



ECONOMIC OPPORTUNITIES

From Terminus to Economic Hub

Accelerating Growth While Sustaining the Environment

By Rogier Vergouwen • November 11, 2021

Summary:

- Increase economic growth
- Reduce carbon emissions
- Funding available

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The expansion of high-speed rail encourages economic growth. It is sustainable, and if properly designed, the fastest way to travel up to 800 km. Countries all over Europe are scaling up their high-speed rail network. To strengthen the economy, it is important that The Netherlands does not ‘miss the train’.

Due to an increasing Dutch population (from 17.5 to 19.5 million in 2050), expanding world population and higher prosperity in Asia, more people will travel than ever before. Without infrastructure investments, it will result in clogged roads, increased carbon emissions and a slowing economy. But by investing in high-speed rail (HSR), the economy will accelerate while a more sustainable way of transportation will be achieved.

Strengthening the Dutch Economy

Shorter travel times improve competitiveness and accelerate economic growth. At distances between 200 and 800 km, high-speed trains outperform cars and airplanes by shorter travel time. Italy (operational since 1977), France (1981), Germany (1991) and Spain (1992) have constructed extensive high-speed rail networks. Since 2009, The Netherlands has been connected as a terminus of the high-speed train from Paris. In order to remain an economic center of Northwestern Europe, the Amsterdam Metropolitan Area must extend its HSR-connections with other major European destinations. These hubs include Hamburg, Berlin and Frankfurt, from where high-speed trains run to further destinations.

- **Amsterdam – Hamburg – Copenhagen**

To connect Amsterdam with Hamburg (450 km), an HSR passing Groningen and Bremen should be built. A non-stop high-speed train from Amsterdam can reach Hamburg in about 2 hours, the time the TGV Paris – Lyon covers a similar distance (425 km, less than 2 hours). The connection ties in well with HSR developments elsewhere: Germany and Denmark are building an 18 km undersea tunnel (*Fehmarnbelt*, see frame below), enabling future travel from Hamburg to Copenhagen in about 2.5 hours.

- **Amsterdam – Berlin**

The current conventional train between Amsterdam and Berlin (650 km) taking over 6 hours can be reduced to 2.5 hours by HSR. By eliminating several intermediate stops, the Dutch and German governments currently aim to shorten the journey to 5.5 hours. These travel times will unlikely encourage travelers to choose the train: an airplane will accomplish the same trip (including security check and travel times to and from the airport) in about 3.5 hours only. High-speed trains can accomplish the trip much faster: the train Madrid – Barcelona (625 km) covers a similar distance in 2:30. Consequently, travelers between these Spanish cities hardly opt for air travel. With half the track (between Hanover and Berlin) already accomplished, only a new highspeed track between Amsterdam and Hanover needs to be constructed.

- **Amsterdam – Frankfurt**

An ICE (the German high-speed train) is currently traveling between Amsterdam and Frankfurt (400 km), but since it runs over conventional track from Amsterdam till Duisburg, and upgraded conventional track between Duisburg and Cologne, the entire trip takes 4 hours. Here too, travelers prefer to take the plane. If new high-speed rail will be built and trains travel without intermediate stops, the journey could be reduced to 2 hours, much faster than traveling by car or plane. Frankfurt is an important hub from where trains continue to Stuttgart, Basel, Zürich and Munich.

Additional Economic Incentives Outside

Amsterdam

Non-stop travel between major cities like Amsterdam and Hamburg, Berlin and Frankfurt will strengthen the economy of the Amsterdam Metropolitan Area. But a high-speed rail system offers an additional advantage: next to a non-stop train, another high-speed train making a limited number of stops can use the track. As a result, medium-sized cities like Groningen, Enschede and Arnhem will gain quick access to large European cities. Concerning the Amsterdam – Hamburg route, this means that stops can be made in Groningen, Oldenburg and Bremen, while the train to Berlin also stops in Enschede, Osnabrück and Hanover.

Getting a direct connection to major European cities, these intermediate locations can achieve their own economic boost. International experience learns that city size and location matter: cities of over 100,000 inhabitants and within 1 hour of travel from the main economic hub truly benefit.

Thanks to high-speed rail, the journey between Groningen and Amsterdam doubles down to 1 hour. This quick access to the economic engine of the Netherlands will transform the North of the Netherlands into an attractive business spot. The same applies to Enschede, as a stop between Amsterdam and Berlin. The wide availability of space for businesses and housing, a technical university and a fast connection to both Amsterdam and Berlin creates potential of a top international

environment for the entire region. Thanks to the short travel time, these regions can become living places for people working in the more crowded western part of the Netherlands, and expansion locations for growing companies from the Amsterdam Metropolitan Area that lack space there.

