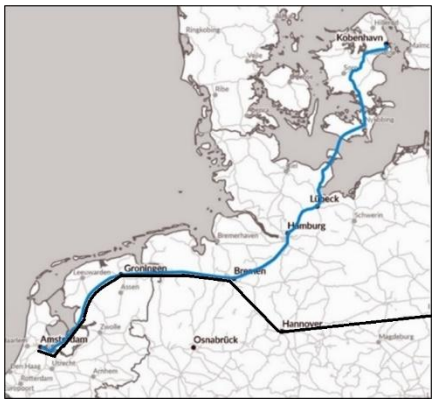
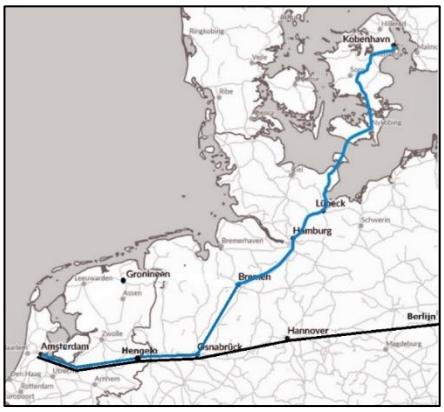
Deutschlandtakt

lely lijn

TWENTELIJN XF

extra Fast





The Lely line (Int.) versus the Twente line XF

Ir. J. de Goeijen Version 1.1 Date:1-October-2024

EUROPEAN GREEN DEAL

JDG

Contents

Chpt 1. Investigation report

1.1 Background

In the coming years, the Netherlands/Europe will face major challenges to improve European rail transport, both fast passenger transport and cargo transport. This is part of the EU green deal. In order to make the substitution of air traffic for train travel successful, the travel times of some international train connections (also in the Netherlands) must be substantially reduced. In addition to more capacity, there must also be more direct international train connections.

When it comes to improving our rail network(Netherlands), a lot of attention has recently been paid to the Lely line. Other important necessary improvements, such as an acceleration of the Berlin train, the realization of a high-speed rail connection between Rotterdam and Eindhoven to Cologne or the construction of the northern branch of the Betuwe line, no longer seem to be important.

Figure 1: NS(Dutch railway) visit Innotrans in Berlin

Roger van Boxtel: "During Innotrans[01], the entire rail sector will come together at one trade fair. This is a unique opportunity to talk to everyone who has a role in the train between Amsterdam and Berlin in a few days. Why do we want this?? Europe's major cities need to be more easily accessible by train - and we really can make this journey faster. In Berlin, we are going to talk to DB, to the city council, to the German Secretary of State for Transport and Transport.

The main research objective of this report is to compare the fast rail connections from Amsterdam to Hamburg and on to Copenhagen respectively via Groningen and Hengelo. Or we take the "International variant" of the Lely line as a starting point and compare it with a new construction of a high-speed rail connection from Apeldoorn to Hengelo, as part of the acceleration of the entire Hengelo to Amsterdam route.

1.2 Summary

1.2.1 Compared by criteria

Both trajectories have been compared on the basis of the criteria below:

	Groningen-Oldenburg	Hengelo- Apeldoorn
1. New track (cost)	110 – 265 KM (Billion 5 – 19)	56 KM (Billion 4-6)
2. Travel time	7:00	6:30
3. Connection In Use	2050	2025
4. Business case	1x/h Amsterdam-Kopenhagen	1x/h Amsterdam-Kopenhagen
	1x/h Groningen-Munster	1x/h Amsterdam-Berlijn
		1x/h Enschede-Schiphol
		1x/h Enschede- Den Haag
	Cargo 0	2x/h 40< Cargo < 86
Total	2 Trains per hour and direction	6 Trains per hour and direction
5. Task- Berlin train	-	+
6. Task-Cargo(North Branch)	-	+
7. Prorail	-	+
8. Choice Germany	-	+
9. TEN-T	Core Network (2050)	Extended Network (2030)
10. Government Architect	-	+
11. Soil type	-	+

Table 1: Compare routes Hengelo-Apeldoorn with Groningen-Oldenburg

- = The task is not fulfilled/ Worse option
+ = The task is fulfilled/ Better option

1.2.2 Conclusion

There is no business case for constructing the Lely line as an international main connection. There will be too few trains on the (partial) route Groningen to Oldenburg. The total costs are also very high. The acceleration of the Amsterdam route to (Northern) Germany via Hengelo has a much better, realistic business case, because there will be many more trains running on the (partial) route from Apeldoorn to Hengelo. The costs for the construction of the route via Hengelo are also much less than the route via Groningen.

Important tasks that the (Northern/Eastern) Netherlands has in the field of railway transport are the accelerations of the Berlin train and a transport volume of 86 cargo trains per day to Northern Germany. Both of the aforementioned tasks will not be achieved if the international variant of the Lely line is constructed. When a new railway line from Apeldoorn to Hengelo is built, both of the aforementioned tasks will be met.

The first fast direct train between Amsterdam and Copenhagen will only be able to run via Groningen after 2050. Next year, the first direct train Amsterdam-Copenhagen will run via Hengelo.

Germany chooses the route via Hengelo/Osnabrück for both the connection from Amsterdam to Berlin and from Amsterdam to Copenhagen.

ProRail does not opt for the Lely line. ProRail has opted for the solution of bottlenecks, including the cargo route to northern Germany and the maintenance of the existing infrastructure.
In the coming years, ProRail will replace the current ATB train protection system with ERTMS. This is necessary and costs a lot of money/manpower.

At the moment, investments must be made in the improvement/acceleration of the Amsterdam-Hengelo train connection and not in the far too expensive and unrealistic Groningen-Oldenburg connection.

Chpt 2. The Lely Line

2.1 Introduction

Figure 2: The Lely line

The Lely line [02] is a proposed Dutch railway line between Lelystad and Groningen with stations in Emmeloord, Heerenveen and Drachten with trains that can reach a speed of up to 200 kilometers per hour.

The cost of construction would be between 3.2 and 6.4 billion euros. The Lely line can reduce the travel time by train between Groningen and the Randstad to 1 hour and 30 minutes. Now, a train journey from Groningen to Amsterdam takes 2 hours and 5 minutes.

2.2 International

Visions of the future for the northern Netherlands with the Lely line.
Schools of thought NOVEX Lely line 2050[03] - Studio Bereikbaar - 5 March 2024.

In this study, we take into account "Denkrichting-4(Mindset-4)", The Lely line in an international top region, as a starting point.

(Mindset 4) Lelylijn in an international top region

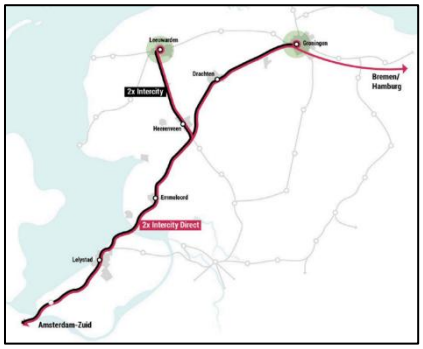


Figure 3: The international Lely line

In this school of thought, maximizing agglomeration power is central. Groningen will have a direct train connection with Amsterdam-Zuid, Bremen and Hamburg.
Groningen is undergoing a major leap in scale and quality, will have a highly dynamic, world-class station area and will facilitate highly urban encounters and innovation. The city is becoming more selective. Companies that are not dependent on international connectivity and metropolitan proximity will be given a place elsewhere in the region.

Twice an hour an intercity Direct between Amsterdam Zuid, Groningen and Bremen/Hamburg. And between Amsterdam South and Leeuwarden. In addition, an intercity train twice an hour.

Figure 4: Top international region

Chpt 3. The Twente Line

3.1 Introduction

Twente

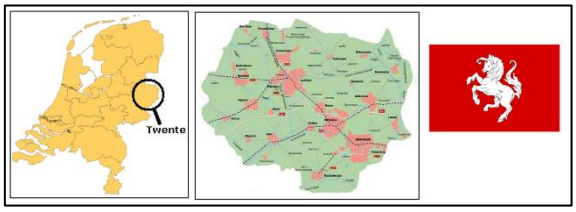


Figure 5: Twente part of the Netherlands

Twente is located in the east part of the Netherlands. Twente is a region consisting of 14 municipalities with approximately 634,000 inhabitants (year=2024). The region has a unique balance between dynamic cities and rural areas.

Twente has a strong manufacturing industry and a growing High-tech & Smart Material sector. The important cities are Almelo, Hengelo and Enschede. Enschede, with its university and many HBO programmes, is the largest city.

Hengelo is the rail hub of Twente with in a few years' time the following international train connections:

- Amsterdam- Hengelo- Hannover- Berlijn
- Amsterdam- Hengelo- Hamburg- Kopenhagen
- Hengelo- Bielefeld
- Hengelo- Dortmund
- Zwolle- Hengelo- Munster

There are also many cargo trains passing Hengelo station every day.

Ten-T North Sea- Baltic corridor

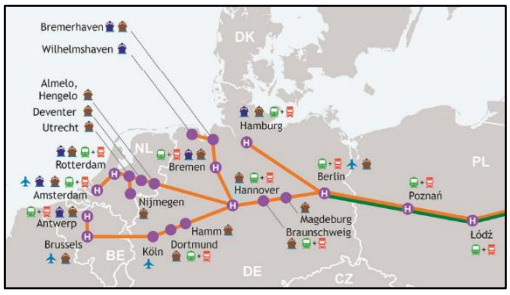


Figure 6: Tent-T North Sea- Baltic corridor

The Ten-t North Sea-Baltic corridor crosses Twente. This corridor is becoming increasingly important in Europe. Before the fall of the Berlin Wall (1989), both passenger and cargo transport in Europe were mainly North-South related. Since then, this has changed to an increase in East-West transport. The invasion of Russia in Ukraine (2022) only reinforces this.

Existing Names of Railway Lines

Figure 7: Some railway lines

Noordtak N18 – Noordtak Betuweroute
Along the N18, this line that goes via Doetinchem via the Achterhoek to Enschede.(To be constructed?)
IJssellijn
from Zwolle- Deventer- Zutphen- Arnhem.
Twentelijn
Van Deventer- Almelo- Hengelo- Oldenzaal.
Twentekanaallijn
from Zutphen via Lochem, Goor and Delden to Hengelo and Oldenzaal.

3.2 The new railway lines XF and XS

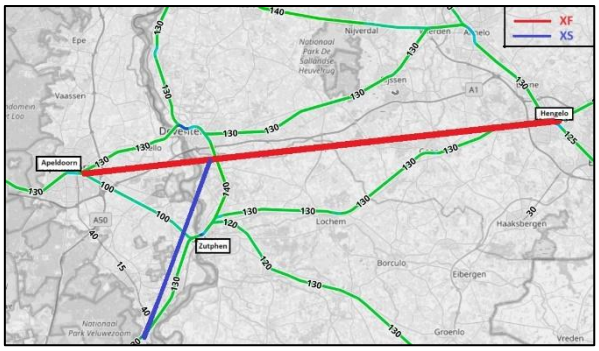


Figure 8: Twente Line XF + North branch XS

Combining fast passenger trains and cargo trains on the same track does not seem possible. In Germany we see that the combination of the aforementioned train types works well on a daily basis, for example at the "ausbaustrecke" from Hannover-Berlin and from Münster to Bremen/Hamburg.

In my opinion, this combination of train types can work on this short route of 48 km and a limited (2x per hour and direction) number of cargo trains.

Both the construction of a North Branch, via the Achterhoek, and a new fast connection between Hengelo and Apeldoorn will cost more than 6 billion euros and that amount money will not be available for this project in the medium term. Combining the two connections just mentioned gives a big cost advantage.

Figure 9: TWENTELIJN XF

Twente Line XF (eXtra Fast)= From Apeldoorn to Hengelo (new railway line). The realisation of this railway line is discussed in this report at a high level of abstraction. Exactly how this line will be realised can be determined in the next phase. Through Delden, along Delden or along the A1. The Vmax for this route will be 250 km/h.

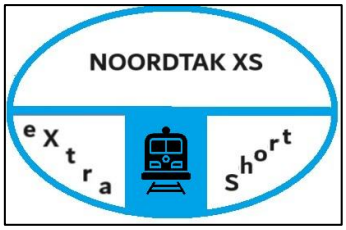


Figure 10: NORTH BRANCH

North Branch XS (eXtra Short)= From Arnhem (Betuweroute) to the Twente line XF and on to Hengelo. Exactly how this connection will work will be worked out in the next phase. The length of the Noordtak (new construction) via the Achterhoek is 80 km. The cargo trains from XS(eXtra Short) will continue their way through the Twente line XF. The Arnhem-Zutphen(XS) route is only 43 km.

