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VIAVISION

VOLKSWAGEN SHAPING THE FUTURE OF MOBILITY

Tailored Success

From Past to Present

Index

Imprint

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Four Decades of Innovation

Dr. Ulrich Hackenberg, Member of the Board of Management of Volkswagen Brand with responsibility for Research and Development.

When comparing the Volkswagen product range today to that of earlier years – where has the most progress been made?

Volkswagen's early success was based on a few models which were built in large quantities. Today, Volkswagen offers a wide range of different vehicles and is – with a model range from the up! to the Phaeton – without a doubt, the car manufacturer with the widest range.

"It runs, and runs, and runs" was the slogan in the era of the Beetle – does this motto still apply?

Of course! Our products are the benchmark for other manufacturers in terms of reliability and durability. Our quality requirements have increased significantly in the past four decades – we are now working within a tolerance range for which there weren't even any measuring instruments in the past. We have long become 'premium' in terms of value.

Volkswagen has never had a model range as wide as today's. Do you see any market gaps or niches, that should also be covered by the company?

As developers, we still have very many ideas and can imagine additional offers in all classes – and beyond.But our assessment of the economics is always conclusive. With regard to our global orientation, there will certainly be further models. By no means least our concept cars, seen at the Paris and Detroit car shows, have shown where the journey can lead to.

What does Volkswagen's near future look like?

We are working under high pressure on the issues of sustainability and CO_2 reduction. The necessary technological and productive requirements are on their way. Our construction matrix makes these sophisticated technologies accessible to our high quantity, volume models. Now, it is about a precisely accurate implementation into many new models.

Progress in Detail

Electrics and Electronics

The electronic development of cars is one of the most important trends within the automotive industry. While the Golf Mk I, which went into production in 1974, was still quite sparsely equipped, it has developed over the generations into a high-tech beacon in the compact car segment. A comprehensive security network with new radar and camera systems, high-performance computer architectures, multimedia concepts for display and control systems – these are just some of the challenges that apply to future automobiles. Volkswagen, as a volume manufacturer, has pursued the democratisation of innovative technology and therefore also stakes a leading position in electronics (see glossary).

Golf Mk I

Length of the onboard electric system: 200 metres

Weight of the onboard electric system: 5 kilograms

Pins: 170

Plug-type casings: 60

No electronic control units

Driving, in the sense of pure movement, did not originally require electronic systems. Mid-range cars of the '70s had two to three control units. Such devices were added to the Golf in the beginning of the 1980s, for example, for the ignition (1981 GTI) and gear shift indicator (1983 GTI). The electrical equipment was still very manageable. On the instrument panel, there were only four switches: for hazard lights, heated rear window, fog light, and the light switch with dimmer. Additionally, there was the indicator control on the steering wheel and the fan control. However, the vehicle was already equipped with a diagnostic connector which significantly facilitated troubleshooting in the workshop.

Golf Mk VII

Length of the onboard electric system: 1,594 metres

Weight of the onboard electric system: 25 kilograms

Pins: 1,443

Plug-type casings: 289

maximum of 35 CAN* connected electronic control units

maximum of 9 LIN* connected electronic control units

A current Golf Mk VII, fully equipped, has more electronics onboard than an early Apollo rocket. The intelligent networking of individual security components and systems creates new functions that increase driving safety, these require the installation of more control units and sensors in the car. Electric-electronic systems make cars safer, cleaner and more comfortable – and also make driving more fun. However, the requirements for the electronics became more extensive. New and improved vehicle functions can greatly increase the complexity of systems – which also create challenges in terms of the durability, quality, space and weight of the vehicle.

* The abbreviations CAN (Controller Area Network) and LIN (Local Interconnected Network) refer to different types of network and communication between devices.

The VW Car Fleet

A Range in All Classes

The Volkswagen brand would not have started as successfully without the Beetle. Though it was technically very minimalistic – from a modern point of view – it was reliable. Only with the new, water-cooled front engines produced from 1973 did Volkswagen earn its leading place in terms of technology.

