



Passenger transport abroad



Photo of high-speed trains in Brussels to respectively. London (back), Paris (middle) and Frankfurt (front).

This report is prepared by **Back-on-Track, Denmark** with the assistance of the NGO's Council for Sustainable Traffic, Friends of the Earth (NOAH) and Renewable Energy.

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An ambitious climate change of European passenger transport is both necessary and possible

The Danish government's ambition of a 70% reduction in CO2 emissions in 2030 compared to 1990 so far only applies to domestic emissions. Nevertheless, the industry made climate partnership¹ report on heavy transport included the International Maritime Area (IMO) . We would like to acknowledge that. And this report will go the next step and address passenger transport in Europe.

Passenger transport is not only domestic, but is also international in nature. And the sector is becoming one of the largest emitters of CO2e.

This report does not include international travel in your own car and by bus. The share of cars in international long-distance transport is rather limited². Buses will continue to play a minor role, but will never be able to offer the comfort that today's air travelers will require to change from aircraft to more climate-friendly means of transport.

The timing of the report must also be seen in the context of the Swedish Transport Administration's report on night trains, which will be published at latest on 30 April. 2020, which provides the basis for international night train traffic to and from Denmark (and Sweden) in the years to come.

The one planned re-introducing night trains from Denmark south from 2021 or 2022 we see as a beginning and a renaissance for trains in Europe. Trains in the future will not only be perceived as a "niche" for special types of environmental travelers. Trains must be seen as a real alternative to flying in Europe until 2030 and up to 2050. Something that society must work for.

Is it an illusion to see trains as a real alternative to flying? There are two perspectives:

- From the climate perspective
- From the travelers' perspective

In this report, we will try to work on both perspectives.

¹ <https://www.trm.dk/media/4497/klimapartnerskabsrapport-landtransport-rapport.pdf>

² For some of the destinations that the first night trains will travel to (central and southern Germany), car travel compensation may be of greater importance. The Swedish Transport Administration's report will discuss this.

Key findings from the report

Flying is a major challenge for the climate and unfortunately there is no immediate prospect for technical solutions to come in time.

Flight must therefore be reduced, and it makes particular sense to reduce flight most where other means of transport can enter and replace air travel.

European railways have the potential to gradually replace flights in Europe until 2050.

Both capacity and speed must be increased on the rails, and this requires a large and coordinated European investment program.

The large socio-economic gain³ from the conversion of aviation to electric trains provides enough room for investment in infrastructure and operating support for the main routes, which will not initially be economically viable.

Restructuring of European passenger transport seems impossible without aviation paying for climate costs in the form of CO2 taxation. But timing for escalating taxation and strengthening trains can follow several different tracks. A long-term plan will give the industry something to relate to. Work should start now.

The changeover must take into account the comfort of the passengers. Travel times will be significantly increased from aircraft to train; it must be compensated through comfort and service.

The geography of Europe makes it possible for remote areas such as Scandinavia to include the night hours, which means that huge growth in night trains with different categories of service must be anticipated.

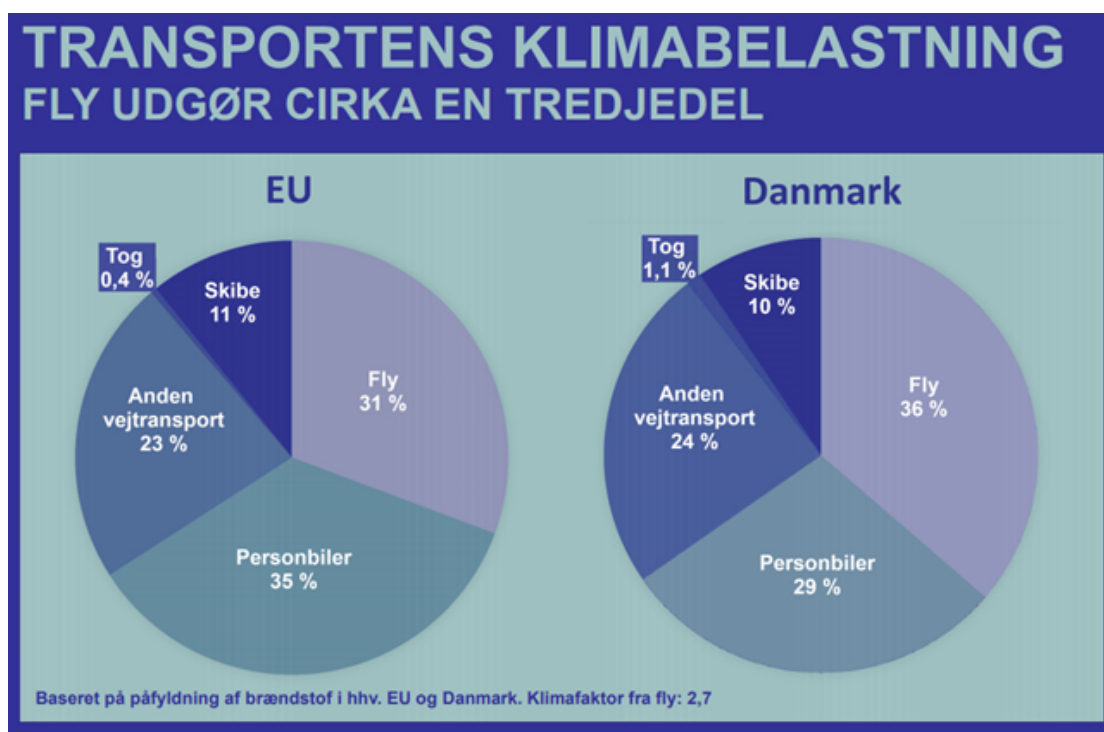
³ Socio-economic gain is a macroeconomic term used for large investments.

