Alternative and low-carbon accessibility to Finland

Visit Finland

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Mapping low-carbon accessibility to Finland

Tourism sector is expected to grow rapidly, but this should be happening in decarbonizing world. The development and promotion of low-carbon modes of transport play a key role in supporting the sustainable growth of the tourism sector. One of the goals of sustainable tourism is to reduce tourism, that causes more greenhouse gas emissions. Developing low-carbon travel chains will reduce emissions-intensive tourism.

This project was about mapping land and waterway accessibility to Finland from Visit Finland's target markets in Europe (Belgium, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, UK). In particular, the focus was on connections from the most suitable railway stations from Amsterdam, Berlin, Brussels, Dusseldorf, Frankfurt, Hamburg, London, Madrid, Milan, Munich, Paris, and Zurich. During the reference period, most trips were made to Finland from the airports of these cities.

The idea was to map out alternative accessibility from these destinations, including (and combining) rail, ferry and bus connections. In addition, since many tourists visit more than one Nordic country or combine Baltic countries in their visit to Finland, accessibility from these countries was included in the mapping.

The mapping of the rail, bus and ferry accessibility to Finland included travel time, travel chain (the number of changes within the route) and estimated CO2 emissions. The results were compared to the similar data on air routes. The aim was to build a comprehensive picture of the alternative routes to Finland, should aviation not be an option. In addition, the objective was to find the lowest emitting route to access Finland.

The alternative routes to Finland were researched during January and February 2024. The research was conducted by The Travel Foundation in collaboration with Visit Finland.

1: Background

1a: Research Rationale

- Potential Vulnerability of Air Route: Can tourists reach Finland if the air route was temporarily unavailable, for example due to industrial action or a natural disaster, or if the prices of flights increased (e.g. due to pricing in of emissions) making them less competitive?

- Potential Vulnerability of No-Fly Routes: Are the various alternative routes resilient to disruption?

- Market Opportunity: There is a small but growing market in travellers who are reducing or refusing to fly due to their concerns over climate change. There is also a market of those who don’t fly because they don’t enjoy the experience. In addition,

since Finland is seen and marketed as a sustainable destination, it is already focussing on the demographic most likely to be interested in travelling sustainably.

- Responsibility: As a signatory of the Glasgow Declaration Visit Finland has committed to bold emissions reductions for the country's tourism sector. It is essential to explore the potential of all aspects of the sector in helping to deliver these commitments.

1b: Research Methodology

- Connections were researched from the most suitable railway stations for the following Western European cities: Amsterdam, Paris, Madrid, Frankfurt, Milan, Munich, Berlin, Dusseldorf/Cologne, Hamburg, Brussels, Zurich and London.

- Connections were researched from the three Nordic neighbours' capitals: Stockholm, Oslo, Copenhagen, and also from the Baltic countries.

- A range of different websites were used to analyse routes and compare their emissions
    - a) Seat61 to define the route
    - b) for trains: used Ecopassenger to verify journey time and number of changes. Travel and Climate used to calculate emissions.
    - c) for ferry: used Direct Ferries to verify, and to extract nautical miles and travel time. Travel and Climate's emissions data per passenger km were multiplied by the distance
    - d) for coach: Flixbus used to calculate routes, and google maps to calculate distance. Travel and Climate's emissions data per passenger km were multiplied by the distance
    - e) for flights, Travel and Climate used to calculate emissions

- **Ecopassenger:** used as the main website for calculating exact journey times and number of changes. Whist detailed C02e journey data was collected from Ecopassenger, this data was not used for the comparison to ensure consistency.

- **Travel and Climate:** used as the main source of data for all C02e emissions comparisons to ensure consistency in system boundaries and data sources.

- Flights and trains were calculated using Travel and Climate's online calculator based on Methodological Notes 3.0[1] (7g CO2e/pkm for electric trains in Nordic countries, 24g C02e/pkm for electric trains in rest of Europe. 133g CO2e/pkm for flights).

