
Height 1.79 m
Weight 75 kg

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SIDE JOBS

Lucas di Grassi is an Audi factory driver and in 2016 is competing in the WEC and at Le Mans in an R18. In June, he took third place in the 24-hour race. Daniel Abt drove a Bentley Continental GT3 for Bentley Team ABT in the ADAC GT Masters this year besides his Formula E commitment.






DANIEL ABT #66

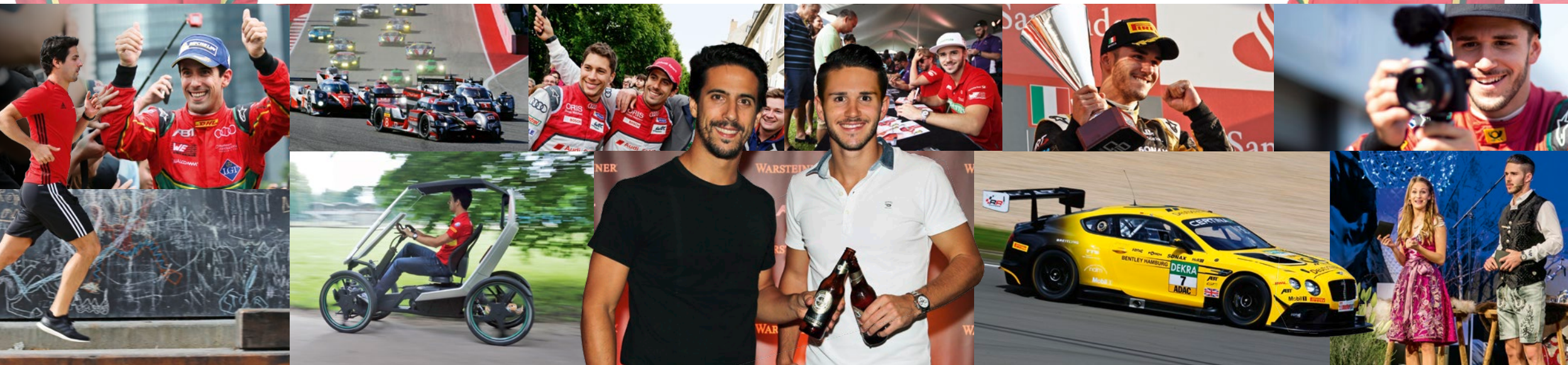
HIGHLIGHTS

- 2007 **2nd** ADAC Kart Championship
- 2008 **8th** ADAC Formula Masters
- 2009 **1st** ADAC Formula Masters
- 2010 **2nd** ATS Formula 3 Cup
- 2011 **4th** FIA Formula 3 International Trophy, **7th** Formula 3 Euro Series
- 2012 **2nd** GP3 series
- 2013 GP2 Series
- 2014 GP2 Series, FIA Formula E
- 2015 **1st** in Le Mans 24 Hours (class), **11th** FIA Formula E
- 2016 **19th** ADAC GT Masters, **7th** FIA Formula E

VITA

Date of birth December 3, 1992
Place of birth Kempten (D)
Domicile Kempten (D)
Height 1.79 m
Weight 70 kg

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1899 ELECTRIFYING BEGINNINGS

The car picks up speed. The first car to exceed 100 kph: the electric race car "La Jamais Contente" made by Camille Jenatton. That was 1899, the same year that the Baker Motor Vehicle Company began to build electric cars. Fully electric or hybrid drive from Ferdinand Porsche for the Lohner electric vehicle. The same idea with the Mercedes Électrique and Mercedes Mixte. Up to 1939, Detroit Electric models with more than a 100-kilometer driving range. Around the turn of the century there were more electric cars on the road than combustion ones. Only with the improvement of performance, range and gas station networks do petrol-powered vehicles take over.