Section 1. Climate impact from means of transport in Europe

International passenger transport is a major contributor to the world's greenhouse gas emissions. 5-8% of the world's climate impact comes from aviation⁴.

27% of the EU's climate impact comes from transport and is likely to increase to 31% by 2030. The rate of increase is globally around 5% per year. Intra-EU flights emit over 60 Mt CO₂e⁵.

Figure 1: passenger transport climate impact 2019



Source: National Inventory Submissions 2019, UNECCC, however, CO₂ emissions from aviation have increased by 2.7

⁴ <https://www.umweltbundesamt.de/publikationen/schwerpunkt-2-2019-fliegen>

When you look at a figure around half, it is because the aviation industry has long avoided recognizing the climate effects that come from flying, but which are not directly CO₂-derived.

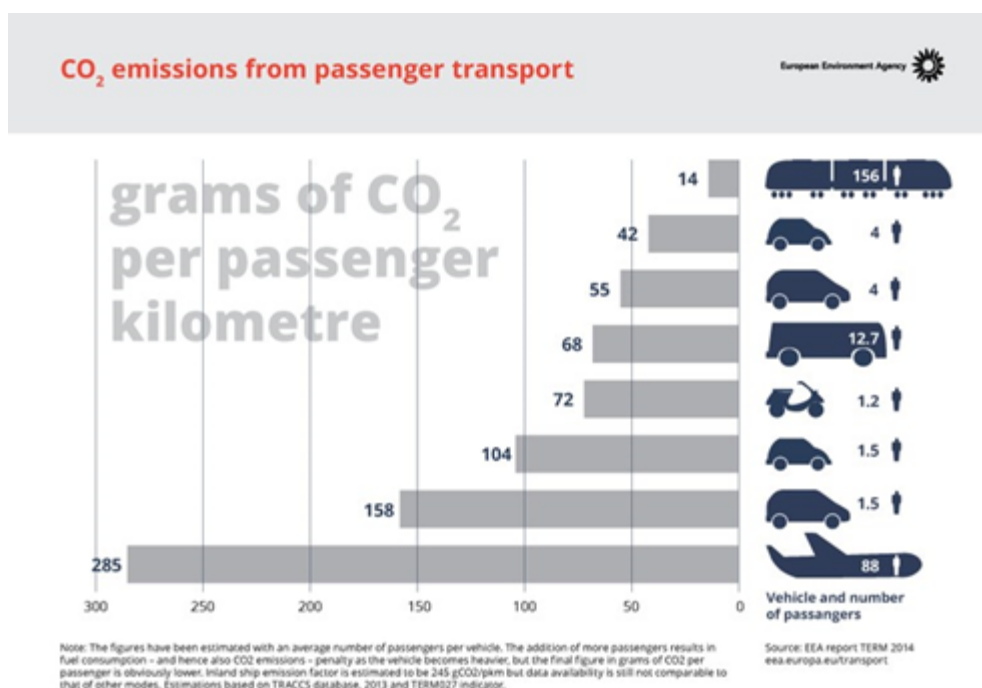
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<https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-12> og T&E's European Aviation model, quoted from Air2Rail report Annex A. The Air2Rail report is not yet published.

Aircraft contributes to a high impact on the climate - trains with very little

Means of transport are various contributors to climate impact. For passenger transport, CO₂e / passenger kilometers are measured. Traveling by plane is by far the greatest burden on the climate per passenger kilometer.

Figure 2: The climate impact of different modes of transport



Source: EEA (however, data is not included in this type of info graphic since 2019),

<https://www.eea.europa.eu/media/infographics/co2-emissions-from-passenger-transport/view>

When aircraft burn fossil fuels in the atmosphere it gives rise to a much greater climate effect than if the fuel was burnt by ground level. Get an easy overview of this by watching a short film on Youtube: <https://youtu.be/cENokgd9gTM>

Figure 3: The flight contributes to climate damage in addition to CO₂ emissions

Contribution to the climate	Domestic	European short-distance	Intercontinental long-distance
CO ₂	1	1	1
Non-CO ₂	0.5	1	3.5