[1] Travel and Climate Methodological Report 3.0 Available at https://travelandclimate.org/metod. To be updated to Version 4.0 in April/May

- Emissions for ferries and coaches were calculated based on Travel and Climate's forthcoming Methodological Notes 4.0 2 (30g CO2e/pkm for coaches, 186g CO2e/pkm for ferries)

- The following assumptions are made about journeys calculated Travel and Climate
  - An average load factor (e.g. normal level of crowdedness)
  - Where countries have Green Certificates for renewable energy, these were not taken into account.
  - Emissions associated with the extraction, production and distribution of electricity and fuel were included
  - Additional climate effects of other GHG emissions, especially for emissions in high altitudes (nitrogen oxides, ozone, water, soot, sulphur) were included.
  - Train journeys are made by electric train
  - Flights are by scheduled economy class
  - Emissions from transport by car or bus to and from airports to city centres were included

- DirectFerries: used as a reference for ferry journey times and distance. Direct Ferries was used to provide the Nautical miles per ferry route, which was converted into Km using a multiplication factor of 1.852.

- Google maps: used to calculate distance for coach travel.

- Seat61: used to get a detailed understanding of route options. For train routes departing from Western Europe Seat61's exact journey recommendations were used as a basis for calculations (e.g. via Travemünde or Hamburg). In some cases, such as from the UK or Amsterdam, there were shorter possible journey times available with shorter or no stops along the journey.

- Flixbus: Since Seat61 does not provide recommendations for coaches via Tallinn, Flixbus's website was used, and the journeys were selected with a preference for reasonable departure times, shortest overall journey and fewest changes.

- Trainline.com: used to compare rail routes

- Individual transport company websites: used to assess information on climate initiatives or to compare emissions data

[2] Larsson, Jörgen (forthcoming) Methodology Report for www.travelandclimate.org Version 4.0

1c: Factors to Consider

Comparison is complex due to the number of factors.

Comparing Time

- All flights were direct and therefore a single time can be estimated. In order to give a realistic comparison of the actual journey time (since a passenger needs to arrive at an airport much earlier compared to arriving at a train station, and because airports are situated out of main cities whereas rail stations are normally in the centre), 2hrs 45 mins total was added for check in, security, and real transfer times on public transport from each airport.

- All train journeys involve one or more connections, which vary in length depending upon when the first leg of the journey begun. The waiting times were integrated into the total journey time calculations.

- On average land and sea journeys were 7 times longer than flight journeys (often more than 30 hours quicker). Considering that London to Paris or Paris to Amsterdam are quicker by train than flight, and that even Barcelona to Paris is comparable (9hrs vs 5hrs), it is clear that for any passenger considering coming by train from Europe to Finland time is not the factor.

Comparing Emissions

- Comparing emissions between different transport modes, and even between different companies is a challenge due to the use of different methodologies for measuring and reporting. Different companies report their emissions in different ways, as do different climate calculators. Factors to consider include:
    - Some report only CO2, others all GHGs.
    - Some report GHGs individually, but without providing a CO2e measurement to enable comparison.
    - Aviation emissions are considered more polluting, because they happen in the high atmosphere, but this is not always factored in
    - Some emissions are Well to Wake (i.e. production and transportation impacts included). Others are Tank to Wake (only usage included).
    - Some transport modes have non standardised methods for comparison. For example, ferries' emissions can be allocated between passengers and freight according to volume, weight or revenue allocation, producing vastly different results.
    - Such individual complexities necessitate using an emissions calculator to compare across modes. But these may not have been updated to reflect individual company improvements. Or they may use averages for one or more legs of a journey.
    - In the case of ferries, there is a huge discrepancy between what the individual ferry companies are reporting, and what the independent carbon

calculator companies are stating. Unsurprisingly the ferry companies give figures that are much lower (by a factor of 10).

- **Car Travel:** We have not included car journeys for comparison because emissions vary vastly depending upon the type of car (from electric to diesel). In addition, while an electric car would be zero (or low) emissions, charging times would vary considerably depending upon the model, making any estimation of journey time specific to the make of car. Thirdly, the number of people in the car significantly affects the per passenger emissions, while also making it possible to cover far longer distances by swapping drivers.

- **Bus Travel:** It is possible to travel by bus from Europe to Finland in a single booking (Flixbus) and travelling via Tallinn. It takes 44hrs from Paris or 25-30hrs from Berlin.

