Report

Opportunities of the Amsterdam – Noord-Nederland – Hamburg railway link

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Executive Summary

This report presents the main findings of an investigation into the opportunities provided by a trans-European railway corridor Amsterdam – Noord-Nederland – Hamburg as part of the TEN-T network in scope of five megatrends on a European level:

- **Connectivity:** The better connection to supra-regional centres increases the attractiveness of Noord-Nederland for new residents and improves conditions for commuters. This is also true for neighbouring Weser-Ems region in Germany, which shows a similar socio-economic structure to Noord-nederland.
- **Resilience:** A better rail infrastructure on the corridor provides a back-up for the cross-border railway connection Oldenzaal – Bad Bentheim and increases connectivity between the ports of the North Range.
- **Economy:** A better rail link strengthen the ties to Northern Germany and Scandinavia, two very important regions for Dutch im- and exports, and helps to reduce CO_2 emissions compared to road and air freight traffic.
- **Sustainability:** Shift from air to rail transport can save up to 95% of current CO_2 emissions and attract sustainable tourists to the region.
- **Innovation:** The regions shows ideal conditions for new cross-border value chains, especially in the hydrogen and fuel cell technology sector.

Therefore, a better railway connection between Amsterdam, Noord-Nederland and North Germany contributes to the European Commission regional policy goals for 2021-2027:

- **Smarter Europe:** Enables innovation and economic transformation in Noord-Nederland.
- **Greener, carbon free Europe:** Railway travel is more sustainable than road or air travel.
- **Connected Europe:** An improved infrastructure allows better connection to Europe and within the Netherlands.
- **Social Europe:** Delivering better access to quality employment and education.
- **Europe closer to citizens:** More locally led development strategies - supporting the equalisation of regional inequality of opportunities.

2 Introduction

Noord-Nederland: In the heart of the North Sea region

Source: worldatlas.com © Prognos, 2021

This report presents the opportunities provided by a trans-European railway corridor Amsterdam – Noord-Nederland – Hamburg as part of the TEN-T network. It is meant to give a structured and both qualitative and quantitative overview over the different ways how this rail corridor can impact not only the Noord-Nederland region but also Europe as a whole. A main point of the investigation was to widen the discussion by looking on the corridor from different angles: What are the effects beyond mobility and transport? What other policy goals can be supported if the mobility options for the communities along the corridor are strengthened?

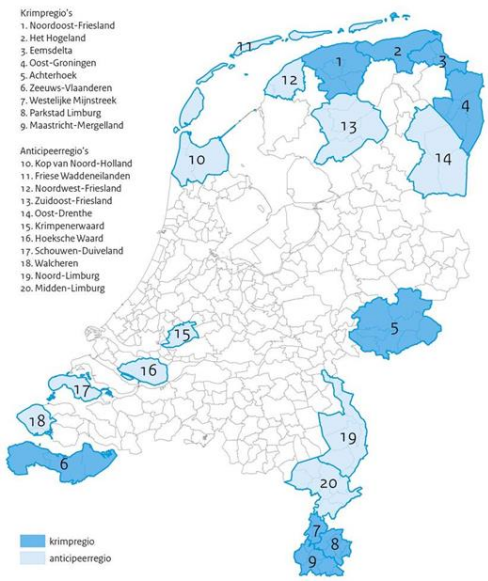
For this purpose, information and data was collected from different sources like statistics, scientific studies and political bodies to identify trends and developments and what they mean for the proposed railway corridor. This report contains the essence of the lessons learned and presents the most important opportunities provided by the railway corridor in a structured way under five headlines representing megatrends on a European level: **Connectivity**, **Resilience**, **Economy**, **Sustainability** and **Innovation**.

The goal is to give the full picture of opportunities that arise from a better rail infrastructure in Noord-Nederland on a regional and European level, varying from the effects on commuters over better trade relations between the Netherlands and Scandinavia to innovations in the field of hydrogen and fuel cell technologies. It also shows how they align with current policy goals on a European level, providing a strong case for the integration of the corridor into the TEN-T network.

3 Connectivity: Noord-Nederland – In the very centre

The better connection to supra-regional centres increases the attractiveness of Noord-Nederland for new residents

Shrinking regions in the Netherlands



The Dutch central government defines so-called shrinking areas in which a decline in population of at least 12.5% and a decline in households of about 5% is expected by 2040. With Noordoost-Friesland, Het Hogeland, Eemsdelta and Oost-Groningen, four of these nine shrinking areas are in the region of Noord-Nederland. In addition, there are "anticipated areas", where a slower decline in population and households (-2.5%) is expected by 2040. Four of these eleven areas are located in the Noord-Nederland region.[1] A better railway link could help to counteract the population decline in the provinces of Noord-Nederland, as the region experiences a significant increase in attractiveness through connections to supra-regional centres.

This can help to rejuvenate the population. Currently, the ageing of society is a factor which plays an important role when considering the future viability of Noord-Nederland: For every inhabitant of Noord-Nederland between the ages of 0 and 14, there are 1.4 inhabitants older than 65.[2] A well-developed railway link can counteract this ageing population: It is a decisive location factor for the settlement of new companies, which in turn generate new jobs and thus attract the younger, working population. In addition, the railway link can provide a high-quality (public) transport service and thus also ensure the mobility of the older population group in the long term.

Three railway lines, one mission: A better connection for Noord-Nederland

The combination of the new Lelylijn and an upgrade of the existing railway line Zwolle – Meppel – Groningen allows the improvement of mobility for the whole region without leaving anyone behind. In combination, the railway lines could provide reliable rail connections between Groningen and Amsterdam in under two hours every 30 minutes, providing improved railway connections for citizens in Drenthe and Fryslân along the way. This is bolstered by the Nedersaksenlijn, providing a better connection from Enschede via Emmen to Groningen, Fryslân and the North of Lower Saxony.

[1] Rijksoverheid (2019): Indeling gemeenten krimpregio's en anticipeerregio's per 1 januari 2019
[2] https://ugeo.urbistat.com/AdminStat/en/nl/demografia/eta/noord-nederland/1/2 (April 2021)

Nedersaksenlijn: New possibilities for Drenthe and Groningen.

