

High Speed Trains are Killing the European Railway Network 1



Picture: The Étoile du Nord Paris-Amsterdam (1927-1995). Almost as fast as the high speed train, but two to three times cheaper.

High speed rail is marketed as a sustainable alternative to air traffic. According to the International Union of Railways, the high speed train "plays a key role in a stage of sustainable development and combating climate change". As a regular long-distance train traveller in Europe, I have to say that the opposite is true. High speed rail is destroying the most valuable alternative to the airplane; the "low speed" rail network that has been in service for decades.

The introduction of a high speed train connection invariably accompanies the elimination of a slightly slower, but much more affordable, alternative route, forcing passengers to use the new and more expensive product, or abandon the train altogether. As a result, business people switch from full-service planes to high speed trains, while the majority of Europeans are pushed into cars, coaches and low-cost airplanes.

A look at European railway history shows that the choice for the elite high speed train is far from necessary. Earlier efforts to organize speedy international rail services in Europe accompanied affordable prices and different ways to increase the speed and comfort of a rail trip. Quite a few of these services were even faster than today's high speed trains.

Five years ago [I promised my readers I would not fly anymore](#). Hopping on a plane would be a hypocritical thing to do when you run a publication called *Low-tech Magazine*. Since then, I have been travelling across Europe almost exclusively by train (apart from the occasional boat trip), good for some 70,000 km of long-distance travel. I went as far north as Helsinki, as far south as Málaga,

and as far east as Budapest. Europe has [the most amazing railway network in the world](#). It gets you anywhere, anytime, and it's much more fun and interesting to travel by train than by air.

However, this is not the time to get lyrical about the pleasures of long-distance train travel. Every year, it becomes harder to keep my promise, and the advance of the high speed train is to blame. As more and more reliable train routes are shut down in favour of high speed lines, international train travel becomes prohibitively expensive. Strangely enough, many of these abolished routes are almost as fast, and sometimes even faster, than the new, expensive high speed connections.

As an example, let's have a look at the route which I cover most often: from Barcelona, Spain (where I live) to the Netherlands and Belgium (where I grew up). It is now possible to travel all the way from Barcelona to Amsterdam by high speed train, a trip of 1,700 km. The final link between Barcelona and the French border was inaugurated December 15, 2013. Great news, you would think.

Paris - Brussels - Amsterdam

The section between Paris and Amsterdam is a busy trajectory with a long history. The first direct train between Paris and Amsterdam was established in 1927. The *Étoile du Nord*, a train operated by the Belgian *Compagnie Internationale des Wagon-Lits*, covered the 545 km long route in about eight hours. There was one train per day in each direction. [1]



During the subsequent decades, the rolling stock was modernised, the capacity of the line was extended with extra trains, and the length of the journey was gradually reduced.

By 1957, travel time had been shortened to five and a half hours, by 1971 it was five hours, and in 1995, the last year of its operation, the *Étoile du Nord* did the trip in four hours and 20 minutes. At that time, the route was also covered by a night train which took eight hours. The itinerary of these services is indicated by the red line in the illustration on the right.

In 1996, the *Étoile du Nord* was retired and replaced by a high speed train which is still running today: the *Thalys*. It takes another, somewhat longer route via Lille, which is depicted by the blue line on the illustration. By 2011, when the whole section was equipped with new high speed track, the travel time of the *Thalys* had come down to 3h19, about one hour faster than the 1995 *Étoile du Nord*. Some years after the arrival of the high speed service, the direct night train between Paris and Amsterdam was also abolished.

The relatively modest time gain of the *Thalys* has a steep price. The fare for the *Étoile du Nord* was a fixed amount calculated according to a rate per kilometre. Converted to the current kilometre charges of the Belgian, French and Dutch railways, a single ticket Paris-Amsterdam over the same route (the blue line) would now cost 66 euro, regardless of whether you buy it two months in advance or right before you leave.

The *Thalys* is two to three times as expensive as the *Étoile du Nord*, while it's only 25% faster.

The fare for the *Thalys*, on the other hand, is determined by market demand and booking time. If you order well in advance and if your departure time is not fixed, you might get a single ticket for as less as €44 -- two thirds of the kilometer rate. These heavily advertised prices, however, are the exception rather than the rule. If you buy a single ticket the day of your departure, you pay €206, almost five times as much. Most tickets, even if ordered two or three weeks in advance, cost €119 or €129 -- almost three times as much as the widely promoted fares [2]. In marketing, this pricing strategy is called "reducing *perceived* ticket costs" [3][4].

