



*A Plea for a Night Train Renaissance:  
Presented by Back on Track Belgium*

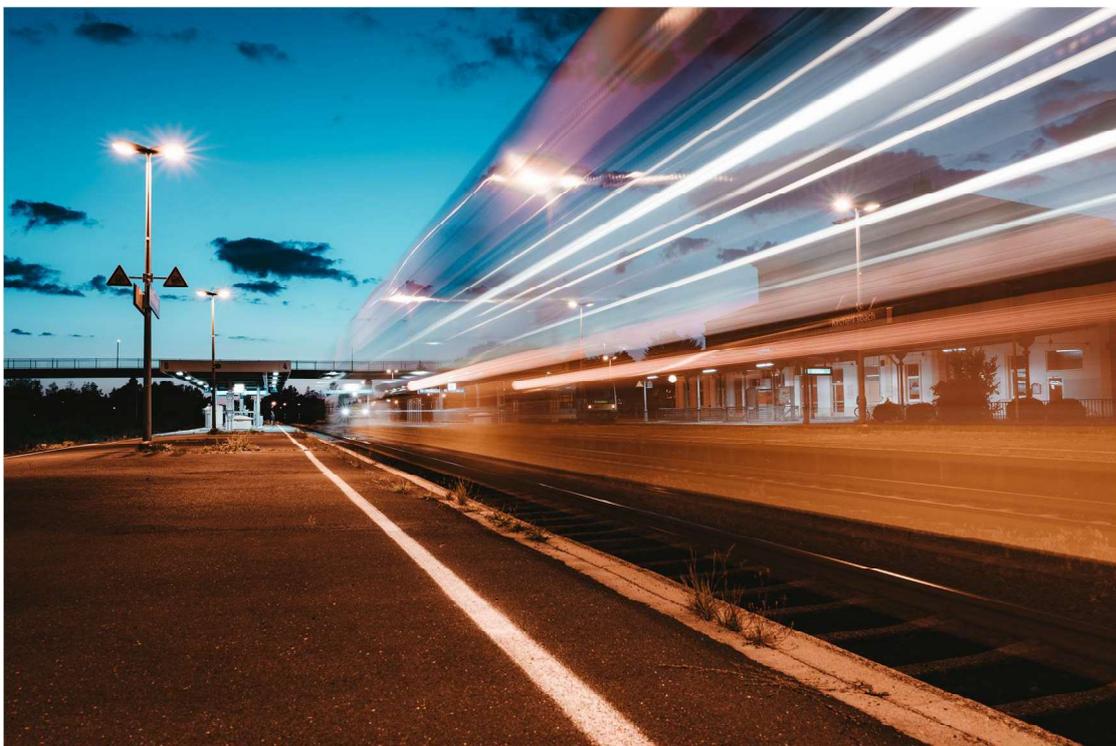
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## INTRODUCTION

A clear path is needed to achieve a 90% reduction in transport-related greenhouse gas emissions by 2050. In 2018, emissions from transport in the EU were responsible for 29% of total economy-wide greenhouse gas emissions, and that share is growing [1]. Between major European cities, long distance, point-to-point passenger travel could easily be bridged by cross-border trains. An extensive night train network could serve travellers on distances between 800-1500 km. A night train trip typically is less fragmented, more efficient, more comfortable, and less polluting. As Europe already features one of the most extensive and best railway infrastructure in the world, the development of new night train lines would contribute to the reduction of the CO<sub>2</sub> footprint of the passenger transport sector and of its dependency on energy imports without "reinventing" a completely new infrastructure.

Unfortunately, the offer for international night train lines has drastically decreased over the last decades to the benefit of other transport modes, in particular aviation. A broad redeployment of this service is necessary to enable a shift from air to rail. A plan in this regard was presented during the German EU presidency in 2020. There, the TEE 2.0 was presented as an agreement between several national railway operators<sup>1</sup> for a renewed Trans-European night train network. The lines proposed by this initiative are a first step, but further connections are required.

In addition to developing a network of night train services, it is important to stress that this network should be built around hubs and based on lively interactions between cities, regions, and especially European and national authorities active in the rail industry (as outlined in the EU "Sustainable and smart mobility strategy"). Brussels should fulfil such a 'hub' function. It is the largest conference city in the EU, and it provides access to international high-speed trains such as Eurostar, Thalys, ICE and TGV to millions of passengers that travel between France, Germany, the UK, and the Netherlands. Night trains arriving and departing in Brussels could link with high-speed and express services to many other destinations: the European capital can again become a night train hub linking the north with the south and the west with the east of Europe.

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<sup>1</sup> French (SNCF), German (DB), Swiss (SBB) and Austrian (ÖBB)

## SUMMARY

Back on Track Belgium has published an updated version of its 'Dossier' that was first published in April 2020. The purpose of this document is to be informative, visual, and accessible for everyone who is interested.

The document is divided into 8 chapters.

**Chapter 1** discusses **the history of night trains** in Europe. In the 1880s, the first sleeper trains were introduced. At the time, it was for example possible to travel from Paris to Istanbul by train. Then, in the 1960s, train travel ceased to be the dominant mode for international travel. Slowly, air travel became more and more important. By 1990, low-cost airlines started to play an important role in intra-European air travel and night train connections started to disappear.

**Chapter 2** discusses **today's context**. We believe 7 points are especially relevant in this regard.

- The first one is the modal split. The modal split of long-distance travel (+1000 km) is very car or air travel focused: 33% of people fly, and 51% drive for such distances. The night train could be very competitive over such long distances and that is why we believe there is an enormous potential for night trains.
- The second argument is the 21<sup>st</sup> century economic, political, and social context. People want to travel further. The tourism industry has changed since the last night trains disappeared, and the COVID-19 pandemic has very likely changed the way we think about business travel forever. Additionally, there is a strong interest in rail travel at the policy level with for example the European Year of Rail 2021 initiative launched by the European Commission recently.
- Thirdly, the regulatory context today makes it impossible for rail to compete in a fair way with air travel as taxation and infrastructure access are regulated differently.
- Fourthly, we briefly discuss the relation between high-speed rail and night trains. From our point of view, there should be no competition at all for customers. Rather, both services should complement each other to facilitate the modal shift in favour of rail.
- The fifth point is the concept of rail operator: running trains on international routes can be very complex, specifically because of very complex regulation.
- The sixth and final point is environmental sustainability. If Europe wants to decarbonize the transport industry, switching short distance flights to rail is indispensable.

In **Chapter 3** we **discuss what customers want today**: certain segments want to keep travelling but would prefer to travel in an environmentally sustainable way if possible. Also, they want to be able to easily book international train trips. We must keep in mind that there is no one-size-fits-all solution, and different segments require different solutions to fit their travel needs.

In **Chapter 4** we elaborate on **recommendations** that can support the revival of international night trains. We discuss actions that policy makers can take on different levels e.g., ensuring a level playing field for all transportation modes, which today is non-existent by shifting pricing, taxation etc. Also, we discuss measures that operators can take to make night trains services viable and attractive for customers e.g., strongly focusing on digital services and offerings

**Chapter 5** discusses **the role of the European Railway Agency (ERA)** and how it could play a more prominent role as to support night train development. We envisage a Eurocontrol kind of role for the ERA in the future.

In **Chapter 6**, five arguments are discussed that support **Back on Track Belgium's desire for a night train hub** in Brussels. Among other things, we argue that Brussels has a very interesting customer base as it is one of the most cosmopolitan cities in the world.

Also, in terms of geography, accessibility from close by European metropolises and population density Brussels is the ideal candidate for fulfilling a hub-function in the night train network.

Chapter 7 provides an **overview of all planned and announced lines**. It features several comprehensive maps of Europe that visualize those lines. Also, it includes Back on Track Belgium's 'dream network'

Finally, **Chapter 8** consists of **a concise conclusion** in which we address the key points that are discussed in this document.

# 1 YESTERDAY'S CONTEXT

## 1.1 Night trains have a 140-year-old history of moving people on our continent

Night trains were invented in the middle of the 19th century and evolved greatly with the arrival of sleeping cars around 1880. Technical progress has improved the rolling stock over the decades. Night trains are attractive over distances of 800 to 1500 kilometres [2]. While often reserved for privileged travellers, the night train evolved in the 1950s and 1960s as transport, with the introduction of couchette-cars, which offered a more affordable price.