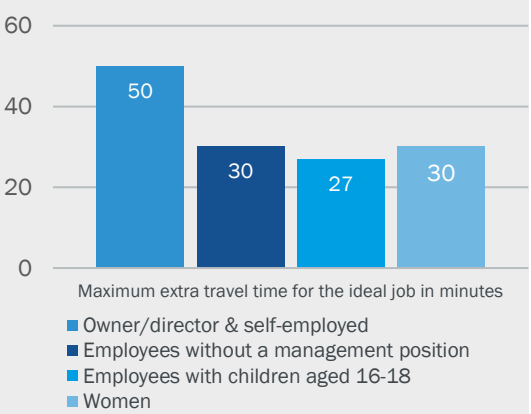
The proposed Nedersaksenlijn connects Groningen with the future railway line Emmen – Coevorden – Rheine. This creates a connection from Groningen to the south of Lower Saxony and North Rhine-Westphalia and improves the connection of Emmen to Groningen, Assen and Northern Germany. Combined with a better railway connection to Amsterdam and Randstad, it opens new possibilities for citizens of Drenthe, Groningen and Overijssel.

At the same time, the connection from Groningen to the south is improved by providing a link to the Coevorden border-crossing and further south to Almelo, both for passengers and goods. The rail freight terminal in Coevorden is the largest rail terminal in Noord-Nederland, with further room for expansion. It provides regular connections to Germany and Sweden, one of the fastest growing trade partners of the Netherlands. With a better connection to Groningen and Fryslân, Coevorden will strengthen its role as the rail freight gateway for Noord-Nederland.

Furthermore, the resilience of cross-border rail links between the Netherlands and Germany is improved by connecting all four active railway border crossings north of Zevenaar.

Living in Noord-Nederland and working in Randstad: A better railway connection makes it easy!

Willingness to commute for ideal job



Source: Savills Research © Prognos, 2021

The better connectivity provided by the improved railway links would serve commuters: More than 30% of workers in the Netherlands spend 45 minutes or more on the road or in public transport between home and work. This is the longest daily commute in Europe, which can be explained by the high commuter frequency between major cities.[3] Currently, commuter flows between Noord-Nederland and the rest of the Netherlands are low due to long travel times compared to other regions. An improved railway connection would improve connectivity, too, allowing far more people to reach Noord-Nederland in no more than 2 hours and allowing access to up to three times as many jobs in a 2-hour radius as before – a growth of 200%.[4] This helps to overcome the lower opportunity rate of people born in Noord-Nederland compared to the rest of the country by providing access to communities currently left behind.

An improved infrastructure has big impacts on travel times: The current travel time by train between Amsterdam Centraal and Groningen takes on average 2:04h and requires a change of trains. This travel time could be reduced to 1:24h (-32%) – without changing trains. An upgraded railway line Zwolle – Meppel – Assen – Groningen improves life for commuters, too. With an improvement, the current travel time by train between Groningen, Assen and Zwolle could be cut by a third, improving connections for commuters to and from Overijssel, Gelderland, Flevoland and Randstad and thus allowing access to better employment. Due to the improvements, travel time from Assen to Amsterdam is reduced by 12 minutes (-11%) and from Leeuwarden to Amsterdam by 52 minutes (-42%).[5]

This makes living in Noord-Nederland and working in the Randstad more attractive, as the housing market in the Randstad Metropolitan Area is particularly tight: purchase prices for existing own homes in Amsterdam or Rotterdam grew by more than 60% since 2015 compared to 37% in Noord-Nederland.[6] The reduction in travel times from Randstad Metropolitan Area to Noord-Nederland encourages more commuting and takes pressure from the housing market in the Randstad. This opens growth potential for housing in towns like Groningen, Leeuwarden, Assen, Emmen, Drachten, Heerenveen, Hoogeveen and Meppel.

Additionally, the better railway infrastructure helps the regional labour market. One job in railway transport creates more than one job in other sectors (manufacturing, accounting, food services, wholesale trade, building services). Furthermore, rail infrastructure projects increase the size of the available labour market to companies, enhance the productivity of companies and offer additional clustering benefits.[7]

[3] Savills (2019): What Workers Want. The Netherlands – Winter 2019
[4] Berenshot (2021): Bouwstenen voor het Deltaplan – Noordelijk Nederland en het Stedelijk Netwerk Nederland beter verbonden
[5] Calculated according to current travel times and travel times projected for upgraded rail connections, Lelylijn and Nedersaksenlijn
[6] CBS (2021): Existing own homes; purchase prices, price indices 2015=100
[7] Community of European Railway and Infrastructure Companies (2014): The economic footprint of railway transport in Europe

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Lille, Montabaur, Wittenberge: High-speed trains stimulated substantial investments.

The arrival of the high-speed train in Lille, a city of 230,000 inhabitants in Northern France, has provided the potential for its economic transformation. Additional investments were at first channelled mainly to the train station area. Later, private actors began to invest in other parts of the city as well. A great demand for office space has developed, and the city is experiencing an upswing in urban tourism.

In Euralille - an urban quarter in the centre of Lille and strategically located at the intersection of the high-speed railway links between Paris, Brussels and London - a large regional shopping centre was built (31,000 m² of shopping space). It attracts many visitors from a wide area and has reinforced the function of the inner city, as some visitors combine a shopping spree in Euralille with a visit to the city centre.[8][9]

The same development can be found in Montabaur, a town of 14,000 inhabitants in central Germany. In 2000, an ICE stop along the main line between Cologne and Frankfurt was built in the city. Today, the economic performance in Montabaur is 10% higher than in times without an ICE connection. The GDP in neighbouring counties also increased by 2.7%. This effect is clearly due to the improved market access created by the railway station: Within a few years, 80 companies with a total of 1,800 jobs settled at the station, including a factory outlet with 70 shops, and a predicted demand volume of 4.9 billion euros a year.