Killing the alternatives

The *Thalys* is two to three times as expensive as the *Étoile du Nord*, while it's only 25% faster. For most people, the time gained by taking the high speed train is not worth the extra cost. However, since the *Étoile du Nord* has vanished, they are left no other choice than to pay more when they want to travel by train.

You can still travel cheaply by low speed train between Paris and Amsterdam -- over the same route that was covered by the *Étoile du Nord*. But you have to be very patient: the trip takes 7 to 8 hours and you have to switch trains 5 to 6 times (Paris-Maubeuge-Jeumont-Erquelinnes-Charleroi-

Brussels-Amsterdam). A one-way trip costs €66, half the price of the most common fare of the *Thalys*.



Erquelinnes station (1852-2012). Don't forget your walking shoes. Picture by Low-tech Magazine.

It's an adventure, not a regular train ride. And it's become even more unpredictable since December 2012, when the train service between Jeumont (the French border town) and Erquelinnes (the Belgian border town) was suspended. The trip now includes a 30 minute walk or a 10 minute bus ride across the border. This is why the route doesn't show up on online route planners. I only discovered it after I learned about the existence of the *Étoile du Nord* and started following its itinerary.

There is another alternative route between Paris and Amsterdam, which consists of a combination of regional trains following more or less the same trajectory as the *Thalys* (Paris-Amiens-Lille-Courtrai-Brussels-Amsterdam), but it's more expensive (€99) and only marginally faster.

You can still travel cheaply by low speed train between Paris and Amsterdam, but the trip takes as long as it did in 1927 and you have to walk half an hour to cross the border between France and Belgium.

Quite surprisingly, those who want to avoid the high costs associated with the high speed train between Paris and Amsterdam are much worse off today than people were in 1927, when the trip also took eight hours, but there was no need to switch trains or walk across the border. [5]

Barcelona - Paris

The *Thalys* is not an isolated case. The completion of the last link in the high speed line between Barcelona and Paris on December 15, 2013, had a predictable consequence: the abolishment of the direct night train between both cities, the *Trenhotel Joan Miró*. This very popular train ran daily in both directions and covered the distance in about 12 hours, leaving around 20h30 in evening and arriving around 08h30 in morning. It was introduced in 1974, and received its present name and rolling stock in 1991.

Again, this is not the time to marvel about the comfortable cabins, the linen table clothing in the dining car, or the many friends I have made on this trip. Let's just look at the numbers. The fare for a one-way trip on the *Trenhotel Joan Miró* was between €70 (ordered more than two weeks in advance) and €140 euro (ordered shortly before departure). The standard fare on the new high speed train covering the same trajectory is €170, up to twice as much. As with the *Thalys*, heavily advertised cheaper fares (€59 euro) are available for early bookers, but the availability of these tickets is very, very limited.



The Trenhotel Joan Miró Barcelona-Paris (1991-2013). Cheaper and faster than the high speed train. Picture by [Sergio Evangelio](#).

At first sight, it seems that you get something valuable in return for this steep price: a travel time of slightly over six hours. However, numbers don't tell the whole story here. On a night train, passengers sleep about seven to eight hours, which brings the perceived travel time back to between four and five hours -- faster than the high speed train. Furthermore, the night train meant you arrived in Paris or Barcelona in the early morning, which can be very practical. If you

want to arrive early morning by high speed train, you need to take a train the day before and book a hotel, increasing the overall cost.

As of 2014, a round trip between Barcelona and Amsterdam will set me back at least €580 at standard fare. Before the introduction of the high speed train, the cost was €270.

For die-hard idiots like me, there are still cheaper options available. You can take a regional train from Barcelona to the French border, either going straight over the Pyrenees (via Latour de Carol-Enveitg) or alongside the coast (via Cerbère-Portbou). From these border stations, you can hop on a domestic night train to Paris -- in spite of its extensive high speed network, France still has some domestic night trains. A one-way trip costs about €70 to €140, corresponding with the fare of the abolished *Trenhotel*. However, this is cold comfort as the trip takes close to 16 hours and requires an extra change. And forget all the comfort and extras that came with the *Trenhotel*: you sleep in a cabin with six instead of four beds, and there isn't even a drinking fountain onboard, let alone a bar or a restaurant.

In summary, as of 2014, a round trip between Barcelona and Amsterdam will set me back at least €580 at standard fare. In 2013, a combination of the now suspended *Trenhotel* and the *Thalys* allowed me to travel back and forth by train for a minimum standard fare of €360. And in the early 1990s, combining the *Étoile du Nord* and the *Trenhotel* would have allowed me to make the trip for a minimum of €270 euro (calculated at today's kilometre rate). The price has doubled, while the travel time remained more or less the same.

Let's go East !