However, it should be borne in mind that in the 1960s and 1970s it was found that there were not always enough international passengers to form a single night train to a single destination. It was therefore necessary to work in groups of 3 or 4 cars which had to be hooked up to other trains in foreign countries. This resulted in a huge international jigsaw puzzle that had to be coordinated every year at a "European Timetable Conference" [3]. Some trains had as many as three or four blocks of sleeping cars and/or couchette cars for separate destinations, which was notably the case of trains departing from Ostend or Hoek van Holland toward many European destinations. In other cases, however, there were fully occupied trains when there were many customers, for example on the Paris-Nice, Paris-Barcelona, London-Scotland, Hamburg-Munich, or Milan-Rome routes.

## 1.2 Social-economic, political, and business forces that dictated night trains

The comparative table below discusses in a concise way which socio-economic, political, and business forces influenced the night train industry. The comparison with the 1990s as a key turn point.

Table 1: Comparative table: before vs. after 1990s

### Socio-economic Level

<u>Socio-economic Level</u>	
<b>Before the 90s</b>	Since the 1960s, international rail has ceased to be the dominant form of transport, facing competition from motorways and, later, from aviation, which became increasingly accessible to all.
<b>After the 90s</b>	It took high-speed rail to draw the attention of the public and politicians to the benefits of this mode of transport. Air travel in the 2000s became a status symbol for wider strata of society: before then, air travel was very expensive, reserved for businesspeople, and fares even for short European regional distances were very high [4].

## Political Level

<b>Before the 90s</b>			<b>After the 90s</b>
	<p>The railways were state administrations that suffered chronic disinvestment and accumulated large debts that weighed on the public finances.</p>	<p>In order to consolidate public finances, the 'new management' concept wanted subsidies to be better controlled and public services to be managed with a contract approach, with responsibilities and penalties, and with a more commercial-centric, i.e. more commercial, approach [5]</p>	
	<p>It was thought that the train would only be a niche transport in the year 2000, that there was no future.</p>		
	<p>The railways lived on subsidies</p>	<p>The railway was 'sectorised' to distinguish between subsidised and commercial traffic. Infrastructure and regional trains remained public services, while long-distance trains and freight became commercial operations.</p>	
	<p>The rail fare was based on the distance travelled and depended on the pricing model determined by each state. The international fare was a simple addition of the fares of each country crossed. There were no commercial tariffs based on market supply and demand.</p>	<p>Since the 1990s, the national law of each EU Member State has gradually been brought into line with Community law. The European Union issued four legislative railway packages and several regulations. The main thrust of this policy has been to allow a variety of operators, both competing and non-competitive, to enter the market in all rail markets, including the long-distance markets. The railway reforms in the EU most often took the forms of vertical separation and entry of competition, although there were also some cases of horizontal separation [6], [7].</p>	

## Railway Agency Level

<b>Before the 90s</b>	<p>A European convention called COTIF<sup>2</sup> [7], signed at state level, obliged each railway administration to take charge of each train handed over at the border.</p> <p>International traffic was managed by conventions signed by each administration. Each network took charge of the deficit on its territory and generally, the ministers did not interfere.</p> <p>The purchase of international rolling stock was very expensive because it was only a fraction of the needs of the much more important domestic service. These purchases depended on the subsidies from each government.</p> <p>The timetables of international trains, their composition and the means of traction were regulated by an annual conference.</p> <p>The shortfalls of night trains were included in the global shortfall of the national public service. The only distinction was the pricing, as access to sleeping cars and couchette cars required a supplement to add to the official railway tariff.</p>	<b>After the 90s</b>
	<p>The COTIF Convention and the obligation to carry was repealed in 1999 by European law. From now on, each train had to pay a fee on the foreign rail network (and on the national). Prices are arbitrary chosen. For e.g. a passenger (night) train pays in Belgium more than 8,17 euros/km, in Slovenia 0,01/km (1/817th!)</p> <p>International rail operations can be carried out in two ways: either by an operating company such as Thalys, Eurostar or Thello, in which public companies have a share, or via a traction contract when an operator goes it alone, such as ÖBB's Nightjet or RegioJet's summer night trains.</p> <p>The pressure on the financial autonomy of the long-distance sector has put many day and night trains at risk. For SNCB in Belgium, all night trains disappeared by December 2003. Only a night train Paris-Brussels-Berlin and one Warsaw-Cologne-Brussels (Jan Kiepura) train ran until 2005 when these services were also discontinued.</p> <p>Technology and open borders now make it possible to sell locomotives that can run on several networks. However, it is still customary to</p>	

<sup>2</sup> COTIF: Convention concerning International Carriage by Rail (COTIF)

<b>Before the 90s</b>	<p>There were significant differences in approach between rail networks in terms of service. This had consequences for comfort, catering, and ticketing. The Eurocity system created in 1987 was a German idea and was not supported by the Benelux countries and France, which did not follow this example.</p> <p>Given the concern to preserve the work culture of each country, and due to technical differences, the locomotives were changed at the borders.</p> <p>The railways never knew what was happening on the neighbouring network in terms of delays or customer care.</p> <p>In the 1980s, night trains were confronted with ever-improving journey times and the introduction of air-conditioned carriages on major rail routes, such as the Corail carriages in France or the Intercity concept - a train every hour - in Germany, which made daytime travel much more comfortable. This aspect was further emphasized with the arrival of the high-speed train [9], [10].</p>	<p>change the driver at the border for reasons of employment regulations, knowledge of signalling and language.</p> <p>Today, one operator manages the entire journey on domestic but also on foreign territory. It is the operator who, for example, decides who will clean the train at the destination and which staff will do the onboard service.</p> <p>However, the liberalisation of the rail market has led to a loss of cooperation between railway companies as railway operators now consider their counterpart on the other side of the border as a competitor. In addition, to study the market, the contractual nature of rail services has made it difficult to access traffic data as it has become "commercially valuable information" and is legally protected.</p>	<b>After the 90s</b>
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## 2 TODAY'S CONTEXT

### 2.1 Promising modal share in Europe

A 2015 study [11] published by the Joint Research Centre of the European Commission shows the following modal splits for trips over 1000 km.

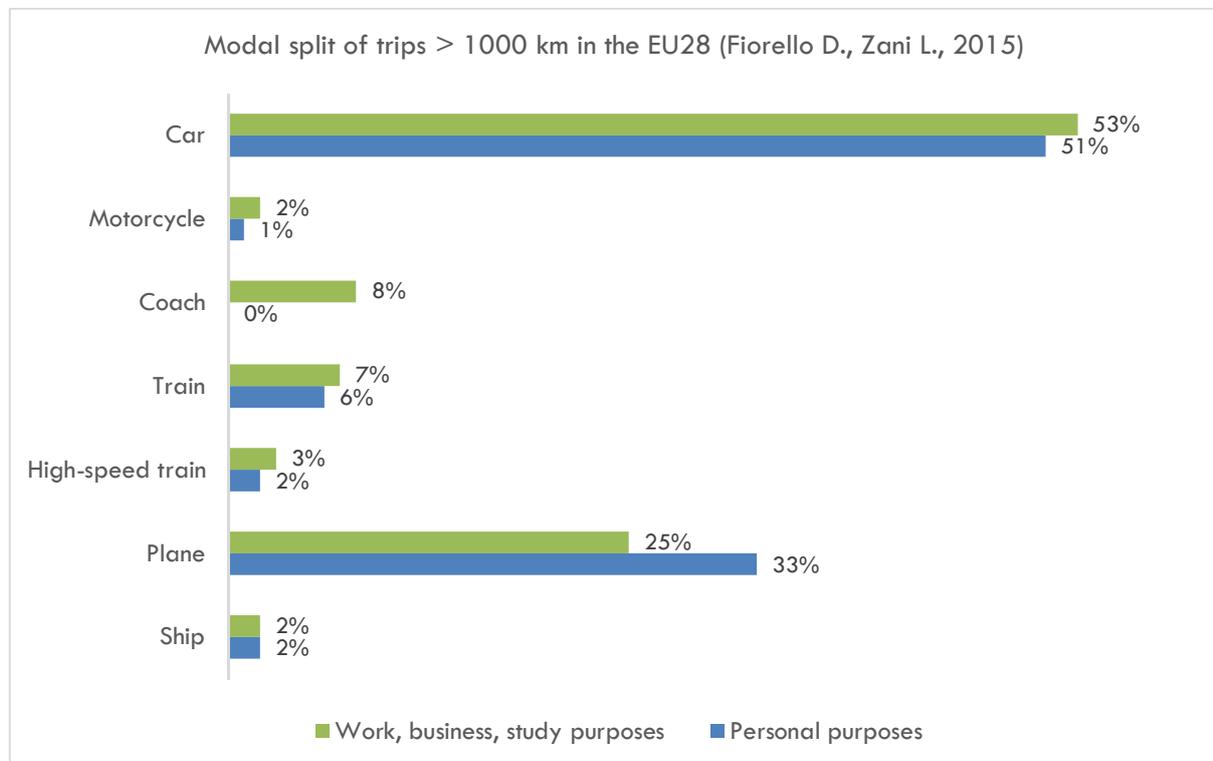


Figure 1: Modal split of trips >1000 km in the EU28 (Fiorello D., Zani L., 2015)