- **Offsetting:** Several ferry and airline companies offer different types of offset, and we have not considered these since they do not reduce the actual emissions from the journey. However newer 'offsets' enabling travellers to investing in financing SAF (as offered by Finnair and Viking Line) may offer a more effective option. It should also be noted in this context that the upcoming EU Green Claims Directive will place greater restrictions on companies claiming Carbon Neutrality through the use of offsets.

Qualitative Comparisons (not included in measurements)

Time and Emissions (and cost) are numerically quantifiable (even if inexactly) and offer the most immediate comparable factors by which to assess a journey. However there are other factors that a traveller might consider (especially where time is not the key issue).

- **Booking Complexity:** Researching and booking a flight (including comparing multiple flight options) is a straightforward process involving the use of one (or perhaps two) websites. Researching and booking trips using trains and ferries often requires multiple websites for different legs of the journey (for example a passenger from the UK might need to use at least four websites - Eurostar from UK, Train in Mainland Europe, Overnight Train between Hamburg and Ferry from Stockholm to Finland). In addition, should there be a need for public transport connections (e.g. in Stockholm from train to ferry port), then more booking systems will be required. This makes the booking process even more complicated, especially for those less comfortable with digital / mobile technologies.

- **Comfort:** While lasting considerably longer, train journeys may be considered a more comfortable experience.

- **Accessibility:** Depending upon the specifics of the individual's access needs, the route and vehicle, visitors may find different routes more or less accessible.

- **Pleasure:** Depending upon the route, a train journey may pass through iconic scenery. An overnight train may be considered an experience in its own right.

- **Luggage Allowance:** Different companies offer differing luggage allowances, which is generally far larger and less strictly enforced when travelling by train

- **'Workability':** Depending upon the class of carriage, the quality of the wifi, many people consider a train an excellent place to work, and indeed the longer journey time may provide a better opportunity than the shorter but broken up experience of flying, with its continual interruptions

- **'Family Friendly':** With four person booths, wifi, space to move around, access to a variety of meals, some families may consider the train (and/or ferry) a preferable option. For others it may be preferable to get the journey over as fast as possible.

- **Reasons to Stop:** The train+ferry journey from Madrid to Helsinki takes 66hrs with 8 changes, compared to a 6hrs journey using a flight. But it stops in Barcelona, Marseille, Paris, Cologne, Hamburg and Stockholm (with other options such as Copenhagen also viable). There is an entire holiday available by slowing down, and designing a trip that does not seek the quickest route, but rather allows time to discover at various stops along the way.

2: Key findings

2a: Key European Source Markets

For all 11 western cities assessed, the best route (considering a balance of time, convenience, emissions) always converges on Hamburg. From there there are multiple options depending upon what factors are most significant for a passenger. However, this focussing on one city limits the potential capacity according to the number of trains running between Hamburg and Copenhagen. In addition, there is a potential vulnerability should an issue in Hamburg cause problems with the connections or access to the train network.

Emissions: The lowest emitting way to get to Finland is by train (see Figure 1). From Hamburg a passenger would therefore take an overnight train to Stockholm, and then connect up to Tornio-Haparanda, before connecting onwards into Finland. By the end of 2024, the current bus connection from Tornio to Kemi will be upgraded to a railway.