The worst is yet to come, though. The high speed line between Paris and Barcelona has also cut off my gateway to Central and Eastern Europe. Contrary to the "slow" train route that goes over the mountains and then heads straight to Paris, the high speed track does a sharp turn to the right, heading towards Narbonne and Montpellier in the south of France before setting course to Paris. If I want to go to Italy, Switzerland, Austria or beyond, I have to go in the same direction.



The Catalan Talgo Barcelona-Geneva (1968-2010). Cheaper and faster than the high speed train. Picture: [RailwayMania](#).

The completion of the high speed track between Montpellier and the Spanish border in 2010 led to the suspension of three "slow" trains. The first was the *Catalan Talgo*, a direct train that had run between Barcelona and Montpellier since 1969. In fact, it originally operated between Barcelona and Geneva in Switzerland, but the route was shortened when the high speed line between Montpellier and Geneva was opened in 1994.

I felt lucky to be travelling on this train, which still used the original rolling stock from 1969. But, again, this is not the time for nostalgia. Look at the numbers. The original *Catalan Talgo*, running between Barcelona and Geneva until 1994, completed the journey in 10 hours. My only option when travelling to Geneva now involves a combination of three high speed trains and a regional train with a total travel time of eight to ten hours -- just as fast as the *Catalan Talgo* in the 1970s, but that was direct. The train itself may have been in need of an upgrade, but the direct connection clearly wasn't.

A trip from Barcelona to Switzerland or Italy now takes longer than before the installation of the high speed train. In spite of this, fares on the route have more than doubled.

The two other trains were abolished in December 2012. These were night trains: the *Trenhotel Pau Casals*, which ran between Barcelona and Zürich (Switzerland), and the *Trenhotel Salvador Dalí*, which connected Barcelona and Milan (Italy). They each took about 13 hours to complete their journey, leaving around 20h30 in evening and arriving at 10h00 in morning. The only way to reach Zürich now is through a combination of at least two high speed trains that take 11 hours. The only way to get to Milan is now through a combination of two high speed trains and a regional train with a total travel time of over 12 hours.

A trip from Barcelona to Switzerland or Italy now takes longer than before the installation of the high speed train. In spite of this, fares on the route have more than doubled. This is why I started thinking about doing my next trip by bicycle.

High Speed Trains are not Sustainable

Despite its supposed efficiency, the high speed train will not make my travels any more sustainable. Passengers who switch from low speed trains to high speed trains, like I have to do now, increase energy use and carbon emissions. However, most Europeans aren't like me. If they travel between Amsterdam and Barcelona, they take a plane. If we are to believe the European Union, who has made the high speed train a key element in its strategy to make long-distance transportation less energy and carbon-intensive, passengers who now take planes will switch to high speed trains.



A low-cost plane in Barcelona. Cheaper and faster than the high speed train. Source: Wikipedia Commons.

However, if you compare the ticket prices, it's obvious that this won't happen. You can fly back and forth between Barcelona and Amsterdam with a low-cost airline for €100 if you book one to two weeks in advance, and for about €200 if you buy the ticket on the day of departure. [6] That's compared to €580 for what the journey would cost you if you would take the high speed train. Furthermore, the flight only takes about two hours. Flying has become so cheap in Europe that it's now cheaper to live in Barcelona and commute by plane each day, than to live and work in London. [7]

With the arrival of high speed trains and low-cost airlines, rich and poor are simply swapping long-distance transport modes.

Historically, train fares have always been lower than air fares. The arrival of high speed trains and low-cost airlines in the 1990s has inverted this. Rich and poor have simply swapped travel modes: the masses are now travelling by plane, while the elite take the train. Since there are less rich Europeans, this obviously won't bring any energy savings or reductions in carbon emissions.

High speed trains share a fundamental problem with almost all other "sustainable" high-tech solutions that are being marketed these days: they are way too expensive to become mainstream. This explains why installing 10,000 km of high speed train lines did not stop the growth of passenger air traffic in Europe. From 1993 to 2009, air traffic in Europe grew by an average of 3-5% per year. It is estimated to grow by another 50% from 2012 to 2030 in spite of the present economic downturn and the 20,000 km of high speed lines that still need to be built. [8]

Notes



[1] Present and historical timetables and itineraries cited in this article come from a variety of sources. For present timetables starting December 2013, I have consulted the [online database of the German Railways](#) (the link goes to the Austrian version which I find more user-friendly), as well as the online timetables from [RENFE](#) (Spain), [SNCF](#) (France), [NMBS](#) (Belgium), [NS](#) (The Netherlands), [SBB](#) (Switzerland) and [TrenItalia](#) (Italy). For recent timetables pre-dating December 2013 (rail operators traditionally change timetables and trains routes in December), I have relied on the [Thomas Cook European Rail Timetable](#) and my own collection of train tickets. Information about train routes was found in a variety of [rail maps and atlases](#). The historical timetables for the *Étoile du Nord* and other trains were found in the Dutch Magazine "Het Spoor".