Around 3,000 people commute from Montabaur every day. The number of passengers increases annually by an average of about 100 passengers per working day. One of the reasons for this development is the growing population: Between 2014 and 2019, Montabaur gained more than 1,000 inhabitants.[10][11]

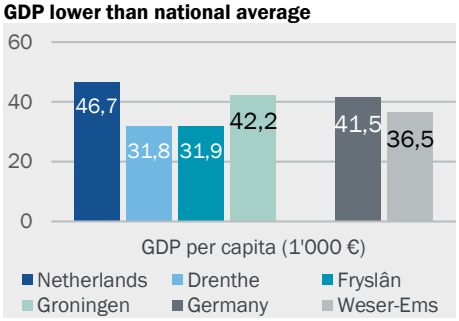
Another case study is Wittenberge, a small town of 17,000 inhabitants located between Hamburg and Berlin that lost over 40% of its inhabitants since 1990. Since the opening of the improved railway connection between Hamburg and Berlin, the city is served by long-distance trains in both directions every two hours, allowing to reach both cities in about 60 minutes. The result: new companies opened in Wittenberge, reducing unemployment from over 20% in the 1990s to 8% in 2021.

For the „Summer of Pioneers“, Wittenberge invited digital workers to try out living in the city for a year, providing them with housing and workspace in return for new ideas how to improve the city. After the trial, 75% of participants decided to stay – and convinced others to follow.[12]

[8] Chen, C-L., Hall, P. (2012): The wider spatial-economic impacts of high-speed trains: a comparative case study of Manchester and Lille sub-regions, Journal of Transport Geography 24, 89–110
[9] Pol, P. (2003): The economic impact of the high-speed train on urban regions. European Regional Science Association ERSA conference papers 03 397
[10] M. Ahlfeldt, A. Feddersen (2018): From periphery to core: Measuring agglomeration effects using high-speed rail, Journal of Economic Geography 18 (2), 355–390
[11] Westerwälder Zeitung (2019): Montabaur lockt mehr Menschen an – Einwohnerzahl und Anzahl der Arbeitsplätze steigen weiter.
[12] Metzger, J. (2021): Stadt oder Land? Die 60-Minuten-Stadt. In: brandeins /thema Unternehmensberater 2021

Noord-Nederland and Weser-Ems: Different countries, same structure

GDP lower than national average



Source: Eurostat © Prognos, 2021

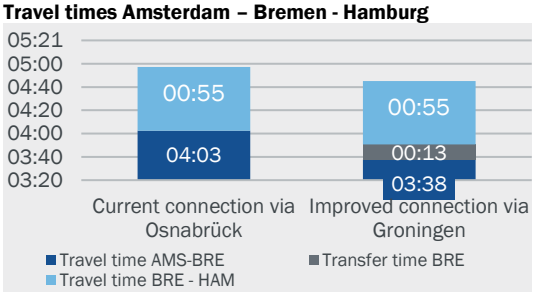
The benefits of an improved railway link are also felt across the border in Germany. For commuters living in the cross-border region between Bremen and Groningen, high time savings are possible (up to 33% of travel time). This is particularly relevant for people living in Germany who commute from border regions in Lower Saxony to the Netherlands (ca. 5,800 people) or from Germany to the Noord-Nederland region (ca. 2,640 people). People living in the Netherlands and working in municipalities in Lower Saxony (ca. 1,300 people) can also benefit from the time savings.[13]

Strengthening cross-border rail connections can also have a positive impact on the cross-border school and labour market. There is already a host of cross-border labour market projects that stimulate cross-border traffic among younger border residents:[14]

- **Frühe Nachbarsprache!** A unified education and labour market without borders is developed. 300 students and 100 teachers are actively and cooperatively involved.
- **Sorgen für..., sorgen dass...** 400 Dutch and German pupils and students completed an internship or took part in an excursion in the neighbouring country between 2016 to 2019.
- **Grenzenlo(o)s Talent!** 400 employers and 322 employees were advised; 90 people were placed in work; 115 students were active in internships or research work.
- **PraktiTrans** Brings companies and schools together to facilitate cross-border internships.

Furthermore, over 27 colleges and universities currently participate in cross-border INTERREG projects between the Netherlands and Germany. 103 currently running projects cooperate in the fields of High-Tech Systems & Materials (29), Energy & Low CO_2 Economy (17), Agrobusiness & Food (13), Health & Life Sciences (9) and Logistics (6). The new funding period starts in 2021 and will lead to further cross-border cooperation involving universities and knowledge workers across borders. [15]

Travel times Amsterdam – Bremen - Hamburg



Sources: DB AG, own calculations © Prognos, 2021

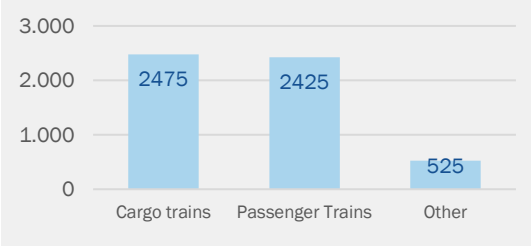
Knowledge workers in general show a high mobility and therefore not only the INTERREG projects would essentially benefit from a faster railway connection to increase the exchange of knowledge. Current rail connections between Amsterdam Centraal and Bremen via Osnabrück need more than 4 hours. A better railway connection between Randstad, Noord-Nederland and Northern Germany could reduce travel times by more than 12% to just over 3.5 hours even without a direct train connection and would serve the travel needs between Noord-Nederland and Northern Germany at the same time. The journey to Hamburg would be slightly shorter, too, than current travel times – even with changing trains in Bremen.