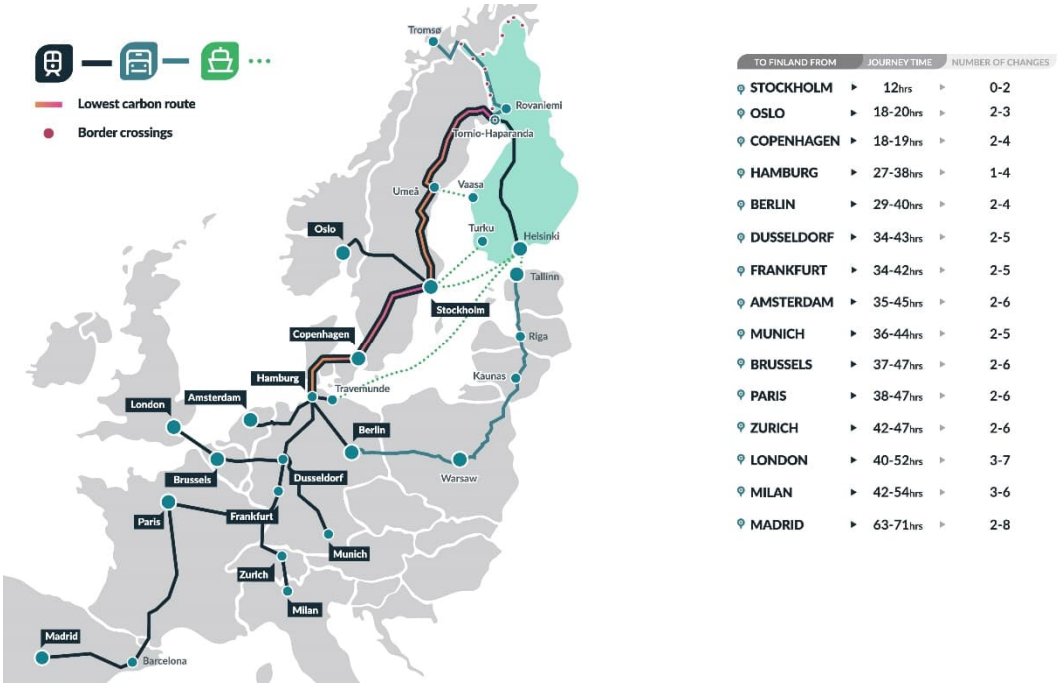

Figure 1: Alternative accessibility to Finland. The lowest emitting route to Finland is by train via Haparanda, Sweden.

No Fly: For a traveller who simply wishes to avoid flying, there are multiple train+ferry options that offer alternative ways to reach Finland.

- **Option 1:** Overnight train to Stockholm, then ferry to Turku or Helsinki. Depending upon the destination in Finland, this route offers a balance of convenience and the chance to spend a few hours in Stockholm.
- **Option 2:** Ferry from Travemunde: Although considerably slower than Option 1, the direct connection from Finland to Germany reduces the number of legs in the journey, and offers the option to take the car.

2b: Baltic States

There is a regular ferry from Tallinn to Helsinki. However, the complexity of the journey to reach Tallinn by train from Western Europe means that we consider this option to be only viable for residents of Baltic states. When attempting to search for routes such as Paris-Tallinn, or even Berlin-Tallinn on rail sites such as trainline.com no results were given. It is technically possible to access Tallinn by rail from across Europe, but it is complex and lacks co-ordinated booking options. Tallinn is accessible by train from Riga in Latvia, which is accessible by train from Vilnius in Lithuania. There is a single daily train from Warsaw to Vilnius. Warsaw connects to Berlin and Brussels. It would take four nights to travel from London to Tallinn overland the whole way. Seat61 recommends that travellers wishing to reach Tallinn from the UK without flying go via Finland.

However, given that you can get a Flixbus with just a couple of changes, this route offers the cheap and simple to book option. It may be less comfortable, but times are comparable to trains on the other routes, and it's lower carbon than the other ferry routes as it's a shorter ferry connection.

2c: Scandinavia

Routes from Sweden and Norway

The best land and sea routes from Oslo and Copenhagen are through Stockholm, from where the same options for onward travel to Finland exist as from Western Europe

For those already travelling along the Arctic Route, there is a bus connection from Tromso to Rovaniemi. Similarly, for those travelling within Sweden, there is also a short ferry connection from Umeå to Vaasa.

While there are multiple other road connections (5 between Norway and Finland, and 7 between Sweden and Finland), these don't feature a scheduled international bus route and so are not bookable They can, however, be crossed by foot or bicycle, and some private tour and shuttle companies operate along them. Key routes to Rovaniemi include from Kirkenes, Kiruna and Nordkapp.

2d: Russia

Ongoing tensions with Russia have closed all routes into Finland from Russia. It is impossible to predict the long-term situation.