This means that much less new track needs to be constructed, hence the designation XS.

BY HENGELO

Many cargo trains a day passing through Hengelo is not an ideal/ultimate solution. In time, an additional freight route could be built around Hengelo. This route could then be built along the A1 or between Hengelo and Enschede. There is already a plan for a new section of the A1 to be built in combination with the cargo line along Hengelo from “Werkgroep Twente 3.8”(Working Group Twente 3.8).

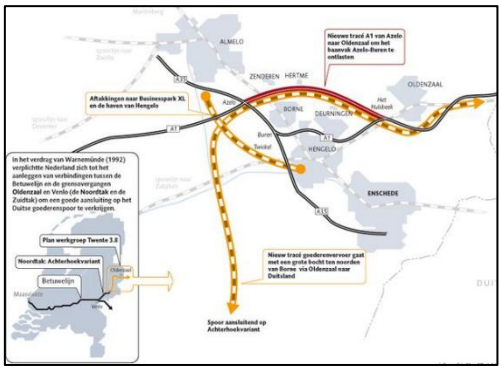


Figure 11: Cargo trains passing Hengelo

Werkgroep Twente 3.8[04]: route from Achterhoek with big bend to Germany.
HENGELO - A new cargo railway line, combined with a rerouted A1 motorway. For Twente, this means both the end of a lot of nuisance and new economic opportunities. The condition is that this northern branch of the Betuwe route will have rail connections to the port of Hengelo and the XL Businesspark Twente. That's the opinion of Twente entrepreneurs, urban planners and architects.

How the many Cargo trains in the future will be routed through or past Hengelo will not be investigated in this report.

Chpt 4. Connection Amsterdam- Hamburg -Copenhagen

4.0 Introduction

With the Lely line in 7 hours from Amsterdam to Copenhagen and the construction of a high-speed rail from Groningen to Hamburg. At the moment, a train journey from Amsterdam, via Groningen, to Copenhagen still takes 11.5 hours. Partly due to the construction of the Lely line, this should be possible to speed up by 4.5 hours in the future. This is evident from a first Quickscan[05] into a fast international connection Amsterdam – Groningen – Copenhagen, which was carried out on behalf of the Northern authorities.

There is a faster/better route that connects Amsterdam (Netherlands) with Northern Germany (Copenhagen). Of course, the current Amsterdam-Copenhagen route via Hengelo will also benefit from the improvements/accelerations that are taking place on this route between Hamburg and Copenhagen.

In this chapter we compare the fast connection from Amsterdam to Copenhagen via Groningen with the route via Hengelo. Other challenges faced by the Netherlands with regard to rail transport to (Northern) Germany will also be discussed. For the comparison between the two routes mentioned here, we take into account, among other things, the criteria "the fast Berlin train" and the "Cargo North Branch".

4.1 Construction of new track/Cost

4.1.0 Introduction

In this section, we compare both routes on:
- Number of km of new track to be built
- The total cost of improving the entire rail route

The route from Weesp to Amsterdam is not included in this comparison because this part of the route is part of both routes.

4.1.1 Groningen - Oldenburg

4.1.1.0 Introduction

We investigate 3 separate tracks as part of the connection from Amsterdam to Hamburg via Groningen:

-Groningen to Oldenburg (new track)
-Lelystad-North to Groningen(Lely line)
-Weesp to Lelystad-North

Figure 12: Amsterdam- Copenhagen via Groningen

4.1.1.1 Groningen- Oldenburg

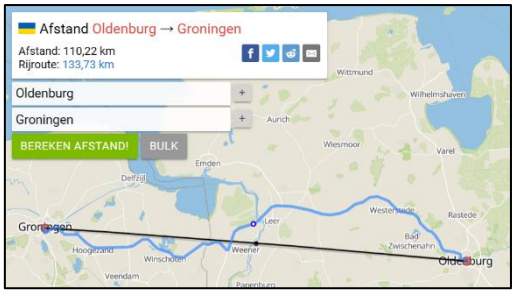


Figure 13: Connection Groningen- Oldenburg

The current Groningen-Oldenburg route is now largely single track. In order to run a direct fast train from Amsterdam to Copenhagen, a completely new track line is needed between Groningen and Oldenburg.

If we assume construction costs of *40* million euros per KM of new track, the total costs will be *at least* 110 x 40 = *5* billion euros for this route.

4.1.1.2 Lely line

The construction of the Lely line is necessary to achieve a fast connection between Amsterdam and Hamburg and beyond. Until now, the cost of the Lely line has always been estimated at 6 to 8 billion. The total length of the Lely line is 125 km.

Date: February 2024
The Ministry of Infrastructure and Water Management takes into account that the costs for the Lely line could amount to 10 billion euros[06].

4.1.1.3 Weesp to Lelystad-North (Flevolijn)

Figure 14: Station Almere Buiten

As can be seen, in the table left, there are 6 railway stations in Almere. This route should be extended to 4 tracks. This is difficult to achieve because there is no space for it. As can be seen in the adjacent photo of “Almere Buiten” station.

In addition to the 2x per hour train from Amsterdam to Hamburg, there will be an intercity train to Leeuwarden (Lely line), Groningen (Lely line) and Zwolle 2 times an hour on this route. That's already 8 times an hour an intercity train. Also at least 6 times an hour a Sprinter train for each direction.

A new railway line will have to be built between Amsterdam and Almere. The plan for the IJmeer line between Almere and Amsterdam is not profitable. This is mainly due to the high cost and complexity of the plan. According to the CPB, the IJmeer line[07] will cost at least 4.3 billion euros with a length of 30 KM.

4.1.1.4 Total trajectory

New construction Groningen-Oldenburg	= 110 km (5 billion)
New construction Lely line	= 125 km (10 billion)
New construction IJmeerlijn	= 30 km (4.3 billion)
	265 km (19.3 billion)

For a fast connection, 265 km of new track have to be built on this route at a cost of 19.3 billion euros.

4.1.2 Apeldoorn – Hengelo

4.1.2.0 Introduction

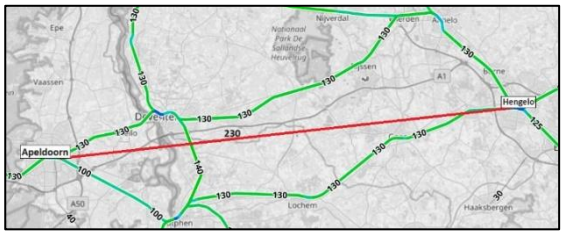
We are investigating 3 separate tracks as part of the connection from Amsterdam to Hamburg via Hengelo:
-Apeldoorn to Hengelo(New construction/ 250 km/h)
-Amersfoort to Apeldoorn (200 km/h)
-Amsterdam to Amersfoort(160 km/h)

Figure 15: From Amsterdam to Hamburg via Hengelo

Amsterdam – Apeldoorn 88,6 km
Apeldoorn-Hengelo(Nieuw) 56,5 km (See Figure 16)
Total 145,1 km
This route is 11 km shorter than the current route from Amsterdam to Hengelo via Deventer and Almelo (156.7 km)

4.1.2.1 Apeldoorn- Hengelo

In order to speed up the Hengelo-Randstad route, the Hengelo-Wierden route must be avoided because the capacity of this route is already at its maximum number of trains. Between Hengelo-Wierden there are already 10 trains per hour/direction.



By constructing a new railway line between Hengelo-Apeldoorn, with a length of 56 km, the busy Hengelo-Deventer section can be avoided and considerable time savings can be achieved.

Figure 16: The new railway line Apeldoorn-Hengelo

Current travel time Hengelo- Apeldoorn= 48 min
Future travel time Hengelo- Apeldoorn = 27 min
Time-saving 21 min

The costs for this new line of 56 km are 56x40 = 2.24 Billion Euro.

4.1.2.2 Amersfoort- Apeldoorn

At this moment there are no local trains running between Apeldoorn and Amersfoort. Upgrading the Apeldoorn-Amersfoort route to a Vmax.=200 km/h is relatively easy/cheap.

Figure 17 Route Amersfoort- Apeldoorn

Upgrade to 200 km/h is also necessary for the putting into service of the new ICNG trains.
See also Attachment 3 ICNG.

Today travel time Apeldoorn- Amersfoort=	24 min
Future travel time Apeldoorn- Amersfoort =	17 min
Time-saving	7 min

The cost of upgrading this route will be around 500 million Euros.

4.1.2.3 Amsterdam- Amersfoort

The Amsterdam-Amersfoort route is a short route (45 km). This route goes through an urban area and there are already many trains on this route. Driving with a Vmax=160 km/h should be feasible on this route.

Today travel time Amersfoort-Amsterdam=	33 min
Future travel time Amersfoort-Amsterdam=	26 min
Time-saving	7 min

The cost of upgrading this section will be 500 million.

4.1.2.4 Totaal traject

New construction Apeldoorn- Hengelo =	56 km	(2,24 miljard)
Acceleration Amersfoort- Apeldoorn =	46 km	(0,5 miljard)
Acceleration Amsterdam- Amersfoort=	45 Km	(0,5 miljard)
		(3,24 miljard)

For a faster connection, 56 km of new track would have to be built on this route and 91 km of track would have to be accelerated with a total cost of 3.24 billion euros.

4.1.3 Conclusion

The costs for the new construction of the Groningen-Oldenburg section are 5 billion. For a fully-fledged high-speed rail connection from Amsterdam to Oldenburg, the costs will amount to 19.3 billion euros.

The costs for the new construction of the Apeldoorn-Hengelo route are 2.24 billion. For a fully-fledged high-speed rail connection from Amsterdam to Hengelo, the costs will amount to 3.24 billion euros.

A high-speed rail connection between Amsterdam and Hamburg via Groningen is going to be very expensive. An HSL connection via Hengelo is much cheaper and therefore a more realistic/feasible solution.

See also Attchment 9 - Research into Lely line alternatives
This study confirms my conclusion that the international version of the Lely line will be very expensive because the Almere-Wessp and Groningen-Oldenburg routes will also have to be upgraded.

A new cost estimate for the construction of the Lely line was also presented with a price tag of 13.8 billion.

4.2 Travel time

4.2.0 Introduction

In order to make the substitution from Air to high-speed rail successful, the travel time, which is now 11 hours for the Amsterdam-Copenhagen connection, must be considerably reduced. It is also important that direct trains will run. Travelers prefer this.

Figure 18 The Fehmarn Belt Connection

The Fehmarn Belt Connection[08] (Deens: Femern Bælt-forbindelsen, Duits: Fehmarnbelt-Querung) is a planned tunnel connection between Germany and Denmark, which will connect the German island of Fehmarn and the Danish island of Lolland across the 18-kilometre-wide Fehmarn Belt from 2029. It is a tunnel for both car and train traffic.

The connection is intended to replace the Rødby-Puttgarden ferry service and be part of the so-called Vogelfluglinie, the shortest rail link in distance between Hamburg and Copenhagen/Malmö.

The Fehmarn Belt link should significantly reduce travel time between Hamburg and Copenhagen. The intention is that from 2029 the trains will go via the new line, reducing the travel time between the two cities to approximately two hours. Now the travel time is 4 hours and 40 minutes.

The current connection From Amsterdam to Copenhagen via Hengelo/Osnabrück will also benefit from this acceleration.

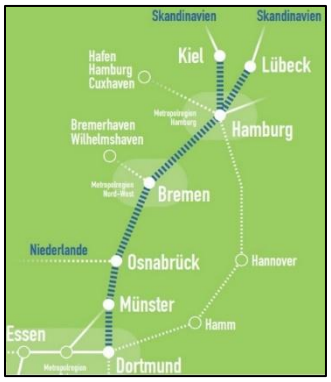
4.2.1 Groningen - Oldenburg

With the Lely line from Amsterdam to Copenhagen in seven hours
At the moment, a train journey from Amsterdam, via Groningen, to Copenhagen still takes 11.5 hours. Partly due to the construction of the Lely line, this should be possible to speed up by 4.5 hours in the future. This is evident from a first Quickscan[09] for a fast international connection Amsterdam – Groningen – Copenhagen, which was carried out on behalf of the Northern authorities. Further reduction of travel time on the Amsterdam-Groningen-Hamburg-Copenhagen connection could be achieved by making rail infrastructure between Groningen and Oldenburg suitable for higher speeds of 160-200 km/h (after completion of construction steps 1 and 2 of the Wunderline, the speed will be 120 km/h). This is expected to reduce the travel time between Groningen and Bremen to approximately 1 hour and 23 minutes, making the travel time Amsterdam-Groningen-Hamburg-Copenhagen approximately 7 hours.