[13] Grenzdaten (2021): Grenzpendler; Staatsangehörigkeit, Wohnland, Arbeitsregion (NUTS 3)
[14] https://www.arbeidsmarkt-noord.eu/bouwstenen/ (April 2021)
[15] Figures and taken from https://deutschland-nederland.eu/projekt-datenbank/ (April 2021)

4 Resilience: Closing a gap in the TEN-T network

Back-up for cross-border railway connection Oldenzaal – Bad Bentheim

Trains at Oldenzaal – Bad Bentheim border crossing

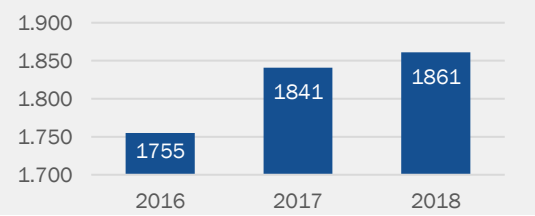


Source: Eurostat © Prognos, 2021

About 5,000 trains are crossing the border between Oldenzaal and Bad Bentheim per year.[16] In case of a line closure on the connection due to maintenance, construction works or unpredictable events the supply chain would be restricted and potentially interrupted, leading to high economic costs. An improved railway connection in Noord-Nederland (especially Nedersaksenlijn, Wunderline and Emmen-Coevorden-Rheine) could severely improve the resilience of the cross-border railway connection between the northern parts of the Netherlands and Germany especially as an alternative route to the Oldenzaal – Bad Bentheim link.

An additional border-crossing to the North connecting to the German long-distance railway network would then allow for more flexibility in the case of interruptions for passenger flows between Amsterdam and Berlin. Pre-Covid, almost 2,000,000 passengers used the Oldenzaal - Bad Bentheim border crossing each year travelling between the two cities.[17] In case of both unexpected ruptures of railway operation due to accidents, weather damages of the infrastructure or planned maintenance work, these travellers currently must take the longer route via the much more congested Zevenaar – Emmerich border-crossing and Ruhr valley to the south instead of the more northern route via Nieuweschans – Weener.

Long-distance passengers at Oldenzaal – Bad Bentheim border crossing



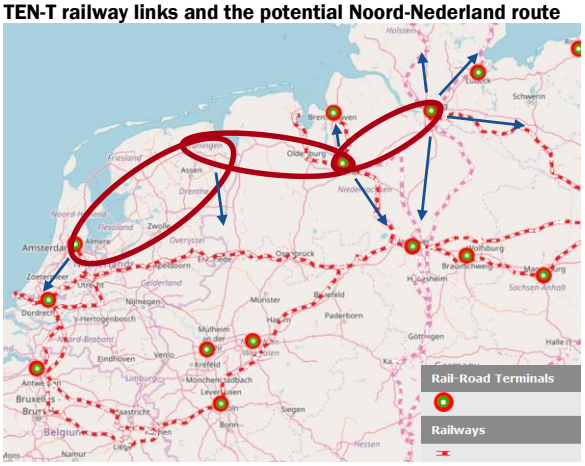
Source: Prognos based on DB AG © Prognos, 2021

Increased port connectivity provides resilient infrastructure for Europe

Additionally to passenger trains, about 2,500 cargo trains are crossing the border between Oldenzaal and Bad Bentheim each year.[18] In the case of line closures on that connection due to construction work or unpredict-able events the supply chain would be restricted and potentially interrupted, leading to high economic costs. A better rail connection in Noord-Nederland serves as back-up for connecting the ports of Rotterdam and Amsterdam to ports in Bremen/Bremerhaven, Hamburg and Wilhelmshaven in equal travel time compared to the existing route via Osnabrück. The railway connection therefore improves the resilience of the north range ports' connectivity.

[16] Eurostat (2021): Traffic of trains on the rail network - the Netherlands, 2015 [rail_tf_ns15_nl]
[17] Calculated based on information provided by DB AG to train capacity and load factors for long-distance trains.
[18] Eurostat (2021): Traffic of trains on the rail network - the Netherlands, 2015 [rail_tf_ns15_nl]

TEN-T railway links and the potential Noord-Nederland route



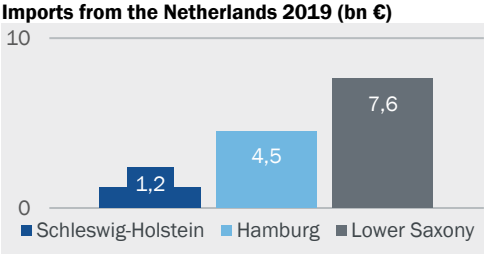
Source: European Commission

A better railway link also **closes the current gap in the TEN-T network** between Amsterdam – Noord-Nederland – Hamburg and bypasses the crowded railway node of Hanover. By being integrated into the TEN-T network, the new railway link can significantly improve and shorten the connection to the Scandinavian countries.

5 Economy: Trade opportunities for Europe

Northern Germany is the 11th biggest export market for the Netherlands

Imports from the Netherlands 2019 (bn €)



Sources: Landesamt für Statistik Niedersachsen, Statistisches Amt für Hamburg und Schleswig-Holstein © Prognos, 2021

More than 2% of all Dutch exports go to the three Northern German states of Lower Saxony, Hamburg and Schleswig-Holstein. Were these three states an independent country, they would be the 11th biggest export market for the Netherlands, almost as important as Sweden with a trade volume only 2.3bn € smaller than China. An important reason for this lies in the well interconnected food markets. Of all food exports from the Netherlands to Germany, 11% go to Lower Saxony alone (representing almost a quarter of Lower Saxony's overall food imports). This equals almost 3% of all food exports of the Netherlands and contributes 2bn € a year to the Dutch food industry.[19]

The high importance of cross-border trade is also reflected on the German side: In 2019, more than 7% of Northern German imports came from the Netherlands. This makes the Netherlands Northern Germany's most important import source in the EU. Accordingly, over 2,000 German companies operate in the Netherlands, making it by far the biggest home base in the EU for foreign-owned multinationals operating here.[20]

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Noord-Nederland has the choice between two multi-port regions.