[2] All prices: winter 2013. See [TGV-europe](#) and the national railway operators listed above [1]. Fares from before December 2013 are based on my own collection of train tickets. The [Man in Seat 61](#) provided missing information.

[3] [Applying Low Cost Airline Pricing Strategies on European Railroads](#), Thomas Sauter-Servaes, 2006

[4] [The Functioning of Inter-modal Competition in the Transportation Market: Evidence from the Entry of Low-cost Airlines in Germany](#), Guido Friebe, 2005

[5] In 2012, a joint venture between Belgian and Dutch railways introduced a competing high speed train on the section between Brussels and Amsterdam: the *Fyra*. Its introduction went together with the abolishment of a slightly slower but much cheaper alternative, the *Benelux train* -- which is also operated by the Belgian and Dutch railways. If everything would have gone according to plan, the route between Amsterdam and Brussels would now be a copy of the route

between Paris and Brussels. Travellers would be forced to use the more expensive fast train, or take a combination of regional trains that would be ridiculously slow. However, the *Fyra* trains were plagued by technical problems and had to be retired after two months. An alternative route has been established -- slower than the *Benelux train*, but faster than the combination of regional trains. It is still unclear how things will evolve in the future. For the calculations of travel times in this article, I assume that the *Benelux train* is still running.

[6] Prices: [Vueling](#), December 2013.

[7] [Can't afford London's sky-high rent? Try commuting from Barcelona](#), The Atlantic Cities, November 2013.

[8] [Challenges of Growth 2013](#) (PDF), Eurocontrol, 2013



High Speed Trains are Killing the European Railway Network (2)

The difference in ticket prices between low-cost airlines and high speed trains is so large that it is impossible to achieve a significant modal shift from planes to trains. Nevertheless, both the European Union and the International Union of Railways have published many reports showing that people *are* switching from planes to trains, saving energy and carbon emissions. How can that be? Because these reports are flawed.



Picture: The TEE Rheingold Amsterdam-Geneva (1965-1987). Source: Wikipedia Commons.

Granted, on many routes where high speed trains have been introduced, air traffic has diminished significantly. In general, when high speed rail offers a journey time of three hours or less, it attracts at least 60% of the combined air and rail market. On some routes, such as the Brussels-Paris and Cologne-Frankfurt, air traffic has disappeared completely. [9]

Based on these figures, the advocates of sustainable high speed trains conclude that the reduction in energy use and carbon emissions equals the flights that have been "avoided", minus the (lower) energy consumption and emissions generated by high speed trains. This is a tempting conclusion, but once you start looking who is on those trains and why, things start to look very different.

First of all, passengers who switch from planes to high speed rail are not switching from low-cost airlines to high speed trains -- as you would suspect by comparing the fares. The most important substitution effects are those by passengers travelling with traditional air companies, which have similar fares as high speed trains. [10] However, low-cost airlines are responsible for the growth of air traffic and the increase of energy use and emissions.

High Speed Trains Fuel Air Traffic

Secondly, the studies that claim an ecological advantage for high speed trains ignore the extra traffic being generated by such trains. On one hand, high speed trains induce new demand for train travel. Between 30 and 50% of the trips on a high speed train are due to new demand. [10][11][12] These are all trips that would not have been undertaken if the high speed train did not exist. These travels do not replace a plane or car trip and consequently don't save energy and emissions.



A EuroCity train in Austria. Source: Wikipedia Commons.

Not surprisingly, this new demand is largely coming from affluent customers. While part of the demand is from tourists, a much larger part is business related. A study of the high speed line between Rome and Naples in Italy shows that on weekdays almost 60% of new demand is due to business trips. [12] Another 6% corresponds to people that have moved their residence from Rome to Naples and started to commute every day -- and that was only one year after the line was opened.

On the other hand, high speed trains also generate more air traffic. A study of 56 airports and 28 cities in the UK, France, Spain, Italy and Germany between 1990 and 2010 shows that in most of these airports and cities air traffic has kept growing despite the presence of extensive high speed train lines. [13] A significant part of this extra traffic is prompted by high speed trains. The study observes that short haul flights have indeed decreased. However, at the same time, medium and

long-haul flights (within Europe) have increased. This is because high speed rail allows airports to run more long-distance flights, which are more profitable for airlines.

