

Cost-benefit analysis of The Fehmarn Belt Fixed Link

The Danish Ministry of Transport

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The analysis in brief

The consultancy firm Incentive has been commissioned by the Danish Ministry of Transport to compute the value for society of a fixed link across the Fehmarn Belt including onshore facilities - a "cost-benefit analysis". The analysis has been prepared in the same way as assessments of other new infrastructure projects.

The analysis shows that, over a period of 50 years, the investment in the Fehmarn Belt Fixed Link will generate an economic return of 5.0 per cent for European society. The result for Danish society in isolation is almost identical.

The importance of The Fehmarn Belt Fixed Link

The Fehmarn Belt Fixed Link is one of the largest standalone construction projects currently underway in Denmark. In the same way as the Great Belt Fixed Link and the Øresund Bridge significantly reduced travelling time and brought two regions and countries closer together, a Fehmarn Belt Fixed Link would bring Denmark and Scandinavia closer to Germany and the rest of Europe.

A quicker and easier way across the Fehmarn Belt

The tunnel under the Fehmarn Belt will reduce travelling time between eastern Denmark and the rest of Europe to the south. While it currently takes 45 minutes to cross the Belt by ferry, the journey will take ten minutes in a passenger car when the fixed link opens at the end of 2021. This in itself represents a significant time saving. However, no longer having to waste time waiting for the ferry or leave at a fixed time in order to reach a ferry departure will be equally important.

In this analysis we assume that the price to cross the Fehmarn Belt Fixed Link in a car or lorry will be similar to the ferry price. This means that travellers will enjoy all the benefits of arriving sooner without having to pay more than they do today.

Major upgrades of the railways will also provide benefits for travellers who are not crossing the border

The overall project comprises more than "just" a tunnel under the Fehmarn Belt. The infrastructure associated with the link will be upgraded in both Denmark and Germany. There will be some minor upgrades of roads, along with major upgrades of railways. In Denmark, the railway from Vordingborg to Rødby will be upgraded from single to double track. The upgrade will be implemented in parallel with the electrification of the railway from Ringsted to Rødby and the raising of the maximum speed to 200 km/h. The railway in Germany will be similarly upgraded between Lübeck and Puttgarden.

Once all the above measures, including upgrading of the German onshore facilities, have been completed, it will be possible to complete the train journey between Copenhagen and Hamburg in 2.5 hours. Furthermore, upgrading the Danish railway will result in a quicker train link for all commuters and other train passengers on South Zealand and between Lolland and Falster.

Large number of international travellers

The Fehmarn Belt Fixed Link is primarily an international link. One-third of the people expected to use the Fehmarn Belt Fixed Link will be resident in Denmark, the remaining two-thirds coming from abroad. Non-Danish travellers will be

distributed relatively evenly between travellers passing through Denmark and travellers starting or ending their journey in Denmark.

Rail freight across the link will be even more international in nature. The traffic forecast for the Fehmarn Belt Fixed Link estimates that 90 per cent of rail freight traffic will consist of transit traffic to and from Sweden.

International travellers will enjoy all the benefits of the link, but will also have to pay for these.

The link will reduce the environmental and climate impacts of transport

The Fehmarn Belt Fixed Link will change traffic flows, most notably for rail freight traffic that currently uses the Great Belt. The route for this traffic will be shortened by 160 kilometres. This will result in less air pollution. At the same time, all other things remaining unchanged, trains and vehicles will use less energy making their own way across the Fehmarn Belt than a ferry plying the same relatively short distance. However, the link will also encourage more people to travel, and consequently result in more air pollution and CO₂ emissions.

Despite this, in overall terms, the Fehmarn Belt Fixed Link will reduce air pollution and CO₂ emissions.

A benefit for Europe

The construction of the Fehmarn Belt Fixed Link and upgrading of onshore facilities represents a major investment. The analysis puts the construction costs for the link and onshore facilities in Denmark and Germany at BDKK 60. Despite this, the link will return a net benefit. Over 50 years, taking into account all costs and benefits in all affected countries, the Fehmarn Belt Fixed Link will return a user-funded net benefit of BDKK 26. This equates to an economic return of 5.0 per cent. Any project that achieves a return of more than 4 per cent is deemed to be a project that makes society richer.

The net benefit reflects time savings and greater flexibility in departure times for the various travellers using the link.

A benefit for Denmark and the Danish government

The link is also a benefit for Denmark in its own right. Taking into account all benefits and costs for Denmark alone, the link and the associated onshore facilities in Denmark will generate a net social benefit of BDKK 28 over 50 years. This equates to an economic return of 5.4 per cent.

Moreover, the fixed link also represents good business for the Danish state, once all impacts are considered. The tunnel and onshore facilities will be paid for by users who use the fixed link. The Danish Treasury will also benefit from a series of derived impacts. For example, revenues from the Great Belt and the Øresund links will be impacted, with fewer people using the Great Belt and more people driving to and from Sweden. The extra traffic will also generate revenues for the state in the form of vehicle tax. Finally, Denmark is expected to receive significant grants from the EU for the tunnel and the onshore facilities.

Thus, there will be a net benefit for users, the Danish government and society as a whole.

Sound investment

The cost-benefit analysis has been prepared based on the best knowledge currently available. However, uncertainty always attaches to estimates of returns on major infrastructure projects. We have therefore performed a number of sensitivity analyses highlighting the sensitivity of the result to various assumptions and calculations. The Fehmarn Belt Fixed Link is economically viable in all the sensitivity analyses.

In overall terms, the analyses also indicate that the Fehmarn Belt represents a sound investment for Europe and Danish society.