Two things stand out in each segment:

- Combined, car and plane have a modal share of over 75%.
- Car is the dominant mode for all types of trips (53% for working, business, study and 51% for personal).

At Back on Track Belgium, we believe these figures reveal an interesting potential for the revival of night trains.

Regarding the majority share of car travel in both segments, we argue that it is quite nonsensical to drive solo more than 1000 km for a business meeting or to visit a relative. At an average driving speed of 100 km/h (including breaks, fuelling up etc.) a traveller can easily spend 10+ hours driving. This travel time is lost time: on a night train you spend your time productively: you can relax, work some more or sleep.

Regarding the large share of air travel, we argue that a portion could be switched to a night train service: especially flights between 1000 and 1500 km.

Naturally, a portion of those flights are feeder flights for intercontinental flights. However, the air travellers that use these flights only for intra-European travel, could be incentivised to switch to night train services.

## **2.2 The economic, political, and social context**

The social context has changed significantly since the 1980s and 1990s. Holiday periods got more fragmented throughout the year and became shorter. Also, people want to travel to destinations that are more remote, exotic and more varied [12]. We have seen the emergence of a social, economic and tourism model driven by the extensive travel opportunities offered by low-cost aviation which has increased the number of destinations not accessible by night train, such as the Mediterranean islands or the southern coasts of Spain and Portugal. High-speed rail has also made it possible to reach some domestic destinations more quickly, such as between Paris and the Mediterranean or between Berlin and Bavaria.

However, except for the Cologne-Amsterdam-London-Paris square, there are not many optimal international connections for high-speed rail below 4-5 hours. All these reasons can have a positive impact on overnight trains, for example for destinations becoming popular, such as Berlin, Vienna, Milan, or Stockholm. The social and political context, despite the COVID-19 crisis, seems more favourable to the night train and it is therefore important that the rail sector be able to seize this new opportunity. Good services on board would bring back business customers, who can save hotel nights if the night train becomes a "rolling hotel" (see annex 2) [13].

## **2.3 The regulatory context**

We already knew that the aviation and road sectors continue to receive significant indirect and direct benefits and a disproportionate political attention. This has major implications for transport pricing and related discrimination. But to compare, it was essential to know the real costs of rail.

In the past, infrastructure costs were pooled with train operations in a single financial package, and it was often the argument for the road and aviation to say that the comparisons were distorted. Since rail infrastructure is accounted for separately, it is now easier to compare the costs of rail infrastructure with other transport infrastructure costs. These comparison elements now make it possible to detect some forms of discrimination.

The fact is that European and national authorities treat road transport and air travel differently from rail travel. There is no level playing field [14]. Many member states exempt airline tickets for domestic trips from value added tax (VAT) and all states exempt tickets for intra-European flights from VAT. Kerosene is also tax-exempt throughout the world since 1944. Conversely, the railway sector is hardly internationalised and is still considered as an entity strictly subject to national political cultures. It results in a great discrepancy between the European countries regarding VAT on rail tickets (domestic and cross border). Another example, VAT on a coffee sold while the train is in Sweden is 12%, but this rises to 25% once the train travels into Denmark, before dropping to 19% when the train reaches Germany. Taxation of energy is also dependent on the EU country and their energy policy, which are matters under national sovereignty.

However, the calculation of the rail levy is not always very clear as it is closely linked to the public finances of each country. Some countries provide cheaper access charges than others, but this requires each government to bail out the deficits of their rail network. Not all countries have the same approach to intervention. In addition, the various capacity allocation regulations in different countries make building a path difficult for an international night train.



## 2.4 Mass transport by high-speed train

The temptation to increase volume and compete with the plane - and not the car -, has led some public companies to create a large high-speed network in many countries in Europe. High-speed trains are fundamentally different from night trains in their intensive use throughout the day and their access to many intermediate cities, which increases occupancy rates and increases the attractiveness of high speed to a wider audience. It is generally accepted that the high-speed train is competitive for trips not exceeding 4 hours. Yet some studies show that business travellers could accept up to 4 hours travel time and leisure travellers up to 6 hours. [15], [16]. However, a 2014 research paper by Dobruszkes F., Dehon C., Givoni M. that considers 161 EU-wide travel routes, found that indeed air services are impacted by high speed travel time: there are more air services if the high speed rail travel time is longer. Between 2.0 and 2.5 hours of travel time this effect quickly drops which means that the impact of high speed rail provision on air services is limited [17].

It is an industrial version of public transport and probably a sector that brings in the most income because of the standardisation of products and marketing [18]. In addition, some companies have set up a clockface timetable and facilities for changing seat reservation, often by copying the aviation business model. For several years, a low-cost TGV model has been circulating in France and more recently in Spain, offering low prices thanks to very intensive use of rolling stock. The business model is therefore radically different from a night train which, even if it runs a long distance during the night, cannot be used during the day. However, the night train timetables are often optimised to arrive at the destination in the morning (not too early) therefore additional stops are inserted along the route. This makes it possible to reach cities that are sometimes not served by high-speed rail and have no air connections.

A night train must be complementary to daytime traffic and address a different audience. This requires a special business model, which can be very successful if a good service is provided, as the ÖBB has shown with its Nightjets.

## 2.5 The concept of a rail operator - current operations of night trains in Europe

As described in the previous points, each train must pay a toll to the infrastructure manager. The commercial risk of running the train is borne by the organiser of the service. In most cases, this organiser is the railway undertaking itself, which owns the rolling stock fleet, with or without locomotives. The organiser must negotiate the desired train path in each country and the traction resources if he does not have them.

However, the commercial risk largely depends on the railway legislation, which differs from country to country [19]. If a country does not want to subsidise a rail service, the incumbent operator has no obligation to operate loss-making commercial trains. These elements are the enshrined legislation of each country. However, it is possible to operate long-distance trains under the subsidised service regime. Indeed, many inland passenger transport services which are required in the general economic interest cannot be operated on a commercial basis. It is still the case in many countries, for example in Poland, Slovakia, and Italy. The regulation (EC) No 1370/2007 on public passenger transport services by rail and by road shall apply to the national and international operation of public passenger transport services by rail, which may include international night trains.

International trains can be run on the initiative of a single company - state or private - which then pays the access and traction charges in the foreign countries on its own. This is the case with the ÖBB's Nightjets, which are only subsidised within Austria and through Austrian state guarantees for the purchase of rolling stock. In other cases, a foreign entity has to accept a subsidy on its territory, as is the case with the Vienna-Amsterdam Nightjet, which is subsidised by the Dutch state on its own territory. In Germany, this Nightjet receives no subsidies.

In autumn 2020, during the German EU presidency, the German transport minister *Andreas Scheuer* presented a concept for TEE 2.0, which took up the idea of 1957<sup>3</sup>, but based on the existing high-speed network. Night trains are added to this network. In December of the same year, four networks: (DB, SNCF, SBB-CFF and ÖBB) joined forces to operate a series of night train connections.

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<sup>3</sup> TEE: Trans-Europe-Express, created in 1957, were luxury trains only with first class for business customers at a time when international rail links were slow and, in some cases, uncomfortable.