On the German side of the border the same applies: cities in the periphery of the country as Oldenburg and Osnabrück will get an excellent connection with major German and Dutch cities, offering them new opportunities for growth. A study from the London School of Economics and University of Southern Denmark (G.M. Ahlfeldt & A. Feddersen, 2018), analyzing the economic impact of the newly built high-speed rail between Cologne and Frankfurt, supports this: 6 years after the line had been completed, the GDP in the regions with intermediate stations increased 8.5% faster due to the line.

Last, the construction itself will generate an economic impulse over a longer period of time. It reduces unemployment, and thanks to the salaries of the employees working on the construction, will give a spending infuse to the region where these people live and work.

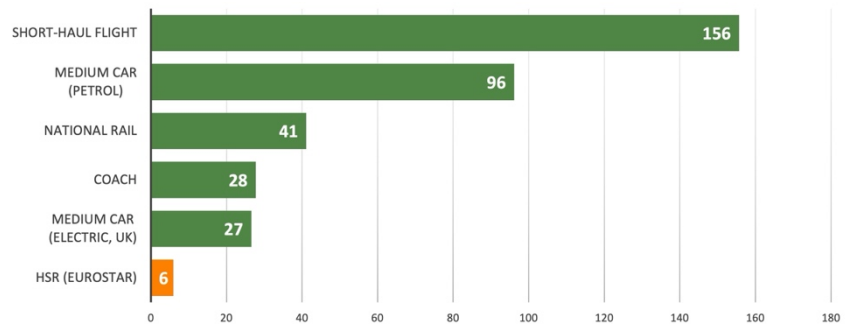
Schiphol Airport

Schiphol Airport is important for the Dutch economic development and prosperity, but is reaching the limits of its expansion. Improved international train connections can substitute short-haul flights by high-speed trains. As a result, Schiphol can use some of this freed-up capacity for the increasing number of long-haul flights that it needs to handle due to the growing population. As such, it can continue in its role to enhance the economic growth and prosperity of The Netherlands.

Environmental Impact

Road transport and air traffic contribute for a large proportion to greenhouse gas emissions. In order to reduce these dramatically as stipulated in the Paris Agreement, transportation must become more sustainable. High-speed trains are known as the most environmentally friendly way of transportation, as shown in the graphics below.

Greenhouse emissions in grams per passenger per km



Source: Our World in Data, UK Department for Business, Energy and Industrial Strategy (2018)

Note: The carbon footprint of travel is measured in grams of carbon dioxide equivalents per passenger per kilometer. Car usage based on 2 passengers per car, but emissions will double in case of single use. The figures include carbon dioxide, but also other greenhouse gases, and increased warming from aviation emissions at altitude. Data is based on official conversion factors used in UK reporting (2019). These factors may vary slightly depending on the country, and assumed occupancy of public transport such as buses and trains.

To encourage passengers to switch from cars and short-haul flights to the sustainable train it needs to be competitive. International research has shown the main factor for selecting the mode of transportation is travel time, and that high-speed trains are prevailing for travel times under 2 hours. For travel between 3 and 4 hours, HSR still controls a market share of 50 – 70%, but above that air travel is the preferred method of transportation. The French Parliament has gone one step further: in 2018, it decided that flights between destinations that can be reached within 2.5 hours by train should be cancelled. Spain has the same intention.

In 2018, engineering firm Royal HaskoningDHV calculated that 133,000 flights from Schiphol could be cancelled annually if the Netherlands and Europe invest in HSR quickly. The decrease of flights and car travel will result in a net reduction of 53% carbon dioxide and 37% nitrogen emission.

Funding

To accomplish the before-mentioned three tracks, about 500 km of new high-speed rail must be built within the Netherlands. With construction costs of 25 million euro/km, it requires an investment of about 12.5 billion euro.

There are many opportunities for loans and grants of the investment. The Dutch National Growth Fund invests in projects that provide long-term economic growth, including infrastructure. The EUR 20 billion fund has hardly been used so far, something that has been widely criticized by public opinion.

In addition, the European Commission contributes to cross-border projects (see frame: *Europe International*) and funds sometimes up to 40% of the construction costs.

Third, the EU Economic Recovery Package, Next Generation EU, has been established to support countries severely impacted by the covid-pandemic, providing member states with a budget to transform and strengthen their economy. Over a third of the budget must be used to reform the economy and make it more sustainable. The total budget is EUR 700 billion, of which 6 billion reserved for the Netherlands. As the Dutch plan for using the fund hasn't been finalized or submitted yet, high-speed rail can be added as an objective to use these funds.

Keep the Train Going...

Meanwhile in Italy, Prime Minister Mario Draghi, who had the Italian plans submitted in spring, received EU confirmation that Italy will be awarded with EUR 191 billion from the *Next Generation EU Fund*. Of this amount, 31 billion will be dedicated to improve the Italian infrastructure and make it more sustainable. Priority? The construction of high-speed rail between Naples and Sicily. To connect the isolated south with the richer north and thus give it an economic boost.

What Are Other European Countries Doing?