Two-thirds of passengers on the high speed train between Cologne and Frankfurt are either coming from or going to the airport

In other words, by alleviating the congestion at airports, the high-speed train helps to pave the way for the growth of low-cost airlines. [9][10][13] Air traffic between Paris and Brussels, and between Cologne and Frankfurt has disappeared completely because airlines have agreed to use trains instead of planes to serve main airport hubs. According to Deutsche Bahn, the German national railway operator, two-thirds of passengers on the high speed train between Cologne and Frankfurt are either coming from or going to the airport. [9] However, their longer flight might not have been possible without the high speed train.

Towards a Truly Sustainable Transportation System

In conclusion, affluent customers switch from (expensive) planes to (expensive) trains, at least for medium distances where the train is faster, or as fast, as a plane. All other people choose low-cost airlines for longer distances, and cars or busses for medium distances where affordable train travel isn't an option anymore. They generally only travel on high speed trains when they are on their way to an airport to catch a long-distance flight, or when they can get hold of a cheap fare. Lastly, almost nobody chooses high speed rail when the travel time is over five hours, not even those who can afford the ticket.



A Pullman train from the 1920s. Picture: B. Zsolt (Wikipedia Commons)

If Europe wants to make its long-distance transportation more sustainable, it has no other choice than to limit the growth of air traffic in a direct way. Such a measure should accompany a more affordable railway system, like the one that is now being dismantled, or long-distance travel will become a privilege of the rich. The tracks are still there, so this could be done in no time.

It's enlightening to look at the present European focus on high speed trains in the context of railway history. It's not the first time that smooth international railway traffic has been reserved for the elite. The high speed train is the latest in a long history of European luxury trains aimed at business travellers, which seem to appear whenever the economy is booming, and disappear when good times are over.

The high speed train is the latest in a long history of European luxury trains aimed at business travellers, which seem to appear whenever the economy is booming, and disappear when good times are over

Only the rich could afford the luxurious *Pullman* trains that appeared on European railways in the 1920s. [14] These trains only carried first class cars. The original *Étoile du Nord*, the first direct connection between Paris and Amsterdam, was one of these trains.

High Speed Rail in the 1950s



Pullman trains started taking second class coaches during the economic downturn in the 1930s, after which the Pullman heritage withered. The economic crisis of that time tipped the balance to more affordable international train travel, and it would stay like that for almost thirty years.

At the end of the 1950s, elite trains made a comeback. In 1957, the direct train connection between Paris and Amsterdam was modernized in the context of the Trans Europ Express (TEE) project, which was aimed at travellers on business. TEE trains only took first class cars and the fares were higher than the kilometre charges for first class travel on normal trains.

TEE was an answer to the growing competition from airplanes, which were at that time exclusively used by rich people. The similarities with today's high speed trains are striking -- TEE was marketed as a "plane on wheels". Faster trains were introduced (with top speeds over 140 km/h) and travel distances were mostly under 500 km. At its peak in 1974-1975, the TEE network consisted of 31 routes, stretching from Copenhagen to Barcelona and from Amsterdam to Sicily. (See the illustration above, from Wikipedia Commons). [15]

High Speed Trains for Everybody: EuroCity

At the end of the 1970s, air travel had become [faster and more comfortable with the introduction of the jet engine](#). Business people switched to planes again. Losing their affluent customers, the railways reverted to affordable international trains -- planes were still too expensive for the masses. There was, however, strong competition from road transport. Thousands of kilometres of motorways had been built and the car had become the main long-distance transport means for the majority of Europeans.

EuroCity and EuroNight formed a sustainable, efficient and cheap long-distance transport system that was the best that Europe ever had.

TEE trains were equipped with second class carriages, a trend which eventually culminated in the EuroCity project, which was launched in 1987. EuroCity trains were as fast as TEE trains, but they carried mostly second-class coaches and the price of a ticket was again based on the regular kilometre fares. From the start, EuroCity offered 64 pairs of international trains with 50,000 daily seats, connecting 200 cities in 13 countries. [15]



