

## Studie 8: Studie naar personenvervoer per spoor



**Studie 8**

**DE POTENTIE VAN  
PASSAGIERSVERVOER  
REALISTISCH EN BREED  
IN BEELD**

*Implementation Study for Optimization  
of Cross-border Rail Infrastructure in the  
Port area Ghent - Terneuzen - ISOCRIP /  
ZSP 10212*

Omdat we ons verplaatsen

TERNEUZEN

GENT

adviseurs  
mobiliteit  
**Goudappel  
Coffeng**

**MINT**  
Mobiliteit in zicht

North Sea Port  
Eindrapport

## Passagiersvervoer Rail Gent – Terneuzen | Eindrapport

# Implementation Study for Optimization of Cross-border Rail Infrastructure in the Port area Ghent – Terneuzen

Datum	28 februari 2018
Onderwerp	Passagiersvervoer Rail Gent – Terneuzen   Eindrapport
Kenmerk	ZLS002/Wvh/0011.01

# Summary

This report presents the conclusions of a study of passenger services in the area of the Ghent-Terneuzen Canal. The study was one of 11 EU-subsidised studies directed at optimising the rail infrastructure within that area. The summary table on page 5 shows the main statistics. In accordance with the stage of the study, the results in this report are within a certain range and are mainly intended to provide an initial impression and make comparisons possible. A follow-up study will need to be carried out in order to obtain a better understanding of the material.

## **Problem to be considered and assignment**

There are numerous goods lines in the Canal area. The L.204, for example, connects Ghent to Zelzate along the east side of the canal and the L.55/L.58 connects Ghent to Terneuzen along the west side. Various parties in the Canal area are strongly in favour of activating/reactivating parts of the system for passenger services, so that the Canal area becomes more easily accessible by public transport. Flanders is committed to goods transport by rail. The conversion of goods lines in the Canal area to make them also suitable for passenger services cannot be allowed to create new obstacles to goods transport. In 2017, North Sea Port (a merger of Zeeland Seaports and the Ghent Port Authority) commenced a number of studies aimed at optimising the rail infrastructure in the Ghent-Terneuzen Canal area. That set of studies comprises the “Implementation Study for Optimisation of Cross-border Rail Infrastructure in the Port Area Ghent – Terneuzen” project. The present study looks at passenger demand for a rail connection in the Canal area and the costs involved (for infrastructure and operation). Various variants for routes, stations, and frequencies were studied.

## **Spatial and economic**

As a major player, North Sea Port expects to grow rapidly. It accounts for € 13.6 billion in added value, with this expected to have increased by 10% by 2022. A major proportion of North Sea Port’s activities take place in the Ghent-Terneuzen Canal area, which has a population of more than 350,000 and more than 100,000 jobs. Given the economic and spatial activities and their development, the hypothesis is that there is room for better public transport services within the Canal area.

## Transport value

After analysis of 16 passenger variants, 6 of those variants were worked out further in the present study. The variants differ as regards use of a different side of the canal (east or west), and variation in frequencies, number of stops, and terminal points. The variants are of an indicative nature and do not constitute a blueprint. They can be further optimised in a follow-up study and/or other variants can be investigated. Given the absence of a good reference situation, the variants were compared with one another.

The following operating variants were examined in detail:

1. East side, 1x/hour, numerous stops and 80 km/hour;
2. East side, 2x/hour, numerous stops and 80 km/hour;
3. West side, 2x/hour, numerous stops and 80 km/hour;
4. Shuttle service Ghent – ArcelorMittal, peak period 2x/hour and off-peak period 1x/hour and 80 km/hour;
5. Shuttle service Ghent – Zelzate East, 2x/hour and 80 km/hour;
  - a. Subvariant shuttle service Ghent – Zelzate Centre, 2x/u and 80 km/u;
6. Shuttle service Ghent – Zelzate West, 2x/hour and 80 km/hour.

Based on a benchmark, the study shows that the number of cross-border journeys (variants 1 to 3), i.e. single-person movements, between Ghent and Terneuzen in variant 1 is comparable, with an average of 600 journeys, to the transport value of the cross-border Groningen (NL) - Leer (Germany) connection. In variant 3, the number of cross-border journeys is an average of 1,700, making the transport value comparable with the cross-border Venlo (NL) – Kaldenkirchen (Germany) connection. The total transport value of the variants for cross-border through services averages between 3,800 journeys (variant 1) and 6,200 journeys (variant 2). For the shuttle variants, the average number of journeys is between 3,000 (variant 4) and 6,000 (variant 5a). One can therefore say that passenger services between Ghent and Terneuzen represent a potential whereby the line, depending on its actual form, has the function, to a greater or lesser extent, of opening up the port and providing access to residential centres; it thus fulfils a double function.