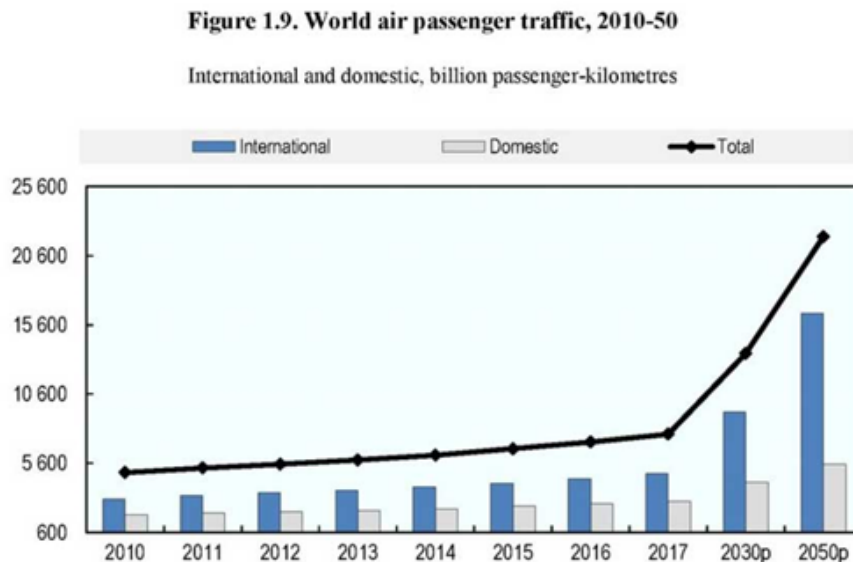
Total: Radiative Forcing Index, RFI	1.5	2	4.5
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Source: German Aerospace Center, quoted from <http://bevarjordforbindelsen.dk/hvad-er-op-og-ned-i-the-calculations-about-the-aircraft-climate-effect/>

It is crucial to keep this in mind. Not only do the figures show the current climate effects of the flight, but the impact of the aircraft on the atmosphere will unfortunately continue for the non-CO₂-related part in the future where non-fossil fuels can be used, as long as the fuels are still based on carbon (plant-based or e-fuels).

The ratio of aircraft to train in Europe is in pure CO₂ emissions 1:18, and with non-CO₂ related climate effects of flight the ratio is 1:36.

Figure 4: How is air traffic expected to develop?



Source: ICAO (2018^[28]), Annual Report of the Council 2017 for data through 2017. Data for 2030 and 2050 are ITF projections from the current demand pathway using region of origin.

StatLink  <http://dx.doi.org/10.1787/888933972126>

By 2030, aviation unfortunately has no technical solutions to reduce its carbon footprint effectively. Fortunately, the aircraft fleet is replaced by slightly more efficient aircraft; but these improvements (less than 1% per year for new aircraft⁶) are completely overtaken by the expected more flight, as you see in Figure 4.

⁶

<https://www.euractiv.com/section/railways/news/planes-vs-trains-high-speed-rail-set-for-coronavirus-dividend/>

What is the alternative to fossil fuels?

Biofuels: Palm oil is the basis for replacements for the known aviation fuels. But the globe cannot supply palm oil or other vegetable to all planes. We simply do not have enough agricultural land for that kind. In fact, paradoxically, none of the common sources of biodiesel production, such as canola, soy and palm oil, emit less CO₂ than fuel produced by crude oil.

Brian Vad Mathiesen, professor of energy planning and renewable energy at Aalborg University says:

“It confirms to me that the biodiesel path is not the right one to go at all. It's almost the worst thing to do. To meet these energy targets (EU demands for biofuel blending in gasoline and diesel, ed.) we have tried to push a technological development”.

"But obviously it has not succeeded. There are no sustainable biofuels that can reach the goal. That is why I believe that we must recognize that we cannot achieve the goals in a way that makes sense for the climate" he says⁷.

About the use of palm oil see also: <https://palmeolienspris.dk/>

“Real” e-fuels (power-to-x) are probably the way forward for the planes. Here CO₂ is collected from the atmosphere, mixed with hydrogen from renewable energy electrolysis, and an energy-dense, liquid fuel can come out of it. It does not exist today and lies in the future, and it becomes expensive per liter. At least three times the price of jet fuel today.

According to Professor Brian Vad Mathiesen⁸, by 2030 there will be 1% of aircraft fuel coming from e-fuel.

Therefore, a different quick and purposeful effort is required to reduce the aviation.

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<https://politiken.dk/klima/art7313684/Professor-Vi-b%C3%B8r-droppe-biobr%C3%A6ndsel-i-benzin-og-diesel>

⁸ <https://www.berlingske.dk/business/kan-alternativt-flybraendstof-blive-klimaredning-nej-siger-forsker>

Section 2. Air travel can be reduced in several ways

A vision: In 2030, high CO₂e taxes will make travelers prioritize between what's important and less important in their lives. High taxes on CO₂e will be able to stimulate the development and production of fuels for aircraft that are less harmful to the climate, and eventually at all not harmful to the climate. In 2050 there will be long-haul flights, but to a much lesser extent than today and one will fly with emission-free fuels combined with CO₂ capture and storage. It will be expensive to fly intercontinental and distances within the continents will be replaced by electric trains.

2.1 Changing personal habits and public structures

1. Many conferences and meetings can often be held as video meetings.
2. Tourist destinations for our closer geography can be developed. Destinations that can be reached without flying must be stimulated.
3. Switch to modes of transport that contribute significantly less to global warming. It can be in Europe by train, bus and ferries (e.g. from Denmark to UK).
4. Do not build infrastructure that causes climate damage. Airport extensions should not take place as long as increased air traffic is demonstrably detrimental to the climate. On the other hand, infrastructure that benefits from climate-friendly solutions must be supported.
5. Flight charges like other climate charges should be seen as a charge upon damages. It is not primarily to create revenue, but to influence behavior so that consumption changes.

The report here will proceed with paragraphs 3) - 5).