APPENDIX 1: Other factors to consider

Developments in Cleaner Energy Sources

- **Grid:** Depending upon the country who is supplying the electricity, the mix of fuel sources used will vary. As countries shift away from fossil fuels grid source electricity will continue to become lower emissions
- **Trains**: While efficiencies will increase, trains are already the most sustainably powered long distance transport option so the pace of change will be incremental.
- **Buses**: Until/unless hydrogen becomes a widely used fuel source, the limitations of battery technologies will limit the abilities of long-distance coaches to reduce emissions from their fuels
- **Ferries**: Although increasingly technologically viable, the small number of vessels in fleets, and the time and cost of updating or replacing them, makes change slow. Biofuel stocks are also limited.
- **Aviation**: Although work on the electrification of aviation will continue to develop, and therefore may offer an alternative for certain short flights and very small aircraft in the future, battery technology makes larger planes and longer flights impossible. Hydrogen is discussed, but still far from viable. SAF (so-called Sustainable Aviation Fuel) offers a short-term fuel solution, but supplies are miniscule, and it will take a long time for more to be available.

Specific work by transport companies on emissions

All companies report engaging in different climate initiatives. As many are specific to the companies or individual vessels they cannot be used directly for comparison, but are included here for context.

Ferries: Viking Line

- The two ferries operating by Stockholm and Turku, Viking Grace and Viking Glory, are powered by LNG (liquefied natural gas) but can also operate on biogas and synthetic fuels made from renewable energy sources.
- Passengers can help reduce carbon emissions by purchasing a relative amount of biofuel that matches their journey.
- Heat Power System produces clean electricity from engine heat waste.
- Land-based power supply facilities in several ports, including Tallinn, Mariehamn, and Helsinki allow ships to connect to shore power while docked, reducing emissions during port stays.
- Food waste is converted to biogas.

Ferries: Finnlines

- Every vessel operated by Finnlines satisfies the Energy Efficiency Existing Ship Index (EEXI) standards without modification.

- Annual measurement of Carbon Intensity Indicator (CII) to ensure ships achieve a minimum carbon intensity during operation. The required carbon intensity level decreases by 2% annually, driving continuous energy efficiency improvements.
- Through an Environmental Technology Investment Programme, Finnlines lowered sulphur emissions by over 90%.
- Finnlines enhanced environmental performance by Breeze Class ro-ro ferries being extended by 30 metres.

Ferries: Eckerö Line

- The vessels run a low sulphur fuel and optimise operating speeds.
- Waste heat from the ship's engines and seawater temperature is utilised as an energy source of their ventilation and heating systems.
- Utilises shore power. Adopts recycling and food waste mitigation initiatives.

https://www.eckeroline.com/environment-and-responsibility

Ferries: Tallink Silja line

- All new vessels operate a zero spill to the sea policy.

Ferries: Wasaline

- Wasaline's Aurora Botnia ferry operates on a hybrid solution of dual-fuel engine and batteries. It can operate on LNG fuel and BioLNG fuel which it claims can lower emissions by up to 90%.

Railways: SJ

- Trains powered by electric motors utilise 100% of electricity from hydropower or wind. Additionally, 50% of this source has the Good Environmental Choice label ("Bra Miljöval"), imposing additional requirements on electricity production, such as preserving riverbeds and creating fish passages for aquatic species.
- SJ's train drivers freewheel (move without using engines) for up to more than 100 km on certain routes.

https://www.sj.se/en/about-the-journey/climate-friendly-travel

Railways: Snälltåg

- Trains are powered by renewable electricity, primarily hydropower. The Transdev group, a member of Fossilfritt Sweden, aims to become fossil-free by 2030.
- During breaking, energy efficient locomotives restore back the energy.
- Fossil-free fuels (RME or HVO) are used for the connecting buses.
- Meals on board pre-ordering option before trip helps to mitigate food waste.

https://www.snalltaget.se/om-oss/en-klimatsmart-resa-med-snalltaget

Railways: Deutsche Bahn

- Long-distance train services are powered completely by renewable electricity.

Railways: Eurostar

- Renewable energy is used in an increasing number of Eurostar trains - 100% wind energy in the Netherlands and 40% wind energy in the UK.
- Onboard eco-driving technology is being tested in an effort to cut energy use on every trip by at least 5%.

Railways: SNCF

- Renewable energy (wind, hydraulic, solar, etc.) will become the primary source for powering trains by 2025.
- SNCF is testing novel propulsion technologies (biofuel powered, hybrid, battery, and hydrogen) in partnership with industry partners and regional authorities.
- New SNCF stations with improved insulation can produce their own energy and are High Environmental Quality (HEQ) certified.
- The driver support system with optimised braking and the engine's system on TGV INOUIs can minimise consumption by up to 12%.

