



Fehmarn Belt Forecast 2014 - Update of the FTC-Study of 2002

- Effects of Great Belt toll reduction
on the Fehmarn Fixed Link-

for
Femern A/S

August 2017

1 INTRODUCTION

The most important route for road traffic between Scandinavia and the rest of Europe is the route via Rödby – Puttgarden. Today roughly 65 % of all cars and 25 % of all lorries between the Scandinavian Peninsula and East Denmark on the one side and Germany and Central and Western Europe on the other side use the connection between Rödby and Puttgarden. And, with a Fehmarn Fixed Link, the share of traffic on this route will even increase.

However, for some traffic segments, especially in the passenger traffic, the Great Belt is a reasonable alternative. This route is around 160 km longer for most OD-relations but provides seamless connection via the Great Belt Bridge and the bridge toll is at the average around 50 % cheaper than the price for the ferry crossing between Rödby and Puttgarden.

With the Fehmarn Fixed Link (FFL), providing an uninterrupted connection, most international travelers will change to the FFL.

In the FTC 2014 forecast the existing toll rates have been assumed in the forecasting period, both for the Great Belt bridge as well as for the FFL for which the average ferry fares for Rödby – Puttgarden are used as benchmark for the future toll.

In this memo a sensitivity calculation has been analysed on which effects on the ridership of FFL that would arise by a reduction of the toll rates on Great Belt Bridge by 25 %. The calculations have been made with the traffic model used for the FTC-study. Base data and basic assumptions are derived from this study, Base Case B.

2 RESULTS PASSENGER TRAFFIC

The results of the sensitivity calculation related to the car traffic on the FFL are shown in table 1.

Purpose	Base Case	GB - 25%	Difference	Difference
	2025	2025		
	cars (1000)	cars (1000)	cars (1000)	%
Day commuter	188,7	188,7	0	0
Shopping	420,4	415,3	-5,1	-1,2
Business	820,7	820,7	0	0
Holidays	764,1	670,6	-93,5	-12,2
Other day excursion	196,9	196,9	0	0
Short holidays	363,0	312,7	-50,3	-13,9
Visiting friends/relatives	360,9	323,9	-37,0	-10,3
Weekend commuter	302,2	289,2	-13,0	-4,3
total	3.416,9	3.218,0¹⁾	-198,9	-5,8

1) The opening year of the Fixed Femern Link was in FTC 2014 forecast assumed as 2022. Expected opening year is today 2028. The traffic figures for the later opening have been extrapolated for the use of the business planning.

Tab. 1: Effects of toll reduction on Great Belt (GB by 25 % on the car traffic on FFL (on the basis of the 2025 figures, Base Case B)

There would be a reduction of car traffic of 5,8 % or 199.000 cars per year due to a 25 % toll reduction on Great Belt. The main effects are related to the purposes holiday traffic (- 93.500 cars), short holidays (-50.300 cars) and visiting friends/relatives (- 37.000 cars), because these segments are price sensitive and there is a big share of long distance travel for which indeed the Great Belt route is an alternative to the FFL. The other segments are less price sensitive (mostly business), but are also dominated by short to medium distances (for example Lübeck to Copenhagen) for which the Great Belt route is no alternative.

3 RESULTS LORRIES

For lorry traffic, a reduction of the toll for the Great Belt Bridge by 25 % will not lead to relevant changes for the FFL. For traffic relations with origin and destination south of Hamburg the way through the Femern Belt tunnel is cheaper and faster even with the toll reduction analysed.

Possible traffic relations for route changes are situated between Hamburg on the one hand and Flensburg-Kiel on the other hand. For origins and destinations related to this area the reduction

of toll rates will lead to cost advantages for the Great Belt route. However, the time advantage of more than an hour for the FFL tunnel will exceed this effect by far and thus traffic changes from the Femern Belt would not to be expected also in these cases. Details can be seen in Annex 1. Apart from that, the traffic volume which is in this "competition area", accounts only for 1 % of the estimated FFL-traffic in 2025. Differently from passenger traffic the reduction of the toll rates of Great Belt by 25 % will not have a countable effect on FFL-traffic.

4. Overall results

The overall results of the sensitivity calculation about the effect of a 25 % decrease of Great Belt toll rates for the traffic on FFL are shown in table 2. There is an effect on the passenger traffic, but no effect on the lorry traffic. The overall loss of vehicle traffic on the FFL due to the toll reduction on Great Belt would be of 5 %.

