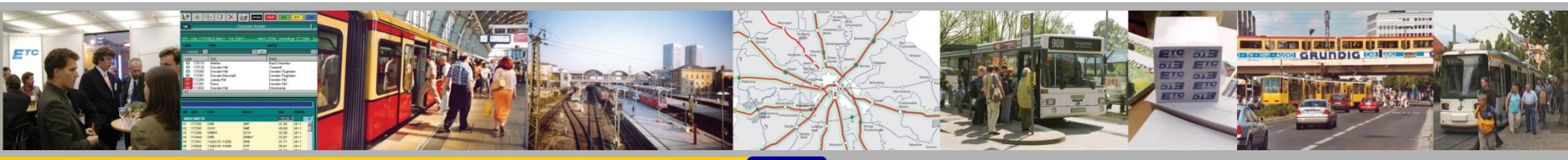
Overview of Infrastructure Analyses for the Fehmarnbelt Railway Corridor

Lübeck, 05 October 2011



Logistics in the Fehmarnbelt Corridor

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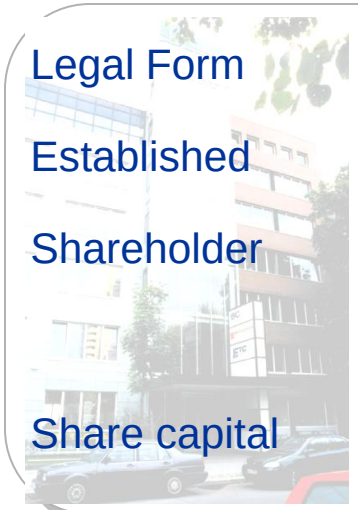
Gauff
THE ENGINEERS WITH THE BROADER VIEW

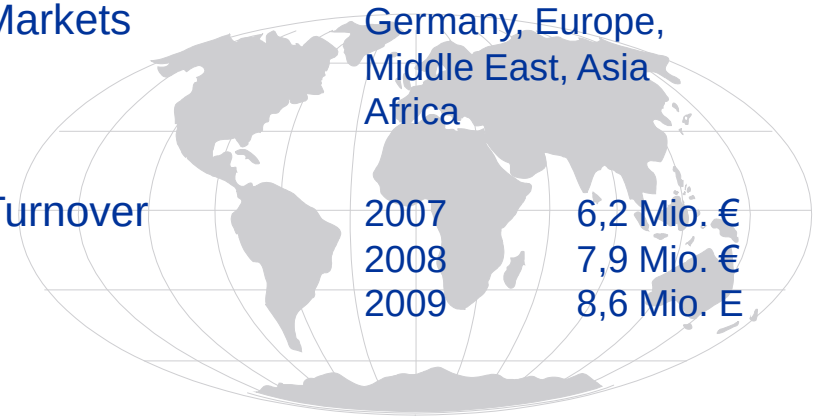
Introducing ETC Transport Consultants



Legal Form	Limited liability company
Established	1974
Shareholder	- Gauff Rail Engineering GmbH & Co. KG (74 %) - COWI A/S (26 %)
Share capital	1,79 Mio. €

Number of Permanent Staff: 85

Engineers, transport planners, business managers, political scientists, sociologists, geographers and IT specialists



Markets	Germany, Europe, Middle East, Asia Africa	
Turnover	2007	6,2 Mio. €
	2008	7,9 Mio. €
	2009	8,6 Mio. E

ETC is DIN EN ISO 9001: 2008 certified

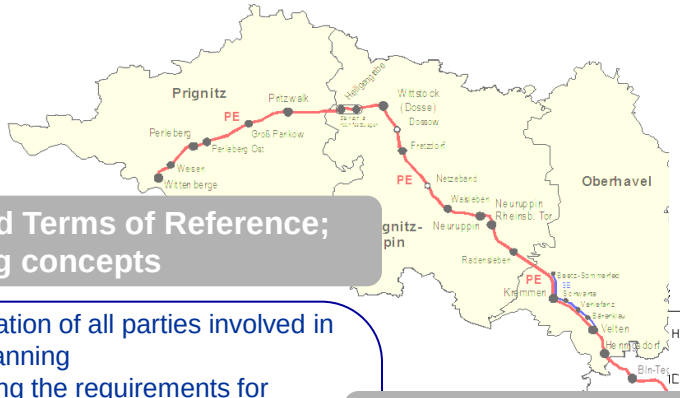
Quality management

Introducing ETC

From Operational Concepts and Engineering Planning to the Realization of Railway Infrastructure Projects