4.2.2 Apeldoorn – Hengelo

After the implementation of acceleration measures, the new construction of Apeldoorn-Hengelo and an upgrade to 200 km/h for the Amsterdam-Amersfoort section, the travel time will be Amsterdam-Hengelo:
0:26 (Amsterdam-Amersfoort)
0:02 (Stop Amersfoort)
0:44(Amersfoort-Hengelo)
1:12 Total (Today 1:50 min. Difference 38 minutes)

Amsterdam-Copenhagen
1:12 Amsterdam-Hengelo
0:02 Stop Hengelo
0:56 Hengelo-Osnabrück
0:02 Stop Osnabrück
4:43 Osnabrück-Copenhagen
6:45 uur/min.
(Travel time Osnabrück-Copenhagen as Eurocity 34. See Attachment 4 EC 34 to Copenhagen)



Nord-West-Schienenmagistrale[10]: the upgrading of (partial) routes to 200/230 km/h and the construction of additional passing tracks (June 2022).
Konkrete Maßnahmen für den Ausbau der Nord-West-Schienenmagistrale von Dortmund über Münster, Osnabrück, Bremen und Hamburg bis nach Kiel und Lübeck haben sechs Industrie- und Handelskammern mit Staatssekretärin Susanne Henckel aus dem Bundesministerium für Digitales und Verkehr im Dezember 2022 in Münster besprochen. „Wir brauchen dringend mehr Tempo und Qualität auf dieser wichtigen Schienenstrecke“

Figure 19: North-West Schienenmagistrale

With the realization of the "Nord-West-Schienenmagistrale" project, the travel time from Amsterdam-Copenhagen via Hengelo can be further reduced to 6:30 .

ICE Sprinter

Figure 1: Logo ICE Sprinter

In addition to the higher speed and thus shorter travel time, the ICE Sprinter of the DB[11] is characterised by a particularly relaxed travel climate thanks to the few stops.

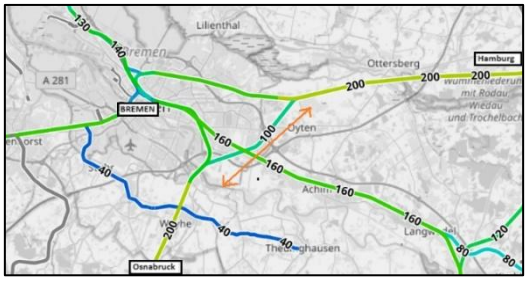


Figure 2: Shorter route without stop Bremen

The ICE sprinters are already in operation from Cologne to Hamburg and do not stop in Bremen. By not stopping in Bremen, the travel time Amsterdam-Copenhagen can be further shortened by 7 minutes.

The travel time will be 6:23 min.

4.2.3 Conclusion

The travel time between Amsterdam and Copenhagen can be significantly reduced, in addition to the commissioning of the Fehmarnbelt connection, by investing in the Hamburg to Amsterdam route.

The project group "Lelylijn" indicates that, with substantial investments, the travel time from Amsterdam to Copenhagen via Groningen can be shortened to 7 hours. With less investment, the travel time from Amsterdam to Copenhagen via Hengelo can be reduced to 6:30 hours. This shorter travel time is due to the (partial) route Osnabrück-Hamburg-Lübeck, which is part of the DB hochleistungsnetz[12] suitable for high speeds.

4.3 Train connection in operation

4.3.0 Inleiding

One of the aims of the improvement of the rail infrastructure is to create a **direct** and **fast** train connection from Amsterdam to Copenhagen.

Figure 22: The Holland-Scandinavië Express

A train enters Amersfoort, the D 231 (Holland-Scandinavia Express) on 21 May 1980. The Holland-Scandinavia Express was the first international train to depart from Hoek van Holland after World War II. It starts its service in 1947 and connected Hook of Holland with Copenhagen. Passengers arriving by night ferry from Harwich were able to board this train, which then passed through Amersfoort, Oldenzaal, Osnabrück, Bremen and Hamburg. In 1988 the Holland-Scandinavia Express has stopped running.

4.3.1 Groningen – Oldenburg

Figure 23: First direct train via Groningen in 2050

Further reductions in travel time on the Amsterdam-Groningen-Hamburg-Copenhagen route could be achieved by making rail infrastructure between Groningen and Oldenburg suitable for higher speeds of 160-200 km/h.

The report from the working group "Lelylijn" indicates that the first fast direct train from Amsterdam to Copenhagen via Groningen will operate in 2050.

4.3.2 Apeldoorn – Hengelo

Direct train Copenhagen at the end of 2025
The Danish Railways (DSB)[13] are committed to a direct train from Amsterdam to Copenhagen. The direct train should start operate according to the 2026 timetable. That timetable will take effect in mid-December 2025. A spokesperson for the Danish railways emphasizes to SpoorPro that there is no final decision yet.

GoVolta: trains to Copenhagen, Basel and Berlin in 2025

	Treinnummer Frequentie	- Dagelijks
Amsterdam Centraal	V	08:00
Amersfoort Centraal	A	08:35
Amersfoort Centraal	V	08:37
Deventer	A	09:10
Deventer	V	09:12
Hengelo	A	09:40
Hengelo	V	09:42
Bad Bentheim	A	10:10
Bad Bentheim	V	10:15
Osnabrück Hbf	A	11:00
Osnabrück Hbf	V	11:05
Bremen Hbf	A	12:30
Bremen Hbf	V	12:35

GoVolta Dienstregeling
Amsterdam Centraal - København H v.

Hamburg-Harburg	A	13:50
Hamburg-Harburg	V	13:55
Flensburg	A	15:20
Flensburg	V	15:25
Padborg	A	16:00
Padborg	V	16:05
Kolding	A	16:45
Kolding	V	16:50
Odense	A	17:30
Odense	V	17:35
Roskilde	A	18:20
Roskilde	V	18:25
København H	A	19:00

Figure 24: Train timetable Amsterdam- Copenhagen

The new train provider GoVolta[14] plans to launch several new train services next year. The ambition is that the first budget train will operate to Berlin in April 2025. The second train service should start around June, with Copenhagen as its final destination.

4.3.3 Conclusion

In 2025, the first direct train from Amsterdam via Hengelo/Osnabrück will go to Copenhagen. Any improvement/acceleration on this route will immediately lead to shorter travel times on this route.

The first fast direct train from Amsterdam to Copenhagen via Groningen will not operate until 2050.

4.4 Business case

4.4.0 Introduction

What is a Business Case??

A business case[15] is an important tool in project management that sets out the business justification for initiating a project. It provides a detailed underpinning of the economic logic behind the project by thoroughly analyzing the expected costs and benefits.

Figure 25: BUSINES SCASE

Important Aspects of a Business Case

Cost-Benefit Analysis: The business case provides a comprehensive analysis of all the costs associated with the project and estimates the benefits that the project will bring. The benefits can be both financial (e.g. increase in turnover or cost savings) and non-financial, such as in this case the number of trains that will run on the route.

Alternative Options: The business case explores alternative scenarios to the main project, including the option not to start the project, to give stakeholders a complete picture of all possible outcomes.

In this section, we compare the results of the 2 rail routes from our research. How many trains will operate (per hour) on the respective routes.

4.4.1 Groningen – Oldenburg

International position of the Lely line (Donders Report)

What does the Lely line[16] mean for the (European) international passenger? And what impact does the option of the Lely line have for the passenger on the cross-border rail connections? One of the important arguments surrounding the Lely line, especially with its inclusion in the extensive TEN-T network, is the international importance of the Lely line in the connectivity between Randstad, northern Germany and further to Scandinavia.

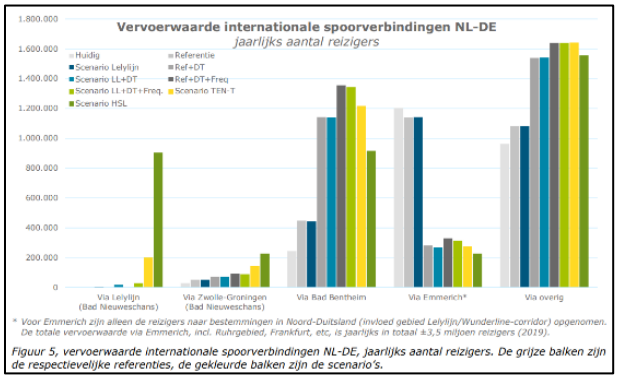


Figure 26: Transport value int. Rail connection

The analysis, visualized in the adjacent Figure, makes it clear that the number of international passengers via the Lely line is minimal. In addition, the impact of the Lely line on the other international connections, the possible cannibalization effect, is also minimal.

Citannibalization

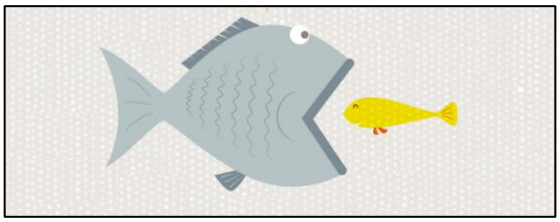


Figure 27: cannibalization

Only with significant speed improvements on the Wunderline (160 km/h in the TEN-T scenario or 200 km/h in the HSL scenario), respectively, 200,000 or 900,000 passengers would use the Lely line annually and there would be cannibalization, especially on the Bad Bentheim corridor and to a lesser extent on the Emmerich corridor.

Cannibalization = competing with both trajectories.

Fast train connection in >2050 over this new route (Groningen-Oldenburg)
- 1x/h Groningen Münster
- 1x/h Hamburg-Amsterdam (every 2 hours on/from to Copenhagen)

I opt for a fast train Amsterdam-Hamburg 1x per hour.
I also opt for a fast train Amsterdam-Berlin (Via Hengelo, see below) 1x per hour.

4.4.2 Apeldoorn – Hengelo

Berlin train (Hengelo)
Train travel is expected to increase in the future: based on previous research, it is expected that the number of cross-border passengers in the Amsterdam-Berlin IC will rise to approximately 1.6 million by 2030. Grows.

Significant increase in passengers with investment in current Berlin train. Thanks to investments in the current track and extra trains from Amsterdam to Berlin, via Hengelo, between 35,000 and 110,000 extra international passengers will use the current connection by 2040.

Figure 28: Different types of trains past Hengelo

TL: NS Intercity
TR: KEOLIS Enschede- Zwolle
BL: Intercity Berlin
BR: Cargo train

Hengelo is already a busy rail hub. I will only increase that in the coming decades.

Fast Train Connection in >2030 over this new route (Hengelo-Apeldoorn) (One direction)
-1x/h Enschede-Schiphol
- 1x/h Enschede-Den Haag
- 1x/h Berlin-Amsterdam
- 1x/h Hamburg-Amsterdam (every 2 hours on/from to Copenhagen)
- 2x/h Cargo train (Hengelo- Zutphen – Betuweroute)
- *1x/h (Optional Enschede-Arnhem)*

4.4.3 Conclusion

The new track line Apeldoorn-Hengelo scores with 6 trains per hour and direction much better than the new track route Groningen-Oldenburg with only 2 trains per hour and direction.

4.5 Task faster Berlin train

4.5.0 Introduction

Figure 29: The Berlin train

Intercity Berlin is the absolute leader when it comes to passenger growth. For example, the train is very popular with travelers with Interrail – the multi-day international travel pass. Crowds in the summer months therefore bring the necessary challenges.

Luiten: "During these months, we advise passengers who book with NS International to always reserve a seat. And especially for domestic travelers who also use the Intercity, we will operate an extra train between Amsterdam and Deventer from June to August. Due to this additional train, there are more seats for domestic travelers and extra seats are created for travelers across the border."

Consultation between Germany and the Netherlands on the acceleration of the Berlin train

Figure 30: Consultations between the Netherlands and Germany

The Dutch State Secretary Stientje van Veldhoven[17] and the German State Secretary for Rail Transport, Parliamentary State Secretary Enak Ferlemann, discussed the improvement of the important Amsterdam-Berlin rail link. The common objective is to make rail, a particularly environmentally friendly mode of transport, more attractive on this route in order to increase its market share.

Figure 31: Many more passengers for the Berlin train

Boom beim internationalen Fernverkehr: 21 Prozent mehr Fahrgäste als 2019
Nachfrage weit über Vor-Corona-Niveau • Ausbau von Fernverkehrsflotte und internationalen Verbindungen schreitet voran

Die wichtigsten Neuerungen im Fahrplan 2024:
Verbindung Berlin–Amsterdam um eine halbe Stunde beschleunigt.

Hannover – Expansion

Figure 32: Hbf Hannover

Hannover Hauptbahnhof is a railway station in Hanover, Lower Saxony, Germany. The station has around 250,000 passengers per day, making Hannover Hbf the sixth busiest station in Germany.

With 750 trains a day, this station is already a bottleneck in the rail network that needs to be improved.

The station has six island platforms with twelve platform tracks and two transit tracks.