## 2.6 Trains are more environmentally sustainable

European and national authorities treat airlines and train companies differently. The effect is even bigger when comparing night train lines to international flights. Currently, the train enjoys a reputation as the most environmentally friendly means of transport for long distances [20]. Most major railway lines are now electrified. Night trains can enable states to achieve their climate targets. It is therefore important to avoid promoting modes of transport that emit a lot of CO<sub>2</sub>. Let's look at environmental sustainability two perspectives: 1) the travel mode perspective and 2) the popular flight destinations perspective.

### 1) Travel mode

The graph below shows transportation emissions comparisons measured in grams of CO<sub>2</sub> emissions per passenger-kilometre and by transport mode [21]. Important to note is that these figures are of course highly dependent on the energy mix of the respective country. As a result, countries with still a high usage of diesel locomotives and coal-based energy production (e.g., Poland) will have a skewed energy consumption for rail.

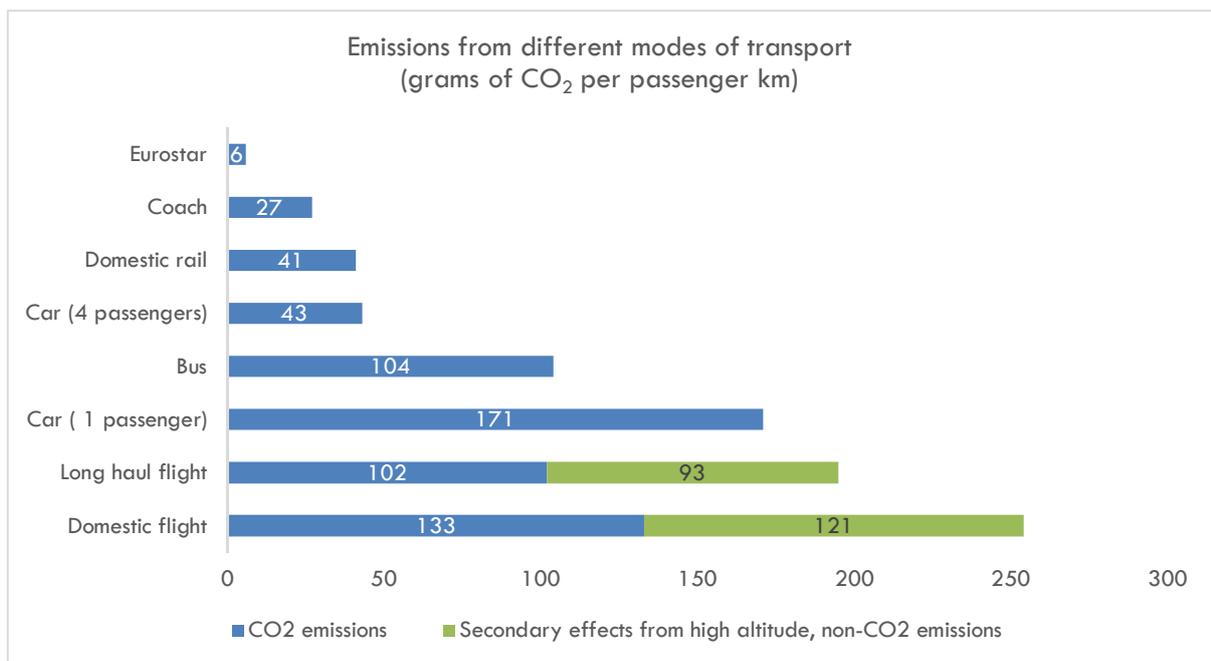


Figure 2: Emissions from different modes of transport (grams of CO<sub>2</sub> per passenger km). Source: <https://www.bbc.com/news/science-environment-49349566> (2019)

All too often, transport modes are compared solely on a CO<sub>2</sub> basis. However, to determine the total climate effect, non-CO<sub>2</sub> greenhouse gases (GHGs) such as methane, nitrous oxide and others should also be considered. That is why on Figure 2 aviation features a bar for *secondary effects*. The latest academic research estimates that these secondary effects from aviation are even larger than displayed on Figure 2. A 2021 study by Lee D. et al found that the ratio for aviation is 3 (all GHG/CO<sub>2</sub> = 2.9, with significant uncertainties) [22].

This means that for every kilogram of CO<sub>2</sub> an airplane emits, 2 additional kilograms of CO<sub>2</sub> should be added to determine the total climate effect (CO<sub>2</sub> equivalent (CO<sub>2e</sub>) of that flight). Air travel thus appears to be even ‘dirtier’ than was first estimated.

## 2) 20 most popular flight destinations to / from Brussels – environmental comparison between plane and train

This section illustrates the substantial environmental benefits of travelling by train. Figures on emissions are computed using [ecopassenger.org](http://ecopassenger.org). and are the emissions for a one-way trip between the city in question and Brussels-Midi. For travel via train, it considers a ‘normally crowded occupancy’ and for air travel it considers an average load factor, arrival, departure, and taxiing on the airfield. Also, the given CO<sub>2</sub> emissions cover the climate factor of those emissions. This is done to cover the complete global warming impact of the flight. Lastly, the emissions from flight also include emissions associated with production and distribution of electricity and or fuel.

Table 2: made using [ecopassenger.org](http://ecopassenger.org)

City	CO <sub>2</sub> Train (in kg pp)	CO <sub>2e</sub> Plane (in kg pp)
Barcelona	13,6	229,1
Rome	36,2	333,9
London	6,0	118,5
Geneva	7,2	157,1
Frankfurt am Main	11,3	114,2
Vienna	27,6	264,2
Copenhagen	46	205,6
München	22,7	176,3
Nice	9,6	238,8
Berlin	22,9	176,1
Prague	38,3	191,7
Warsaw	84,1	242,8
Zürich	22,3	140,9

The figures above undoubtedly have some error margins as they come from a simple online calculator. Yet, the table shows the order of magnitude in which flying is more polluting than

travelling by train: between 3 to 25 times more polluting than travelling by train. This indicates the clear potential to curb emissions from air travel as according to the European Commission [23], direct emissions from aviation account for 3.8% of total CO<sub>2</sub> emissions. The aviation sector creates 13,9% of emissions from transport within the EU, making it the second biggest of transport GHG emissions after road transport.

One important point should be noted: the CO<sub>2</sub> emissions are shown in kg per individual trip. This means that the total emissions of the train or plane are divided by a number which represents the number of travellers. Logically, this means that the CO<sub>2</sub> emissions for a night train trip are higher than those of a regular train, as a night train has a lower passenger transport capacity, due to space being occupied by beds and other furniture. However, renewable energy sources will increasingly play a role in the electricity mix, which will reduce the discrepancy between regular trains and night trains.

Conclusion: Travelling by train is much less carbon-intensive than flying and should therefore be the preferred option on trips under 1500 km. This covers almost all popular destinations from Belgian airports.

## **3 WHAT TRAVELLERS WANT TODAY<sup>4</sup>**

### **3.1 To travel more sustainably**

Travellers are increasingly paying attention to the carbon footprint of their journeys and want to travel differently, both for short and long journeys. Think of the ‘flight shame’ trend that followed the youth protests for climate action in 2019. The massive use of aeroplanes to travel 1,000 to 1,500 kilometres is not sustainable. Many people are now thinking about the carbon footprint they emit when they travel. The night train can be a solution to making long journeys with a much lower CO<sub>2</sub> footprint [24]. Yet, we should consider rebound effects of reducing the amount of short haul flights [17]. Freed slots at airports can be taken over for long-haul flights. Thus, in the end the number of long-haul flights would be increased, which does not exactly bring a net positive climate effect.

### **3.2 A train which is easy to book**

Liberalisation has resulted in the loss of several ticketing facilities that previously existed in state-owned companies. The purchase of international tickets included all stations included in the CIV tariff (Uniform Rules concerning the Contract of International Carriage of Passengers by Rail). Europe's rail operators have not yet agreed on the creation of a Global Distribution Centre (GDS) for rail, like those that exist for aviation (Amadeus). The contribution of a GDS system is essential both to capture new customers and to facilitate the implementation of digital pricing. Customers should find only one interface and be offered a global price.

### **3.3 Different customers have different needs**

On the other hand, there is a demand for more individualized offers, i.e., it is necessary to respond to clients with different aspirations. For example, some people want more privacy or comfort and no longer want to travel in six-berth train compartments. This has an impact on the range of services, comfort, and prices to be offered on a train. It is therefore necessary to extend the offer with different levels of comfort to capture more customers [25].