Section 3. Train connections as an alternative to flights in Europe

Cheap flights without taxes and, as a result, downgraded international train connections have made it difficult to choose climate-friendly passenger transport in Europe since the 1990s. Travel volumes by air have doubled, and these opportunities for more travel have been popularly paid for by the climate.

Therefore, efforts must be made with a conscious effort to find / offer alternatives where possible. Therefore, by 2030, flights within Europe should be avoided up to approx. 1,500 km. From 2030 until 2050 with new investments, the whole EU can be reached by train (i.e. up to about 2,500 km).

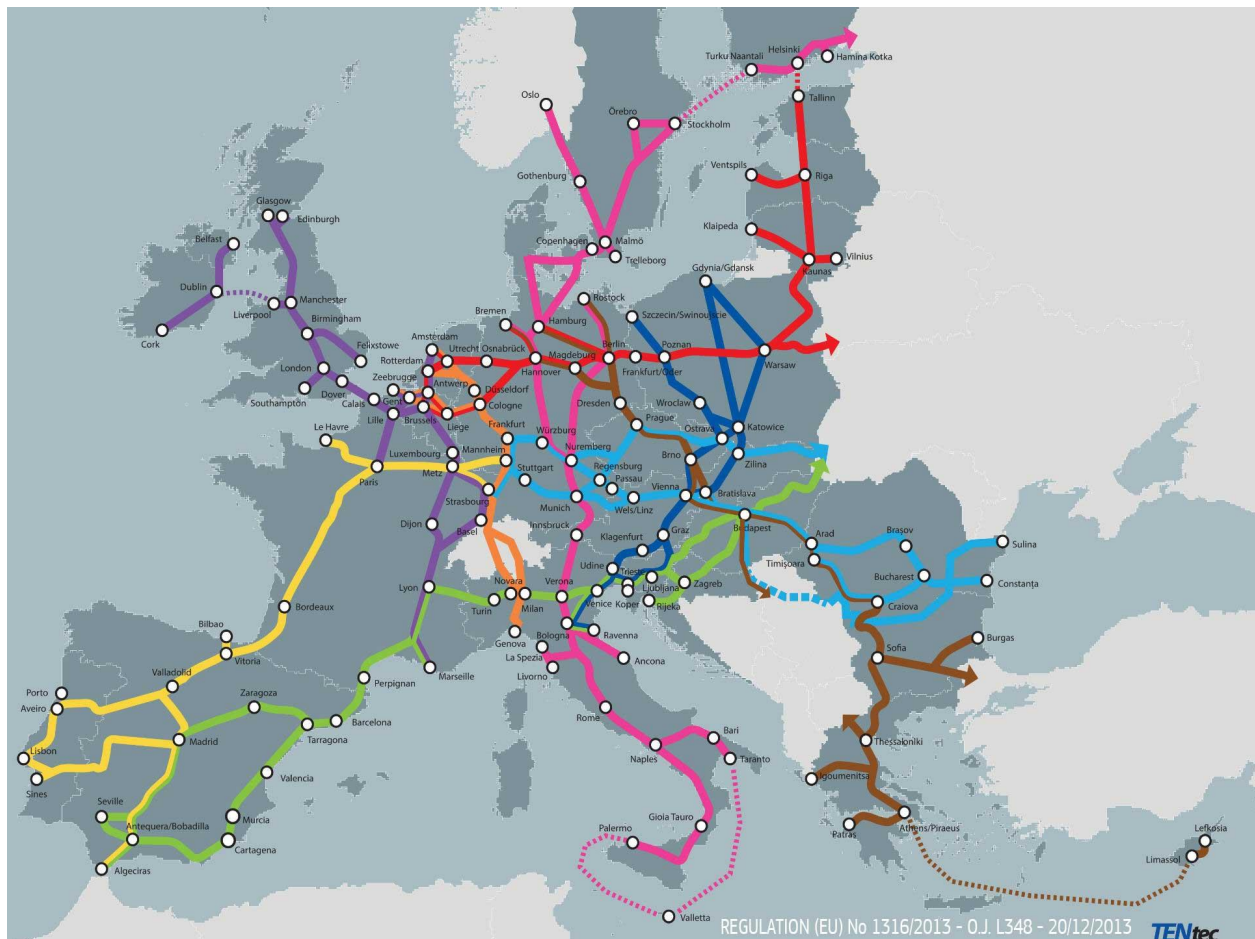
Effective efforts must be made at EU level to move the traffic that currently goes by air to trains. This is also what the 2011 EU White Paper⁹ proposed.

While improving rail infrastructure, rail transport can solve the entire passenger transport needs of the European continent up to distances of 1,500 km, but also to 2,500 km, as enough international high-speed railways are developed.

Many distances, on the other hand, are impossible without aircraft, especially to the American double continent and Africa. Even Britain can be difficult to reach from Denmark and the rest of Scandinavia. There have been good opportunities in the past for sailing to England and for example bring your own car along.

⁹ https://www.transportmagasinet.dk/article/view/153969/hvidbog_fra_eu_transport_2050

Figure 5: TEN freight network in Europe



We propose to create a network of European high-speed passenger trains similar to the existing TEN freight network. Such a priority must form the basis for large public investment.

Part of the development of the European railways is that the main lines (which is essentially electrified today) is also supplied with renewable energy. This allows CO₂e emissions on the main railway lines to drop to zero. Also, emissions related to construction work should be brought as close to zero as possible.