Noord-Nederland is embedded between the multi-port gateway regions of the Rhine-Scheldt-Delta and the Jade-Weser-Elbe-Delta. A better railway connection to Germany thus provides better access from Noord-Nederland to the ports of Bremen/Bremerhaven, Hamburg and Wilhelmshaven. This better access results in several benefits for Noord-Nederland's economy:

- Increased competitiveness in import/export.
- Improved access to the ports' economic and logistics centres.
- Improved access to the Baltic Sea region (feeder shipping) and Eastern Europe (rail) via Port of Hamburg.
- Improved access for German goods to ports of Amsterdam and Rotterdam via Coevorden railway terminal.

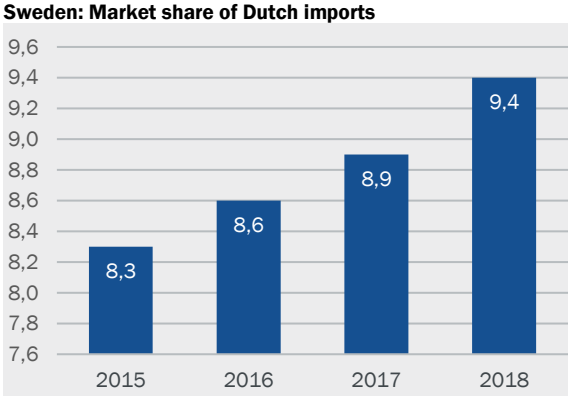
[19] Calculations based on Landesamt für Statistik Niedersachsen (2020): Die Einfuhr Niedersachsens nach Warengruppen und Ursprungsländern 2019; Statistisches Amt für Hamburg und Schleswig-Holstein (2020): Ein- und Ausfuhr des Landes Hamburg 2019 - nach Ländern - & Ein- und Ausfuhr des Landes Schleswig-Holstein 2019 - nach Ländern -; Eurostat (2021): EU trade since 1988 by SITC [DS-018995]

[20] Statistics Netherlands (2020): Dutch Trade in Facts and Figures

One of the Netherlands Top 10 trading partners gets closer: Sweden

Sweden is one of the fastest-growing major destination for exports from the Netherlands and in the Top 10 of Dutch export destinations – almost 10% of Swedish goods imports are from the Netherlands.[21]

Sweden: Market share of Dutch imports



Source: Statistics Netherlands © Prognos, 2021

After the opening of Fehmarn Belt Fixed Link and improvements of the railway connection between Hamburg, Groningen and Amsterdam, rail freight transport from the Randstad to South Sweden could be done overnight. This is good news for importers, as the Dutch top imports[22] from Sweden like wood, pulp, paper and road vehicles are perfectly suited for rail freight transport. The already **high demand for rail freight connections between Noord-Nederland and Sweden** is highlighted by the existing daily rail freight connection between Coevorden and Nässjö.

Seen from the Swedish perspective, trade links are similarly strong: In 2018, 6% of all Swedish goods trade by value was with the Netherlands. This makes the Netherlands one of Sweden's Top 6 trade partners.[23] A particularly important trade link is in vehicles: 1 € in each 14 € the Swedish vehicle industry earned from exports is made thanks to trade with the Netherlands.[24] Looking on imports alone, almost 10% of Swedish goods imports are from the Netherlands – the amount grew by 27% between 2015 and 2019. Furthermore, around 400 Swedish companies operate in the Netherlands, making it the fourth-biggest home base in the EU for foreign-owned multinationals operating here.[25]

After the opening of Fehmarn Belt Fixed Link and an improved railway infrastructure in Noord-Nederland, rail freight transport from the Randstad to South Sweden could be done overnight and would save over 82% of CO_2 per Container.[26]

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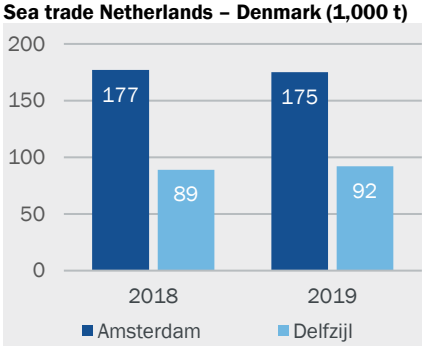
Scandinavia is the 6th biggest market for Dutch exporters.

Together, Sweden, Denmark and Norway count for 4% of total exports from the Netherlands. If the three countries would be counted as one, they would be among the Top 6 trade partners of the Netherlands.[27]

[21] Statistics Netherlands (2020): Dutch Trade in Facts and Figures
[22] Eurostat (2021): EU trade since 1988 by SITC [DS-018995]
[23] Nordic Statistics (2021): Foreign trade, 1000 euro by partner, flow, reporting country and time [FOTR49]
[24] Eurostat (2021): EU trade since 1988 by SITC [DS-018995]
[25] Statistics Netherlands (2020): Dutch Trade in Facts and Figures
[26] Calculation by Prognos based on proposed travel times for new rail infrastructure, transport distance information from Raildar and Google Maps, and CO_2 emission factors provided by German Federal Agency for the Environment (UBA)
[27] Eurostat (2021): EU trade since 1988 by SITC [DS-018995]

Delfzijl port handles almost 1 in 5 tons traded by sea between Denmark and the Netherlands

Sea trade Netherlands – Denmark (1,000 t)



Source: Eurostat © Prognos, 2021

In 2019, 8% of all Danish goods trade by value was with the Netherlands. This makes the Netherlands one of Denmark's Top 3 trade partners.[28] Almost 8% of Danish goods imports are from the Netherlands.[29] 1 € in each 12 € the Danish metal industry earned from exports is made thanks to trade with the Netherlands.[30]

There is already an established connection between Noord-Nederland and Denmark: **Delfzijl is the second-most important Dutch port for trade with Denmark** after Amsterdam port – almost 20% of all trade by sea between the two countries are handled here.[31]