Deutsche Bahn (DB) is planning a comprehensive expansion[18] of Hanover Central Station. It is the mobility hub in Lower Saxony and its importance is growing significantly again, especially with regard to the Deutschlandtakt. An additional platform, two new tracks and a digital signal box are to massively improve the operational quality and punctuality of the trains. In addition, the tracks in front of the station will be re-laid, with the aim of allowing more trains to reach and pass through the station in the future. According to current estimates, the modernization of the platform of tracks 1 and 2, which is already underway, and the planned expansion in the future will cost around 2 billion euros.

On the Amsterdam-Berlin connection, Hannover station is an important rail hub that needs to be served. To operate the connection Amsterdam-Berlin via Groningen-Hamburg to Berlin is not an option because then the Hannover rail junction will not be served.

Deployment of new ICE-L between Amsterdam and Berlin postponed until mid-2025

The commissioning of the new ICE-L, which is scheduled to run between Amsterdam and Berlin, among other places, will not start running until mid-2025. Initially, it was hoped that this would happen in the fall of 2024. Talgo's train has been delayed in the testing and admission process, a Deutsche Bahn spokesperson told EurailPress.

Figure 33: The test of the ICE-L

The first deployment of the ICE-L will take place between Amsterdam and Berlin from mid-2025.

The ICE L is known for its low floor with which there is a ground-level entrance from the platform. Deutsche Bahn currently has ordered 79 ICE L. The ICE L is characterized by its shorter carriages and new interior design.

Germany has ordered new and faster equipment for the important Amsterdam-Berlin connection.

4.5.1 Groningen – Oldenburg

The Amsterdam-Hannover route via Groningen is 481 km.
(Image: Google Maps)

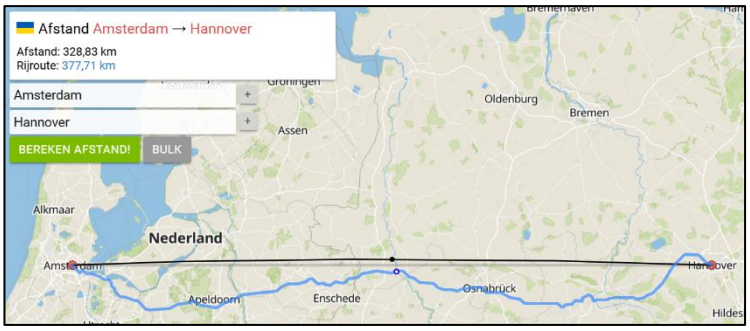
Figure 34: Route Amsterdam-Hannover via Groningen

4.5.2 Apeldoorn - Hengelo

The Amsterdam-Hannover route via Groningen is 376 km.
(Image: Google Maps)

Figure 35: Traject Amsterdam- Hannover via Hengelo

4.5.3 Conclusion



The as the crow flies distance Amsterdam to Hanover is 328 km.

Figure 36: Distance Amsterdam- Hanover (as the crow flies)

Compare with As the crow flies distance
Groningen:= 481-328=153 km
Percentage 153/328 x 100 %= 47% (+)

Hengelo:= 376-328=48 km
Percentage 48/328 x 100%= 14% (+)

Compare route Groningen with Hengelo
481-376= 105 km
Percentage 105/376 x 100%= 28% (+)

The route for the fast Berlin train via Groningen to Hanover is 105 km longer. Either this is a detour of 28%. The international version of the Lely line is not suitable for speeding up the Berlin train.

4.6 Task Cargo(North branch)

4.6.0 Introduction

Figuur 5.2.1.1: Treinaantallen op de grens Nederland – Duitsland in 2019[16], 2030, 2040 en 2050

Aantal goederentreinen per dag (som beide richtingen)	Realisatie 2019	Lage scenario			Hoge scenario		
		2030	2040	2050	2030	2040	2050
Oldenzaal – Bentheim	23	51	55	62	63	73	86
Zevenaar – Emmerich	100	123	124	129	126	141	160
Venlo – Kaldenkirchen	52	62	66	70	71	77	86
NL – DE	**165**	**236**	**245**	**261**	**260**	**291**	**332**

Figure 37: Forecast number of freight trains from Netherlands to Germany

Rail freight transport in the Netherlands is expected to grow by 42.1 million tonnes in 2019 to 68.6 million tonnes in 2040 (high scenario):
– The largest flows are between the ports and the hinterland towards Germany. Rotterdam is the largest generator of rail freight transport, followed by transit traffic (Belgium ↔ Germany via the Netherlands) and transport to and from the other ports and industrial areas.
– More than half of the transport will be transported in containers. This is the segment with the largest growth. On the other hand, the transport of coal is decreasing. The confrontation of the required capacity for the movement of goods with the supply shows that:
– In the high scenarios, a bottleneck arises on the route to/from Oldenzaal border;
– The freight paths on other routes to the border have a high utilisation rate, which means that further growth will almost certainly lead to new bottlenecks.

CARGO TRAINS to Northern and Eastern Europe

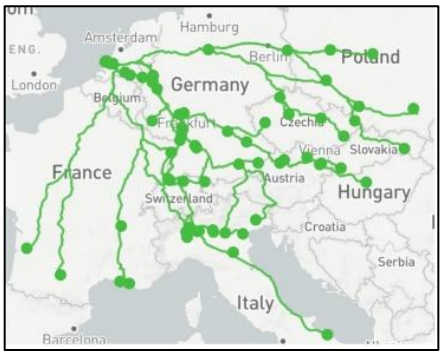


Figure 38: Rail container Rotterdam

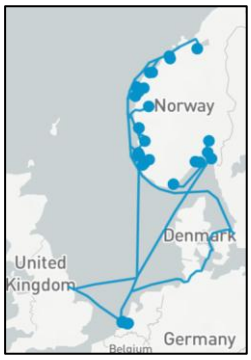


Figure 39: Shortsea Rotterdam-Norway

Container trains Rotterdam

Every week, there are many international container train(400) services to and from the port of Rotterdam[19]. In order to achieve the European sustainability goals, we want to transport 50% more goods by rail in the Netherlands within 10 years. This means a growth from 40 to 61 million tonnes within 10 years. Figure 38 shows the overview of all container services by rail from Rotterdam. What is striking is that there are no container trains to Northern Europe from Rotterdam. This will partly have to do with the good shortsea connections that Rotterdam has with the Scandinavian countries. Figure 39 shows which Norwegian ports are served from Rotterdam by shortsea connection. The population of Norway with 5 million inhabitants and Denmark with 6 million inhabitants will certainly not contribute to a busy freight rail connection with both countries from the Netherlands.

Shift to Eastern Europe
More and more production is shifting to Eastern European countries (Railcargo – magazine 2022) and with it the location of European Distribution Centres (EDC). Do the Dutch want to remain their ports competitive in the future, good rail connections to and from **Central-Eastern Europe are essential**. In any case, the distances to and from these countries are very suitable for rail freight transport. (See also Attachment 7, Railcargo magazine)

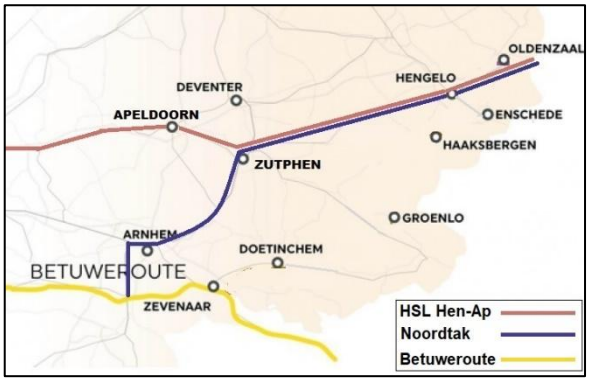
4.6.1 Groningen – Oldenburg

The last freight transport across the border at Nieuweschans was in 1985. For a number of years there has been a UC connection between Onnen and Leer. In the beginning this train ran with 6400, later the German 232 was used. The connection has already been discontinued, the freight wagons go back to Germany via the Kijfhoek. The number of wagons of the train just mentioned usually consists of less than 10 wagons.

Figure 40: Cargo train on the Westerwoldse Aa

For military transports by train, the border crossing Groningen/Nieuwschans is not designated.

4.6.2 Apeldoorn – Hengelo



By having fast passenger transport and freight transport partly run on the same track, we will achieve synergy effects. The solution is becoming affordable and realistic and has now become a real option. On the new Hengelo-Apeldoorn route, one or more freight trains per hour/direction will also run on the Hengelo-Zutphen section, which will then be diverted from Zutphen via Arnhem to the Betuwe route.

Figure 41: Passenger/Cargo route Hengelo-Zutphen

Clearing the road for allies
The Ministry of Defence will tackle military mobility[20] in the Netherlands. In other words, ensuring that our own units and foreign troops can move through our country more quickly and without bureaucratic red tape. Because at the moment, this is a needlessly complicated and time-consuming process.

When troops are moved across Europe on a large scale, all armed forces always run into the same problems. On the one hand, complex and time-consuming permit applications. On the other hand, infrastructure that does not meet the requirements. Think of railway tunnels that are too narrow and too low. Bridges that cannot support the weight of a semi-trailer with tanks. Signals along tracks that get in the way due to the width of military vehicles or a huge amount of paperwork for the transport of dangerous goods or ammunition to cross borders in Europe. This greatly slows down the movement of troops. Even in the Netherlands. Especially at a time of crisis in Europe, that is not the intention.

A Problem Example.
A ship arrives in the port of Rotterdam. The ammunition on board had to be transported by rail, through the Netherlands, via Germany, to Poland. Different permits are required for such a transport. A complex and time-consuming operation.

In the example above, Hengelo would be the border crossing where this train with ammunition travels to Germany and then further after Poland. Hengelo is also an important border crossing for military transport by rail.

Figure 43: Military train at Hengelo station

The National Plan for Military Mobility includes three routes on which free, rapid and large-scale troop movements can take place from now on. These multimodal corridors cover road, rail and inland waterways. Where and how these routes run through the Netherlands remains a secret for security reasons. These routes for military train transport could be: Hengelo, Betuwe route and Border crossing Venlo.

4.6.3 Conclusion

The Hengelo border crossing has a freight list of 86 trains per day for the year 2050. No freight trains are expected for the Bad Nieuweschans border crossing in 2050. We also see that the transport of goods from the Netherlands is increasingly focused on Eastern Europe. Hanover, Poland and the Czech Republic are the destinations to be served.

The Lely line cannot contribute to this cross-border freight transport because there is very little freight rail transport from the Netherlands to Hamburg and Scandinavia.

4.7 ProRail

4.7.0 Introduction

Figure 44: Logo Prorail

About us. ProRail[21] is the Dutch railway operator. This means that we are responsible for the maintenance, renewal, expansion and safety of the Dutch railway network.

As an independent party, we divide the available space on 7,000 kilometres of track, regulate all train traffic (160 million km per year) and build and manage stations. We do this with with an eye for the future.

What we do
ProRail is responsible for the railway network in the Netherlands. We work day and night to ensure that passengers and cargo reach their destination safely and on time. We do this together with carriers. We also work together with a lot of rail contractors.

4.7.1 Groningen – Oldenburg

Region - The arrival of the Lely line is not a priority for ProRail for the time being. The rail manager would rather see billions of euros invested in other projects that are more necessary to ensure that the trains can continue to run in the future.

That's what ProRail CEO John Voppen says in the Leeuwarder Courant. 'The Lely line is a political choice. If you ask me what is best for the Netherlands in the medium term, I would say 'not now'. Other investments that are more important now take precedence.' The article can be read here[22].

4.7.2 Apeldoorn – Hengelo

ProRail vindt nieuw goederenspoor door Achterhoek belangrijker dan Lelylijn door Noordoostpolder

EMMELOORD/EIBERGEN - Liever een nieuw goederenspoor door de Achterhoek dan een reizigersspoor door Flevoland. De miljarden euro's voor het spoor kunnen het beste besteed worden aan échte knelpunten, vindt beheerder ProRail.

Figure 45: North branch important

The list of bottlenecks does not include the Lely line, but the northern branch of the Betuwe line[23]. A separate track for freight transport will provide a more efficient connection to Germany and provide more space for passenger trains on the existing domestic track.

" The accessibility of the Netherlands is important, I say 'finish that line!'" (Betuwe Line) according to Voppen.

4.7.3 Conclusion

ProRail does not opt for the Lely line. ProRail has opted for the solution of bottlenecks, including the freight route to northern Germany and the maintenance of the existing infrastructure.
In the coming years, ProRail will replace the current ATB train protection system with ERTMS. This is necessary and costs a lot of money/manpower.