In Europe, where there is an extended high-speed network today, each train can carry 900 passengers (eg TGV Duplex). With new European Rail Traffic Management System (ERTMS), which is being introduced in these years and until 2030, trains can run at a 3 minute interval.

The train may already be a real alternative in the short term for the many people who are taking the plane today to reach many destinations in Europe. These are the people who today choose the aircraft for different purposes:

- Tourists, often families with children and young people on 'educational trips'
- Business travelers and politicians who travel related to the work
- Researchers traveling to conferences or project meetings

It is important to have several different potential users in mind and not just focus on tourism. Travelers today choose the plane because it is often cheaper - and simply easier to find. Politicians in the EU must therefore work to make the train cheaper and easier to use.

It is urgent to get started. The EU's three-tiered political structure causes actors to hide behind one another. The national governments should strive to offer a more accessible alternative.

The Dutch government has just taken this initiative in the spring of 2020¹⁰. That initiative can be a positive turning point.

3.1 Lower prices

In most cases the train is more expensive (and more cumbersome and time consuming) than the aircraft. The European political level should work for lower prices for trains, e.g. with less charges where relevant. Flight fares are already artificially low due to very favorable (or non-existent) charges (for aviation fuel), no VAT and subsidies to many airports. Taxes need to be changed, partly to ensure more realistic prices for air travel, and partly to provide funds for massively investing in trains and greatly increasing capacity on the rails.

Train travel prices (possibly only for a transitional period) may be reduced by state subsidies and the provision of rolling stock. If elements of European legislation stand in the way of this, the legislation must be changed.

Railways have always been considered as **critical infrastructure** and have been based on a certain state subsidy, i.a. for rail, infrastructure and maintenance, and in the

¹⁰

<https://back-on-track.eu/dutch-government-is-pushing-for-more-and-better-international-rail-services/>

future a new balance should be found for train connections across national borders, which, as a rule, do not receive public operating funds today.

For example, train connections between EU capitals should be considered as basic infrastructure independent of all market logic, enabling operators to compete for public procurement and to provide additional services such as restaurants and the opportunity to bring their own car along.

As far as the economy of trains is concerned, we need to get used to the fact that the necessary conversion from climate-damaging aircraft to climate-friendly trains will make a financial contribution to the trains.

Figure 6: How should revenue and expenditure structures be changed in the future?

Train	Revenue	Expenses
Tickets	Prices must be adjusted according to competition with the aircraft.	
Differentiated prices	High comfort must be paid for. Keep for example several comfort classes in the night train.	
Infrastructure charges for running the rails		Down to an absolute minimum for maintenance.
VAT (VAT) and fuel in some countries of Europe		International train traffic should not pay VAT. Green power trains shall not pay energy taxes.
Rolling stock		A leasing pool of new night train stock should make it easier to get started for smaller and new operators.
Climate related subsidies for operations	There is ample room for grant schemes (PSOs) - for take-offs and for selected routes.	

Investment	CO2e taxes must be channeled into new climate-friendly infrastructure in Europe.	Planning in railways demands a long time horizon. Long-term plans are important.
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3.2 Public support for direct links between capitals and major cities

Direct connection between the major cities in Europe will make it easier and more manageable for new users (: air passengers) to plan a train journey in Europe.

Direct connections should be ensured between all capitals and major cities, in many cases supported by public service contracts (PSOs) and typically through bilateral cooperation between two or more countries. Access to rolling stock should be provided with the necessary facilities (e.g. sleeper cars) capable of crossing borders to facilitate operators entering the market. It can be done with leasing agreements.

It is not enough that there are rails to run on. A basic network of direct train connections is a socially critical infrastructure in Europe. This is a **paradigm shift** for the railways, which has primarily had a regional and national focus for the last 35 years.

Section 4. Capacity of train journeys must dramatically rise to give impact, practical and economical

According to the Danish Climate Council, approx. half of all 30 mill. flights to and from Copenhagen Airport goes within EU countries¹¹.

Again, approx. half of these flights in 2030 (after the opening of the Fehmarn connection) will be reached by day or night train¹². This is 7.5 mill. travels (two ways). By 2050, the whole EU can be reached by train¹³.

Scandinavia is geographically on the outskirts of Europe. Like the Southern Balkans and the Iberian Peninsula. There is far to travel, not only to the middle of Europe, but by nature very far to the other outskirts. In trains it is not realistic to travel without using the night.

¹¹ https://klimaraadet.dk/da/system/files_force/downloads/regulering_af_flysektoren_endelig_0.pdf

¹² According to T & E's unpublished Air2Rail report.

¹³ Here we allow ourselves the audacity to make the EU the same as Europe.

Approx. $\frac{2}{3}$ of flights from Denmark to Europe must be replaced by night trains because travel time is over 4-6 hours, which is a "pain limit" for passengers traveling during daytime hours. Four hours for business travelers and six hours for leisure travelers¹⁴. The remaining $\frac{1}{3}$ can be handled by daytime trains and by ferries.