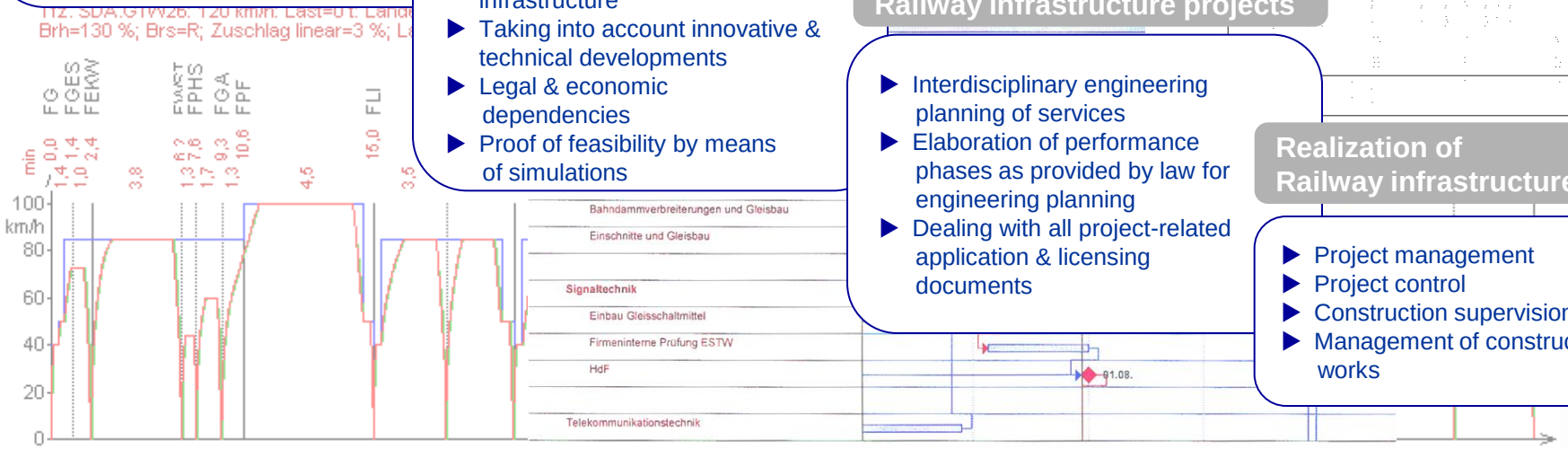
Traffic, operation, and Infrastructure concepts

- Definition of target(s)
- Analysis of status quo
- Development of target network & forecasts for railway systems
- Operation programs
- Infrastructure concepts & their assessment
- Proof of economic efficiency
- Preparation of documents for operation



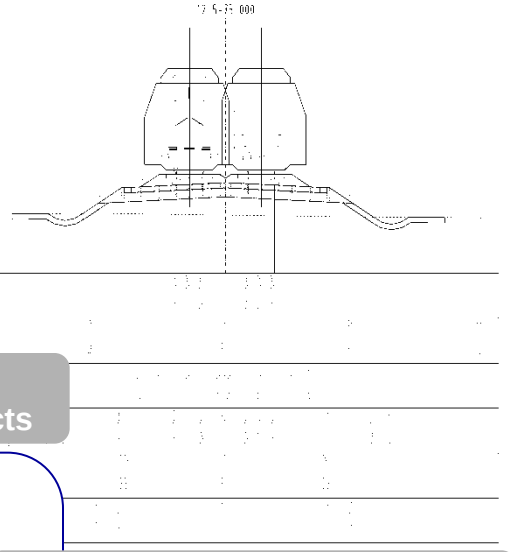
Qualified Terms of Reference; Planning concepts

- Integration of all parties involved in the planning
- Defining the requirements for efficient traffic, operation & infrastructure
- Taking into account innovative & technical developments
- Legal & economic dependencies
- Proof of feasibility by means of simulations



Engineering planning for Railway infrastructure projects

- Interdisciplinary engineering planning of services
- Elaboration of performance phases as provided by law for engineering planning
- Dealing with all project-related application & licensing documents



Realization of Railway infrastructure projects

- Project management
- Project control
- Construction supervision
- Management of construction works