4.8 Choice Germany

4.8.0 Introduction

High-performance rail network

Figure 46: Hochleistungsnetz

The federal government and DB are developing a high-performance network for significantly more reliability and growth on the railway tracks.
80 percent of the quality in the railway system is decided on the rail network • High-performance network becomes the backbone of passenger and freight transport • The federal government and Deutsche Bahn invite the rail sector and industry to jointly shape the future.

In the figure above, we see the plans for the year 2030 of the German government and the DB. As part of the Amsterdam-Copenhagen route, the Lübeck-Osnabrück section is part of the Hochleistungsnetz. The distance between Hengelo-Osnabrück is only 92 km.

Choice Germany faster train to Bremen

Figure 47: Interview Enak Ferlemann

Germans find fast Lely line Groningen-Bremen[24]["not interesting"; all fast trains via Osnabrück and Hengelo.
The German Secretary of State for Mobility, Enak Ferlemann, believes that Groningen-Bremen-Oldenburg is not suitable as a fast international rail connection from the Netherlands to northern Germany and Scandinavia.

An interview of Omroep Fryslân in the FryslânDOK program Spoarsykje. According to Ferlemann, the fastest rail connection between the Netherlands and Hamburg or Bremen is via Hengelo and Osnabrück. According to him, it is best for travellers from Oldenburg to travel to the Netherlands via Bremen and Osnabrück.

"When it comes to rail traffic, it's not just about the shortest route, it's also about how fast a train can travel a certain distance," says Ferlemann. "In the future, all trains from Scandinavia will run via Hanover or Osnabrück. A fast train from Scandinavia via Hamburg and Groningen is not an obvious choice."

Concept TEE 2.0

Figure 48: TEE 2.0 Logo

The German proposal for the TEE2.0[25] concept consists of the following elements:

- A TEE 2.0 connects at least 3 countries with each other or with 2 countries the trajectory is min. 600 km.
- A TEE 2.0 train travels at least 160 km/h on a large part of the route or runs at an average speed of at least 100 km/h over the entire route.
- A TEE 2.0 train offers extra comfort such as free internet, good catering compared to the standard trains.

Border crossing Hengelo:
TEE 49/50 Amsterdam – Hamburg - Copenhagen
TEE 53/54 Amsterdam – Hannover – Berlin – Warsaw

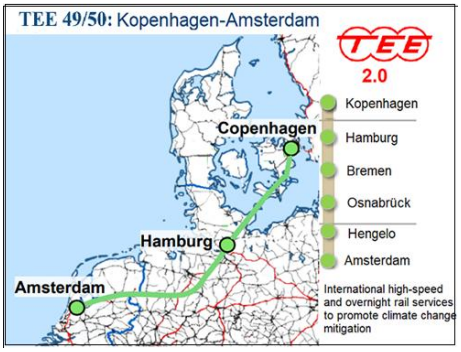


Figure 49: TEE Kopenhagen- Amsterdam

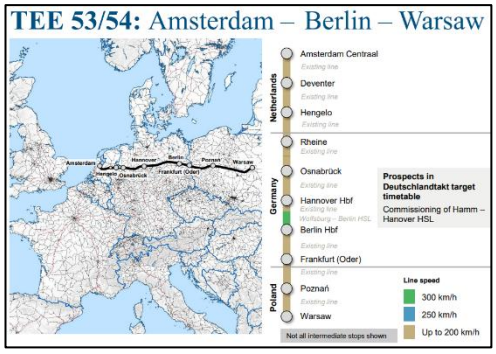


Figure 50: TEE Amsterdam- Warschau

4.8.1 Groningen – Oldenburg

Wunderlinie
Comfortable and fast train travel between Groningen and Bremen
The Province of Groningen, Lower Saxony and Bremen are working closely with Deutsche Bahn (DB) and ProRail on the realisation of the Wunderline[26], the cross-border train connection between Groningen and Bremen. With this realization, the speed on the route will be increased, the travel time for passengers will be shortened and the door-to-door journey will be more comfortable. Improving the quality of the rail connection between Groningen and Bremen ensures a comfortable, fast and international train connection with shorter travel times. This will make it easier for students and employees to study and work in the neighbouring country. For tourists, the train is becoming more attractive to cross the border for a day trip. With the Wunderlinie, Germany is opting for a high-quality connection from the Groningen to Oldenburg route. Germany has no plans to turn this route into a high-speed rail connection.

4.8.2 Apeldoorn – Hengelo

Deutschlandtakt

Figure 51: Timetable Berlin train

Within the "Deutschlandtakt" project, Germany has chosen to run the fast Berlin train via the Hengelo border crossing. As can be seen in the adjacent figure.

4.8.3 Conclusion

For the fast international passenger transport between (Northern) Germany and the Netherlands, Germany has chosen to run this traffic via the route Hengelo-Osnabrück.

25 November 2024:
Committee meeting (MIRT) Ministry of Infrastructure and Water Management.
State Secretary Jansen indicates that he had consultations last month with his German colleague about extending the Lely line to Hamburg. This connection is not a priority for Germany and there is no money available for this route.

4.9 TEN-T

4.9.0 Introduction

TEN-T

The free movement of cargo and people in Europe leads to many transport movements throughout the Union. In order to make this cross-border traffic possible, it is necessary for transport links in Europe to meet certain requirements and be harmonised.

Figure 52: Logo EC

This is pursued by the Trans-European Transport Networks, i.e. TEN-T[27]. The basis for this is laid down in Articles 170-172 of the Treaty on the Functioning of the European Union (TFEU) and is elaborated in Regulation 1315/2013. Trans-European Networks (TENs) are interconnected and interconnected national networks, such as motorways, railways or energy networks. Local and regional authorities are affected by TEN-T when they are involved in infrastructure projects covered by TEN-T, such as rail transport.

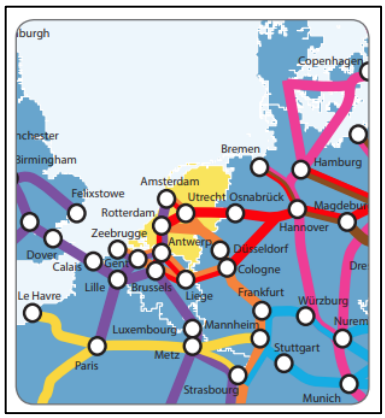


Figure 53: TEN-T in Nederland

The core network is divided into nine core network corridors across the EU, which are the main transport routes.

Three of these corridors pass through the Netherlands:

1. the Rhine-Alpine corridor
2. the North Sea-Baltic corridor
3. the North Sea-Mediterranean corridor

The three levels

The network consists of three levels

-The Extended Network

The comprehensive network covers all existing and planned transport infrastructure of the trans-European transport network. This network must be completed by 2050 and meet all the requirements.

-The Extended Core Network

The Extended Core network is an intermediate form that will be introduced with an upcoming amendment to Regulation 1315/2013. This level must be completed by 2040.

-The Core Network

The core network is part of the overarching comprehensive network that includes the strategically key nodes and connections of the TEN-T in terms of transport needs. This network should be completed by 2030. The infrastructure forming part of the core network is subject to stricter requirements than the other networks, as is clear from Article 39 of the relevant Regulation.

Type of network	Completed	Route
Extended Network	2050 Be complete	Lely line
Extended Core Network	2040 Be complete	
Core Network	2030 Be complete	Berlin train (Amsterdam-Berlin)

Table 2: TEN-T Corridors in the (Northern) Netherlands

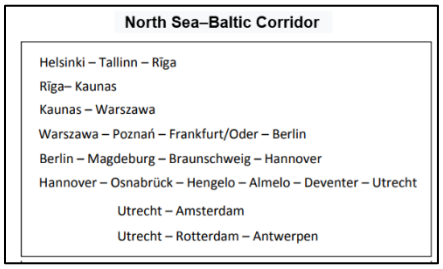
4.9.1 Groningen – Oldenburg

The Lely line is part of the " Extended Network ". The Groningen-Oldenburg section has not yet been included in the Ten-T regulations. This Network to be completed by 2050.

4.9.2 Apeldoorn – Hengelo

The TEN-T network is an EU-wide network of railways, inland waterways, short shipping lanes and roads. The corridor that runs through Twente is important for both rail-freight transport and international passenger rail transport.

HSL TRAINS TO BERLIN/COPENHAGEN



Figurer 54: Route Nort Sea - Baltic corridor

Two of the most important passenger train connections from the Netherlands to northern Germany go through Twente and are part of the TEN-T corridor North Sea – Baltic. These are the fast train connections from Amsterdam to resp. Berlin and Copenhagen.

CARGO

Borderless collaboration to strengthen the North Sea Baltic corridor

Figure 55: Logistics Overijssel

This autumn, the Province of Overijssel[28], Cleantech Region, Twente Region and Zwolle Region started an exploration of strengthening cooperation on the North Sea Baltic corridor on the basis of a joint vision, programs and (structure-strengthening) projects. The North Sea Baltic corridor is one of the 9 TEN-T corridors designated by the European Commission to be further developed with European funding. To achieve this ambition, research is currently being carried out into various (broad) cooperation structures that can promote a shared vision along the corridor. The aim is to build an international network that is active on various themes such as infrastructure, logistics chains, sustainability and circularity, digitization and innovation. In recent months, a large number of interviews have been held with relevant parties in both the Netherlands and Germany to gauge the enthusiasm for such a collaboration. The first reactions are very positive; The added value of more intensive cooperation along the corridor is endorsed by many parties. In addition to the interviews, the first results of the research were presented to the entire network at the North Sea Baltic Corridor Forum in November. Here, too, there was a positive response, especially European Coordinator of the North Sea Baltic Corridor Catherine Trautmann embraces this initiative.

4.9.3 Conclusion

The Ten-T corridor from Amsterdam to Hengelo is part of the core network and must be completed by 2030. This corridor is important for both freight and passenger traffic. For Europe, this connection is much more important than the Groningen/Oldenburg corridor, which is not part of the core network.

NEWS ARTICLE
13 June 2024, Directorate-General for Mobility and Transport
A sustainable and resilient transport network bringing Europe closer together

The European Commission[28B] **welcomes the final adoption** of the Regulation underpinning the trans-European transport network (TEN-T) by the European Parliament and the Council. The revised Regulation significantly enhances EU efforts to build a sustainable and resilient network as the backbone of the internal market. This includes strong incentives to promote more sustainable transport modes, advance digitalisation, and improve multimodality – combining various transport modes in a single journey within the European transport system. The Regulation also addresses climate change challenges and military mobility on the TEN-T network.

The European Union will give its final approval to the addition of the Lely line to the Trans-European Network (TEN-T). This means that the train connection that is yet to be built is eligible for European subsidies.

The yet to be built (HSL >= 200 km/h) section Groningen-Oldenburg does not fall within the EU Ten-t agreements. There is therefore no question of inclusion of the Lely line in the EU rail corridor Amsterdam-Hamburg.

See also Annex 5 "Ten-T Rail freight" and Annex 6 "Ten-T Rail Passenger" of dd: 13-June-2024 where the EU Commission presents its latest plans.

Figure 56: Travelling from a European perspective

4.10 Chief Government Architect

4.10.0 Introduction

Wouter Veldhuis (1971) is an urban planner and architect. He is director of urban planning agency MUST and was appointed Government Advisor for the physical living environment for four years in 2020. Previously, he advised the municipality of Amsterdam on urban renewal for ten years.

4.10.1 Groningen – Oldenburg

Figure 57: Veldhuis Critical about Lelylijn

Government Advisor for the Physical Environment Wouter Veldhuis is critical[29] of the so-called 'Delta Plan for the North'.

The agreement to construct the Lely line in combination with the construction of 220,000 extra homes. A fast train that stops frequently is a train that doesn't exist. (July 1, 2021)

No Lely line, no Lelystad Airport, Veldhuis
(Attchment 2) (February 9, 2024)

Government Advisor on the Physical Environment Wouter Veldhuis is critical of the so-called 'Delta Plan for the North', the agreement to construct the Lely line in combination with the construction of 220,000 extra houses. He believes that the North and also Fryslân should first make their own vision for the future.

For Veldhuis the Delta Plan is a strange proposal and has the following advice for Fryslân: "Don't choose to import a problem that you don't have yourself, to bring in a railway line. I think Fryslân has very different qualities, such as peace and quiet and beautiful villages and small towns." The government advisor is of the opinion that the North and also Fryslân must first make their own vision for the future before a far-reaching decision is made about the Lely line in combination with the 220,000 extra homes.
Veldhuis also doubts whether the Lely line will yield that much for Fryslân. According to him, the railway is mainly in the interest of Groningen and Amsterdam. After all, a fast train has as few stops as possible. He even takes into account a fast train that only stops in Lelystad between Amsterdam and Groningen and rushes past Heerenveen and Drachten at high speed. "A fast train that stops often is a train that doesn't exist."
Veldhuis does not think that 'the whole of Fryslân will benefit from the railway', as the province would like, will not be the case. "The strong spots that stations will have will become even stronger, the less accessible places will become even more unattractive. Here's how it works: The winners become even bigger winners, and the places that are struggling are even more likely to lose."