Yesterday*

Beetle
Production: 1949 to 2003

Karmann Ghia
Production: 1955 to 1974

Type 3/Type 4
Production: 1961 to 1974

K 70
Production: 1970 to 1975

VW Porsche
Production: 1969 to 1975

Today**

Passat
Production: since 1973

Scirocco
Production: since 1974

Golf
Production: since 1974

Polo
Production: since 1975

Golf Cabriolet
Production: since 1979

Jetta

Production: since 1979

Sharan

Production: since 1995

New Beetle

Production: since 1998

Phaeton

Production: since 2002

*Classics developed before 1970.
**The models shown here are for sale in Europe.

Touareg

Production: since 2002

Touran

Production: since 2003

Eos

Production: since 2005

Tiguan

Production: since 2006

up!

Production: since 2011

The Road to the All-rounder

40 Years of the Passat

B1 (Type 32/33)

The first Passat, designed by Giorgio Giugiaro, was almost identical to the Audi 80, except for the hatchback. It was available with two or four doors, a small or large tailgate, as well as an estate version.

1973*

B2 (Type 32B/33B)

The second generation of the Passat was available as a two or four-door hatchback, a four-door estate and a four-door notchback called the Santana. The all-wheel drive Passat Estate GT syncro went on sale in 1984. At the beginning of the decade there was also a Formula E variant with a mechanically operated start-stop system.

1980

B3 (Type 35i)

The B3 series made the transition to transverse engines. As the first VW with flush mounted windows and a partly zinc-coated, streamlined body it achieved a drag coefficient of 0.29.

1988

B4 (Type 3A)

The B4 was available as a saloon and as an estate. It was based on its immediate predecessor but was significantly safer: driver and passenger airbags, seat belt pre-tensioners and ABS came as standard. The technical highlight was the economical, high-torque TDI engine.

1993

B5 (Type 3B/3BG)

The B5 returned to the longitudinally installed engine. Besides a new chassis, and the four-link front suspension, this Passat was equipped with side airbags as standard. Also noteworthy were the fully zinc-coated body and safety equipment, with ESP as standard from 1999. With the revision of the series in 2001, an eight-cylinder four-wheel drive version (W8) was released. The Passat B5 was also manufactured in China.

1996

1997

B6 (Type 3C)

The engine was installed transversely again with the introduction of the sixth generation. The equipment included, among other things, long-distance seats, a keyless starting and locking system, an electronic parking brake, automatic distance control and draft-free Climatronic. At 300 hp the six-cylinder VR installed in the R36 reached the highest performance of any Passat model ever. In 2008 a further model variant was introduced with the Passat CC. One year later, the second version of the fuel-efficient Passat BlueMotion followed. In the same year, the Passat BlueTDI made its debut which, thanks to an SCR catalyst, emits so few nitric oxides that it already meets the limits of the 2014 Euro-6 emissions standard.

2005

B7 (Type 3C)

The improvements to the Passat include the interior and numerous assistance systems such as Easy Open, which opens the boot using a foot sensor. In 2012 it was joined by a four-wheel drive version with various off-road specifications called Alltrack. For the first time a separate Passat model was developed for the U.S. Market – and produced in Chattanooga.

2010

* The production dates shown here refer to Europe.

A Class of Its Own

Innovations in the Small Car League

The Polo has always been a pioneer, not just when it comes to high efficiency and power density, but also due to its low consumption values. The BlueMotion concept, for example, which is now used across all Volkswagen brand models, was introduced in the summer of 2006, in the Polo Mk IV. It includes an aerodynamically optimised body, reduced rolling resistance and longer gear ratios. *VIAVISION* shows you the Polo models that have set new standards over the years.

Polo Sprint

The Polo Mk II hatchback version, with significant aerodynamic modifications, was intended as a prototype and research vehicle. It was a study of the optimal load distribution in a compact car with a turbocharged 156 hp engine in the rear. Its maximum speed was 207 kilometres per hour, the car accelerated from zero to one hundred within about eight seconds.

1983

Polo G40

The G40, with 115 hp based on the 1.3 litre engine, was introduced in the summer of 1985 as the most powerful variant of the Polo Coupe. The extra power was achieved using a scroll-type supercharger (see glossary), whose function is similar to a compressor (see glossary) – today this type of power generation would be called downsizing. The GT G40 was lowered and charge air cooled. In January 1991, the Polo G40 was added to the regular model range. The output shrank to 113 hp because of the catalyst.