A set of night trains with contemporary comfort categories includes 110,000 passengers year-round and a return trip (back and forth) thus holds 220,000 passengers with an occupancy rate of 63%¹⁵ (see Figure 7 below). In addition, the re-introduction of ferries from the port of Esbjerg to England and Scotland. Ferries must be CO2-free and relieve pressure on train connections via Brussels. It could be three ferry routes with a total occupancy of 2,000 overnight passengers per night (one way). In addition, well-known ferries must be added to Sweden and Norway.¹⁶

FIG. 7: Composition of one set of night trains

	Seats	Seats incl. occupancy rate	Number of carriages in a whole train	Number of passengers in a ave. night train
Courette car	40	25	6	151
Sleeping car	22	14	4	55
Seated car	50	32	3	95
			total 13	301
Annual average. occupancy *		0.63		

* Based on the occupancy of the night train, which ran from Copenhagen until November 2014

If we travel by 365 days and by 2 (return journey), a night train route with this occupancy rate can account for 220,000 journeys.

¹⁴

<https://www.euractiv.com/section/railways/news/planes-vs-trains-high-speed-rail-set-for-coronavirus-dividend/>

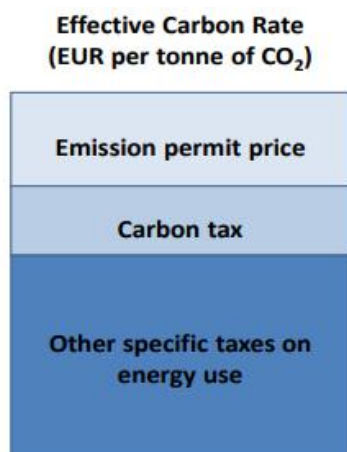
¹⁵ Swedes typically expect a slightly lower occupancy rate. Therefore, the number of passengers may fluctuate slightly.

¹⁶ Ferries are often listed in the CO2 tables as rather climate-damaging. But the inclusion of trucks, passenger cars and passenger passengers is confused. For passengers boarding, emissions are not that great. But when the container ships can become emission-free in 2030, passenger and roll-on roll-off ferries can also become emission-free. But not necessarily catamarans and other fast ferries.

The 300 average passengers per train must be compared with European airplanes, which on average fly with 88 passengers.

Flights in Europe at distances such as those that the night trains typically travel will result in approx. 200 kg CO₂e per journey¹⁷. One night train all year round therefore saves the climate for 22.000 t CO₂e.

4.1 What is the value of CO₂ reductions?



There are two sources of such figures (USD per tonne of CO₂ saved).

The figure is from the OECD.

Taxation

According to the OECD, the current taxation (ECR) is around USD 30 per tonne. It is speculated how high the taxation will be to reach the climate goals of the Paris Agreement. The figures for future ECR are mentioned in the literature between \$ 100 and \$ 500 per tonne.

Socio-economic value

Socio-economic value is different from taxation and can be expected to assume a higher value. This includes, for example what we call “dynamic effects”, where climate damage is calculated in the other sectors of the economy, and they try to estimate values of biodiversity, recreational qualities, etc. For example the Swedish Transport Administration will use values from a revised model, ASEK 7¹⁸, which calculates socio-economic value for CO₂ reductions (and that is somehow similar we also know from Danish models). The model comes to 7 SEK / kg CO₂ savings, equivalent to USD 700 per tonne.

The Danish Climate Council has proposed DKK 1,500, corresponding to USD 200. The Climate Council's figures are a mix of classical taxation and socio-economic value.

¹⁷ <https://travel-footprint-calculator.irap.omp.eu/> Here, a database of specific destinations and volume will also come in handy so that the figure can be exactly accurate. But on average, it should probably fit.

¹⁸ New Swedish base forecast is going to be published on 15.6. 2020

With the Climate Council's moderate 200 USD CO₂e tax per year per tonne, **then the climate reduction value of a night train is 4.4 mill. USD (or Euro).**¹⁹

With the high socio-economic value of CO₂ savings, the Swedish Transport Administration is making a somewhat greater positive contribution from the introduction of night trains.