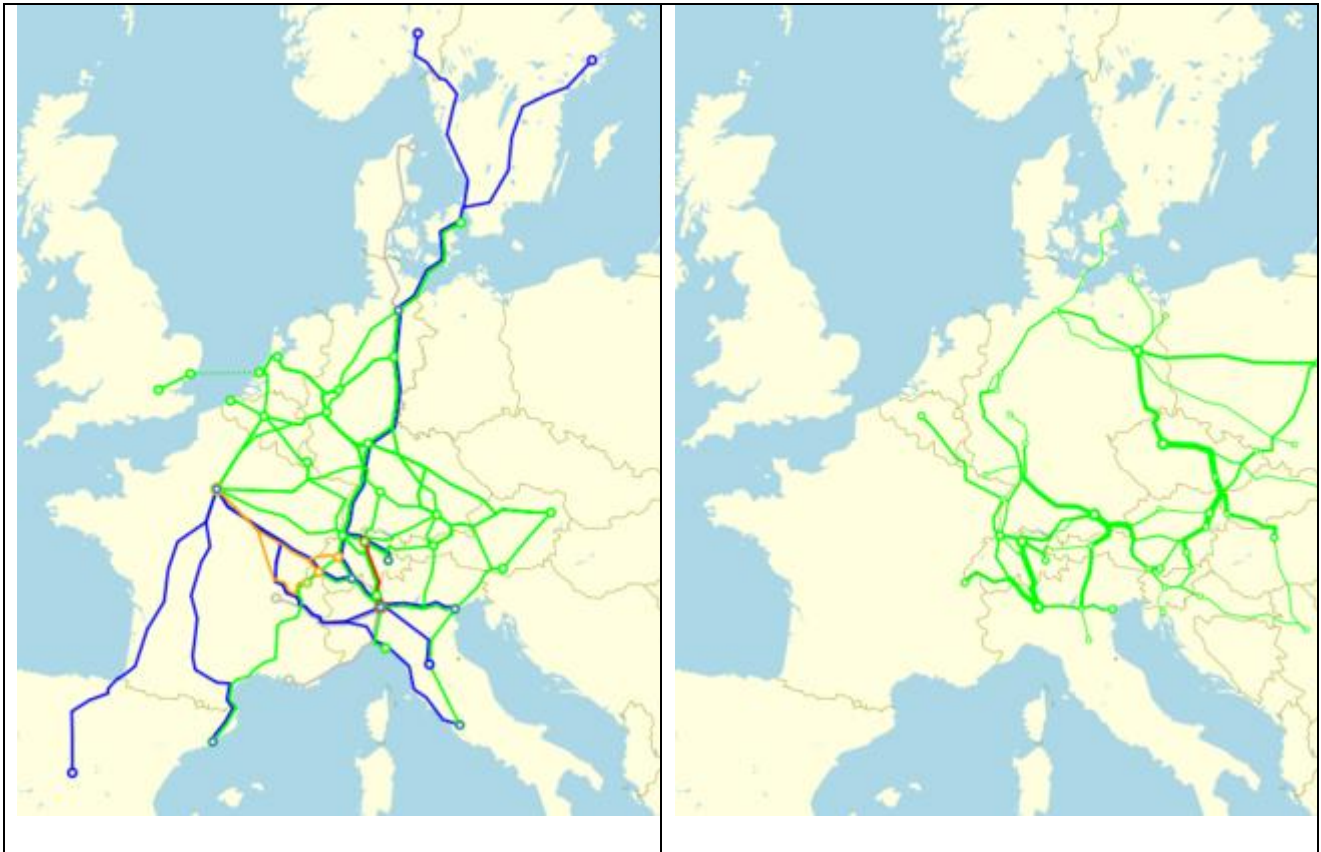
The EuroCity train between Geneva and Venice. Picture: Wikipedia Commons.

EuroCity accompanied an extensive network of night trains (EuroNight), and together they formed a sustainable and efficient transport system that was probably the best that Europe ever had. The *Étoile du Nord* that connected Paris and Amsterdam until 1995 and covered the route in just 4h20 was a EuroCity train, and the night train that covered the trajectory was a EuroNight. The *Catalan Talgo* was a EuroCity train, and the *Trenhotels* fitted the EuroNight class.

The 1996/97 version of the *Thomas Cook Guide to European Night Trains* [1] lists a total of more than one hundred international night trains in Europe, and another one hundred domestic night trains. Western Europe has axed most of them in recent years. Some examples: From the 21 night trains leaving from Belgium in 1997, heading as far as Moscow, not one remains. From the 36 domestic overnight trains in Spain, only eight remain. Understandably, the yearly *Guide to European Night Trains* has ceased publication.

What makes a train affordable?

EuroCity and EuroNight trains still run in Central and Eastern Europe, with the result that fast international trains are still available for fixed, affordable prices. The great advantage of EuroCity and EuroNight trains is that they do not require a unique railway infrastructure, which makes them far less costly to initiate. Furthermore, they are cheaper to operate than high speed trains. This allows for more affordable ticket prices, and it also means that the network can be extended at a faster pace.



The EuroCity network in 1987 (left) and in 2010 (right). Western Europe now opts for high-speed trains. Maps from Wikipedia Commons.