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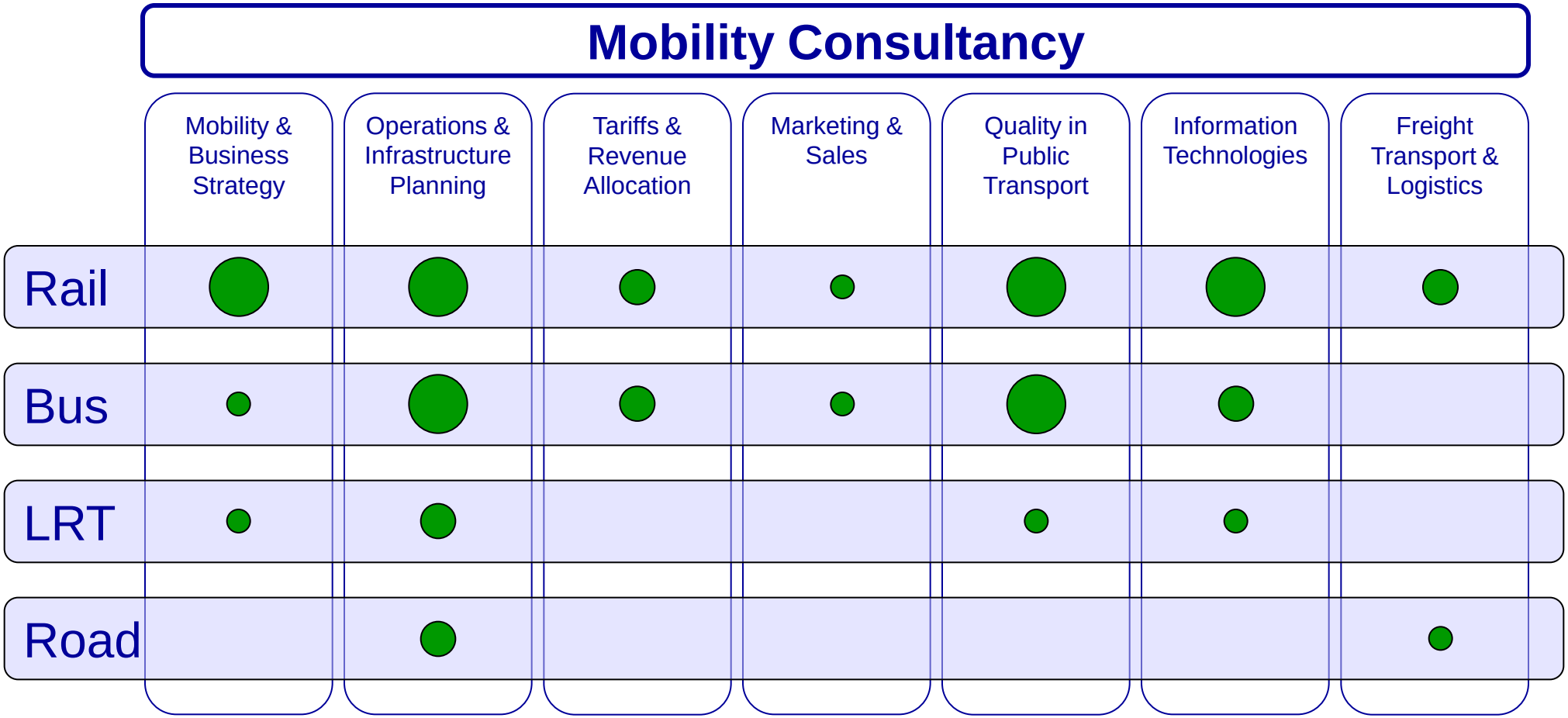


Introducing ETC

Our experience in the region*

- Several studies on railway infrastructure capacity and operation for the railway node in Lübeck 2000-2009 (LHG)
- Gutachten zur effizienten Nutzung der Verkehrsinfrastruktur 2009/2010 (IHK Lübeck) – together with HTC
- Market analysis for an Intermodal terminal in Køge together with COWI 2010 (Trafikstyrelsen)
- Verkehrsgutachten zur Schienenhinterlandanbindung der Fehmarnbeltquerung 2011 (ongoing) – DB Projektbau

*this presentation draws on results and experiences from these studies

Content

Some ideas on traffic demand…

- ***Increase in transport demand*** to encounter increasingly busy transport networks around Europe
- ***Increase in transport distance*** → high increase in traffic volume → higher demands on the regional road network
- Opens up ***new potential for Intermodal transport*** in the future and a higher share for medium and long distance transport

Some ideas on traffic demand…

Challenges:

- more operation necessary due to high share of consumer goods in Intermodal transport
- Higher standardization of vehicles and terminal equipment necessary
- More capacity on the railway side to serve freight traffic as well as passenger traffic
- high punctuality and reliability of IMT traffic
- Shuttle concepts for medium distance transport

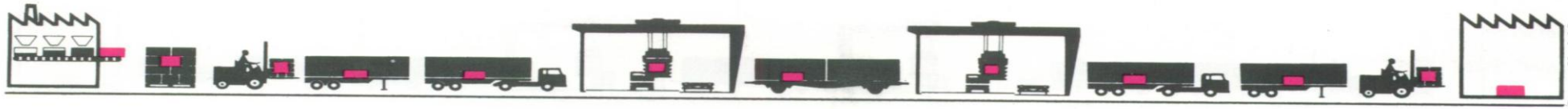
Some ideas on traffic demand…

Three factors which have a direct impact on the future capacity to handle intermodal transport in and around Europe

- Sufficient capacity and free train paths for IMT
- Liberalized access to the railway network
- Sustainable access charges and bridge toll

- Different types of terminals with different functions in different networks and different positions in the network
- Capacity and Availability

- Availability of wagons, locomotives and loco-drivers
- wagons for each type of cargo unit
- Reliability and maintenance



Requirements for railway infrastructure

Why is infrastructure capacity relevant?