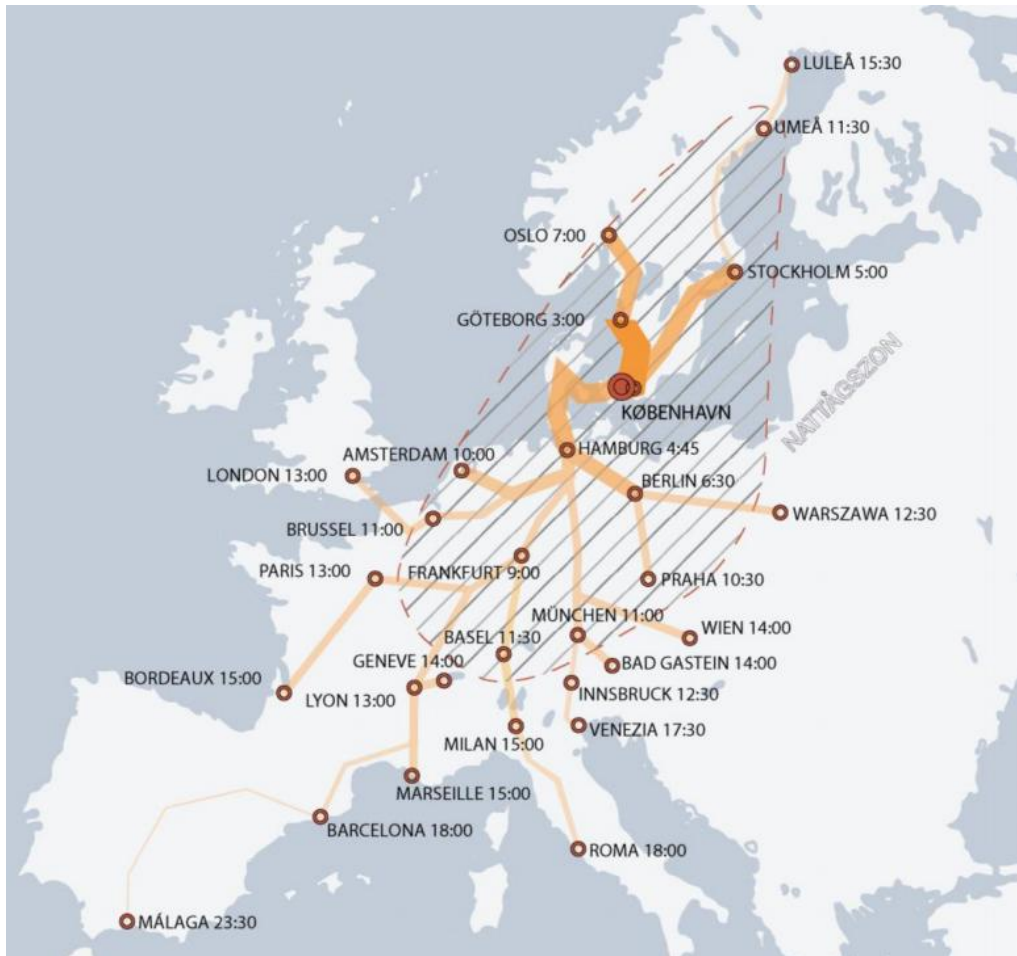
CO₂e taxes from aviation should naturally be included to improve the infrastructure and operation of trains in Europe. The 4.4 mill. per year is a good indication of the financial framework that may be around the future of rail transport; besides of course the passenger's own payment. The 4.4 mill. per year must be seen in relation to the subsidy of 0.66 mill. per year over three years given by the newly Danish political agreement.

Thus, it is both feasible and environmentally profitable to reduce aviation and get trains and ferries running to replace the gap. So how is this going to happen?

¹⁹ Rail travel on electrified main lines in Europe has very little CO₂ emissions, and with the ongoing green conversion of electricity production, the emissions will approach zero.

4.2 Until 2030; where can the train take us to Europe?

Figure 8: Opportunities for day and night trains in 2020 within 12 hours from Copenhagen



Times are hours from Copenhagen by conventional trains (max 200 km / h) with existing infrastructure. Source: Trafikverket in Sweden, which apparently does not mean that we must travel to the Balkans (!)

The train also has the advantage of being able to bring passengers all the way into town. It is a fact that has in some places provided a decisive competitive advantage over aircraft to this day. Just think of Eurostar from downtown London to downtown Paris or Brussels.

Night trains are, as mentioned, necessary over long distances with driving time over 4-6 hours. The night train incorporates the night as travel time and typically saves a hotel night. Night trains run over distances directly competing with aviation. If

Scandinavia is to quickly start replacing flights by train, the answer is night trains, where technology and infrastructure are already in place.

Some additional facilities may be more based on market economy, e.g. opportunity to bring your own car. But couchette- and sleeping cars in night connections and even restaurants / bistros / catering should always be available on trips over three hours.

One must not forget the concept of service: Traveling by rail must be associated with the feeling of safety, comfort and service. Traveling with luggage should be easy, and travelers with children, the elderly, the disabled must be taken into account.

The experience of traveling will change: From rush and stress at airports to peace to prepare meetings, talking to each other, experiencing cities and landscapes along the route.

- One disadvantage may be that the long, direct connections hardly allow for many stops along the way, ie. may be unsuitable for other destinations on the route. Long-distance trains must therefore best be integrated with regional and IC trains (serving several cities and distances up to 300 km).

Examples of connections from Denmark

Therefore we should in Denmark, with the help of, among others, infrastructure owner Banedanmark and DSB ensure direct train connections *without* changing trains to capitals in Northern Europe, such as Stockholm, Oslo, Berlin, Paris, London and Warsaw (and other major cities) typically as night trains with couchette and sleeping cars and comfortable seated sections for low-budget travelers and a form of bistro / catering.

There will be a potential for sharing expensive equipment such as sleeping cars with other companies or leasing cars from a Nordic or European leasing company.

One must, for example, make a practical collaboration with the Swedes, who have a larger population, greater internal distances (as the 3rd largest country in the EU) and yet have to pass through Denmark to move `down` in Europe. The Swedish Transport Administration is putting up billions of investments in new carriages, and of course Denmark must join.

It is up to authorities and operators to start operations, whether it should be to Brussels, Paris, Zurich, Munich, Stockholm and Oslo. These are major and obvious tourist and business destinations for Danish travelers, which today require 3-4 train

changes. A shift of train is a necessity on a longer train journey, but is a pestilence associated with great uncertainty: delays and possible loss of reservation. It should be possible to reach important metropolitan areas without such complications.

We do not decide on which operator and supply structure to use. It does not matter to passengers and the climate whether it is a state operator or a private operator providing the transport work. As long as it takes place in a reassuring way under uniform guidelines. Time is working for more privatized operators and for the provision of publicly supported traffic.