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<sup>4</sup> Reference: <https://europa.eu/eurobarometer/api/deliverable/download/file?deliverableId=73158>

## 4 RECOMMENDATIONS

### 4.1 Recommendations for policy makers

#### 4.1.1 *See the night train as a sustainable tool*

Many governments in Europe have committed to drastically reducing carbon emissions by 2040. To achieve these objectives, concrete tools are needed. One of these tools is the night train because it emits much less CO<sub>2</sub> per passenger than airplanes and cars. Most of the kilometres travelled by a night train are on electrified lines. Or diesel locomotives can be replaced by battery or fuel cell trains using renewable electricity or "green" hydrogen. The night train is, therefore, already the electric vehicle that has been talked about so much for several years.

Another tool is to review the pricing of the different modes of transport. The cost structure of the night train depends on many external factors. Infrastructure pricing is a key issue. Road and air modes do not account for their many external costs, while rail pays its full costs. To achieve the climate objectives and induce a modal shift, it is necessary to completely revise the pricing of infrastructure according to the CO<sub>2</sub> emissions of each mode based on a 'polluter pays' principle.

#### 4.1.2 *Strive for a level play field with rail-friendly taxation*

Taxation on energy is also an important issue. For planes, kerosene is tax-exempt throughout the world (according to Article 24 of the Chicago Convention on International Civil Aviation of 7 December 1944). For trains, depending on the EU country, companies have to pay different types of energy taxes. Most night trains run on routes that are electrified. How green the electricity mix is, depends on where the electricity is purchased from. In Switzerland or Austria, we are close to 100% green electricity. The Deutsche Bahn buys its electricity from renewable energy producers. The green deal aims also to lead to a decarbonisation of Europe's electricity mix and subsequently to a 100% green rail transport system. To achieve the climate objectives, it is necessary to promote green energy instead of the most polluting energies.

VAT also differs on tickets sold, not only between rail and air, but between countries. Many member states exempt tickets for domestic trips from value added tax (VAT) and all states exempt tickets for intra-European flights from VAT. Today, there is a significant discrepancy between the European countries regarding VAT on rail tickets (domestic and cross border). These distortions must be eliminated if rail is to be a financially accessible mode of transport for as many people as possible.

#### 4.1.3 *Develop a financially sustainable business model*

The central issue is whether the goal is a fully self-sustaining (without government intervention such as subsidies) or not. On the one hand, a high occupancy rate can be considered where revenues can cover costs. On the other hand, there is also the idea that different public entities can subsidize night train services in whole or in part. In such a case, it would seem necessary to go through a call for tenders with a set of specifications and to have cost control.

An important point is the cost of access to the infrastructure. The night train runs over long distances and therefore has to pay high access charges. Getting cheaper access charges would make night trains more affordable, yet it is not a miracle cure: Julian Hitschler: *“Train access costs are a fundamental design flaw of European rail policy. They result in high operating costs which make rail uncompetitive with other modes. It is pre-programmed to discourage, rather than maximize use of fixed infrastructure assets. Worst hit services are those with lowest margins and highest km, such as night trains.”*

#### 4.1.4 *Other initiatives*

There are different ways of promoting night trains. The first way is the initiative of private operators who take on the entire commercial risk. This is the case, for example, with Regiojet in the Czech Republic or Snälltåget in Sweden [26]. These entrepreneurs need to have an appropriate legislative framework that allows them to run their trains without hindrance from one country to another.

The second way is to promote and or subsidise a night train service by regions or states. This is perfectly possible in compliance with European legislation, given that there is a call for tender and a contract with an operator, which may be public or private. This solution has been adopted by Scotland for its two night trains to London [27]. The Swedish government is also seeking to introduce a night train from Malmö to Brussels in this way.

The third way to promote night trains is for the incumbent companies themselves to take the initiative. This is what the Austrians do with their Nightjet, the Poles with PKP and the Italians with their *Treno Notte*. In some cases, these trains can be covered by a Public Service Obligation and be the subject of subsidies. This is the case, for example, with the Nightjet Vienna-Amsterdam, which is subsidised on Dutch territory by the government of this country [28]

## **4.2 Recommendations for operators**

#### 4.2.1 *Improve digital ticketing and online experience*

The visibility of the night train offer is crucial. It is not only through sales on a dedicated website but also through various distribution channels. It also means making the offer visible immediately on mobile devices. When you choose a train, all the different service options and their prices should be visible in one table. The customer only must click on his choice of comfort, and then pay. This requires data exchange between all operators readable on all distribution channels and mobile devices.

#### 4.2.2 *Guarantee a reliable schedule*

Time slots are of great importance in the context of the strengths of the night train. Arriving too early or leaving too late could deter some customers. These schedules obviously depend on what the infrastructure managers can offer. Some routes are very busy, others are under construction all year round. In these cases, infrastructure managers have to offer alternative routes. For example, you can go from Brussels to Milan either via Luxembourg and Basel, or via Paris, Dijon, and Lausanne, or via Luxembourg, Lyon, Modane and Turin. Similarly, you can go from Brussels to Munich via Nuremberg, but also via Mannheim and Stuttgart.

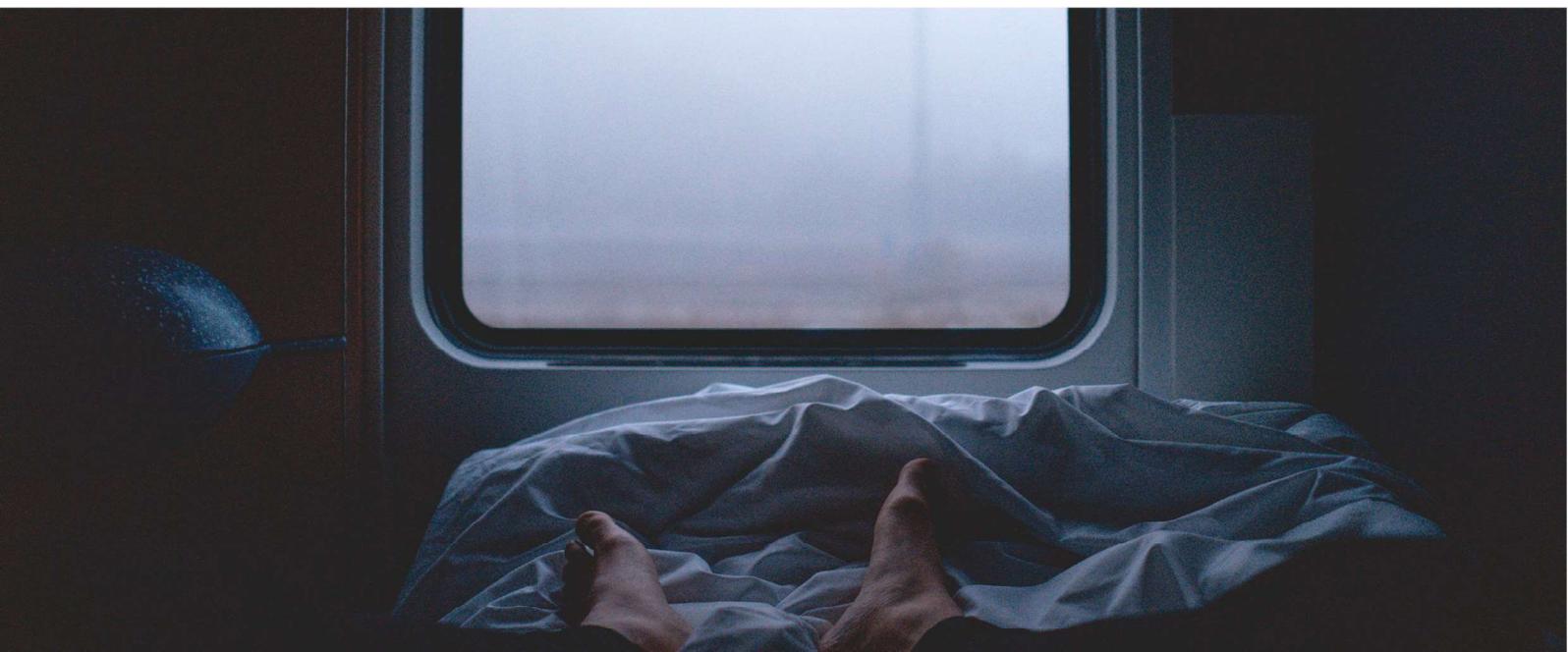
#### 4.2.3 *Offer a comfortable, qualitative service*

It is necessary to make night trains a high-quality product. For example, ÖBB has introduced night trains with a choice of three types of comfort: seating coach (low cost), couchette coach (economy) and sleeping coach (comfort). Experience has shown that the most expensive seats (sleeping coaches) are sold out the fastest. This is also an observation made with the Caledonian Sleeper, an overnight train from London to Scotland, which also offers several levels of comfort. In addition, women tend to prefer more security and do not always want to share a sleeping compartment with strangers. This is an element that should be taken seriously.