Italy, France, Germany and Spain have built extensive HSR-networks. By building completely new track (designed for speeds between 300 and 350 km/h), these work a lot better in France, Italy and Spain than in Germany, where routes consist of an alternation of conventional track (up to speeds of 120 or 160 km/h), upgraded track (up to speeds of 200 or 250 km/h) and new HSR track (in Germany not always designed for 300 km/h or more). Travel times illustrate this: the high-speed train Madrid – Barcelona (625 km, 2.5 hours travel time) or Paris – Marseille (750 km, 3 hours) are considerably faster than, for example, Munich – Berlin (623 km, 4 hours). Because regular trains in Germany also run on HSR track, congestion and delays occur, making the German ICE anything but ‘pünktlich’. While trains in Germany are currently competitive with air travel over distances up to 500 km, HSR in France and Spain still compete successfully at 750 km journeys. High-speed trains in these south European countries are therefore a great success.

Europe International

For faster travel times and reduced emissions, national networks are being connected: France has extended its HSR to London, Brussels, Amsterdam, Frankfurt, Munich and Barcelona. Milan is connected to Zürich by the *Gotthard Base Tunnel*, with 57 km the longest tunnel in the world. Another tunnel through the Alps is being drilled between Lyon and Turin (57.5 km), and a third between Munich, Innsbruck and Verona (*Brenner Base Tunnel*, 55 km). Between Hamburg and Copenhagen, Germany and Denmark are constructing the 18 km undersea *Fehmarnbelt Tunnel*, scheduled to be ready in 2029. Smaller countries are also active: the *Rail Baltica* will connect Warsaw with cities in Lithuania, Latvia and Estonia. There are plans to extend the line to Helsinki, but this will require another undersea tunnel, crossing the Gulf of Finland.

In Europe, about 12,000 km of high-speed rail has been accomplished so far. The European Commission wants to expand and optimize the network (higher speed, fewer stops). That makes HSR competitive at a distance of 800 – 900 km and can consequently be a real alternative to air travel. European Commissioner for the *Green Deal*, Mr Timmermans, has indicated that he wants to increase international rail traffic to reduce short-haul flights.

The EU has made significant payments for the construction of international railroad connections. To finance new high-speed railroads between the Netherlands and Germany, the Dutch and German governments can appeal to European funds as well.

What Is America Doing?

America became an economic power thanks to the railroads it built in the 19th century. Incentivized by the federal government, the *First Transcontinental Railroad* was built to unlock both sides of the continent. It made travel quicker, safer and less expensive, and introduced commerce on a vast scale. As a result, the American industry and agriculture started to grow rapidly, and by 1890 America had established itself as the most powerful economy in the world.

Like Europe and China, traditional rail can't compete with automobiles and airplanes anymore. But unlike Europe and China, there is no national plan to upgrade nationwide railroads to HSR. Although the *Acela* between Washington, New York and Boston reaches travel speeds up to 240 km/h on a small stretch, on average the train does not go faster than 113 km/h. Within some states (California, Texas), there are initiatives for full-fledged HSR, but compared to China and Europe the outcomes have been insignificant so far.

With the *Infrastructure Bill* passed by Congress last Friday, a turning point may have been achieved: USD 12 billion has been set aside to improve intercity rail traffic, including high-speed.

What Is China Doing?

To open cities, provide fast connections and reduce carbon emissions, China has rolled-out high-speed rail in a tremendous pace. The country started late: in 2007, about the same time when the Netherlands started. But while the Netherlands has completed 89 km to the Belgium border, China has accomplished 40,000 km of high-speed rail. That's more than all the other countries have built together, and in a much shorter time as well. China is leading in speed too: new HSR is suitable for speeds up to 380 km/h, the new standard in China, and can therefore compete with air travel over longer distances than other countries.

A good example is the *Beijing – Shanghai Railroad*. Built during the Qing dynasty (before 1912), the railroad was only modernized as late as 2007. Thanks to many modifications, it is now possible to travel with a speed of 250 km/h over this railroad. In addition to this “old” track, a completely new rail track was constructed as well, dedicated for high-speed trains. Started in 2008, the 1,318 km long stretch was completed 3 years later. The result is equally spectacular: 85% of the track is elevated, 244 concrete bridges (including the *Danyang Kunshan Bridge*, with 165 km the longest bridge in the world) are part of the route and 22 tunnels have been drilled. Capable of speeds up to 380 km/h, the train covers the 1,318 km in 4:18 hours only, including 2 intermediate stops. It makes China's high-speed trains still competitive with air travel at 1,300 km.

In a 2019 report about China, the World Bank (who funded 2,600 km of track) concluded that high-speed trains have dramatically reduced travel times and transformed the Chinese economy. Operational speeds of 350 km/h have broken the dominance of the airlines and laid the foundation for greenhouse gas reduction. And with a return on investment of around 8%, it has been a good investment as well.