The report presents the transport value as a range. For numerous reasons, the authors consider that the potential is in fact closer to the bottom end of the range than to the top end. That is certainly the case as regards the short term. The top end of the range will be more likely if a decision is taken to promote public transport and/or discourage car use. There are indications (see the draft Flanders Mobility Plan) that seem to encourage public transport.

## Operating costs and passenger revenues

The operating costs for the 6 variants have been calculated. In doing so, a distinction was made between traditional operation under the banner of Belgian National Railways (SNCB/NMBS), in which diesel and electric operation is normal, and alternative operation, for example after putting the train service out to tender (as is more usual in the Netherlands). A distinction was made between diesel and electric operation in the alternative operation too, but also regarding operation with innovative systems, in this case hybrid (after partial electrification) and hydrogen (which is present in the Canal area). Although new systems such as partial electrification have not been considered in Belgium until now, given the stage of the study these were in fact investigated.

The main conclusions based on calculations for the different types of operation are:

- Alternative operation is cheaper than operation according to the SNCB/NMBS system;
- Operation with (hybrid) electrical equipment is cheaper than with diesel equipment;
- Operation using hydrogen operation will be broadly comparable (in the long term) to using diesel, but this technology is still in its infancy and is not proven technology for the time being;
- The operating costs vary from € 9.2 million annually with electric traction in variant 4 to € 20.6 million with diesel traction in variant 2.

In addition to operating costs, passenger revenue was also calculated. A distinction was made between SNCB/NMBS's usual revenue of € 0.07 per kilometre (under the operator's contract) and € 0.12 (normal in the Netherlands) per kilometre. The latter is conceivable with a different operator (alternative operation). There must of course be a certain quality in return if the user is to be prepared to pay for this. The main conclusions are:

- In the SNCB/NMBS system, annual revenues vary from an average of € 0.9 million (variant 4) to an average of € 2.5 million (variant 3).
- With the alternative system, the annual revenues vary from an average of € 1.6 million (variant 4) to an average of € 4.2 million (variant 3).

In the SNCB/NMBS system cost-effectiveness, including compensation for infrastructure costs, is between 8% (variant 4 diesel) and 16% (variant 5a electric). With the alternative system, cost-effectiveness varies between 15% (variant 4 diesel/hydrogen) and 32% (variant 5 electric).

On the basis of the study, one can state that passenger services between Ghent and Terneuzen cannot be operated cost-effectively. Cost-effectiveness varies and is highly dependent on the type of operation and size of the revenues. Electrical or hybrid traction in an alternative system, for example after putting the train service out to tender, combined with an attractive customer product, would seem to be the best option. This needs to be made clearer by means of a follow-up study.

### **Infrastructure**

Running passenger services will require additional infrastructure. The analysis shows that of the variants with a through train service from Ghent to Terneuzen (variants 1 to 3), variant 1 is the best. That is mainly determined by the relatively limited investment required for additional double track, given that in this variant the train will only run once an hour. The investment costs for variant 1 are estimated at this stage at € 188 million excluding electrification, € 216 million with partial electrification, and € 279 million with complete electrification. Of the shuttle variants (variant 4 to 6), variant 5 is the best. That is mainly determined by the relatively limited investment required for additional double track. The investment costs for this variant are estimated at € 92 million excluding electrification, € 112 million with partial electrification, and € 188 million with complete electrification.

On the basis of the study, one can state that passenger services between Ghent and Terneuzen will not be possible without additional infrastructure. Depending on what is decided, the additional infrastructure costs amount to between € 87 million and € 475 million. It should be noted that passenger services may have a negative impact on the available or required rail capacity. That may have a negative impact on goods services. This needs to be made clearer by means of a follow-up study. An initial step has now been taken: in mid-December 2017, the Belgian federal government approved the cooperation agreement on funding for strategic rail infrastructure in the Canal area. The

agreement formalises € 11 million (spread over 5 years starting in 2019) for feasibility studies (go/no go) and possible removal of level crossings on the L.204. The Federal Council of Ministers also decided that an additional € 18 million can perhaps already be allocated within two years to conversion of the Ghent goods line. This means that important steps have been taken as regards the east-side variants (variants 1, 2, 4, 5, and 5a), with shuttle variant 5a involving the lowest level of additional infrastructure costs.