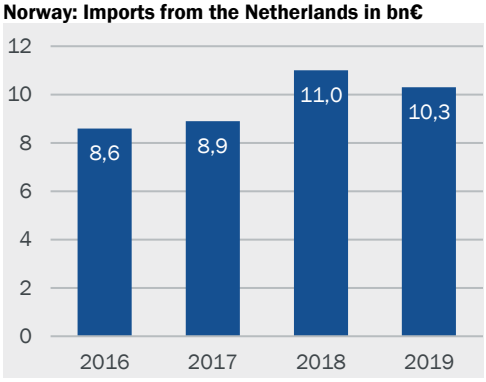
After the opening of Fehmarn Belt Fixed Link and improvements of the railway connection between Hamburg, Groningen and Amsterdam, rail freight transport from the Randstad to Copenhagen could be done overnight and would save over 81% of CO_2 per Container not shipped by road.[32]

The Netherlands is one of Norway's Top 3 trade partners

In 2018, more than 10% of all Norwegian goods trade by value was with the Netherlands. This makes the Netherlands one of Norway's Top 3 trade partners.[33] Around 4% of Norwegian goods imports are from the Netherlands.[34] At the same time, Norway is one of the Top 10 origin countries for Dutch imports.[35]

Air freight transport between the Netherlands and Norway grew by almost 25% between 2015 and 2020.[36] **Rail freight could be a significantly cheaper and more sustainable alternative to air freight** if reliable and fast connections exist.

Norway: Imports from the Netherlands in bn€



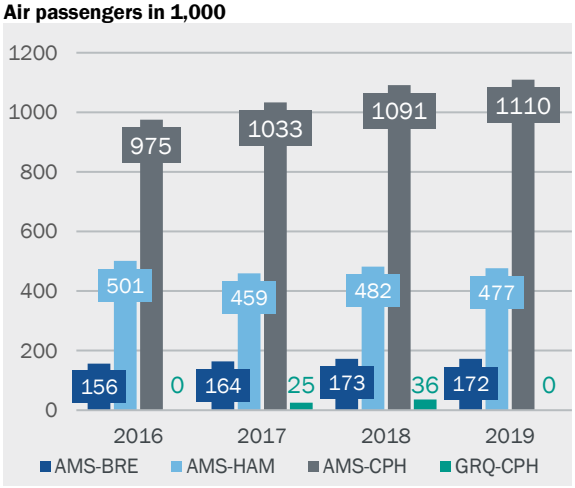
Source: Statistics Netherlands © Prognos, 2021

[28] Nordic Statistics (2021): Foreign trade, 1000 euro by partner, flow, reporting country and time [FOTR49]
[29] Statistics Netherlands (2020): Dutch Trade in Facts and Figures
[30] Eurostat (2021): EU trade since 1988 by SITC [DS-018995]
[31] Eurostat (2021): Gross weight of goods transported to/from main ports – Netherlands [mar_go_am_nl]
[32] Calculation by Prognos based on proposed travel times for new rail infrastructure, transport distance information from Raildar and Google Maps, and CO_2 emission factors provided by German Federal Agency for the Environment (UBA)
[33] Nordic Statistics (2021): Foreign trade, 1000 euro by partner, flow, reporting country and time [FOTR49]
[34] Statistics Netherlands (2020): Dutch Trade in Facts and Figures
[35] Eurostat (2021): EU trade since 1988 by SITC [DS-018995]
[36] Eurostat (2021): Freight and mail air transport between reporting countries [avia_goocc]

6 Sustainability: A shift to rail for the benefit of all

Shift from air to rail transport can save up to 95% of current CO_2 emissions

Air passengers in 1,000



Source: Eurostat

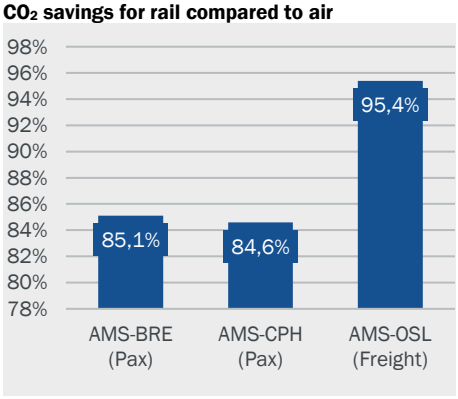
Pre-Covid, short-haul flights between Amsterdam and Bremen carried ca. 170,000 passengers a year – that is about 470 passengers per day.[37] In comparison, a third-generation ICE can carry up to 450 seated passengers.[38] A regular ICE service from Bremen to Schiphol via Groningen and Amsterdam would need about 3.5 hours and offer more flexibility for travellers – while simultaneous serving communities along the way.[39] At the same time, this would lead to a reduction of CO_2 emissions of over 85% - from 34,800 to 5,200 tons of CO_2/day.[40] Hamburg offers an even bigger potential, as the air passenger volume on the route to Amsterdam was almost three times that of Bremen - Amsterdam pre-Covid.

Further to the northeast, flights between Copenhagen and Amsterdam carried about 1,100,000 passengers a year (pre-Covid) – that is over 3,000 passengers per day.[41] If only 10% would choose to take a night train instead, a standard night train configuration would be almost completely booked.[42] After the opening of Fehmarn Belt Fixed Link and improvement of railway infrastructure in Noord-Nederland, the journey from Copenhagen to Amsterdam could be done in 7 hours – ideal for a night train and perfect to serve the existing travel needs between Copenhagen and Groningen as well.[43] At the same time, this would lead to a reduction of CO_2 emissions of almost 85% for each passenger - from 156 kg to 24 kg of CO_2 per trip.[44]

[37] Eurostat (2021): Air passenger transport between the main airports of the Netherlands and their main partner airports (routes data) [avia_par_nl]
[38] https://inside.bahn.de/ice-baureihen/ (April 2021)
[39] Calculation by Prognos based on proposed travel times for new rail infrastructure
[40] Calculation by Prognos based on transport distance information from Raildar and CO_2 emission factors provided by German Federal Agency for the Environment (UBA) and Atmosfair
[41] Eurostat (2021): Air passenger transport between the main airports of the Netherlands and their main partner airports (routes data) [avia_par_nl]
[42] Calculated based on information provided by Austrian Federal Railway (ÖBB)
[43] Calculation by Prognos based on proposed travel times for new rail infrastructure
[44] Calculation by Prognos based on transport distance information from Raildar and CO_2 emission factors provided by German Federal Agency for the Environment (UBA) and Atmosfair