Veldhuis advises the government not to make a decision too quickly about the Lely line and the Delta Plan. He believes that the Netherlands would be wise to first draw up a vision for the future of spatial planning in the long term and to compare the proposals of the various regions. "Make a decision in two years. Then make desicions and execute it quickly. But now don't decide to build a railroad because of a problem you have with housing,"

Criticism of Lelylijn

Veldhuis (1971) is an urban planner, architect and, since 2020, Government Advisor for the Physical Living Environment. The latter position is a four-year appointment that enables him, together with the other members of the Board of Government Advisors, to provide the government with solicited and unsolicited advice on spatial planning in the Netherlands. And that's what Veldhuis does in abundance. He is involved in the public debate: with lectures, a podcast series[30] about the economy of the future, and strong criticism of government plans such as those for the construction of the Lely line (a new railway line between Amsterdam and Groningen) and Lelystad Airport.

No 'new Lely' No Lely line, no Lelystad Airport, as far as Veldhuis is concerned. It is not entirely coincidental that both the railway line and the airport are named after Cornelis Lely, he says. The famous engineer, who designed the Zuiderzee Works, among other things, has had an enormous influence on how the Netherlands developed over the past century. And although the choices made at the time have brought a lot of progress and economic prosperity, Veldhuis does not think that 'a new Lely' is necessary. "Not at all." A large engineer or powerful government that determines the blueprint for the Netherlands from above would no longer work now. So what does the Government Advisor want? The new vision of spatial planning should emerge more from the bottom up, from communities themselves, he believes.

Groningen economist Jan Oosterhaven

The Lely line is profitable, but don't extend it to Germany'

'Do not extend the Lely line to Germany[31]'. That's according to Groningen economist Jan Oosterhaven. Years ago, Oosterhaven conducted research into the construction of the Zuiderzee Line, a rail connection between Schiphol/Amsterdam and Groningen. At the time, he was working at the University of Groningen. He believes in the new plans for the Lely line, a planned rail connection between Groningen and Lelystad, which will also stop in Drachten and Heerenveen. 'It's certainly profitable.'

> **Er zit nu al niemand in de trein naar Leer**
>
> Jan Oosterhaven - Zuiderzeelijn-onderzoeker

Figure 58: Train to Leer always empty

Not to Germany. However, the economist does not support all the plans. Oosterhaven does not have to think long about extending the Lely line to Germany. There is already today no one on the train on the route to Leer. That's not going to change, even if the travel time to the Randstad becomes even shorter.'

4.10.2 Apeldoorn – Hengelo

Living in the Randstad? 'Conceivable scenario that we move to Drenthe and parts of Gelderland towards 2050'

Figure 59: Building outside the Randstad

The new government must look to the east[32]. Large-scale new housing construction is best planned in Twente, Drenthe and parts of Gelderland. That is the clear message of Francesco Veenstra, the most important advisor in the field of spatial planning. "We have to look much, much further ahead." Should Twente become a metropolis of 1.2 million inhabitants? According to Francesco Veenstra, that is certainly an option.

More housing in Twente: the space is there, but 'then you have to be able to be in Amsterdam in an hour'

Twente designated for 'large-scale new construction' after 2030
The regions of Twente[33] and the Apeldoorn-Deventer-Zutphen triangle have been designated by the government for 'large-scale new construction' after 2030. This is what outgoing Minister of Housing Hugo de Jonge writes to the House of Representatives.

The plea to use Twente as a location for large-scale housing construction is getting a lot of support in that part of the country. 'Please!', 'understandable and sensible reasoning', are the reactions.

As Chief Government Architect, Francesco Veenstra is a member and chairman of the Board of Government Advisors. Together with the Government Advisors for the Physical Living Environment Jannemarie de Jonge and Wouter Veldhuis, he advises the government on spatial quality.

4.10.3 Conclusion

The Chief Government Architect Veenstra believes that the Netherlands would be wise to first draw up a vision for the future of long-term spatial planning and to compare the proposals of the various regions. But don't decide now to build a railway line (Lely line) because of a problem you have with housing.

Economist Jan Oosterhaven is clear about this: "The Lely line is profitable, but don't extend it to Germany"

In recent years, the plans for the construction of additional homes have mainly been concentrated in the north of the country, in combination with the construction of the Lely line. Lately, we have seen that the government and the government architect prefer to build in the East, Apeldoorn/Deventer and Twente. Improving the rail connection from Twente to the Randstad fits in well with the homes building just mentioned above..

4.11 Soil type

4.11.0 Introduction

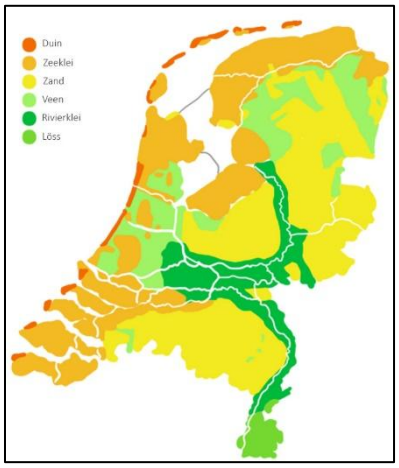


Figure 60: Soil type map

For many forms of infrastructure, the load-bearing capacity of the soil is important. The carrying capacity of the soil depends on the composition of the soil and subsoil. The load-bearing capacity of sand is greater than that of clay and peat. In the case of clay and peat, the soil will be more compressed, if new material is applied, such as during the construction of railways. The concerns about runway stability – as it is called in technical jargon – are shared by the Dutch Railways. "In a number of specific places in the Netherlands, where there is clay or peat soil and NS has ambitions to increase speed or frequency, for example, there is a risk that these improvements will not go ahead or will continue at a lower speed," says Geert Koolen on behalf of NS.

ProRail emphasizes that the peatlands simply cannot withstand more heavy and fast trains and that the speed limits are there for a reason.

Runway stabilisation between Culemborg and Geldermalsen
Soft bottom
The ground on which the track lies is unstable[34] and that means that trains have not been allowed to drive faster than 100 kilometers per hour for some time now. "This speed limit was imposed in October 2018 after research by Movares. The problem is that the track does not drain enough in combination with a soft soil layer underneath. Too much water remains in the track, causing the track to lose part of its load-bearing capacity. Subsidence occurs, as a result of which the track is no longer stable and trains cannot run at the desired speed," explains Smulders.

PSS Layer
To avoid these limitations, we are going to renew the surface. "We are going to lay a new foundation under the railway. That foundation consists of a 30-centimetre-thick PSS layer. This is a very fine-meshed cementitious type of sand that is mainly used in Germany."

4.11.1 Groningen – Oldenburg

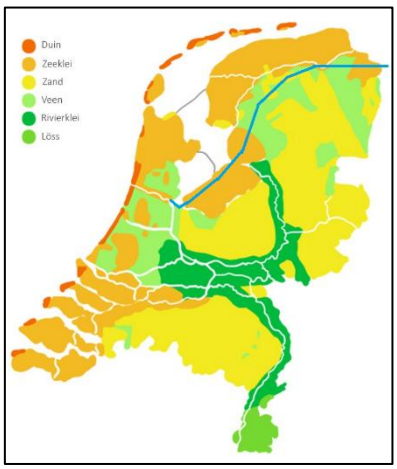


Figure 61: Traject Amsterdam- Border

The ideal type of soil on which to build fast rail connections is Sand. Clay is less suitable and peat causes even more problems.
As can be seen in the adjacent figure[34B], there is no sand or subsoil on the Groningen-border route. Clay and peat are the 2 subsoil species that occur on this route.

The same applies to the types of surface for the entire route, track from Lelystad-Noord to the border that is yet to be built. The section of track that is yet to be built from Lelystad-Noord to the border will be very expensive, both in construction and maintenance.

Border- Oldenburg/Osnabruck

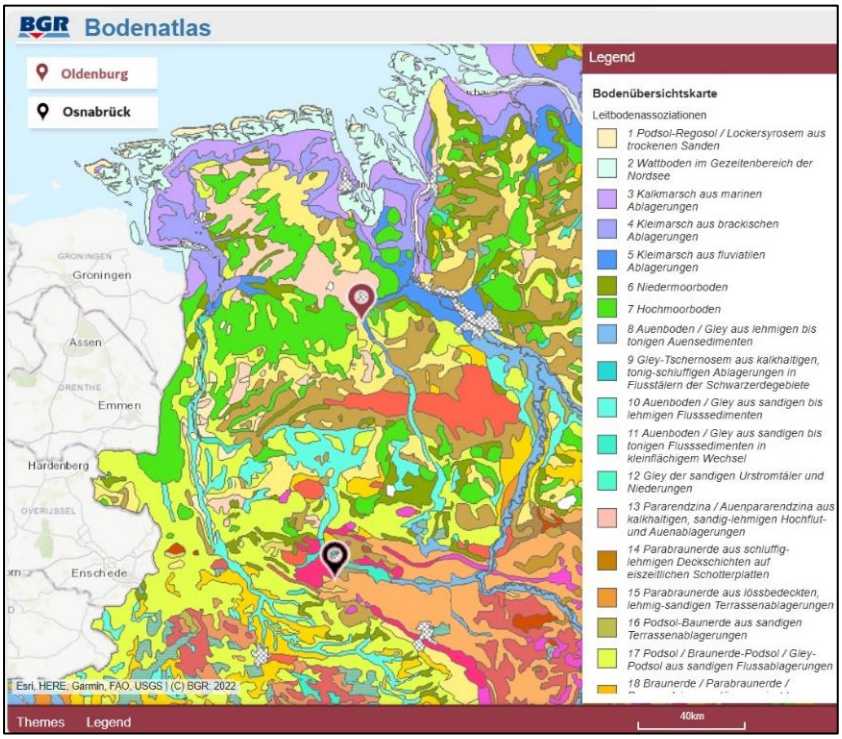


Figure 62: Ground map Germany

As can be seen on the adjacent map, the construction of a fast railway line on the Border-Oldenburg route is very difficult and expensive because this route largely is constructed about clay and peat.

Maintenance for this German section of this section will also be very expensive.

The map shown above is from the BGR Bodenatlas[33B].

The train connection between Groningen and the German port city of Bremen will take even longer. This Wunderline was supposed to be put into operation in December. But that has now been pushed back to mid-2025.

For the Dutch part of the route, the poor quality of the subsurface[34] is the main cause of the delay. The project aims to reduce the travel time between Groningen and Bremen by more than an hour by 2030. The new travel time would then be two hours and eleven minutes.

4.11.2 Apeldoorn – Hengelo

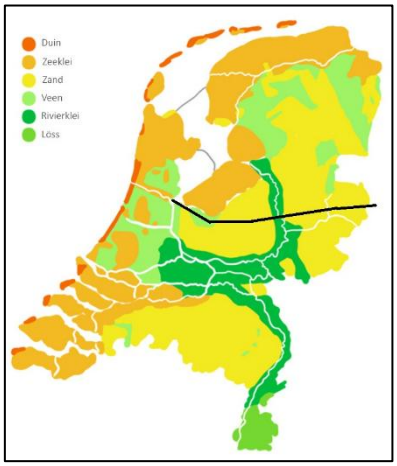


Figure 63: Amsterdam- Hengelo

The adjacent figure shows that most of the Amsterdam-Hengelo route has been/will be built on sandy soil.

A small part of this route goes over peat and river clay.

As can be seen in Figure 62 (Ground map Germany), the soil on the Border-Osnabrück route consists largely of sandy soil, which makes the construction and maintenance of (fast) railway lines relatively easy and cheap.

4.11.3 Conclusion

The construction and maintenance (See also Attachment 8 Soft soil) of the new Apeldoorn-Hengelo railway line will be much cheaper per km than the construction and maintenance of the new Groningen-Oldenburg railway line because the subsoil (Sand) of the former section is much better suited for the construction of a fast railway line.