- **Understanding Capacity**
  Railway capacity is not intuitively obvious
- **Highly interrelated infrastructure**
  An infrastructure improvement in one location can have significant impacts in another location, sometimes far from the improvement. A railway simulation can identify the impacts of such a change
- **High cost of infrastructure**
  Improving a railway is expensive (cost for improvement and construction time). Poorly planned and executed improvement will increase a railways long term operating costs

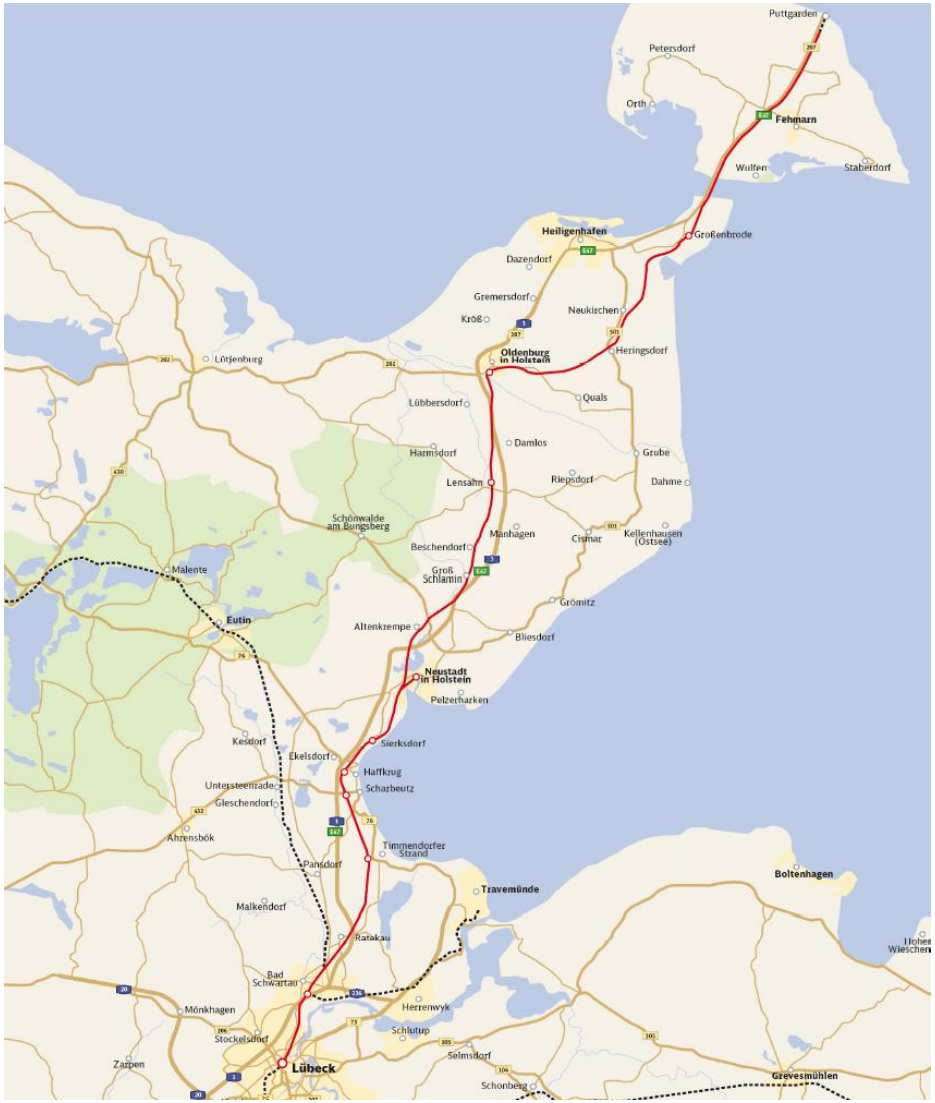
Requirements for railway infrastructure

Line capacity (trains per day, total)

Single track	Vmax, Passenger trains				
Vmax, Freight trains	250 km/h	200 km/h	160 km/h	140 km/h	120 km/h
140 km/h	X	*(20-40)*	30-60	40-70	30-80
120 km/h	X	*(20-40)*	30-60	40-70	30-80
100 km/h	X	X	20-40	30-50	30-60
80 km/h	X	X	*(20-40)*	30-50	30-60

Double track	Vmax, Passenger trains				
Vmax, Freight trains	250 km/h	200 km/h	160 km/h	140 km/h	120 km/h
140 km/h	80-160	100-200	120-240	140-280	160-300
120 km/h	*(80-160)*	*(100-200)*	120-240	140-280	160-300
100 km/h	X	*(80-160)*	100-200	120-240	120-240
80 km/h	X	*(60-160)*	*(80-200)*	80-240	80-240