1985

Eco Polo

The Eco Polo, based on the Polo hatchback introduced in 1981, was produced in a small production series. Under the hood of the slightly aerodynamically adjusted car worked a 0.8 litre diesel engine, which was charged by a G40 scroll-type supercharger. The two-cylinder, essentially, was half of the 1.6 litre four-cylinder diesel – and already featured direct injection which only went into large production series five years later with the TDI. The engine was coupled with a switchable coasting start-stop system that later found its way into the Golf Mk III Ecomatic and then into the Lupo 3-litre.

1988

Polo BlueGT

The BlueGT version of the Polo Mk V, introduced in the beginning of 2013, is as much a fuel-saver as a sprinter. It features a four-cylinder TSI engine with 1.4 litres displacement and 140 hp which can run on two cylinders in certain driving situations, thanks to an electronic cylinder cut-off. On average, this saves about 0.4 litres of fuel per 100 kilometres. The seven gear double-clutch transmission model variant has a standard consumption of just 4.5 litres per 100 kilometres – this is equivalent to CO_2 emissions of only 107 grams per kilometre.

2013

The Golf GTI Fascination

Seven Generations of Cult from the Conveyor Belt

With the Golf, Volkswagen succeeded not only in establishing a class of its own – there was more. Volkswagen's Golf GTI created an emotional, yet affordable, cult classic that has delighted customers since 1976 and so far keeps on fascinating. The expression a "wolf in sheep's clothing" has never found a more perfect fit in reality. The engine power offered has doubled over nearly four decades: instead of 110 hp the current Golf GTI has a remarkable 220 hp under the bonnet. And it remains a front-wheel drive.

Golf GTI Mk I

Production: 1976 to 1983

Volkswagen succeeded in producing a compact sports saloon, the likes of which had never seen before, with the first GTI. With only 810 kilograms of curb weight and 110 hp from the 1.6 litre injection-engine, driving performance and fun were the focus right from the start.

Golf GTI Mk VII

Production: since 2013

The new GTI, with its traditional front wheel drive, delivers 162 kW (220 hp) from the base model up, with a turbocharged 2.0 litre FSI four-cylinder engine; the Performance version offers parallel even

Golf GTI Mk VI

Production: 2009 to 2012

The sixth generation of the GTI took advantage of a newly developed, turbocharged 2.0 litre FSI four-cylinder, which reached a standard 155 kW (210 hp). The limited production anniversary special GTI Edition 35 of 2011 even reached 173 kW (equivalent to 235 hp, matched to the anniversary event!). The XDS electronic differential lock was installed as standard. And, for the first time, the GTI engine of 2012 was transplanted into the convertible version of the Golf Mk VI.

Golf GTI Mk V

Production: 2005 to 2008

In the Golf Mk V too the R32 models at 250 hp received the most powerful engines yet. At the same time there was a separate Golf Mk V GTI model with 147 kW (200 hp) or even 169 kW (230 hp) in the 30th anniversary special edition in 2006. For the third time since the Golf Mk II G60 and the Golf Mk IV 25th anniversary year special edition, turbocharged four-cylinders were used.

Golf GTI Mk II

Production: 1984 to 1991

The new, slightly lighter GTI first produced 112 hp, then came its four-valve engine with 139 hp from 1.8 litres. Its third version was an all-wheel drive GTI G60 with a turbocharged 1.8-litre engine at 160 hp. For the first time it had an electronically controlled front differential lock. Unlike the previous XDS system, which operates by braking, the power transmission between the wheels is varied. The performance package also included an enhanced braking system with ventilated brake discs. A six-speed manual transmission serves for power transmission in all models.

Golf GTI Mk III

Production: 1992 to 1997

The engines became more powerful with the launch of the Golf Mk III. The most powerful of its generation was the VR6 syncro with 190 hp. The GTI meanwhile underwent a phase of democratisation – the strongest version had 150 hp. Special features were the "Plus" suspension and the stronger brakes. The "20 years of GTI" special edition was available from 1996 169 kW (230 hp). For this version, there is a differential front lock. Either a six-speed manual or a dual clutch transmission with six gears transmits the power in both models.