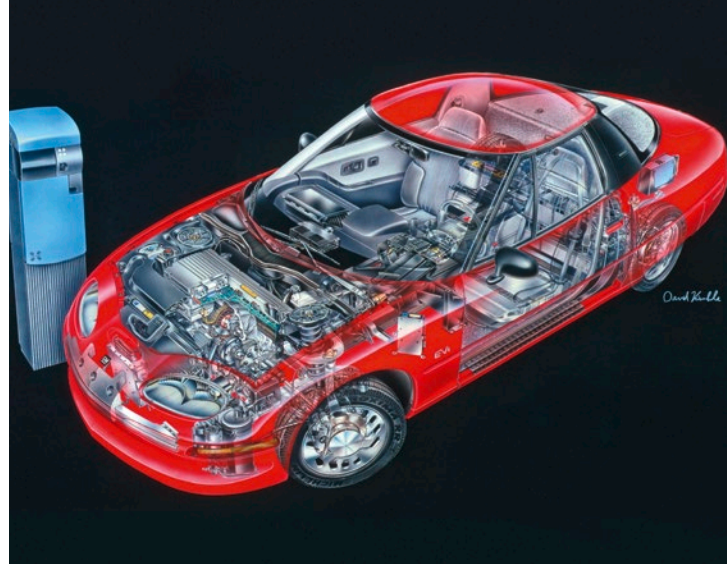
1972 THE LIMITS TO GROWTH

Electric mobility means drive from a fixed electricity supply – trams, trains, trolley buses. But gasoline-power comes under pressure. The 1972 Club of Rome "limits to growth": Finiteness of resources. 1974 oil crisis. The industry responds with rudimentary electric drives: A BMW 1602 Electro for the 1972 Olympics puts out just 43.5 hp. In a fleet test, the e-Transporters from Mercedes and VW cover only 60 to 80 kilometers. And the electric models of Opel, Mercedes and VW in a large-scale project on the German island of Rügen are based on existing cars. This is the wrong path.



FAST CURRENTS

From the early alternative via public transport and back into the automobile: Electric cars have enjoyed a rapid history spanning more than 100 years and are only now coming of age



1996 TAILORED FOR THE FUTURE

Two things are needed: 1) A paradigm shift. In 1996, General Motors is the first major manufacturer to offer a car specifically designed for electric drive. Around 1,100 units of the EV1 are produced. Its cw value: 0.19. It reaches 130 kph with a range of around 250 km using 26.4 kWh from a nickel-metal hydride battery. 2) A technological leap, based on lithium-ion batteries from Sony. With these batteries, Tesla joins the car industry in 2008 with a roadster; 200 kph top speed, 350-kilometer range. In Japan, the Mitsubishi i-MiEV has been rolling off the assembly line since 2009. Today, there are many electric cars, and Schaeffler is a sought-after partner.

1997 ATTRACTIVE ALTERNATIVES?

Is it possible to have a million electric cars on the road in Germany by 2020? The bridging solution comes from the hybrid drive using the combustion engine and electricity. Toyota makes the breakthrough in 1997: The Prius is a million-seller. Electric drive is also possible without a battery: hydrogen and oxygen generate electricity in a fuel cell that drives the car. In 2003, a Mercedes A-class F-Cell is the world's first fuel cell passenger car to go into small-scale production. Since 2015, Toyota has produced the hydrogen model, Mirai.



2009 MOTORSPORT

The milestones of electric mobility in racing: In July 2009, the first victory for a McLaren-Mercedes with hybrid drive in Formula 1. In June 2012, the first Audi win with diesel-electric drive at Le Mans. In September 2014, FIA Formula E is launched as the first race series with electric drive. Schaeffler is one of the pioneers with the ABT Schaeffler Audi Sport team. June 2015 heralds the first overall victory of Rhys Millen's electric race car against petrol-powered vehicles at Pikes Peak. September 2016: World record for electric drive by Venturi with 549 kph in Bonneville.