Railways: ÖBB

- Only renewable energy powers all ÖBB trains since mid-2018 and operating facilities since mid-2019.

Railways: Trenitalia

- Trenitalia has a partnership with Hitachi Rail investing in innovative green technologies from hyperloop to hydrogen, biofuels and batteries.

Airlines: Finnair

- Travellers can participate in sustainable aviation fuel (SAF) initiatives and certified offsetting programmes.
- Biofuel partner is Finland-based Neste, the world's largest producer of SAF refined from waste.
- Stated aim to have carbon neutral non-flight operations (Scope 1 and 2) from 2023 forward (need update on whether achieved so we can include).

Airlines: Lufthansa

- Lufthansa is collaborating on innovative technologies to mitigate fuel consumption and CO_2 emissions, including initiatives such as AeroSHARK surface film or the use of hydrogen as a fuel.
- The company also supports Airbus carbon-removal initiative, which pre-purchases carbon-removal credits to offset emissions.

Airlines: Norwegian Airlines

- Norwegian utilises the SkyBreathe flight operations analysis tool, Through optimising flights and reducing fuel consumption they aim to reduce 140,000 tons of CO_2 emissions per year.

- Travellers can participate in sustainable aviation fuel (SAF) initiatives and certified offsetting programmes.
- Norwegian collaborates with Norsk e-Fuel to construct a new plant in Norway to produce sustainable aviation fuels (SAF).

Airlines: Scandinavian Airlines

- Corporate and cargo customers are encouraged to reduce their emissions (Scope 3) through the Corporate Sustainability Program supporting the use of sustainable aviation fuel (SAF).
- SAS invests into the development of SAF through partnerships with companies Preem, Vattenfall, Shell, and Lanzatech. Further, they support the production of electrofuel powered by wind by joining the Green Fuels for Denmark project.

Airlines: Ryanair

- The Ryanair Sustainable Aviation Research Centre investigates with Trinity College Dublin zero carbo aircraft propulsion systems, sustainable aviation fuels and noise mapping.
- Ryanair committed to invest in Boeing 737-8200 aircrafts with reduction of CO2 by 16% whilst increasing passenger carrying capacity by 4%.

Airlines: KLM and Air France

- KLM and Air France aim for 64% of fleet being new generation aircrafts by 2028 with 25-30% improved fuel efficiency and capacity to lower CO2 20-25%.
- Both companies commit to increase sustainable aviation fuel (SAF) use and the improvement of operational efficiency by favouring more direct routes and introducing procedures that reduce fuel consumption (single-engine taxi, continuous descent).
- Air France commits to reducing food waste and its carbon footprint with a more responsible catering approach, by offering pre-order of meals prior to flight and elimination of single-use plastics.

Buses: Flixbus

- In collaboration with Scania up to 50 coaches will be fitted with Bio-LNG (LBG) technology to increase the usage of biogas. Coaches running exclusively on Bio-LNG are expected to decrease 80% of CO2 emissions.
- FlixBus initiated pilot projects of installing solar panels on their buses to generate energy and reduce CO2 emissions.
- In collaboration with Atmosfair passengers can voluntarily offset their CO2 emissions

APPENDIX 2: Route Comparisons

The following tables show the comparisons between the different routes using the limitations, assumptions and data sources described in Sections 1b and 1c.

Journey time (hours)					
Departure from	Trains + ferry to Turku	All trains to Tornio	Trains + ferry to Helsinki (via Travemunde)	Flixbus to Helsinki (via Tallin)	Direct flights to Helsinki
Stockholm	12	12	n/a	n/a	5
Oslo	20	18	n/a	n/a	4
Copenhagen	19	18	n/a	n/a	4
Hamburg	34	27	38	32	5
Berlin	36	29	40	31	5
Dusseldorf	40	34	43	40	5
Frankfurt	41	34	42	36	5
Amsterdam	42	35	45	41	5
Munich	42	36	44	36	6
Brussels	43	37	47	47	5
Paris	45	38	47	44	6
Zurich	44	37	47	44	6
London	47	40	52	57	6
Milan	48	42	51	44	7
Madrid	70	63	72	67	8