Taking into account investment and cost-effectiveness, variant 5 is the best option at this stage of the study. In the longer term, this variant can be gradually extended to Terneuzen (variant 1/2), with perhaps an “HOV” (High-Quality Public Transport) bus connection in the meantime. In mid-December 2017, the Belgian federal government took the important step of approving the cooperation agreement on funding for strategic rail infrastructure in the Canal area.

### **Subsidies, opportunities, and threats**

Focusing on innovative systems would seem to attract subsidies. In addition to the quantitative aspects investigated, stakeholders have mentioned a large number of positive and negative impacts of passenger services within the Canal area. Reducing congestion and environmental problems is seen as an opportunity and operating and investment costs as a threat. These aspects will be important in a follow-up study.

### **Recommendations**

The following recommendations can be made for future action.

- Investigate (i.e. get a better grip on the material), consult the market (at least train builders and operators), and select what action is to be taken regarding the possibility of passenger services in the Canal area;
- Develop a strategy to gradually develop a better passenger connection within the Canal area, possibly starting with a high-quality bus connection;
- Investigate the extent to which operating costs “saved” annually after (partial) electrification as opposed to diesel operation can be “converted” into gradual development of the infrastructure in the Canal area in favour of passenger services;
- Investigate new financial structures, commissioning, governance structures, etc. in order to take steps, together with partners, towards improvement;
- Investigate (working with market participants) to what extent an (innovative) pilot study for passenger services in the Canal area can act as a catalyst for speeding up the action to be taken;
- Explore possible subsidies to enable (accelerated) action to be taken.

Features:	Variant 1	Variant 2	Variant 3	Variant 4	Variant 5	Variant 5a	Variant 6
Canal side	East	East	West	East	East	East	West
Northern terminal	Terneuzen Centre	Terneuzen Centre	Terneuzen West	Arcelor-Mittal	Zelzate East	Zelzate Centre	Zelzate West
Southern terminal	Ghent-Sint- Pieters						
Total travel time (journey)	0:50	0:50	0:50	0:29	0:32	0:32	0:32
<b>Annual operating costs (EURm) with SNCB/NMBS system</b>							
Diesel	€ 12.8	€ 20.6	€ 20.0	€ 11.3	€ 13.6	€ 13.6	€ 13.4
Electric	€ 12.0	€ 19.2	€ 18.7	€ 10.5	€ 12.7	€ 12.7	€ 12.5
<b>Annual operating costs (EURm) with alternative system</b>							
Diesel	€ 10.8	€ 17.6	€ 17.0	€ 10.4	€ 12.6	€ 12.6	€ 12.2
Electric	€ 9.5	€ 15.4	€ 14.9	€ 9.2	€ 11.3	€ 11.3	€ 10.8
Hybrid	€ 9.7	€ 15.8	€ 15.2	€ 9.5	€ 11.5	€ 11.5	€ 11.1
Hydrogen	€ 11.5	€ 18.4	€ 17.7	€ 10.8	€ 13.1	€ 13.1	€ 12.6
<b>Average transport value at border (number of journeys per 24 hours)</b>							
Average	600	1000	1700	N/A	N/A	N/A	N/A
<b>Average transport value (total number of journeys per 24 hours)</b>							
Average	3800	6200	5800	3000	5700	6000	4600
<b>Average passenger revenues (EURm) per year</b>							
At € 0.07 revenue	€ 1.4	€ 2.3	€ 2.5	€ 0.9	€ 1.9	€ 2.1	€ 1.8
At € 0.12 revenue	€ 2.4	€ 3.9	€ 4.2	€ 1.6	€ 3.3	€ 3.6	€ 3.1
<b>Average cost-effectiveness with SNCB/NMBS system</b>							
Diesel	11%	11%	12%	8%	14%	15%	14%
Electric	12%	12%	13%	9%	15%	16%	15%
<b>Average cost-effectiveness with alternative system</b>							
Diesel	22%	22%	25%	15%	26%	28%	26%
Electric	26%	26%	28%	17%	30%	32%	29%
Hybrid	25%	25%	28%	17%	29%	31%	28%
Hydrogen	21%	21%	24%	15%	25%	28%	25%
<b>Investment in infrastructure (EURm)</b>							
Excl. electrification	€ 188	€ 359	€ 310	€ 102	€ 92	€ 131	€ 87
Incl. partial electrification	€ 216	€ 401	€ 354	€ 120	€ 112	€ 152	€ 110
Incl. electrification	€ 279	€ 475	€ 431	€ 153	€ 149	€ 188	€ 163

Summary of main statistics. *Note: these are often average values within a range.*