Significant reductions in CO_2 emissions are also possible for freight transport connections. As mentioned above, air freight transport between the Netherlands and Norway grew by almost 25% between 2015 and 2020. However, rail freight trains from Randstad via Noord-Nederland and Fehmarn Belt Fixed Link could reach Norway in less than 24 hours.[45] Thus, rail freight could be a significantly cheaper and more sustainable alternative to air freight, resulting in CO_2 emission savings of over 95% for goods that are currently transported by air freight between Schiphol and Oslo.[46]

CO_2 savings for rail compared to air



Source: Own calculations © Prognos, 2021

But also compared to road freight traffic, significant gains are possible: After the opening of Fehmarn Belt Fixed Link and with an improved railway infrastructure in Noord-Nederland, rail freight transport from the Randstad to South Sweden could be done overnight and would save over 82% of CO_2 per Container. Similar gains are possible for the route from Randstad to Copenhagen, which could reach over 81% of CO_2 emission reduction after the opening of the Fehmarn Belt Fixed Link.[47]

i

An improved railway infrastructure for Noord-Nederland aligns with the goals of the New Green Deal.

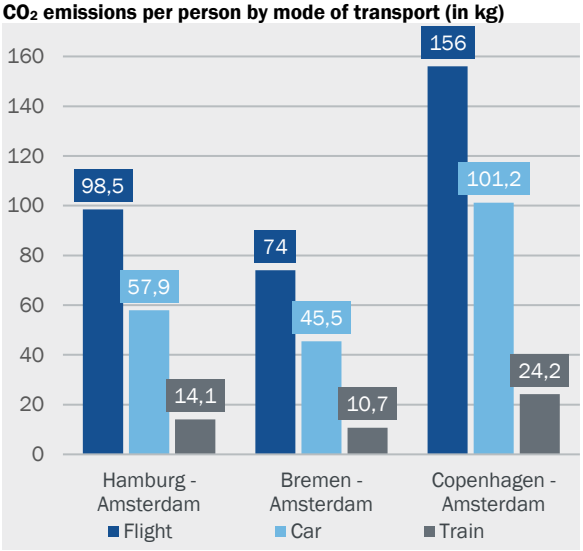
A better railway infrastructure between Amsterdam, Noord-Nederland and Northern Germany supports:

- Climate neutrality by 2050.
- Industry in innovation and sustainable business.
- Introduction of cleaner, cheaper and healthier forms of private and public transport.
- Promotion of attractive and sustainable ways to connect people and businesses.
- Reinforcement of sustainability, safety and connection - since 2014, the European Union has allocated more than 35 billion € to rail.

[45] Calculation by Prognos based on proposed travel times for new rail infrastructure
[46] Calculation by Prognos based on transport distance information from Raildar and CO_2 emission factors provided by German Federal Agency for the Environment (UBA) and klimanko.de
[47] Calculation by Prognos based on proposed travel times for new rail infrastructure, transport distance information from Raildar and Google Maps, and CO_2 emission factors provided by German Federal Agency for the Environment (UBA)

Sustainable tourism: High rail usage potential for inbound tourists

CO_2 emissions per person by mode of transport (in kg)



Source: Own calculations © Prognos, 2021

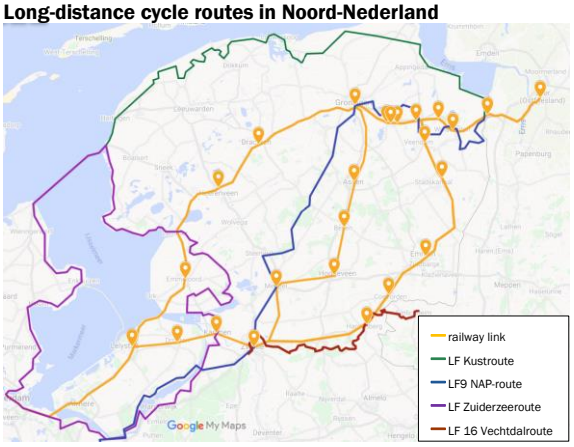
In 2019, almost two out of three overnight visitors in the Netherlands had their residence in the Netherlands or Germany. However, the share of Dutch and German overnight visitors in Noord-Nederland is much higher (93%). There are also clear differences in the absolute overnight stays of Dutch and German visitors at the spatial level (Netherlands: 75%, Noord-Nederland: 94%).[48] An improved railway connection allows for a less stressful travel experience and therefore stimulates tourism in Noord-Nederland, especially for vacationers from the Netherlands and North Germany.

Travellers to Amsterdam can profit from a better rail connection as well. With the implementation of better rail infrastructure and a resulting shorter journey time, the train will become a more attractive means of transport to reach Amsterdam from other cities. Furthermore, travelling by train on the sample routes can save about 76% of CO_2 compared to travelling by car and even 85% of CO_2 compared to travelling by air.[49]

Rail and bike in Noord-Nederland attracts green tourists

With the LF Kustroute, LF9 NAP-route, LF 16 Vechtdalroute and LF Zuiderzeeroute, three long-distance cycle routes run through the provinces of Drenthe, Groningen and Friesland. Especially the LF9 NAP-route is an attractive route for cycling tourists travelling by train due to many railroad stops along the route. There are also other smaller routes ("knooppuntroutes") within the provinces. Of these cycle routes, 12 exist in the province of Friesland, 8 in Drenthe and 6 in Groningen.[50]