By 2030, the volume of travelers by night trains will be $\frac{2}{3}$ of 7.5 million annual journeys. Then no less than 20-30 night trains must depart from Copenhagen every night. Some towards Scandinavia, but most south via respectively Padborg and Fehmarn.

To indicate something about the busy rails at that time, there will probably be just as many night trains in transit from Scandinavia, but at slightly different hours. But that should be possible. At that time, the European railways introduce the new common signaling system; trains can be driven closer than today on the same rails.

Figure 9: How 30 night trains from Copenhagen can depart to the continent and Scandinavia from 2030 (only an illustrative sketch)

	South via Fehmarn	South via Padborg	North via Øresund
Night train 1	18:05		
Night train 2		18:09	
Night train 3	18:11		
Night train 4	18: 17		
Night train 5		18:22	
Night train 6		18:35	
Night train 7	19:05		
Night train 8		19:09	
Night train 9	19:11		
Night train 10	19:17		

Night train 11		19:22	
Night train 12		19:35	
Night train 13	20:05		
Night train 14		20: 09	
Night train 15	20:11		
Night train 16	20:17		
Night train 17		20:22	
Night train 18	21:05		
Night train 19	21:11		
Night train 20	21:17		
Night train 21		21:22	
Night train 22	22:05		
Night train 23		22:09	
Night train 24	22: 17		
Night train 25			22:30
Night train 26			22:45
Night train 27	23:05		
Night train 28			23:09
Night train 29	23:17		
Night train 30			23:30

Night trains will be able to replace some IC trains in Denmark in the evening hours and in the early morning hours. Space must also be provided for transit trains from Sweden and Norway, which will probably pass Denmark in the middle of the night and not enter Copenhagen H.

The time table will of course be adjusted according to seasonal demand. Connection with sections from Aalborg / Aarhus could take place in Kolding or in Padborg. You can also imagine separate trains from / to Aalborg / Aarhus south.

4.3 High-speed trains

Several high-speed trains such as the French TGV and German ICE will of course make it faster to travel - as an alternative to (or replacement for) the aviation. Denmark should be connected to the European high-speed network on the very day the Fehmarn connection is ready. Speeds of at least 250 km/h should in future be standard on newly built / newly refurbished main Danish lines. At high speeds, travelers can reach longer in the daytime, and even longer if the night is used²⁰.

Today, existing high-speed railways in Europe are reserved for special train sets. It needs to be changed so that slower night trains (with a maximum of 160 - 200 km/h) can also be accessed.

With a major European investment plan, by 2050 European railways will have much higher speeds, more capacity and also the railway stations will be expanded to handle the many more travelers.

4.4 Long transverse and seasonal connections

Using the train to travel through Europe will also give rise to long cross-border connections, in the style of the past's Wagon Lits special trains. Who does not remember the Orient Express, which was established as a long distance luxury train and revolutionized the transport sector back then.

These connections can be seasonal (skiing, holidays and festivals) and can be combined with auto trains (to carry private cars).

Such long links can be based on market forces and depend on demand.

²⁰ The domestic electric trains of the future are destined to run only 200 km/h. It is regrettable. The Copenhagen-Fehmarn and Kolding-Padborg connections should be upgraded to 250 km/h to be part of a European high-speed network.

Section 5. Search engine to find - and combine connections. Sales channels.

Much better search engines for rail links in Europe should be created.

There should be search engines that make it easier to find and put together a train connection yourself and buy your ticket. It has become possible for air travel, but poses greater challenges for train connections, where geography and local conditions play a greater role. All operators should be obliged to make data publicly available in a consistent format and should not exclude sales channels. What remains to be achieved in order to achieve this should be done under European supervision.

There should be a focus on personal service for a long period of time. Passengers need to get used to using trains, a routine that has been lost over the past 30 years. Sales platforms must provide financial opportunities for private (and smaller) players to assist and guide travelers.

Good and efficient information and ticket sales should be under state control, and it should be ensured that personal service at stations includes all operators' travelers.

Search engines should be available in national languages. Technical standards coordination takes place in the EU and national opposition to this coordination must be effectively eliminated.

If this does not happen quickly, foreign giants such as Google and Amazon will take over this market and this is hardly in the interest of European travelers.

In addition,

- All sales channels access various discounts.
- Security is established to allow passengers - in the event of delays - to move on to the next connection, without being forced to pay extra.

References

Calculations of the flight's adverse effects, see:

<http://bevarjordforbindelsen.dk/teknisk-baggrund-og-dokumentation/>

In general, recommendations for improvements for the rail sector in the light of the European Green Deal, see:

<https://back-on-track.eu/back-on-track-position-paper-on-new-green-deal/> The

Swedish Transport Administration's explanation of how night trains can be started again (published 30.4.2020).

Socio-economic analyzes carried out by The Swedish Transport Administration (ASEK model) specifically for the transition between aircraft and trains, see:

[https://www.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/Planerings--och-analysmetoder/ Samhallseconomic-analysis-and-traffic analysis / analysis method-and-samhallseconomic-calculation-for-transport sector-asek /](https://www.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/Planerings--och-analysmetoder/Samhallseconomic-analysis-and-traffic-analysis-analysis-method-and-samhallseconomic-calculation-for-transport-sector-asek/)

The new macroeconomic model ASEK 7 from 15.5. 2020.