Purpose	Base Case B	GB – 25 %	Difference	Difference
	2025	2025		
	Vehicles (1000)	Vehicles (1000)	Vehicles (1000)	%
Cars	3.416,9	3.218,0	-198,9	-5,8
Busses	36	34	-2,0	-5,6
Lorries	594,1	594,1	0,0	0
Total vehicles	4.047,0	3.846,1	-200,9	-5,0

Tab. 2: FFL effects of 25 % toll reduction on Great Belt (on the basis of the 2025 figures, Base case B)

ANNEX 1: TIME AND COST FOR SELECTED LORRY ROUTES

As it is depicted in the following three tables, lorry traffic between Hamburg and Copenhagen is not only faster, but generally considerably cheaper over the FFL route, even with reduced toll for the Great Belt Bridge by 25 %. This applies to relations between Scandinavia and Hamburg or south of Hamburg. For these OD's there will be no change of the route choice between the base case and the case with reduced toll rates on the Great Belt Bridge.

	Distance	Minutes (average 65 km/h)	Costs in €
via Puttgarden			
Hamburg Port - Puttgarden in km	164	151	681
Rödby – Copenhagen	160	148	
Tunnel (toll assumed price)	19	18	267
Rest time		45	
Total	343	362	948
via Great Belt (current toll rate)			
Hamburg Port - Nyborg in km	343	317	883
Halsskov - Copenhagen	113	104	
Great Belt costs (current toll)	20	18	158
Rest time		45	
Total	476	484	1041
Difference to FFL	-133	-122	-93
via Great Belt (reduction of toll rate by 25 %)			
Hamburg Port - Nyborg in km	343	317	883
Halsskov - Copenhagen	113	104	
Great Belt costs (reduced toll price)	20	18	119
Rest time		45	
Total	476	484	1001
Difference to FFL	-133	-122	-53

Tab. A1: Comparison of cost and time (prices incl. VAT) for the OD relation Hamburg Port – Copenhagen

Only traffic originating or terminating north of Hamburg may be influenced by a toll reduction of the Great Belt Bridge. As it is shown in table A2, the toll reduction would, for example for the relation Neumünster – Copenhagen, lead to lower overall costs for the route over the Great Belt Bridge in comparison to the FFL route. However, the journey across the Great Belt takes about an hour longer, so that the small cost advantage is by far surpassed by the time advantage. Therefore no changes in the route choice may be expected even for this OD relation.

	Distance	Minutes (average 65 km/h)	Costs in €
via Puttgarden			
Neumünster - Puttgarden in km	149	138	656
Rödby - Copenhagen	160	148	
Tunnel (toll assumed price)	19	18	267
Rest time		45	
Total	328	349	923
via Great Belt (current toll rate)			
Neumünster - Nyborg in km	276	255	783
Halsskov – Copenhagen	113	104	
Great Belt costs (current toll)	20	18	158
Rest time		45	
Total	409	422	941
Difference to FFL	-81	-73	-18
via Great Belt (reduction of toll rate by 25 %)			
Neumünster - Nyborg in km	276	255	783
Halsskov - Copenhagen	113	104	
Great Belt costs (reduced toll price)	20	18	119
Rest time		45	
Total	409	422	902
Difference to FFL	-81	-73	21

Tab. A2: Neumünster – Copenhagen: Cost and time comparison (prices incl. VAT)

For the regions further up in the north, such as Kiel and Flensburg, the route across the Great Belt is already cheaper without the toll reduction. Transports from these regions thus prefer the road across the Great Belt, even without price reductions, so that in this case no changes can be expected either.

	Distance	Minutes (average 65 km/h)	Costs in €
via Puttgarden			
Kiel - Puttgarden in km	285	263	870
Rödby - Copenhagen	160	148	
Tunnel (toll assumed price)	19	18	267
Rest time		45	
Total	464	474	1.137
via Great Belt (current toll rate)			
Kiel - Nyborg in km	269	248	774
Halsskov – Copenhagen	113	104	
Great Belt costs (current toll)	20	18	158
Rest time		45	
Total	402	415	932
Difference to FFL	62	59	205
via Great Belt (reduction of toll rate by 25 %)			
Kiel - Nyborg in km	269	248	774
Halsskov – Copenhagen	113	104	
Great Belt costs (reduced toll price)	20	18	119
Rest time		45	
Total	402	415	892
Difference to FFL	62	59	245

Tab. A3: Cost and time comparison (prices incl. VAT) for the OD relation Kiel – Copenhagen