Of course, if more people travel by low speed train, the infrastructure will have to be extended. But building low speed rail is much cheaper than building high speed rail, which costs an average of 18 million euro per km, excluding planning and land acquisition costs. [10] High speed trains often run on newly built dedicated high speed tracks that allow higher speeds through the use of wider curves, less steep grades, more powerful electrification systems and different branching systems. Logically, these high investment costs, combined with higher operating costs, lead to higher ticket prices, and to the abolishment of alternative routes that might compromise the economic viability of a new high speed line. [16]

The local and regional rail infrastructure, which carries many more passengers than high speed rail, is greatly underfunded in many European countries with high speed trains.

Much more (public) money will be needed to complete the European high speed rail system: of the 30,750 km of high speed lines planned for 2030, only 10,000 km has been built. [9] Naturally, the high investment costs also have a negative effect on the maintenance of the domestic low speed network. The local and regional rail infrastructure, which carries many more passengers than high speed rail, is greatly underfunded in many European countries with high speed trains. Rolling stock is outdated, services are reduced, delays are frequent and accidents are on the rise. [17]

What makes a train fast?

Obviously, limiting the growth of low-cost airlines would decrease the ability for affordable air travel -- that's the price we need to pay for sustainability. But, as we have seen, a network of "low speed trains" would not be significantly slower than a continental network of high speed trains.



A TEE train in the Transport Museum in Nürnberg, Germany. Source: Wikipedia Commons.

The top speed of a train is only one of many factors that influences travel time. European high speed trains reach top speeds of 250 to 350 km/h, but their average speed is much lower. For example, the average speed of the *Thalys* between Paris and Amsterdam is below 170 km/h. This is well within reach of "slow" EuroCity and EuroNight trains, which can reach speeds of 200 km/h.

The top speed of a train is only one of many factors that influences travel time. European high speed trains reach top speeds of 250 to 350 km/h, but their average speed is well within reach of "low speed" trains

The speed of many high speed trains is limited due to, for example, their proximity to densely urbanised areas (to ease the impact of noise and minimise the risk of accidents), the existence of viaducts or tunnels (where speed must be reduced to 160-180 km/h for safety reasons), or the need to climb steeper grades (and when steeper grades are avoided, this often results in considerably longer routes, which is the case for the whole corridor Barcelona-Paris-Brussels). [10]

In many European countries, high speed trains are combined with normal rail traffic on some sections of their route: only 6,000 km of the 10,000 km of high speed lines is dedicated high speed track. Sharing infrastructure with slower trains decreases capital costs, but also brings down speed. [9][10][18]



The Eurocity train between Milan and Zürich. Source: Wikipedia Commons.

On the other hand, EuroCity trains have to meet several criteria to shorten travel time, and many of these are also applicable to high speed trains. For example, the trains only stop in important cities, turnover time in stations is less than five minutes, border control happens on-board, and the trains are given priority over other trains in order to comply with timetables. These are all factors that influence travel time as much as the speed of the train.

High Speed Night Trains

Even on routes where high speed trains are significantly faster than normal trains -- such as between Barcelona and Paris -- they are still slower than the night trains that covered the same distance, at least when we look at perceived travel time. Because time flies when you are under the covers, the night train is the ultimate low-tech alternative for the high speed train.

Of course, high speed trains could also introduce night services. A few months ago, the International Union of Railways -- who has a clear bias towards high speed trains -- published a study about high speed night trains, investigating the potential for operating night train service on high speed lines using high speed rolling stock. [19] One such a train already exists in China. "Very Long Distance Trains" could provide night train service on corridors over 2,000 km long. For example, you could board a train in Barcelona and wake up in Hamburg the next morning.

Because time flies when you are under the covers, the night train is the ultimate low-tech alternative for the high speed train

However, in Europe, with its fragmented railspace, operating such night trains would be a costly affair. On most routes, the fare would be about €700 for a single ticket just to cover the operating costs of the trip, as calculated by the International Union of Railways. A single ticket for a low-cost flight from Barcelona to Hamburg costs €75 (ordered up to 3 weeks in advance) to €130 (ordered one day before departure). [6] Using a combination of low speed trains, the trip previously could have been done in a night and a day for less than €200.



On the night train Madrid-Portbou. Picture by Low-tech Magazine.

Anti-Progress?

Of course, the high speed train is a very comfortable way to travel. The question, however, is not whether we like the idea of a high speed train network, but whether or not we can afford it. Spending billions of tax money on a transportation network that excludes the majority of the population from using it might not be a sound investment.

