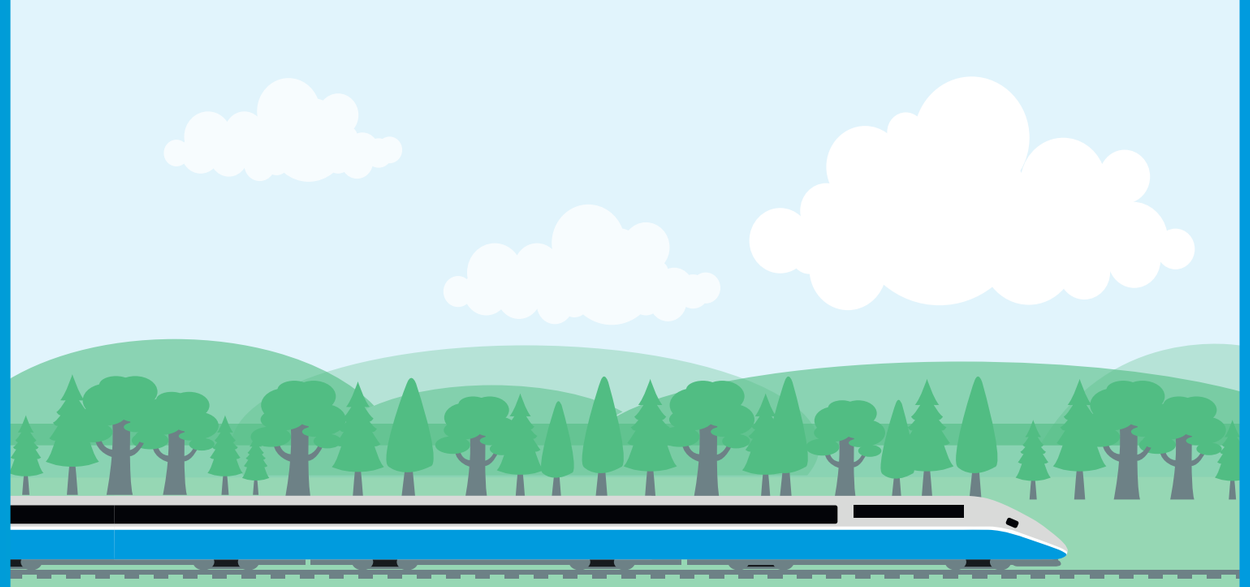

574,8 km/h
World record speed
(France, 2007)

1964
1st october: the first high-speed train between Tokyo and Osaka

80%
The market share of high-speed trains in relation to air travel for journeys lasting less than 2.5 hours

38,000 km
of high-speed rail lines worldwide

320 km/h
Maximum service speed
(April 2015)

3.100
High-speed trains
(faster than 250 km/h)
in operation worldwide (April 2017)

2 billion
200 million
travellers transported by high-speed rail every year worldwide

130 million in France
355 million in Japan
1.400 million in China
315 million in the rest of the world

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Travel quickly... to arrive earlier
a matter of principles

Principle 1
High-speed rail is a system

High-speed rail systems are complex since they utilise the most advanced technologies in different fields. The most significant of these are the engineering structures, the track, signalling, the power supply and the catenaries. Stations, too, are customised according to their location and functional design. The same applies for the rolling stock, operations, maintenance strategy, financing marketing, management, regulation, legal issues and so on.

Principle 2
A different system in every country

The high-speed system is defined by how its various components are designed and how they interact with each other. The result in terms of costs and performances can vary between countries considerably, according in particular to their commercial approach, operational conditions and cost management.

Principle 3
A system which stands for increased capacity

In keeping with the principal feature of rail transport, high-speed rail is all about **capacity** and **sustainable mobility**. This will become even more relevant as it generates a rise in demand. Capacity thus involves accessibility, complementarity between modes of transport and the adoption of a **multimodal** approach.

As far as the customer is concerned, real speed is the aggregate of the time spent purchasing your ticket, getting to the station and waiting for a taxi upon your arrival, factoring in the door-to-door distance. It is not limited to the time saved by a high-speed train which benefits from state-of-the-art technology and significant investment.

rail
a history of speed

Even in 1830...

The 50 km/h reached by George Stephenson's "Rocket" in 1830 foreshadowed the notion of high-speed railways from the outset. Other levels of speed were reached soon after that: 100 km/h by 1850, 130 km/h in 1854, and even 200 km/h at the beginning of the 20th Century.