4.12 Final Conclusion

	Groningen-Oldenburg	Hengelo- Apeldoorn
1. New track (cost)	110 – 265 KM (BillionEuro 5 – 19)	56 KM (Billion Euro 4-6)
2. Travel time	7:00	6:30
3. Connection In use	2050	2025
4. Business case	1x/h Amsterdam-Copenhagen	1x/h Amsterdam-Copenhagen
	1x/h Groningen-Munster	1x/hAmsterdam-Berlin
		1x/h Enschede-Schiphol Airport
		1x/h Enschede- The Hague
	Cargo 0	2x/h 40< Cargo < 86
Total	2 Trains per hour and direction	6 Trains per hour and direction
5. Task- Berlin Train	-	+
6. Task-Cargo(North branch)	-	+
7. Prorail	-	+
8. Choice Germany	-	+
9. TEN-T	Core Network(2050)	Extended Network(2030)
10. Government Architect	-	+
11. Soil type	-	+

Table 3: Compare routes Hengelo-Apeldoorn with Groningen-Oldenburg

- \- = The task is not fulfilled/ Worse option
- \+ = The task is fulfilled/ Better option

Attachment 1 Urls

[01] https://www.treinenweb.nl/nieuws/7307/symbolische-snelle-berlijn-trein-vertrokken-vanuit-amsterdam.html
[02] https://nl.wikipedia.org/wiki/Lelylijn
[03] https://delelylijn.nl/wp-content/uploads/2024/03/Samenvatting-Rapport-Denkrichtingen-NOVEX-Lelylijn-2050.pdf
[04] https://www.tubantia.nl/achterhoek/werkgroep-twente-3-8-trace-vanuit-achterhoek-met-grote-bocht-naar-duitsland~a16ead10/
[05] https://www.wunderline.nl/fileadmin/20220408_RAPPORT-_Stapsgewijs_naar_een_snelle_internationale_spoorverbinding_Amsterdam_-_Kopenhagen.pdf
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[20] https://magazines.defensie.nl/defensiekrant/2021/03/03_militaire-mobiliteit_03
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[26] https://www.wunderline.nl/
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[28B] https://transport.ec.europa.eu/news-events/news/sustainable-and-resilient-transport-network-bringing-europe-closer-together-2024-06-13_en
[29] https://www.omropfryslan.nl/nl/nieuws/1072397/rijksadviseur-veldhuis-kritisch-over-lelylijn-fryslan-kiest-verkeerd
[30] https://open.spotify.com/show/6zOAS1TiwTDyH58waulibB
[31] https://www.rtvnoord.nl/nieuws/216083/de-lelylijn-is-rendabel-maar-trek-hem-niet-door-naar-duitsland
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Attachment 2 Interview Wouter Veldhuis

Rijksadviseur Wouter Veldhuis: „Vraag maar eens aan de mensen in Heerenveen zelf waar ze meer behoefte aan hebben."

INTERVIEW **WOUTER VELDHUIS** RIJKSADVISEUR

'We moeten naar een eeuw van welzijn'

Grote projecten zoals Lelystad Airport hebben verstrekkende en onomkeerbare gevolgen voor de inrichting van Nederland, waarschuwt Rijksadviseur Wouter Veldhuis. Dat besef is er nauwelijks. „We gaan door op het oude pad, terwijl dat een doodlopende weg is."

Tekst **Wouter van Noort**
Foto's **Roger Cremers**

Een winderige winterdag op de Amsterdamse Zuidas. Grote kantoorgebouwen, internationaal ogende koffiebars. Bankiers, advocaten en consultants die snel doorlopen naar hun warme kantoren. Een behoorlijk moderne uitvinding, die Zuidas, zou je denken. Maar volgens stedebouwkundige Wouter Veldhuis moet je veel dieper, historischer, kijken naar zo'n gebied.

„De Zuidas is de plek waar [de beroemde planoloog en architect] Hendrik Berlage in 1929 al een station tekende en het Plan Zuid eromheen ontwierp", zegt Veldhuis, terwijl hij in een van de koffiebars een cappuccino drinkt. „Het duurde nog zestig jaar voordat spoor en station er kwamen, maar de lijnen die honderd jaar geleden op de stadskaart werden gezet, bepalen nog steeds enorm sterk hoe zo'n gebied eruit ziet, hoe we er leven en werken, hoe we onszelf verplaatsen."

Met die plannen van Berlage begon een onomkeerbare stadsontwikkeling: aanleg van infrastructuur, vestiging van mondiale netwerken van banken en andere bedrijven, de komst van duizenden nieuwe bewoners waardoor Amsterdam er praktisch een tweede centrum bij heeft gekregen.

De Zuidas is voor Veldhuis een schoolvoorbeeld van de enorme invloed die 'pad-afhankelijkheid' heeft op de ruimtelijke inrichting van Nederland. Door ogenschijnlijk simpele beleidskeuzes ontstaan in de loop van de decennia ingesleten 'paden': gewoontes, economische belangen, beleidslogica, infrastructuur, netwerken van relaties en kapitaal die het karakter van een plek zeer langdurig en hardnekkig vastleggen. De Zuidas is een magneet voor steeds meer van hetzelfde. Meer internationale bedrijvigheid, meer hoogbouw, meer rijbanen, spoorlijnen, metrolijnen. Daardoor kan het eenmaal gekozen pad diep ingesleten raken, zo diep dat je er bijna niet meer uit kunt ontsnappen.

Kritiek op Lelylijn

Veldhuis (1971) is stedenbouwkundige, architect en sinds 2020 Rijksadviseur voor de fysieke leefomgeving. Die laatste functie is een aanstelling voor vier jaar die hem, samen met de andere leden van het College van Rijksadviseurs, in staat stelt het kabinet gevraagd en ongevraagd advies te geven over de ruimtelijke ordening van Nederland. En dat doet Veldhuis volop. Hij roert zich in het publieke debat: met lezingen, een podcastserie over de economie van de toekomst, en stevige kritiek op overheidsplannen zoals die voor aanleg van de Lelylijn (een nieuwe spoorlijn tussen Amsterdam en Groningen) en Lelystad Airport.

Hij denkt dat Nederland nu weer voor grote, fundamentele keuzes staat die de toekomst vergaand zullen vastleggen. „Net als eind 19de, begin 20ste eeuw." In die tijd werd onder meer het pad naar de huidige Zuidas ingeslagen, werden diverse grote kanalen en waterwerken gebouwd, werd landbouwgrond herverdeeld, en de Afsluitdijk aangelegd om in de decennia erna de IJsselmeerpolders droog te kunnen maken. Zo ontstond Flevoland. Ook toen waren er grote technologische, sociale en geopolitieke omwentelingen. En ook toen werden de keuzes gemaakt die de maatschappelijke en economische richting voor meer dan een eeuw zouden bepalen.

Volgens Veldhuis moeten we inmiddels dringend een ander pad inslaan. „We staan voor de noodzakelijke transitie van een eeuw van welvaart naar een eeuw van welzijn."

De 21ste eeuw moet volgens de Rijksadviseur draaien om collectief welzijn voor gemeenschappen in balans met een gezonde natuur, in plaats van om de individuele materiële welvaart die in de 20ste eeuw centraal stond. Veldhuis vindt dat dit tot wezenlijk andere keuzes moet leiden voor de ruimtelijke inrichting: minder grote distributiecentra, minder op internationale handel gerichte infrastructuur. Nu worden vaak de verkeerde keuzes gemaakt, vindt hij. „Of beter gezegd: ze worden niét gemaakt, waardoor we gewoon blijven doen wat we al deden."

Neem die Lelylijn waar Veldhuis zich al vaker kritisch over heeft uitgelaten: die spoorlijn zou via Drachten en Heerenveen het noorden en de Randstad met elkaar moeten verbinden. Plannen daarvoor zijn vergevorderd, maar er wordt al jaren over gesteggeld en de bouw ervan is nog allerminst zeker.

Volgens Veldhuis moeten bewoners van Noord-Nederland zich ernstig afvragen of zo'n lijn wel brengt waarop ze hopen. „Wil Drachten wel een grote stad worden? Willen de mensen in Friesland en Groningen wel plekken in hun omgeving zoals de Randstad nu is? Of willen ze dat niet, en waarderen ze juist de rust, het landschap, de *mienskip*?"

Volgens Veldhuis worden de fundamentele vragen veel te weinig gesteld. „Willen we dit pad wel doorzetten? Wat voor toekomst zien we eigenlijk voor dat gebied? Kan het niet heel anders dan wat we de vorige eeuw hebben gedaan?"

En neem een nieuwe luchthaven als Lelystad Airport: op korte termijn is dat misschien een oplossing voor de drukte op Schiphol. Maar ingebruikname dreunt minstens een eeuw na, en heeft enorme gevolgen voor de omgeving, waarschuwt hij. „En hoe kijken omwonenden in 2124 naar een vliegveld?" Een meerderheid van de Tweede Kamer bleek vorige week overigens tegen opening van Lelystad Airport voor commerciële vluchten. Zo lijken de ideeën van Veldhuis breder aan te slaan, al zal de discussie de komende jaren nog wel doorgaan. „Grote hinder los je niet op door het te spreiden over een groter deel van het land, maar door de bron van hinder aan te pakken: de luchtvaart op Schiphol", zegt Veldhuis.

Het gezwalk en getwijfel rondom Lelystad Airport laat bovendien een dieper probleem zien, volgens Veldhuis: het ontbreken van een langetermijnvisie in de politiek, en het gemis van een 'gezamenlijk verhaal' over waar Nederland naartoe wil met het landschap.

„Het ontbreken van een nieuwe richting leidt ertoe dat oude patronen zo dominant blijven." En we moeten juist uit die patronen breken, zegt hij, omdat ze ecologisch en maatschappelijk niet vol te houden zijn. „Het gebrek aan keuzes in de laatste decennia leidt nu tot acute keuzenood. We gaan door op het oude pad, terwijl dat een doodlopende weg is."

Geen 'nieuwe Lely'

Geen Lelylijn, geen Lelystad Airport, wat Veldhuis betreft. Het is niet geheel toevallig dat zowel spoorlijn als vliegveld

Figure 64: Interview met Wouter Veldhuis

Attachment 3 ICNG

The Intercity New Generation (abbreviated ICNG, nicknamed 'Wasp') is a type of single-deck trainsets of the Dutch Railways (NS) that entered service in 2023. They are intended for the intercity network and are intended to replace older rolling stock such as the oldest ICMms and the ICRm. They achieve higher speeds and have to cope with the growth in the number of passengers.

This train of the future has started its dress rehearsal. For the time being, the vehicle will be used on the route between Rotterdam and Amsterdam. President and CEO Wouter Koolmees in “De Telegraaf”: "We see it as the last test phase that can only be done in the timetable with passengers. Only when we are satisfied will we deploy more of these fast trains. They offer great comfort and higher speed.

Figure 65: The new ICNG of the NS

At the same time, we have to take into account that new trains can suffer from teething problems. That's part of it, and travelers will probably notice that. We are starting with one new Intercity on one route, we can minimize the impact on passengers. In the beginning, this train travels at a maximum speed of 160 km/h. Only when we have replaced all the existing trains does it make sense to drive at 200 km/h in order to get the most out of it.”

Attachment 4 EC 34 to Copenhagen

Stammdaten

Zug-ID	99990100034
Fahrplanjahr	Deutschlandtakt
Zuggattung	EC (EuroCity)
Zugnummer	34
Verkehrstage	täglich
Höchstgeschwindigkeit	230 km/h
Reisezeit	10 h 4 min
DB-Reiseplan	nein
IC/ICE-Typ	DSB
Zuglinie	FV 2.a

Bahnhof	an	ab
Osnabrück Hbf	13:25	13:27
Bremen Hbf	14:18	14:21
Hamburg-Harburg	15:04	15:06
Hamburg Hbf	15:16	15:30
Lübeck Hbf	16:06	16:10
Nykøbing F	17:16	17:17
København H	18:10	

Figure 66: Timetable Deutschlandtakt

According to the plans from "Deutschlandtakt", these are the travel times for the EC 34 from Karlsruhe(Osnabrück) to Copenhagen.

On this website[36] the timetables for Deutschlandtakt are presented.