Golf GTI Mk IV

Production: 1997 to 2003

In case of the Golf Mk IV, the R32 models offered towards the end of its production period had the most powerful engines with 241 hp. They were even available with optional six-speed DSG gearbox. The traditional GTI models were available with many different engines, up to the TDI. The "25 years of GTI" special edition of 2001, had a 180 hp, turbocharged, 1.8-litre engine.

Glossary

One speaks of **engine charging** when the performance of internal combustion engines is increased by supplying air at higher pressure. This ensures that there is more air available for fuel combustion – and that boosts the performance of the engine.

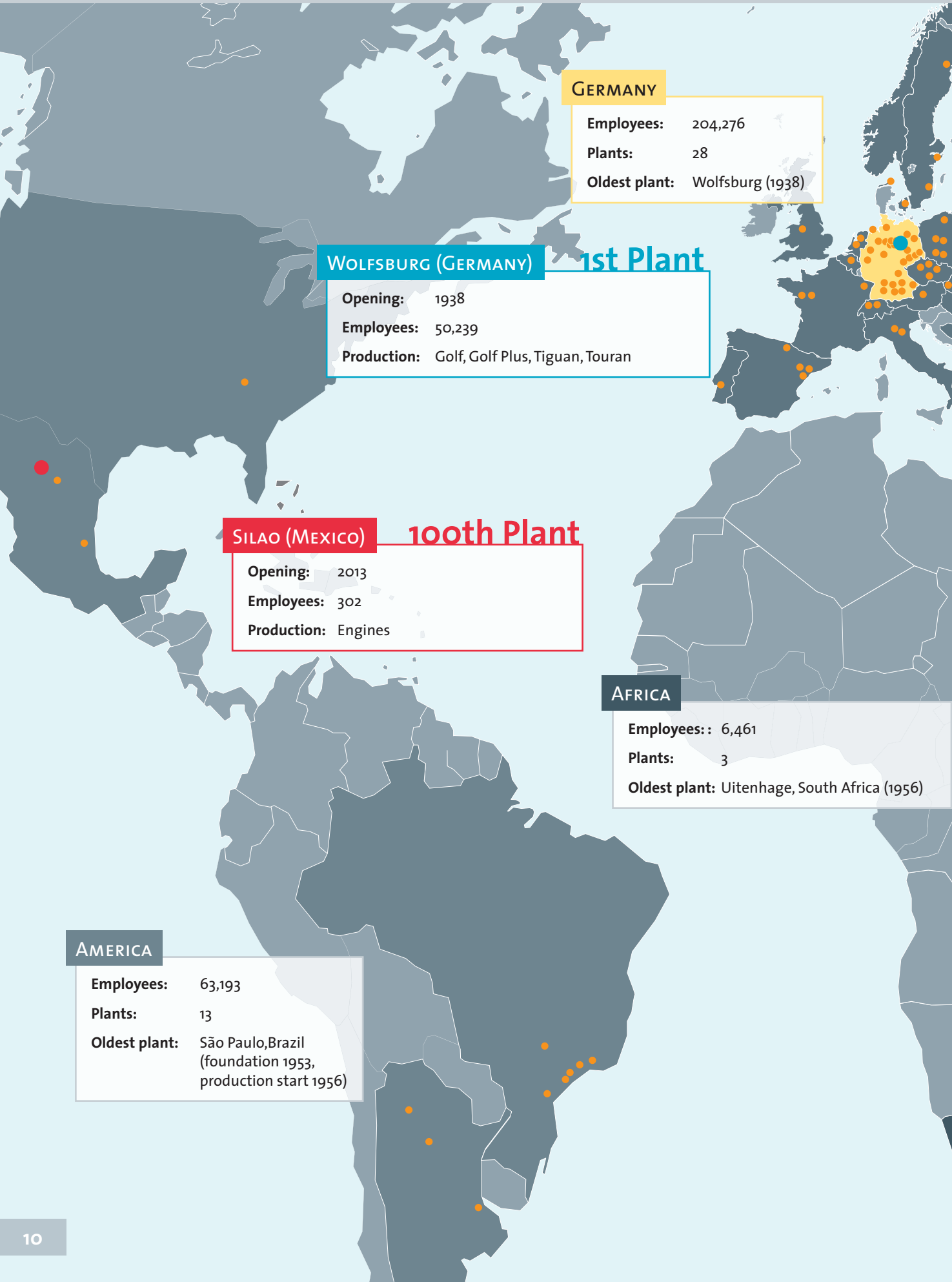
Turbocharger: A turbocharger consists of an exhaust gas turbine which drives a compressor. This in turn pre-compresses the intake air before it is fed to the motor.