#### 4.2.4 *Other*

Trafikverket, the Swedish Transport Administration, in its 2020 study on night train services to the European continent mentions that “it is difficult to make night train services profitable...at least in the short term” [29]. However, they also provide inspiration for factors that could improve viability in the future:

- New trains with more seats per coach
- Combined day and night trains
- Higher air fares
- Greater willingness to pay for night trains



#### 4.2.5 How to operate night trains – Technical aspects

There are four basic operational steps to running a night train:

- 1) Obtaining a train path from the infrastructure managers in each country.
- 2) Obtaining rolling stock, either from the company or from a rolling stock lessor.
- 3) having a contract with a company or companies to pull the train from end to end.
- 4) obtaining on-board staff from a company specializing in catering and hotel-type services. Some of the staff must be certified to comply with railway regulations (train departures, door closing, ticket control, emergency initiatives, etc.)

Most of the rented rolling stock is currently very old and will not be suitable for a modern service beyond 2030. It is therefore necessary to invest in a new fleet of couchette and sleeping cars, as the Austrians have done. A solution is to acquire new rolling stock through leasing companies or schemes that can relieve the public finances.

Locomotives can now cross borders, but this depends on the operator who run locomotives. In general, drivers still drive largely on their home territory due to signalling regulations and language differences. In all cases, it is the traction operator who deals with these issues.

Specialized companies are active in many catering segments, for example railway catering and on-board service. The importance of the quality of service on board is paramount in attracting customers. The contractual specifications must therefore include all details of the service on board, to make an overnight train journey the best experience possible, whatever the comfort you choose.



## 5 THE ROLE OF THE EUROPEAN RAILWAY AGENCY

### 5.1 The current situation at ERA

The European Railway Agency (ERA) was founded in 2005 as a small agency with few responsibilities. Now with the Green Deal, with which Europe is to become the first climate-neutral continent, the railways have gained in importance so ERA's role will have to change significantly:

On 16th July, during a webinar with, amongst others, Karima Delli, chairwoman of the Transport and Tourism Committee of the European Parliament and ERA Executive Director Dr. Josef Doppelbauer, the participation of railway contribution to the Green Deal were discussed. It was pointed out that to foster the railway sector as greenest mode of public transport and make it the backbone of sustainable mobility, the key targets are the following [30]:

- Connect major urban areas in Europe by rail
- Connect top 30 airports to the railway network
- Develop a European network of night trains
- Eliminate the railway bottlenecks
- Foster an industrial railway policy
- Create a Eurocontrol for rail
- Finance railway projects

## 5.2 Upgrading the ERA

In a recent paper from Germanwatch [31] suggested to entrust ERA with demand forecast and corridor coordination, traffic control and capacity allocation on international corridors which unfortunately the current legal framework would not allow in a foreseeable future, but the idea of a Eurocontrol for railways was already mentioned by the ERA in a 2020 report [32].

However, there are ways to address the above-mentioned key factors without assigning competencies to the ERA. Practical solutions for a smart interaction between regions, cities and the European and national authorities could lead to this end by using the EU "sustainable and smart mobility strategy" and the sustainability and digitisation goals of regions and cities:

1. Digital technologies alone could address various problems particularly regarding track access capacity (e.g., reduce (early hours) bottleneck situations), passenger comfort (e.g., good internet connection, good travel information etc.),
2. Also, the European Railway Agency (ERA) as supervisory organisation could ease the planning of future lines through better data collection and standardisation of reporting so that the requirements for new (night)train services are identified in an unbiased manner,
3. A council involving the ERA, but also the representation of regions (e. g. COR) and cities (e. g. Covenant of mayors) could be set up to be able to make effective PSOs without the hindrance of national legislation blocking that kind of initiative.

The ERA could play an important role in other determining factors for the development of a night train network such as a faster return on investment for the operation of the night train lines and on the aspects of availability of rolling stock. It could take place in cooperation with other actors such as the EIB. Further reflections remain to be done here.



## 6 BRUSSELS AS A HUB

At Back on Track Belgium, we strongly believe that Brussels should take on a key role in the re-established night train network. Several arguments can be made as to why Brussels should serve the night train network as a hub.

Firstly, we argue that Brussels has an interesting customer base: tourists, businesspeople, and many foreigners. The exact numbers for those customer segments are very difficult to determine, but there are several other figures that can provide an indication of the size of the potential customer base. Secondly, the importance of Brussels for institutions, international bodies and corporate organisations is highlighted. Thirdly, we discuss the cosmopolitan character of Brussels and argue that population density makes Brussels a viable night train hub. Lastly, we look at the rail and train infrastructure in Brussels.



## 6.1 Customer base

### 6.1.1 Carried passengers in Belgian airports

All cities on the map below (figure 3) feature in the top 30 of most popular destinations to or from Brussels Airport or Brussels South Airport (Charleroi) in 2019 [33]. The detailed list, with the number of air passengers between the respective city and Brussels in 2019 can be found in the annex 1. Remarkably, the vast majority of these 30 is located within a 1,500 km range from Brussels. 1,500 km is also the distance that we see as a maximum viable distance that a night train could travel.

This map presents a clear indication towards the potential for night train services departing from Belgium.



Figure 3: Cities featuring in top-30 flight destinations to/from Belgium (made by Jug Cerovic)

For this reason, we have made a second map that you can see below. We visualise the most popular flight destinations, as well as the night train network that we propose with Brussels as a hub. We see that some popular destinations would then be accessible by night train service.

On another map we show that even more popular destinations will become accessible from Brussels if the night train projects that the media talk about are effectively realised.



Figure 4: Our proposed network: Night train network with Brussels Hub laid over the most popular flight destinations (made by Jug Cerovic)

### 6.1.2 Presence of major institutions in Brussels

Brussels is home to 20 organisations of the European Union and 42 intergovernmental organisations [34]. The whole ‘EU-system’ with its 20 organizations employs over 60,000 people [35], of whom approximately 40,000 work and live in Brussels. The following tables sums up the largest companies, organisations or institutions that are based or are headquartered in Brussels. This list is in no way meant to be exhaustive.

Table 3: Some organization based in Brussels (non-exhaustive)

Organization	Number of people in Brussels
EU-system	40 000
NATO	4578 (34)
Eurocontrol	1 017
29 international schools	+ 20 000 pupils
Foreign journalists	979
Diplomats	5 400
Lobbyists	20 000
Regional representations	300
CFE	+ 8000
Fluxys	850
KBC	<i>Not available</i>
Proximus	+ 14 000
Solvay	+ 500
United Nations	<i>Not available</i>
Audi Brussels	2705

## 6.2 Brussels is one of the most cosmopolitan cities in the world

35% of the population in Brussels has a non-Belgian nationality, which makes Brussels the second most diverse city in the world, after Dubai [36], [37]. More than 60 000 French, 40 000 Moroccan, 33 000 Romanian, 31 000 Italian and 27 000 Spanish citizens live in Brussels [38]. These are typically frequent fliers as they fly to visit relatives.

Additionally, Brussels is the first conference city in Europe, even before London or Paris.

The huge international communities and strong popularity of Brussels as a 'meeting city' are valid indicators for international night train service viability.