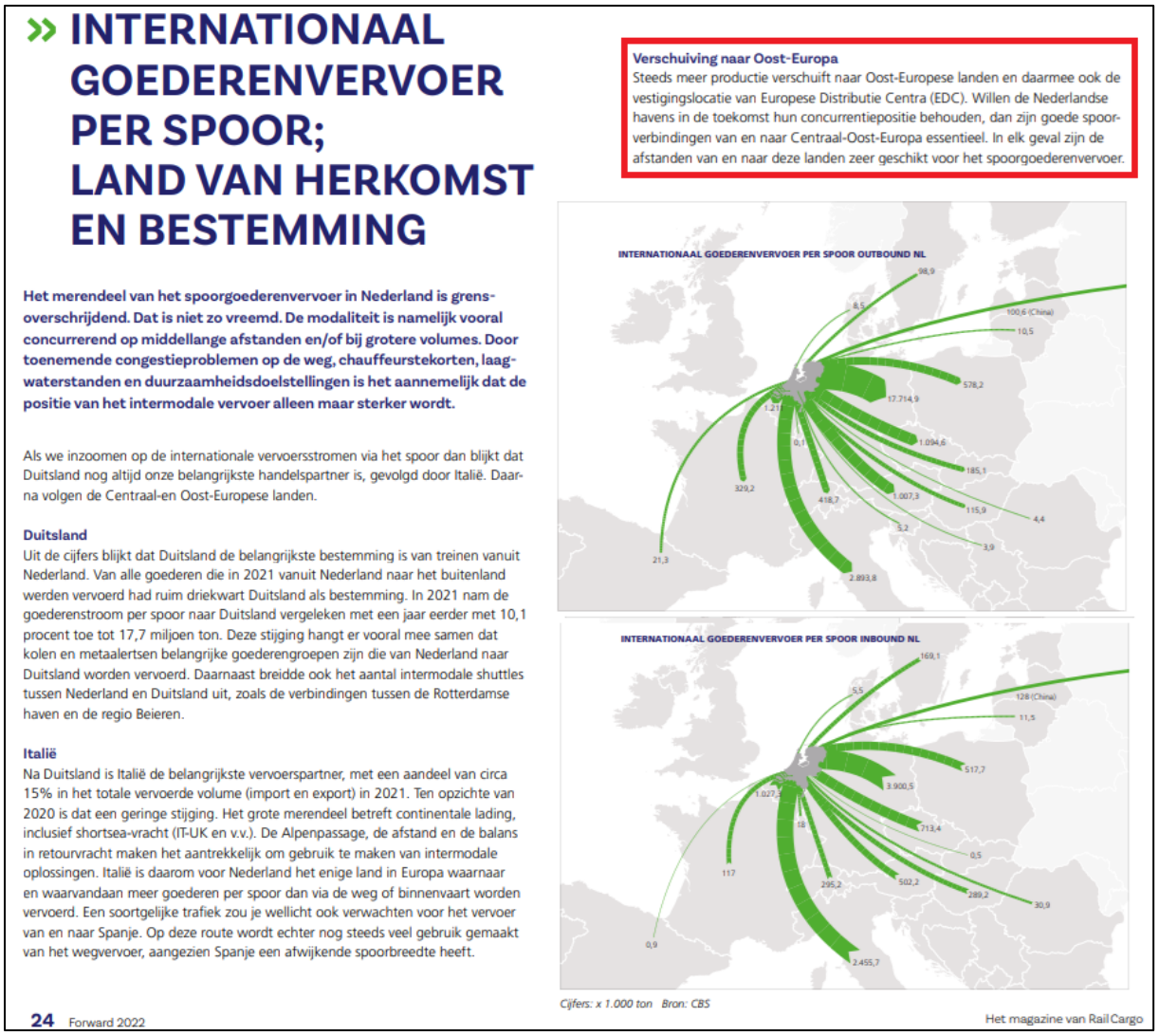
Attachment 5 Ten-T Rail freight

Figure 67: TEN-T CARGO

Attachment 6 Ten-T Rail Passenger

Figure 68: TEN-T Passenger railtransport

Attachment 7 Railcargo magazine



» INTERNATIONAAL GOEDERENVERVOER PER SPOOR; LAND VAN HERKOMST EN BESTEMMING

Het merendeel van het spoorgoederenvervoer in Nederland is grens-overschrijdend. Dat is niet zo vreemd. De modaliteit is namelijk vooral concurrerend op middellange afstanden en/of bij grotere volumes. Door toenemende congestieproblemen op de weg, chauffeurstekorten, laag-waterstanden en duurzaamheidsdoelstellingen is het aannemelijk dat de positie van het intermodale vervoer alleen maar sterker wordt.

Als we inzoomen op de internationale vervoersstromen via het spoor dan blijkt dat Duitsland nog altijd onze belangrijkste handelspartner is, gevolgd door Italië. Daar-na volgen de Centraal-en Oost-Europese landen.

Duitsland

Uit de cijfers blijkt dat Duitsland de belangrijkste bestemming is van treinen vanuit Nederland. Van alle goederen die in 2021 vanuit Nederland naar het buitenland werden vervoerd had ruim driekwart Duitsland als bestemming. In 2021 nam de goederenstroom per spoor naar Duitsland vergeleken met een jaar eerder met 10,1 procent toe tot 17,7 miljoen ton. Deze stijging hangt er vooral mee samen dat kolen en metaalertsen belangrijke goederengroepen zijn die van Nederland naar Duitsland worden vervoerd. Daarnaast breidde ook het aantal intermodale shuttles tussen Nederland en Duitsland uit, zoals de verbindingen tussen de Rotterdamse haven en de regio Beieren.

Italië

Na Duitsland is Italië de belangrijkste vervoerspartner, met een aandeel van circa 15% in het totale vervoerde volume (import en export) in 2021. Ten opzichte van 2020 is dat een geringe stijging. Het grote merendeel betreft continentale lading, inclusief shortsea-vracht (IT-UK en v.v.). De Alpenpassage, de afstand en de balans in retourvracht maken het aantrekkelijk om gebruik te maken van intermodale oplossingen. Italië is daarom voor Nederland het enige land in Europa waarnaar en waarvandaan meer goederen per spoor dan via de weg of binnenvaart worden vervoerd. Een soortgelijke trafiek zou je wellicht ook verwachten voor het vervoer van en naar Spanje. Op deze route wordt echter nog steeds veel gebruik gemaakt van het wegvervoer, aangezien Spanje een afwijkende spoorbreedte heeft.

Verschuiving naar Oost-Europa

Steeds meer productie verschuift naar Oost-Europese landen en daarmee ook de vestigingslocatie van Europese Distributie Centra (EDC). Willen de Nederlandse havens in de toekomst hun concurrentiepositie behouden, dan zijn goede spoor-verbindingen van en naar Centraal-Oost-Europa essentieel. In elk geval zijn de afstanden van en naar deze landen zeer geschikt voor het spoorgoederenvervoer.

Cijfers: x 1.000 ton Bron: CBS

Figure 69: RailCargo magazine 2022

Shift to Eastern Europe

More and more production is shifting to Eastern European countries and with it The Location of European Distribution Centers (EDC). Do the Dutch/Belgium ports want to maintain their competitive position in the future, good rail Connections to and from Central-Eastern Europe are essential. In any case, the Distances to and from these countries are very suitable for rail freight transport

Attachment 8 Soft soil

Risks and uncertainties of the subsurface.
Deltares[37] and ProRail have been working together for several years to map out the risks and uncertainties of the railway subsurface. We do this by investigating vibration nuisance and the stability of the subsurface of the track at various locations. And that's important; **Soft soil causes twice as much maintenance costs on the track**.

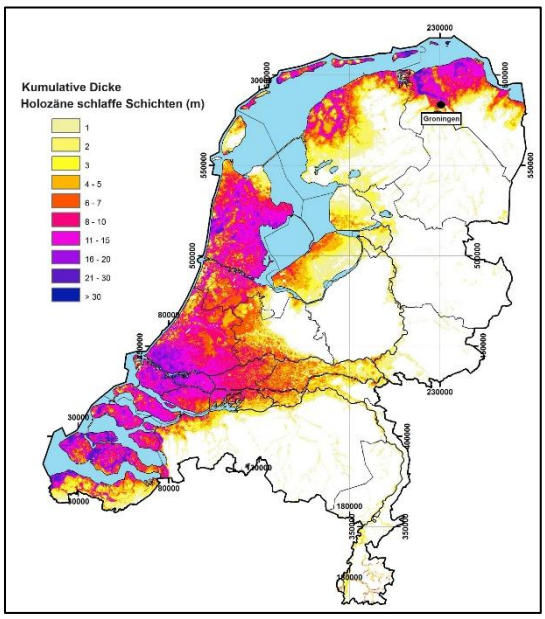


Figure 70: Soft soil map of the Netherlands

Weak ground is messing up NS's timetable and future plans. The ground under almost a third of the Dutch railways is too weak to run even faster with even more and heavier trains. Tackling the problem will cost billions of euros.

We can see in the figure on the left that the province of Groningen in particular has many areas with soft soils. Construction and maintenance of the new Groningen-Oldenburg rail link will be very expensive. The Amsterdam-Hengelo rail route is not on soft ground. Construction and maintenance of the new Apeldoorn-Hengelo rail link will be relatively inexpensive.

If construction is carried out on or in the subsoil, settlement may occur[38]: the bottom is compressed and collapses. Slopes of embankments, roads and dikes can also become unstable and collapse. This may cause damage to the structure or buildings in the area. In some places in the Netherlands, this is more likely than in others; This is highly dependent on the composition of the soil. Sand, for example, is relatively incompressible and peat, on the other hand, is very incompressible. Clay, sand and loam occupy a central position.

The shallow Holocene layers are the main source of risk. **The thicker the flaccid layers, the greater the risk.**

Attachment 9 Research Lelylijn alternatives

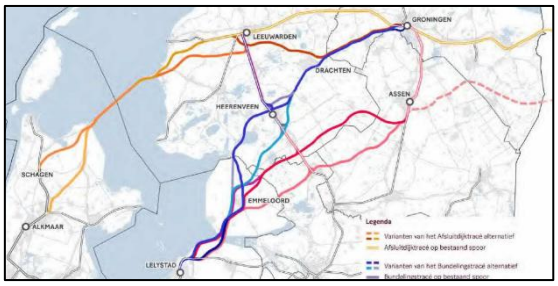


Figure 71: Lelylijn alternatives

This report[39] contains the results of the 'Research Lelylijn alternatives'.

The research was commissioned by the Lelylijn Project Organisation.

Page 36

> rechtstreekse trein. Deze non-stop intercitytreinen kunnen in de praktijk met instandhouding van de (6-basis)-dienstregeling niet ingepast worden op de Flevolijn en Weesp-Amsterdam Zuid zonder aanleg van (veel) extra infrastructuur. Er is hier geen spoorcapaciteit voor extra treinen.

There is no rail capacity between Almere and Weesp for extra direct trains such as the international trains from Amsterdam to Bremen.

Page 124

> De vervoerwaarde van de Lelylijn voor internationale spoorverbindingen naar Duitsland is dan ook minimaal, met beperkte impact op andere routes, behalve bij aanzienlijke snelheidsverbeteringen op de Wunderline. De bredere ontwikkelingen, zoals de Deutschlandtakt en versnelde IC Berlijn, hebben een veel grotere impact. De Lelylijn speelt wel een belangrijke rol in de aansluiting van Noord-Nederland op internationale treinverbindingen naar het Zuiden, België, Parijs en London. De internationale positie van de Lelylijn, zeker in de connectiviteit tussen Randstad, Noord-Duitsland en verder naar Scandinavië is minder aantrekkelijk.

The transport value of the Lely line for international rail connections to Germany is therefore minimal. Except for significant speed improvements on the Wunderline. The broader developments, such as Deutschlandtakt and accelerated IC Berlin, have a much greater impact. The international position of the Lely line, especially in the connectivity between the Randstad and northern Germany and further to Scandinavia, is less attractive.

Page 145

> **5.5.1. Investeringsraming (indicatief)**
>
> Een nieuw tracé van Groningen (of Assen) naar de Nederlandse-Duitse grens is al gauw zo'n 50 kilometer lang. Uit de kilometerprijzen zoals bepaald voor de verschillende basisalternatieven kan een grove inschatting van de investeringskosten gegeven worden als een nieuw aangelegd moet worden tot aan de grens. Deze is 2,5 tot 5 miljard, exclusief dure inpassings-maatregelen, zoals bij voorbeeld boortunnels.

A new route from Groningen (or Assen) to the Dutch-German border is easily about 50 km long. From the km prices as determined for the various basic alternatives, a rough estimate of the investment costs can be given if a new connection is built up to the border. This is 2.5 to 5 billion, excluding expensive integration measures, such as 'Drilling tunnels'. Note(J. de Goeijen): The distance Groningen-Oldenburg is more than 110 km. The total cost will be more than 2x as high as just mentioned.

August 2024: International part (Groningen-Bremen)[41] of the Lelylijn costs 10-15 Billion Euro.

Scenario	Kosten	Toelichting	Nieuw tracé
D1 – 160km/u over bestaand spoor	€5-5,5 miljard	Meeste maatregelen in deel Groningen-Leer. Groot aandeel verbetering ondergrond (160km/u)	"28 mln per km"
D2/E – 160-200km/u nieuw tracé	€8-9 miljard	Nieuw tracé ongeveer 85%, overig upgrades Groningen-Zuidbroek en Oldenburg-Bremen. 83 km nieuw tracé	86 mln per km
E/F – 200-300 km/u nieuw tracé	€14,5-15,5 miljard	Nieuw tracé ongeveer 87%, overig upgrades Groningen-Onnen en Delmenhorst-Bremen. 148 km nieuw tracé	87 mln per km

September 2024:
Lely line will cost at least 13.8 billion Euro , new research[40]: "Huge challenge"