That said, these are just speed records. The maximum speed of trains in revenue service was more modest, but still on the rise. It reached 180 km/h and an average intercity speed of 135 km/h in the 1930s.

Whether powered by steam, electricity or diesel, the emergence of other modes of transport, such as aviation and the automobile, would compel railway companies to make use of all their assets to withstand the competition.

1830 — *George Stephenson's "Rocket" reaches 50 km/h*

1903 — *Siemens & AEG's electrically-powered vehicle reaches 210 km/h*

On 1st October 1964...

After several speed records had been established in Europe (in Germany, Italy, the United Kingdom, and a record of 331 km/h in France in 1955), the world was surprised when, on 1 October 1964, Japan's national railway company (JNR) commissioned a brand new line linking Tokyo and Osaka over a stretch of 515 km. With a standard gauge (1.435 mm) it was different from Japan's previous metre gauge lines. The president of JNR, Shinji Sogo, and the vice-president, Hideo Shima, also the director of technology, did not just want to create a new line. Above all, they intended to implement a new transport system which would subsequently extend to the rest of the country. The Tokaido Shinkansen was designed to travel at 210 km/h with a large loading gauge, electrically-powered motorised units of a 25 kV AC voltage supply, automatic train controls and signalling, a centralised traffic management system and other new additions. On 1st October 1964, with the Shinkansen, the high-speed railway was born.

1964 — *On 1st October, the "Shinkansen" enters service in Japan*

1981
The birth of the TGV

After the Shinkansen's success, the technological progress accomplished in several European countries, particularly in France, Germany, Italy and the United Kingdom, led to the development of new technologies and innovation. This laid the foundations for the future of rail transport.
Despite uncertainty over the future, in particular owing to the commercial use of Concorde, the first oil crisis in 1973 and competition from other modes of transport, SNCF commissioned France's first high-speed rail line on 27 September 1981 which ran between Paris and Lyon. On this line trains travelled at a maximum speed of 260 km/h.
European high-speed rail was born. Unlike the Shinkansan model, the European high-speed system was fully compatible with the existing rail network; this would have a significant influence on the future development of the European system.

1981 — *The TGV prototype, the world's first high-speed train, travelling through France at 260 km/h*

1988 — *The Advent of Pendolino in Italy and ICE in Germany*

1989 — *TGV "Atlantique" becomes the first train to travel regularly at 300 km/h*

1992 — *AVE enters service in Spain*

1997 — *High-speed rail expands into Belgium*

2003 — *HS1 is launched in the United Kingdom*

2004 — *KTX bursts onto the scene in South Korea*

1981-2009
Taking over the world

After the TGV's spectacular success, numerous countries opted for a new generation of long and middle-distance trains, either by developing their own technology or importing rolling stock.
In Europe, high-speed trains entered service in Italy and Germany in 1988, in Spain in 1992, in Belgium in 1997, in the United Kingdom in 2003 and in the Netherlands in 2009. Meanwhile, similar developments were materialising in other countries: in China from 2003 onwards (even if the major rollout was carried out later in 2008), in South Korea in 2004, in Taiwan in 2007 with Taiwan High Speed Rail Corporation and in Turkey in 2009.

A high-speed train in China

2007 — *574.8 km/h: World speed record in France*

Creation of Taiwan Railway High Speed Corporation

2008 — *Creation of China Railway High Speed Corporation*

2009 — *High-speed rail lines open in the Netherlands and Turkey*

Today and tomorrow

On 1st August 2008, the 120 km line linking Beijing to Tianjin became the first step in the transformation of the travel patterns of the world's most populous country. Since then, China has commissioned more than 20,000 km of high-speed railway lines. Its giant fleet of more than 2,200 trains enables the transport of 1.4 billion travellers per year (figures from 2017), which constitutes more than two thirds of all documented high-speed traffic in the world. China's example is being followed by others, such as Morocco, Saudi Arabia, the United States, etc.

Despite the emergence of other modes of transport, such as the magnetically-levitating Maglev train, high-speed railway networks could cover more than 80,000 km by 2030-2035.
High-speed rail must continue evolving and innovating to ensure its sustainability for the next 50 years or more. This is a major challenge for railway corporations, manufacturers and executives.

The TGV Alstom Model

2015

High-speed rail lines cover almost 38,000 km worldwide ...

... In 2050, it will stretch over more than 80,000 km!