## 6.3 Brussels has an interesting location in a densely populated region

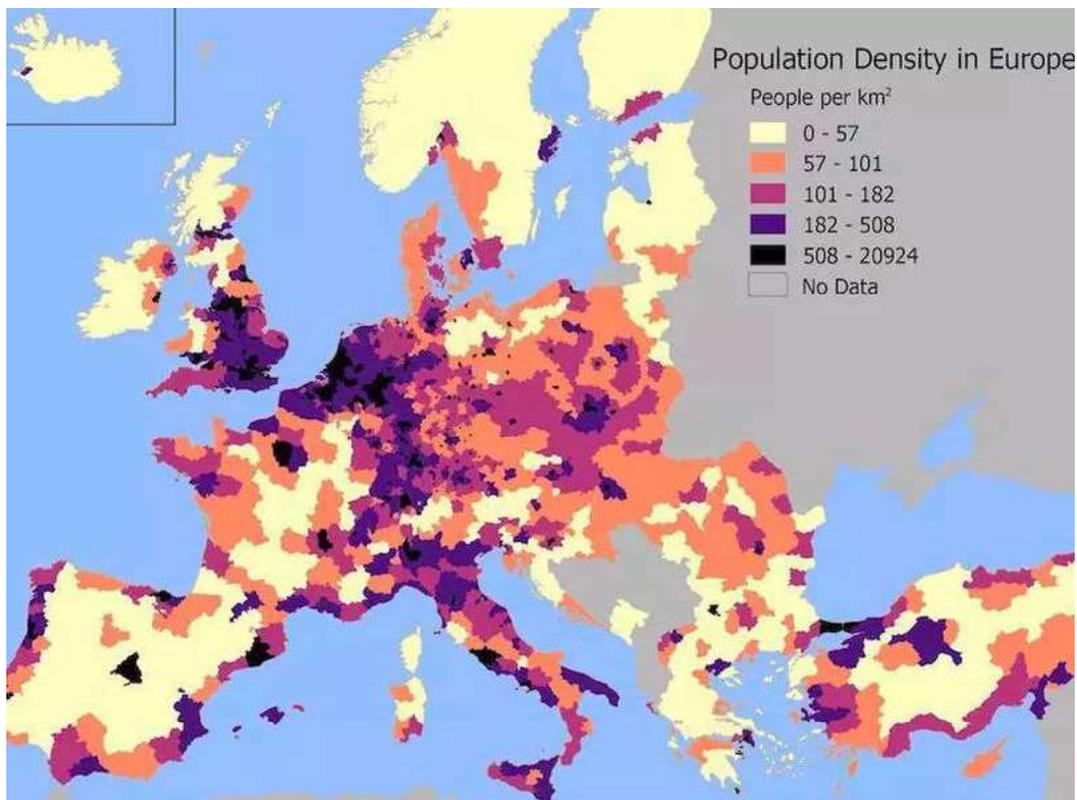


Figure 5: source: <http://aestheticdata.eu/2018/01/27/population-density-in-europe/>

This map shows that Belgium is located in a very densely populated area of Europe [39]. There is a spatial concept, called the Blue Banana that is a discontinuous corridor of urbanisation in Western Europe. It is clearly visible on the map: it starts in North Wales and reaches beyond the Alps. It has a population of over 100 million and Belgium is part of it.

Belgium, and its capital Brussels, thus is a logical location for setting up a night train hub, as high population density implies high travel potential.

## **6.4 Infrastructure in Brussels**

Today, Brussels South station fulfils the role of an international railway station: the ICE, Thalys, TGV and Eurostar all call here. Brussels South Station has some spare capacity and could therefore be the ideal station for centralising night train services. Also, it is very well connected with international high speed train services and is well served by public transport in Brussels, allowing for relatively easy transfer between modes.

Interestingly, the Brussels Capital Region has 35 railway stations. In case of congestion, rail works, or any other service disturbance, alternative train stations could be used during peak hours. Yet, Brussels South Station remains the railway station of choice for night trains as it still has capacity and travellers can easily switch between local trains, high-speed trains, and night trains.

## **6.5 The role of Brussels as a city**

Brussels as a city could also act to welcome night train services and make a name for itself as 'night train city'. Brussels could act in terms of infrastructure, accessibility and feeder transportation.

In terms of infrastructure, Brussels could improve accessibility of platforms (for night trains) for disabled persons. Still too often, disabled persons cannot easily navigate train stations. Also, in terms of train station accessibility, Brussels could improve. It could improve the first / last-mile from and to the train station by for example teaming up with ride-sharing services like MyEcoCar, Blablacar, Poppy etc or the Brussels public transport service STIB.

## **6.6 Trafikverket**

Trafikverket identified that a night train service running between Malmö and Brussels would be the most viable as the customer potential is high and there are good connections to Paris and London.

To those factors, we at Back on Track Belgium would add:

- Issuing Public Service Obligations (PSOs)
- For some countries (not Belgium) it makes sense to add a night train stop at major airports, for example Berlin or Frankfurt. Travellers coming from Denmark or Poland take the bus or a short feeder flight to then transfer to an intercontinental flight.
- A better cooperation with neighbouring countries or the creation of transnational companies in Brussels
- Better companies and institutions' travel directives

## 7 OVERVIEW OF ALL PLANNED AND ANNOUNCED SERVICES

Today, several night train services are announced to be reinstated soon. Those connections are:

Table 4: overview of current and planned night train services

Destination	Night train service as of:	Operator	Information
Vienna	2020	ÖBB	
Prague	2022	European (Regiojet)	Sleeper Via Amsterdam and Berlin
Malmö	2022	Trafikverket	Via Hamburg and Copenhagen and extension to Stockholm possible.
Winter: ski stations Summer: Northern-Italy	December 2021 2022	Ostende Vienne Orient Experience (OVOE)	Winter: Salzburg, Bischofshofen, Kitzbühel, Zell am See and Innsbruck  Summer: Northern-Italy

Next to destinations from Brussels, Trans Europe Express (TEE) 2.0<sup>56</sup>, have proposed several other lines for night trains in Europe. TEE 2.0 is a concept for a modernised international railway network that is backed by Deutsche Bahn, ÖBB, SNCF and SBB.

The first concrete results of this cooperation are four new Nightjet connections that will connect 13 European metropolises with night trains.

### 7.1 A faraway dream

Table 5: future connections

Connection	Planned date
Vienna – Munich – Paris	December 2021
Zürich – Cologne - Amsterdam	
Zürich – Rome	December 2022

<sup>5</sup> <https://www.spoorpro.nl/spoorbouw/2020/12/08/trans-europ-express-tee-maakt-comeback/>

<sup>6</sup> [https://www.standaard.be/cnt/dmf20210510\\_97719476](https://www.standaard.be/cnt/dmf20210510_97719476)

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Vienna / Berlin – Brussels / Paris

December 2023

Zürich – Barcelona

December 2024

Other:

TBD

Amsterdam – Paris – Barcelona

Amsterdam – Frankfurt – Zürich – Rome

Barcelona – Frankfurt – Berlin

Stockholm – Hamburg – Paris

Stockholm – Berlin – Munich

Rome – Verona – Munich – Berlin

Paris – Munich - Budapest

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Figure 7 visualizes all the lines mentioned above. This map is a faraway dream, but dreams only come true by evoking them. It may very well be a long-term to goal to work towards.



Figure 7: Night train network suggested by Back on Track Belgium + other projects

## 8 CONCLUSION

With this first edition of its dossier, Back on Track Belgium (#Hub4Brussels) wants to showcase its expertise on the topic. Written and revised by railway supporters and academics, this dossier serves as a tool to spread awareness about the need for a European Renaissance of night train services across the continent. Also, it takes a clear stance on the central role that Brussels should play in the redevelopment of the night train network.

We argue that it is a pity that night trains gradually disappeared and that a combination of socio-economic, political, and business forces have contributed to their decline and fall. For example, car travel, then air travel and finally the emergence of high-speed rail services led to the decline of night trains, as well as the fact that the railway industry did not operate based on commercial tariffs determined by market forces but rather survived on government intervention.

The past cannot be undone. However, in the light of urgent need for climate action and growing customer segments that want to travel 'differently', the rich European heritage for night train travel can be brought back to life. Rail travel has a smaller climate impact (a degree of 3 to 25) than flying as it accounts for much less greenhouse gas emissions (CO<sub>2</sub>, but GHGs as well). It also has a smaller climate impact than (individual) car travel.