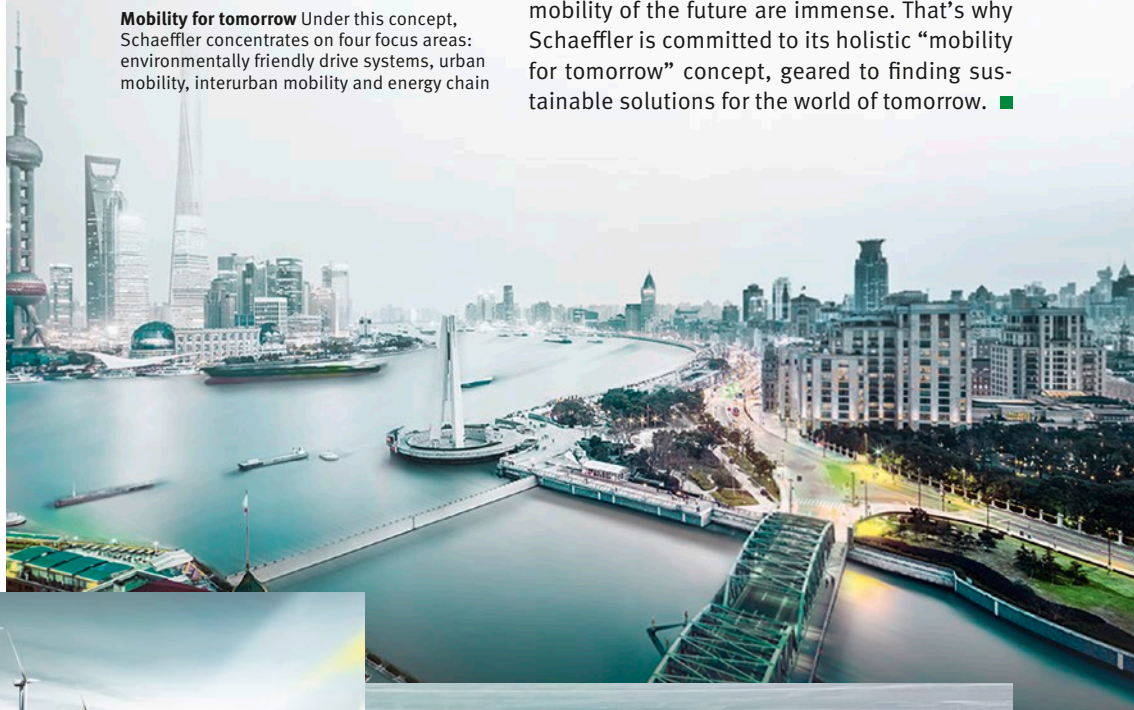
MOBILITY FOR TOMORROW

For Schaeffler, innovation has been part of its corporate DNA since the foundation of the company. It is based on lateral and interdisciplinary thinking



Mobility for tomorrow Under this concept, Schaeffler concentrates on four focus areas: environmentally friendly drive systems, urban mobility, interurban mobility and energy chain

Schaeffler is known as an innovative leader delivering a wealth of technologies that make automobiles more fuel-efficient, environmentally friendly, and safer, as well as products for trains, aircraft, wind turbines, and many other industrial sectors. Schaeffler can be found wherever things are in motion – and motion also means mobility. The challenges facing mobility of the future are immense. That’s why Schaeffler is committed to its holistic “mobility for tomorrow” concept, geared to finding sustainable solutions for the world of tomorrow. ■



DATA & FACTS



78
TV stations



7,240 hrs
TV broadcasts



28,163
news articles

270,319

Spectators visited the racetracks in the 2015/2016 season



us\$ 1,000,000

Prize money at the Las Vegas eRace early in 2017

56 kWh

of energy may be used by a driver per race



The ABT Schaeffler FE02 accelerates from 0 to 100 kph in



2.9 seconds

200 kW
Power output in qualifying

170 kW
Power output in the race

Two-person household (6 days)

Refrigerator, 150 liters (210 days)

Light bulb, 60W (39 days nonstop)

Television (15 days nonstop)

Dish washing machine (70 wash cycles)