Supercharger: A supercharger is a mechanical compressor which is powered directly by the engine. The air is sucked in, compressed and fed into the engine's air intake.

Scroll-type charger: The scroll-type charger, also named G-Lader by Volkswagen because of its shape, consists of two housing halves with cast, spiraling compression channels. The air drawn in by the mechanically driven displacer is compressed and discharged again under pressure through the centre of the scroll-type charger.

Electrics is the colloquial term for the theory of electricity, referring to electrodynamics, which as a physical generic term describes all phenomena that are caused by a static or moving electric charge.

Electronics is the generic term for all processes that are involved in controlling electrons. The term, therefore, refers to the entirety of an electronic device, the so-called electrotechnics.



Germany

Employees: 204,276
Plants: 28
Oldest plant: Wolfsburg (1938)

Wolfsburg (Germany) 1st Plant

Opening: 1938
Employees: 50,239
Production: Golf, Golf Plus, Tiguan, Touran

Silao (Mexico) 100th Plant

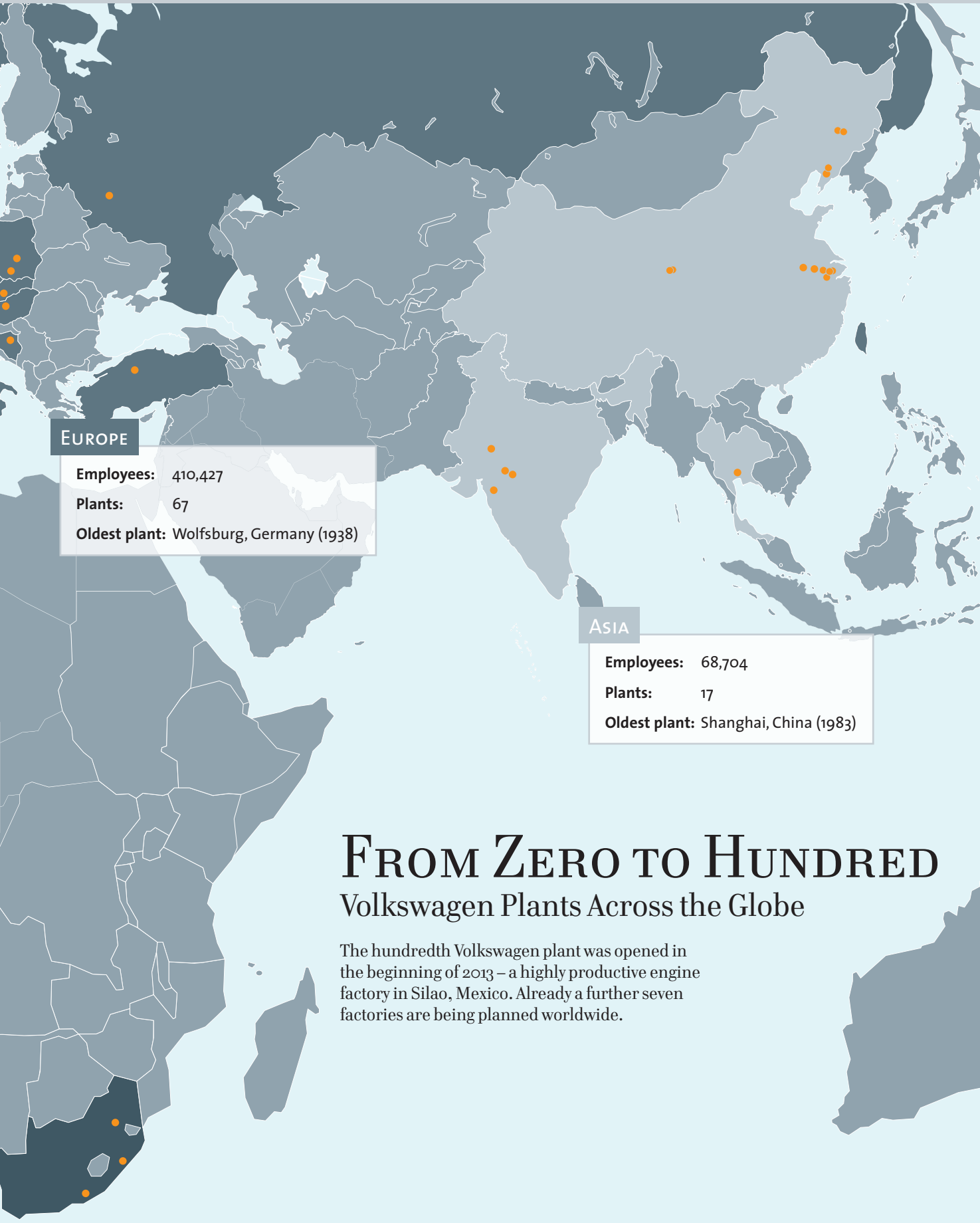
Opening: 2013
Employees: 302
Production: Engines