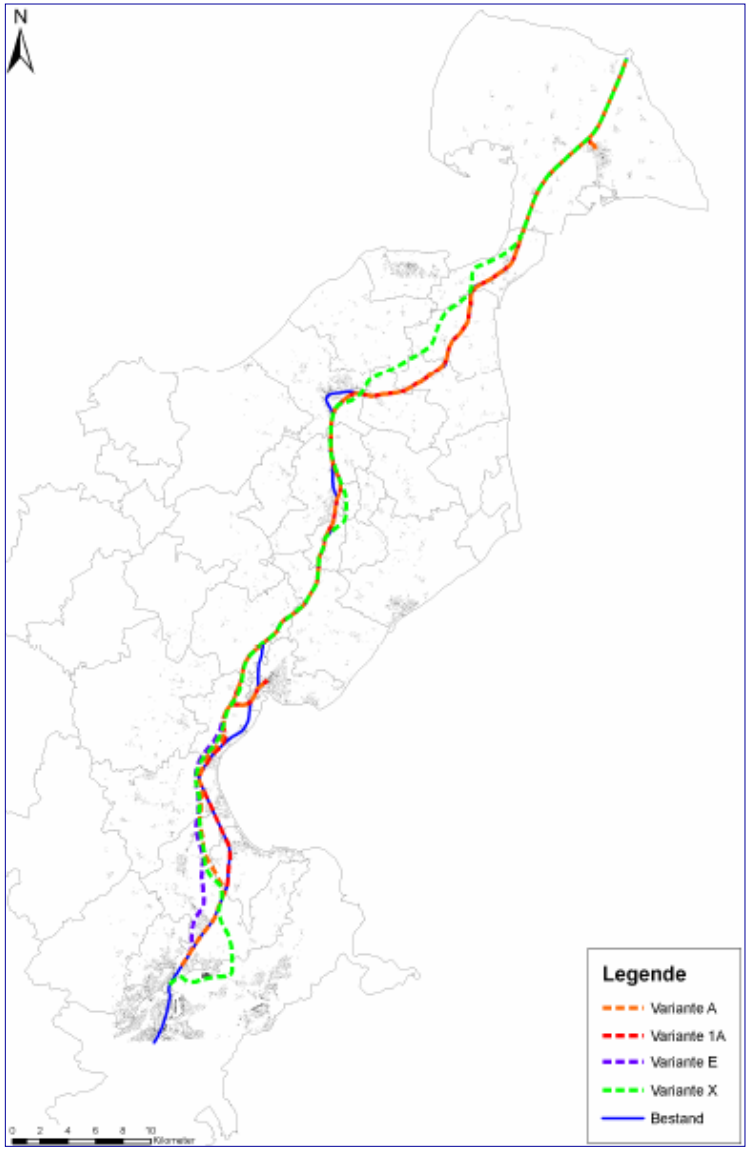
Line section Lübeck - Puttgarden



- *Status Quo "Regional line"*
  - *89 km, single track*
  - *Non electrified*
  - *V_{max} = 80 - 140 km/h*
- *Planned modernisation*
  - 2018: Electrification, *V_{max} = 160 km/h*
    Option 200 km/h?
  - *2025: Double track*

Train pairs	Passenger Regional	ICE/EC/IC	Freight
2011	10 (Puttgarden) 20 (Neustadt)	7	Only local
2025	10 (Puttgarden) 20 (Neustadt)	11	40

Line section Lübeck - Puttgarden

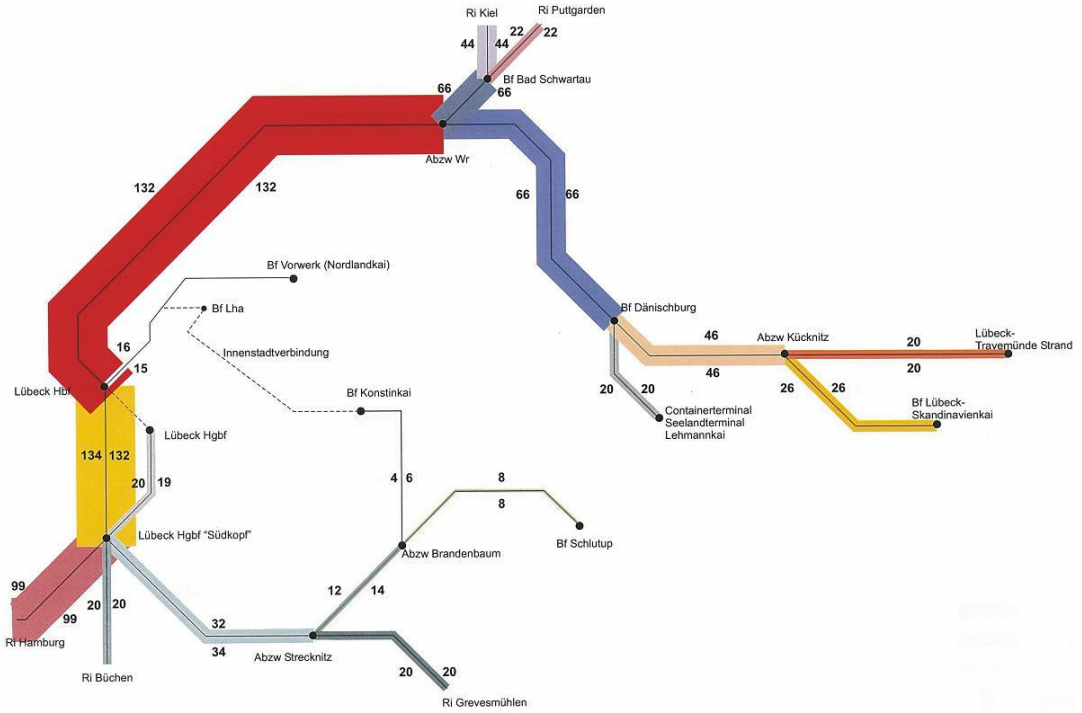


- Regional resistance to planned modernisation along the existing alignment (mostly due to noise)
  → regional planning procedure until 2012 including 4 alignment variants
  - *1A: along the existing alignment with minor changes (i.a. Neustadt and Oldenburg)*
  - *A, E mostly along the motorway A1*
  - *X mostly outside settlements*
- insignificant impact on freight traffic
- Environmental impact vs. accessibility
  - *Stops of A, E and X are located mostly far away from settlements*
  - *No advantage of possible short travel times, e.g. Lübeck – Oldenburg (1 → ½ hour)*