Long-distance cycle routes in Noord-Nederland



Source: nederlandfietsland.nl © Prognos, 2021

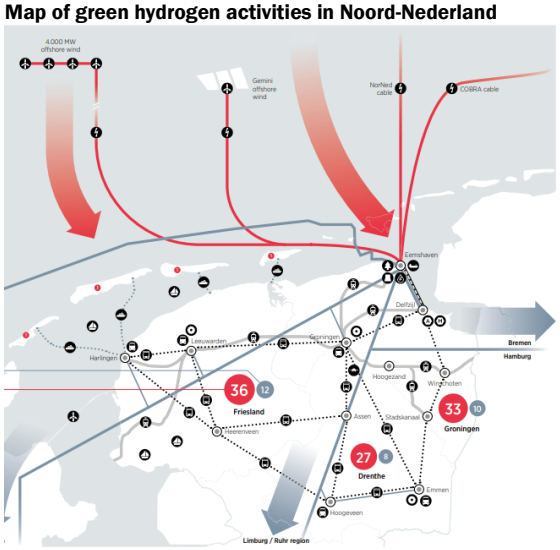
The well-developed cycling network in combination with the new railway link could stimulate green tourism in this region by combining cycling vacations with train travel, e.g., between Coevorden and Bad Bentheim. This is good for the local economy: Each new tourist spends an average of 1,150 € during their stay in the Netherlands.[51]

[48] StatLine (2021): Overnight accommodation; guests, country of residence, type, region
[49] Calculation by Prognos based on proposed travel times for new rail infrastructure, transport distance information from Raildar and Google Maps, and CO_2 emission factors provided by German Federal Agency for the Environment (UBA)
[50] https://hollandcyclingroutes.com/ (April 2021)
[51] https://www.worlddata.info/tourism.php (April 2021)

7 Innovation: Ideal conditions for new cross-border value chains

Investments into the hydrogen value chain of €430 billion until 2030 – the border region is ready

Map of green hydrogen activities in Noord-Nederland



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The *European Green Hydrogen Alliance & Clean Hydrogen Partnership* seeks to scale the hydrogen value chain across Europe – estimating investments of up to €430 billion until 2030.[52] The Netherlands and Germany have recently intensified cooperation, launching a cross-border hydrogen project to investigate the potential of green hydrogen business models (HY3) in the border region.[53] This shows a big potential for comprehensive transnational hydrogen infrastructure, especially as the region is recognised by the European Commission as Hydrogen Valley and shows ideal conditions for a cross-border rail pilot for fuel cells and hydrogen (FCH) technologies.

A recent study shows significant market potential FCH technologies in the rail environment. FCH makes economic sense when used on longer non-electrified routes of over 100 km, e.g., between Emmen and Rheine or on the Nedersaksenlijn. FCH trains operate with very short downtimes of less than 20 minutes (due to fast refuelling) and can operate more than 18 hours without refuelling. Initial experience with FCH rail were already gained in the region: Zero-emission FCH-powered regional rail services were already tested in the provinces of Groningen and Friesland.[54]

[52] https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance_en (April 2021)
[53] https://hy3.eu/ (April 2021)
[54] Shift2Rail Joint Undertaking / Fuel Cells and Hydrogen Joint Undertaking (2019): Study on the use of fuel cells and hydrogen in the railway environment

Significant potential for interregional value chains

In the 2021-27 programming period, Cohesion Policy's new instrument – the Interregional Innovation investment (I3) – will invest in interregional partnerships and reinforce globally competitive EU value chains. I3 aims to support the creation of interregional public-private innovation partnerships that shall strengthen industrial ecosystems and their key value chains, thereby also unlocking the innovation potential highlighted by Noord-Nederland's RIS3 strategy which explicitly states the high potential of cross-border cooperation with Northern Germany.[55] The Netherlands and Germany already record one of the most intensive ties in intermediate consumption, growing by 20% from 2015 to 2019, recording a direct trade volume of € 134 billion.[56] Improved transport infrastructure could allow to further build off this strength, above all in the chemical, machinery & refinery sectors.

i

Centrepiece of NextGenerationEU: The Recovery & Resilience Facility (RRF).

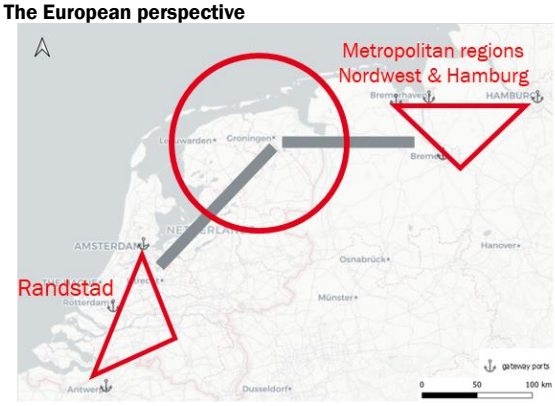
The Recovery & Resilience Facility (RRF) will make €672.5 billion in loans and grants available to support reforms and investments in the EU. A minimum of 37% will be targeted for climate investments and reforms. The Commission encourages national reform plans to include, among others, sustainable transport and asks Member States to *"consider such measures as investing in public transport and in infrastructure that supports the shift towards more sustainable and smart mobility, including seamless and efficient European multimodal networks as well as upgrading Trans-European Transport Network networks for passengers and freight."*

[55] SNN (2013): Research and Innovation Strategy for Smart Specialization (RIS3) Noord-Nederland 2014-2020
[56] Statistics Netherlands (2020): Dutch Trade in Facts and Figures

8 Conclusion: A better rail connectivity of Noord-Nederland pays into the European goals for regional policy

The common perception of Noord-Nederland as a peripherical region is only true on a national level. On a European level, the region is in the very middle between two of Europe‘s big metropolitan areas: Randstad and Hamburg. A better cross-border connection with fast and reliable railway links to Amsterdam and Hamburg helps to open the potentials of the region as a gateway between the Netherlands and Northern Germany.

The European perspective



A better railway connection between Amsterdam, Noord-Nederland and North Germany also contributes to the European Commission regional policy goals for 2021-2027:

- **Smarter Europe:** Enables innovation and economic transformation in Noord-Nederland.
- **Greener, carbon free Europe:** Railway travel is more sustainable than road or air travel.
- **Connected Europe:** An improved infrastructure allows better connection to Europe and within the Netherlands.
- **Social Europe:** Delivering better access to quality employment and education.
- **Europe closer to citizens:** More locally led development strategies - supporting the equalisation of regional inequality of opportunities.

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