Africa

Employees: : 6,461
Plants: 3
Oldest plant: Uitenhage, South Africa (1956)

America

Employees: 63,193
Plants: 13
Oldest plant: São Paulo,Brazil (foundation 1953, production start 1956)



Europe

Employees: 410,427
Plants: 67
Oldest plant: Wolfsburg, Germany (1938)

Asia

Employees: 68,704
Plants: 17
Oldest plant: Shanghai, China (1983)

From Zero to Hundred

Volkswagen Plants Across the Globe

The hundredth Volkswagen plant was opened in the beginning of 2013 – a highly productive engine factory in Silao, Mexico. Already a further seven factories are being planned worldwide.

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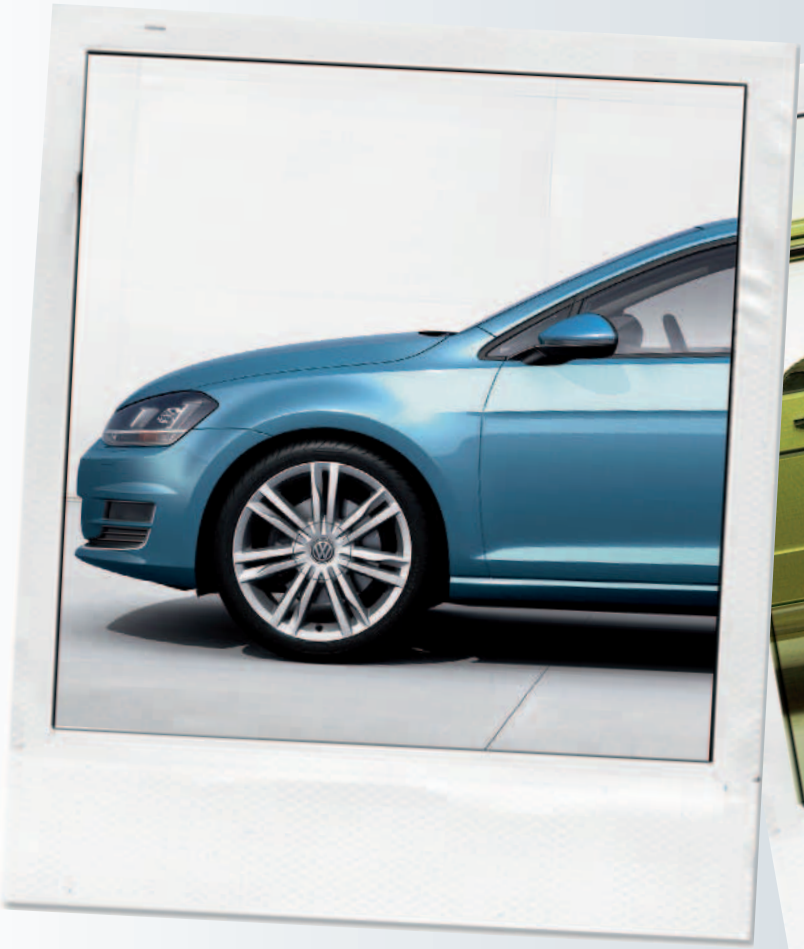

The latest Golf has more electronics onboard than an early Apollo rocket.

Efficient, powerful, economical – among small cars the Polo is a class of its own.