3

The 3 drivers with the most #FanBoost votes get 100 kJ more energy

1

FanBoost for second car

fanboost.fiaformulae.com

SCHAEFFLER FACTS

- ≈ 85,000.....employees worldwide
- 13.2.....billion Euro turnover in 2015
- > 2,300.....registered patents in 2015
- 24,000.....active and pending patents
- 170.....locations in 50 countries
- 74.....factories worldwide
- 60.....Schaeffler components in automobiles worldwide (average)
- 17.....R&D centers worldwide



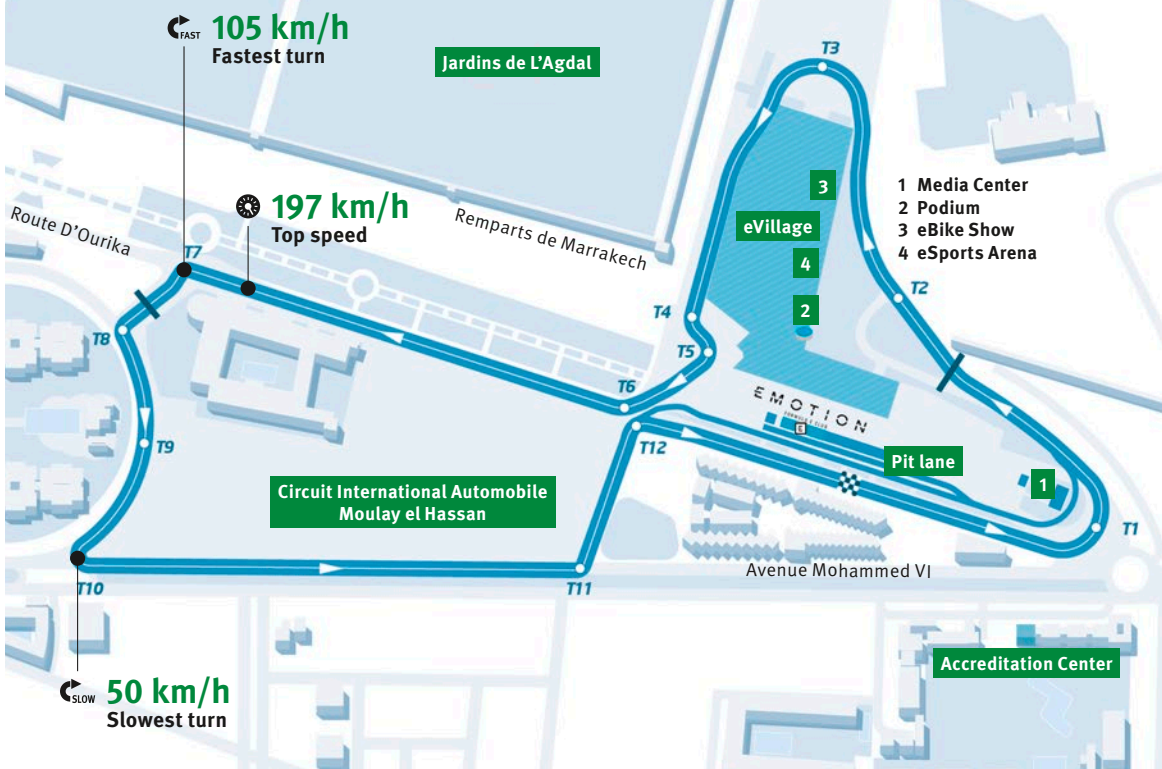
20,000

conventional AA batteries provide the same amount of energy

FACTS AND FIGURES ABOUT FORMULA E IN MARRAKESH



2,971 m
Track length



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SCHEDULE SAT, NOV 12, 2016 (LOCAL TIME, CET -1)

08:00 – 08:45 Free practice 1
 10:30 – 11:00 Free practice 2
 12:00 – 12:36 Qualifying (4 groups)
 12:45 – 13:00 Super Pole
 14:05 – 14:35 Autograph session (eVillage)
 15:10 Driver parade
 15:23 Pit lane open
 16:00 Race (33 laps)
 17:05 Podium ceremony
 17:15 – 17:30 Press conference (Media Center)



Learn more about mobility for tomorrow

FORMULA E

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