Capacity of Lübeck railway node

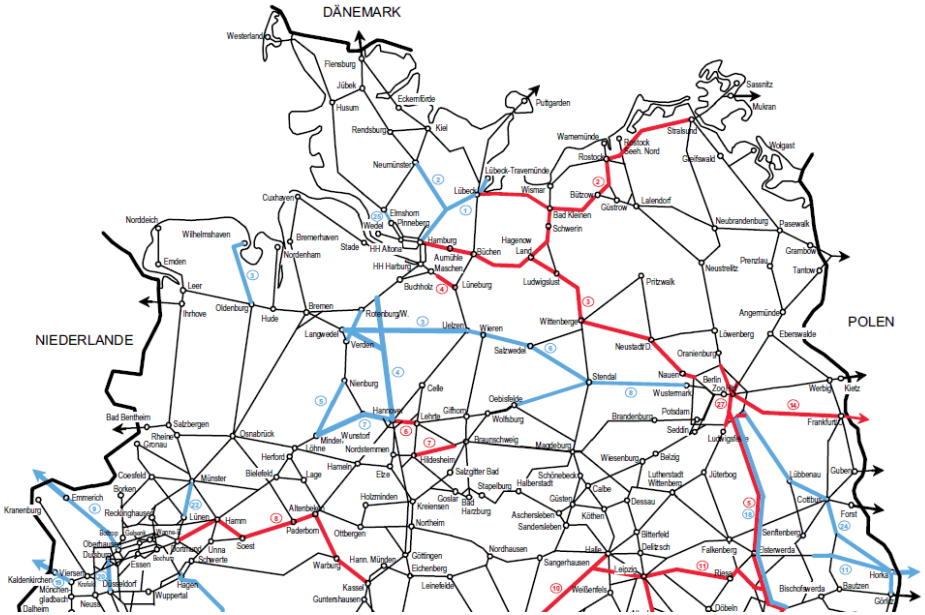
- The future capacity of the Lübeck railway node is crucial for the success of the Fehmarnbelt-Corridor
- Not only in terms of coping with the proposed freight and passenger traffic moving through the node, but also to offer free and unrestricted access to the port facilities in and around Lübeck
- With additional trains from Puttgarden, the node will reach a critical limit

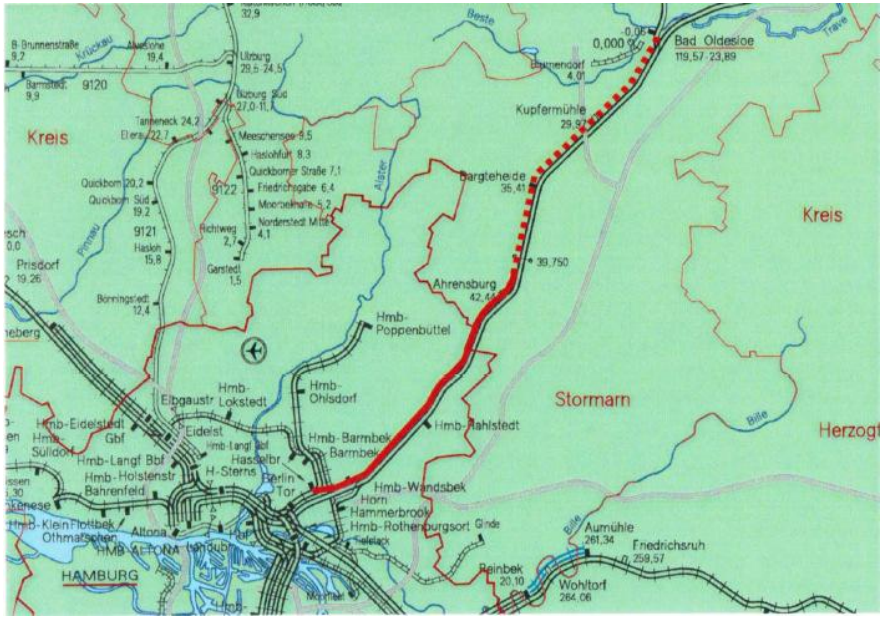
Demand projection for the Lübeck node



Source: „Engpässe im Schienennetz des Lübecker Raums“, Hansestadt Lübeck, März 2004