It is generally accepted that night trains could compete with short-haul flights and road travel on city pairs at 800-1500 km from each other. For example, the recently founded 'European Sleeper' service that will soon connect Brussels to Prague via Amsterdam, Berlin, and some other smaller cities, covers approximately 1,100 km.

Over the last years, awareness about the climate impact of air travel grew and as a result there is a market for greener, slower, and more comfortable ways of travelling. International night trains perfectly meet the needs of tourists and travellers with such requests. At Back on Track, we believe that next to tourists, business travellers can also travel by night train on certain routes e.g., Brussels-Munich. Business travel via night trains may soon be a key pillar of the corporate travel in European corporations as in most service-based industries, corporate mobility remains one of the most important contributors to a business' environmental footprint.

To facilitate a European night train renaissance, bold action must be taken by policy makers and important actions set up by railway operators. One particularly important tool for policy makers is taxation. By considering externalities on a 'polluter pays' basis when reviewing taxation for the transport industry, rail travel has a fairer chance of competing with air and road travel. Railway operators should focus on digitalizing their offerings, being punctual and offer exceptional comfort. Booking an international night train should be as easy as booking an air ticket, which today is not the case. Also, to convince travellers of the perks of night train travel, it should offer greater comfort than flying at a reasonable price.

Now it is clear that a night train Renaissance is welcome, let's dig in the role we envisage for Brussels in the night train network and the reasons for it. We see Brussels, the de facto capital of the EU, a central node in the 21<sup>st</sup> century night train network (see figure 7 on page 38). To support that claim, several (indirect) indicators can be used.

Firstly, more than 20 out of 30 most popular destinations (in terms of passengers carried) from Zaventem or Charleroi are cities within 1500 km range of Belgium. This is a potential customer base of approx. 10 million travellers. Of course, not all those cities are easily reachable by train, nor is it always interesting e.g., feeder flights to Brussels to then travel intercontinentally e.g., to Africa.

Secondly, Brussels is home to major international institutions and important organizations. These organizations employ people that are likely to travel regularly within Europe e.g., there are 40 000 Eurocrats living in Brussels.

Thirdly, after Dubai, Brussels is the most 'cosmopolitan' city in the world in terms of nationalities and it is also the number one conference city in Europe, before London or Paris. Again, we envisage that international night train travel will be used by business travellers, not only tourists.

Lastly, Brussels is in the most densely populated region in Belgium, and it still has sufficient rail capacity to accommodate night trains e.g., in Brussels South Station.

Curbing emissions from transport is a long(er)-term fight. Systemic solutions are required, yet a shift from air to rail can already help reduce greenhouse gas emissions from international passenger transport in Europe. On top of that, it is a bonus that night train travel can be relaxing, adventurous and convenient.

The infrastructure is already largely ready-to-use, the public support is growing. This is a warm to policy makers on all levels, as well as rail operators to now provide to the much-needed willingness on the supply side of the discussion.

Let's all get Back on Track together!

## 9 ABOUT THE CONTRIBUTORS

Back on Track Belgium (#Hub4Brussels) is the Belgian chapter of the European network Back-on-Track that supports European cross-border passenger train traffic and in particular the night trains. As a citizen think-tank we want to enable this change and this study is the first tool towards that goal.

Many people have contributed to this study. The active external contributors will be briefly mentioned below.

**Jug Cerović** is the creative brain behind the several beautiful maps featured in this document. He is an expert in mapping transportation systems and is a Design & Culture Committee Member at the UITP.

**Trevor Garrod** is a retired teacher and civil servant who commuted to work by train for many years. Since the 1970s he has campaigned for a bigger role for rail, initially in Great Britain and since the 1990s at EU level as well. He was one of the founders of the European Passengers' Federation (EPF) and is active in the Back-on-Track network.

**Dr. Imre Keserü** is an assistant professor of urban mobility and deputy co-director at the MOBI Mobility, Logistics and Automotive Technology Research Centre at the Vrije Universiteit Brussel (VUB). His research is related to supporting the sustainable transition of mobility through policy advice, travel behaviour analysis and evaluation.

**Prof. Frédéric Dobruszkes**, who holds a PhD in Geographical Sciences, specialises in transport geography. His research and teaching focus on the dynamics of air networks, on travel policy, particularly in urban areas, and on the environmental impacts of transport<sup>7</sup>.

We also want to thank all **Back on Track Belgium Board Members** who were there to support the development of this dossier and challenge our assumptions. Thank you, Peter Baeyens, Frédéric de Kemmeter, Maarten Demarsin, Francis Genon, Clémence Gillion, Alexandre Gomme & Maxime Walczynski. Finally, we also want to thank Raphael (Winkler)-Goldstein who is one of the founder member of Back on Track Belgium. He is not an active member anymore, but still devoted to the subject.

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<sup>7</sup> Reference: <https://bsi.brussels/nl/researcher/dobruszkes-frederic/>

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## 11 ANNEXES

### Annex 1: List of most popular flight destinations from Zaventem / Charleroi in 2019 (Eurostat)<sup>8</sup>

	City	passengers carried
1	Madrid	1 086 037
2	Barcelona	952 169
3	Lisbon	772 853
4	Rome	721 051
5	London	675 607
6	Geneva	615 005
7	Frankfurt am Main	578 559
8	Malaga	528 277
9	UNKNOWN	494 311
10	Vienna	486 177
11	Copenhagen	478 894
12	München	439 029
13	Dublin	438 568
14	Milan	430 943
15	Alicante	412 625
16	Nice	385 835
17	Alicante	362 258
18	Dubai	358 464
19	Berlin Tegel	348 494
20	Porto	347 994
21	Budapest	340 078
22	Prague	333 833
23	Warsaw	326 537
24	Zürich	324 112
25	NYC	303 476
26	Oslo	295 114
27	Moscow	283 872
28	Amsterdam	281 812

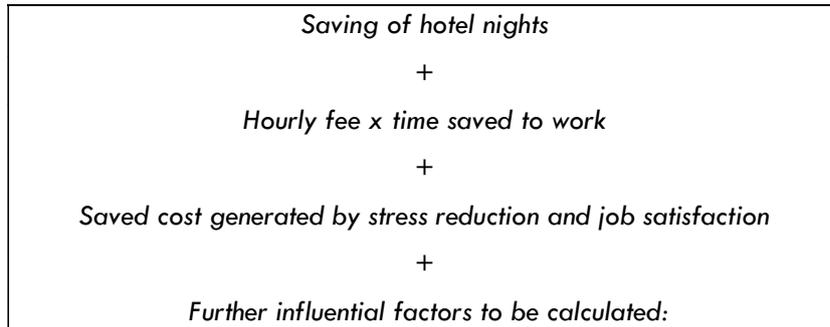
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<sup>8</sup> Source: <https://ec.europa.eu/eurostat/web/transport/data/database>

transport → air transport → air transport measurement → detailed air passenger transport by reporting country and airports → Air passenger transport between the main airports of Belgium and their main partner airports (routes data) (avia\_par\_be)

## Annex 2: Night train for business

### A. As a company you can calculate the financial (and social) advantages of night trains for business travels:



- *Influence on image (marketing)\*,*
- *Internal administrative costs (travel management costs, accounting costs, etc...)\*,*
- *Influence on ETS and further mechanisms related to company activities, now and in the future\*,*
- *Further externalities to be considered, now and in the future, etc...\**

### B. But also, incentives to use night trains\* for business trips must be developed:

#### Starting with EU/International organizations and national state administrations:

In most of the EU countries travel expenses ordinance states that flights are paid if they are more economical. In practice, state employees, public servants and consultants are encouraged to fly because of lower costs.

International organizations and states must play a pioneering role in climate protection. For example, the national travel expenses ordinance could stipulate that, as a rule or criteria, the most climate-friendly alternative should be used. That would significantly reduce inland and transnational air traffic.

#### Private companies:

If night trains were to be found in CWT and other classic business travel portals, much would have been done.

A system of green credits, where you collect points when you choose the less polluting means of transport, could be developed in a first step on a voluntary base at the company or the employee level.

There are already companies using the principle of “cost object” in that view: If you go by train, the travel expenses are assigned to the central department and if you fly, they are assigned directly to your project.

\*An in-depth assessment would be necessary to have an exact estimate on the short, medium and long term: # HUB4Brussels is working on this subject