A 2009 study by Spanish researchers analysing the economic impact of high speed rail in Europe [10] puts it this way:

"Building, maintaining and operating high speed rail may substantially compromise both the transport policy of a country and the development of its transport sector for decades... An exhaustive revision of the specific economic literature shows that the research effort devoted to

the economic analysis of investing in high speed railways is almost insignificant... It deserves a closer look, well beyond the technological hype and the demand figures... Deciding to reject the construction of a high speed rail line is not necessarily a position against progress."

In less than 10 years, Spain has built the most extensive high speed rail network in Europe. Today, the country is virtually broke and can hardly afford to keep its trains running.

Kris De Decker (edited by [Deva Lee](#))

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[1] Present and historical timetables and itineraries cited in this article come from a variety of sources. For present timetables starting December 2013, I have consulted the [online database of the German Railways](#) (the link goes to the Austrian version which I find more user-friendly), as well as the online timetables from [RENFE](#) (Spain), [SNCF](#) (France), [NMBS](#) (Belgium), [NS](#) (The Netherlands), [SBB](#) (Switzerland) and [TrenItalia](#) (Italy). For recent timetables pre-dating December 2013 (rail operators traditionally change timetables and trains routes in December), I have relied on the [Thomas Cook European Rail Timetable](#) and my own collection of train tickets. Information about train routes was found in a variety of [rail maps and atlases](#). The historical timetables for the *Étoile du Nord* and other trains were found in the Dutch Magazine "Het Spoor".

[2] All prices: winter 2013. See [TGV-europe](#) and the national railway operators listed above [1]. Fares from before December 2013 are based on my own collection of train tickets. The [Man in Seat 61](#) provided missing information.

[3] [Applying Low Cost Airline Pricing Strategies on European Railroads](#), Thomas Sauter-Servaes, 2006

[4] [The Functioning of Inter-modal Competition in the Transportation Market: Evidence from the Entry of Low-cost Airlines in Germany](#), Guido Friebel, 2005

[5] In 2012, a joint venture between Belgian and Dutch railways introduced a competing high speed train on the section between Brussels and Amsterdam: the *Fyra*. Its introduction went together with the abolishment of a slightly slower but much cheaper alternative, the *Benelux train* -- which is also operated by the Belgian and Dutch railways. If everything would have gone according to plan, the route between Amsterdam and Brussels would now be a copy of the route between Paris and Brussels. Travellers would be forced to use the more expensive fast train, or take a combination of regional trains that would be ridiculously slow. However, the *Fyra* trains were plagued by technical problems and had to be retired after two months. An alternative route has been established -- slower than the *Benelux train*, but faster than the combination of regional trains. It is still unclear how things will evolve in the future. For the calculations of travel times in this article, I assume that the *Benelux train* is still running.

[6] Prices: [Vueling](#), December 2013.

[7] [Can't afford London's sky-high rent? Try commuting from Barcelona](#), The Atlantic Cities, November 2013.

[8] [Challenges of Growth 2013](#) (PDF), Eurocontrol, 2013

[9] [High-speed Europe, a sustainable link between cities](#), European Commission, 2010

[10] [Economic analysis of high speed rail in Europe](#) (PDF), Ginés de Rus et al., 2009

[11] [Forecasting Demand for High Speed Rail](#) (PDF), Maria Börjesson, 2012

[12] [High speed rail demand: empirical and modelling evidences from Italy](#) (PDF), Ennio Cascetta, 2011.

[13] [Impacts of high-speed rail and low-cost carriers on European Air Traffic](#) (PDF), Regina R. Clewlow, 2013

[14] *Histoire des Trains de Luxes: de l'Orient-Express au TEE*, George Behrend, 1977

[15] Information about TEE and EuroCity comes mainly from the Dutch railroad magazine "Het Spoor". Wikipedia has a great overview of [TEE](#) and [EuroCity](#) trains.

[16] It should be noted that there is not one high speed line that can recover infrastructure costs. However, high speed trains in France and Spain are able to recover their operating costs. Source: see [10]

[17] News reporting in *Le Monde* and *El País*, following the spectacular train accidents in France and Spain last summer (Note: the crashed train near Santiago de Compostela was not a high speed train). News reporting in *La Vanguardia*, following a cascade of smaller accidents involving local trains in Barcelona. News reporting in *De Standaard*, following train accidents in Belgium.

[18] Germany is the only country with a "fully mixed model", which means that both high speed and conventional services can run on each type of infrastructure. High speed trains can use upgraded tracks while freight services use the spare capacity of high speed lines during the night. Germany has relatively few dedicated high speed tracks, and trains are comparatively slow. These factors make HSR more affordable in Germany than in France or Spain. [Edited]

[19] [Night Trains 2.0.](#) (PDF), International Union of Railways, 2013