Infrastructure Hamburg - Lübeck





Consequences for future infrastructure

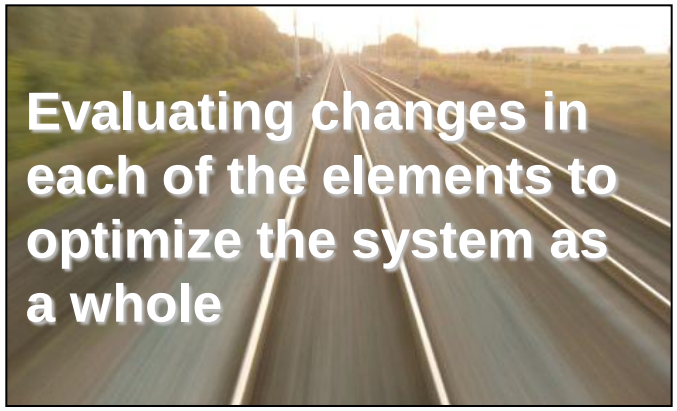
Line	Consequences
Hamburg - Lübeck	Will reach its capacity limit with Fehmarnbelt especially near Hamburg
Lübeck – Neustadt	No restraints to be expected with double track , single track might lead to to some restraints/reduced capacity
Neustadt - Puttgarden	No restraints to be expected with double track , single track might lead to to some restraints/reduced capacity
Puttgarden - Rødby	No restraints to be expected with double track
Rödby - Nyköping	No restraints to be expected with double track
Nyköping - Ringstedt	No restraints to be expected with double track
Ringstedt - Kopenhagen	Will reach its capacity limit with Fehmarnbelt

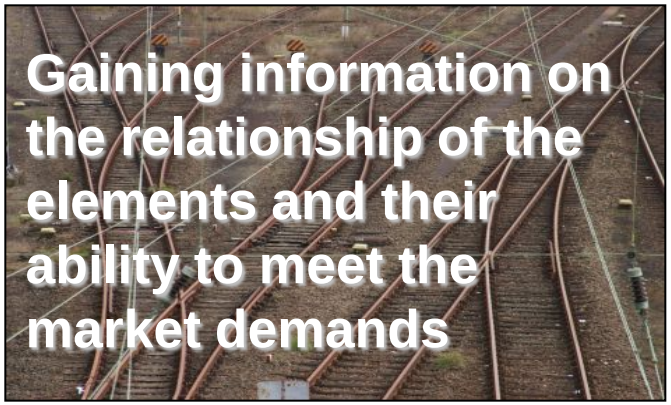
Conclusions

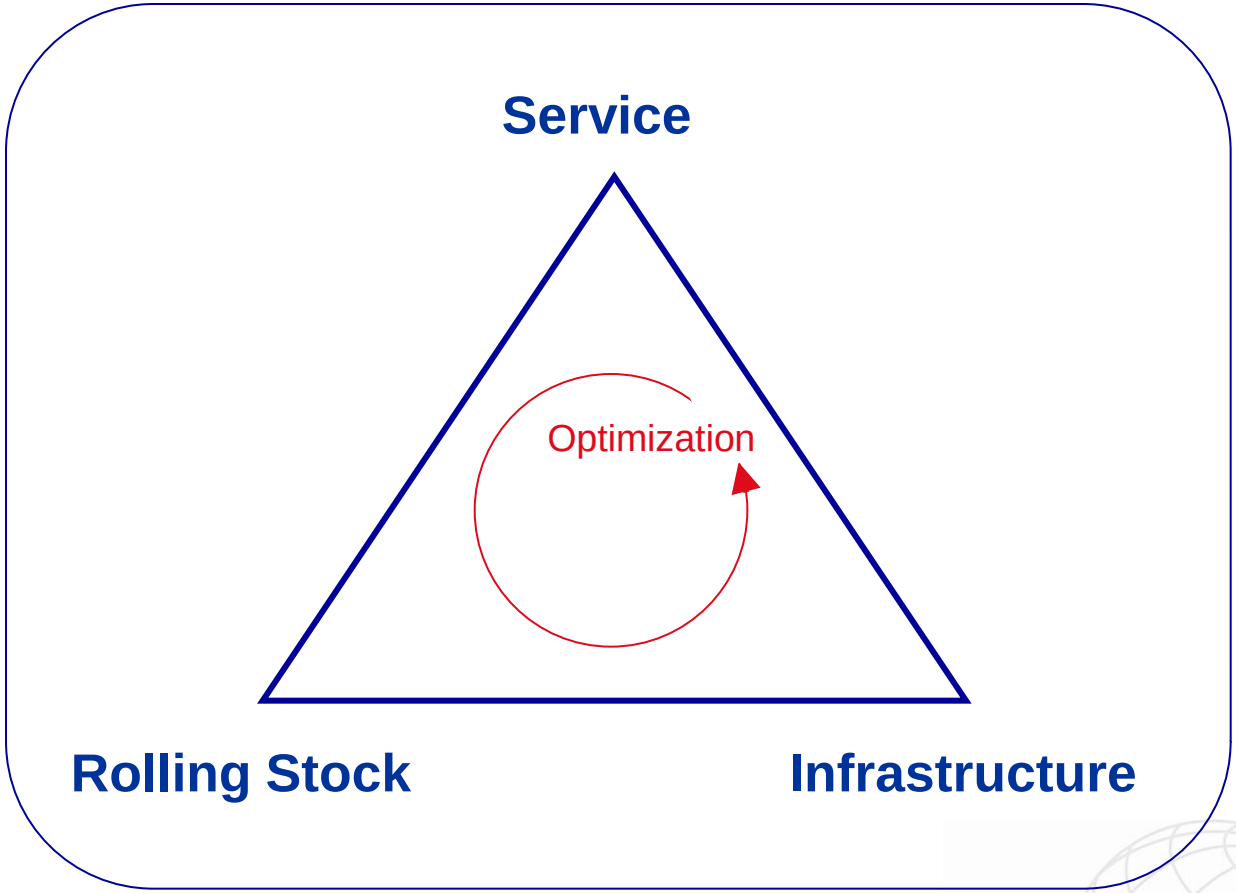
- The existing and planned railway and road infrastructure north of Lübeck should be sufficient to handle forecasted transport demand in the Fehmarnbelt corridor from 2025 onwards.
- But the railway line Lübeck – Puttgarden should be upgraded to a double track line before 2025.
- Capacity restraints to be expected in the railway node of Lübeck and Hamburg (especially on the line towards Hamburg)
- Additional infrastructure measures should be realized in order to add capacity or circumvent the nodes (i.e. strengthening / electrification of the railway lines towards Bad Kleinen and Lüneburg via Büchen).