C02e Emissions					
Departure from	Trains + ferry to Turku	All trains to Tornio	Trains + ferry to Helsinki (via Travemunde)	Flixbus to Helsinki (via Tallin)	Direct flights to Helsinki
Stockholm	87	9	n/a	n/a	54
Oslo	97	19	n/a	n/a	107
Copenhagen	91	13	n/a	n/a	119
Hamburg	103	25	322	70	156
Berlin	110	32	337	68	148
Dusseldorf	114	36	340	87	201
Frankfurt	110	32	346	91	203
Amsterdam	107	29	347	91	201
Munich	118	40	361	97	214
Brussels	111	33	350	99	221
Paris	119	41	359	116	255
Zurich	122	44	363	109	237
London	120	42	359	88	244
Milan	132	54	373	118	259
Madrid	160	82	411	187	394

Number of changes					
Departure from	Trains + ferry to Turku	All trains to Tornio	Trains + ferry to Helsinki (via Travemunde)	Flixbus to Helsinki (via Tallin)	Direct flights to Helsinki
Stockholm	0	2	n/a	n/a	0
Oslo	2	3	n/a	n/a	0
Copenhagen	2	4	n/a	n/a	0
Hamburg	2	4	1	2	0
Berlin	2	4	2	2	0
Dusseldorf	3	5	2	2	0
Frankfurt	3	5	2	2	0
Amsterdam	4	6	3	2	0
Munich	3	5	2	2	0
Brussels	4	6	3	2	0
Paris	4	6	3	2	0
Zurich	4	6	2	2	0
London	5	7	4	3	0
Milan	4	6	3	3	0
Madrid	6	8	5	2	0

Hours longer than a flight				
Departure from	Trains + ferry to Turku	All trains to Tornio	Trains + ferry to Helsinki (via Travemunde)	Flixbus to Helsinki (via Tallin)
Stockholm	7	7	n/a	n/a
Oslo	15	14	n/a	n/a
Copenhagen	15	14	n/a	n/a
Hamburg	29	22	33	27
Berlin	31	24	35	26
Dusseldorf	35	29	38	35
Frankfurt	35	29	37	31
Amsterdam	36	30	40	36
Munich	36	30	38	30
Brussels	38	31	41	41
Paris	39	32	41	37
Zurich	38	31	41	39
London	41	34	46	51
Milan	42	35	44	37
Madrid	63	56	64	59

C02e saved vs flight				
Departure from	Trains + ferry to Turku	All trains to Tornio	Trains + ferry to Helsinki (via Travemunde)	Flixbus to Helsinki (via Tallin)
Stockholm	-33	45	n/a	n/a
Oslo	10	88	n/a	n/a
Copenhagen	28	106	n/a	n/a
Hamburg	53	131	-166	86
Berlin	38	116	-189	80
Dusseldorf	87	165	-139	114
Frankfurt	93	171	-143	112
Amsterdam	94	172	-146	110
Munich	96	174	-147	117
Brussels	110	188	-129	122
Paris	136	214	-104	139
Zurich	115	193	-126	128
London	124	202	-115	156
Milan	127	205	-114	141
Madrid	234	312	-17	207

% less C02e vs flight				
Departure from	Trains + ferry to Turku	All trains to Tornio	Trains + ferry to Helsinki (via Travemunde)	Flixbus to Helsinki (via Tallin)
Stockholm	-61%	83%	n/a	n/a
Oslo	9%	82%	n/a	n/a
Copenhagen	23%	89%	n/a	n/a
Hamburg	34%	84%	-106%	55%
Berlin	26%	78%	-128%	54%
Dusseldorf	43%	82%	-69%	56%
Frankfurt	46%	84%	-70%	55%
Amsterdam	47%	86%	-73%	54%
Munich	45%	81%	-68%	55%
Brussels	50%	85%	-58%	55%
Paris	53%	84%	-41%	54%
Zurich	48%	81%	-53%	54%
London	51%	83%	-47%	64%
Milan	49%	79%	-44%	54%
Madrid	59%	79%	-4%	53%