Conclusions

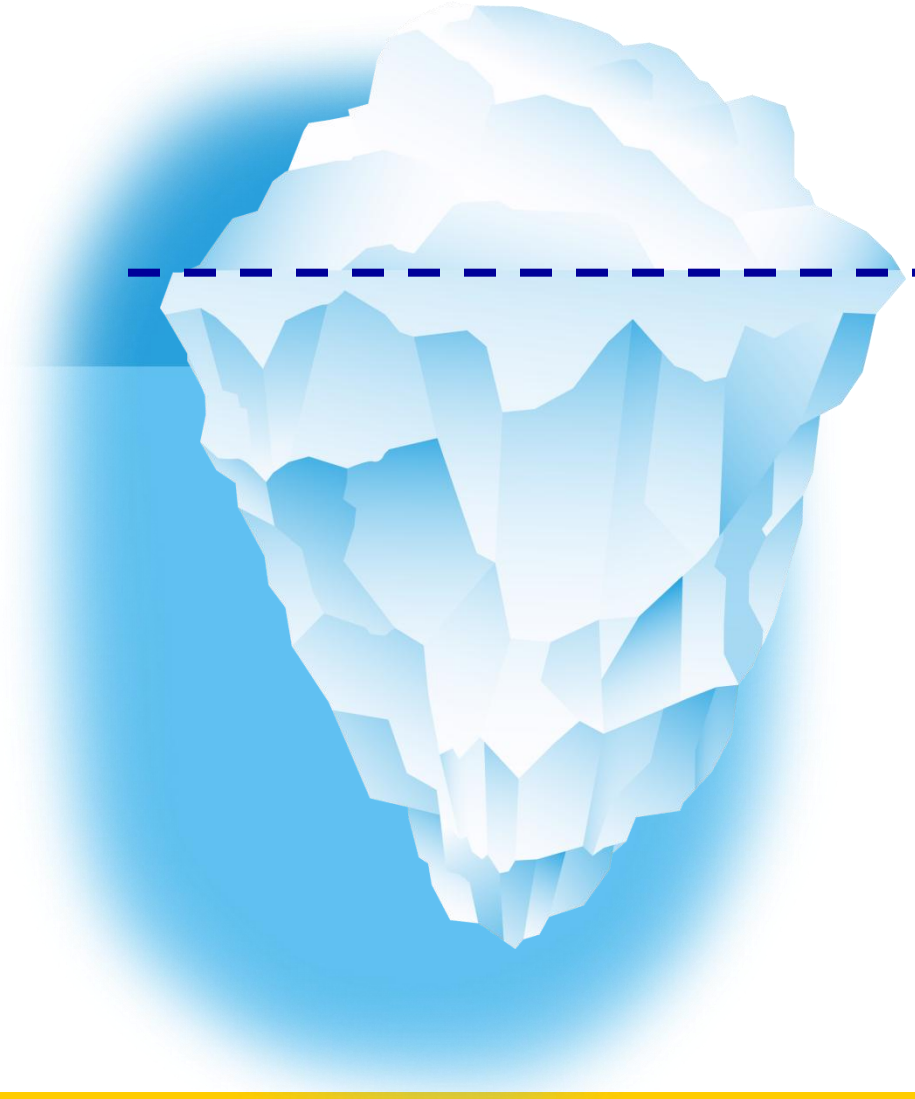
The overall picture needs to be reviewed concerning the Fehmarnbelt Corridor







Conclusions



Above the line

- New connection between two countries
- A “symbol” for growing together

Below the line

- Market development?
- Freight strategy?
- Network capacity?
- Key players in the logistics market?
- Network development in neighboring countries (Sweden/Germany)?