
Integrating the Extended Gateway Concept in Long-Term Strategic Seaport Planning: A European Case Study

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Agenda

1. Problems of port development
2. Longer-term strategic port planning
3. The port of Antwerp case
4. The port system and the extended gateway approach
5. The calculation model
6. Conclusion

Problem of port development (1)

- Large-scale port development in the EU is becoming increasingly difficult:
 - Long lead times due to legal uncertainties, court procedures, long planning processes
 - E.g. Maasvlakte 2 (Rotterdam), Deurganckdok (Antwerp), Port 2000 (Le Havre)
- Port authorities have become aware that ***spatial and environmental parameters*** must be included in the planning process in order to secure long-term port development

Problem of port development (2)

- Long-term sustainable port development requires:
 - A **bottom-up approach** to long-term planning
 - An integrative approach, taking into account all **stakeholders** and the **impacts** they consider critical
- Some literature on stakeholder involvement in the port planning process
- Problem: lack of **integrative framework and operational calculation model** to assess impacts of long-term development choices throughout the **overall port system**, showing the unbundled contribution of choices to stakeholder goals

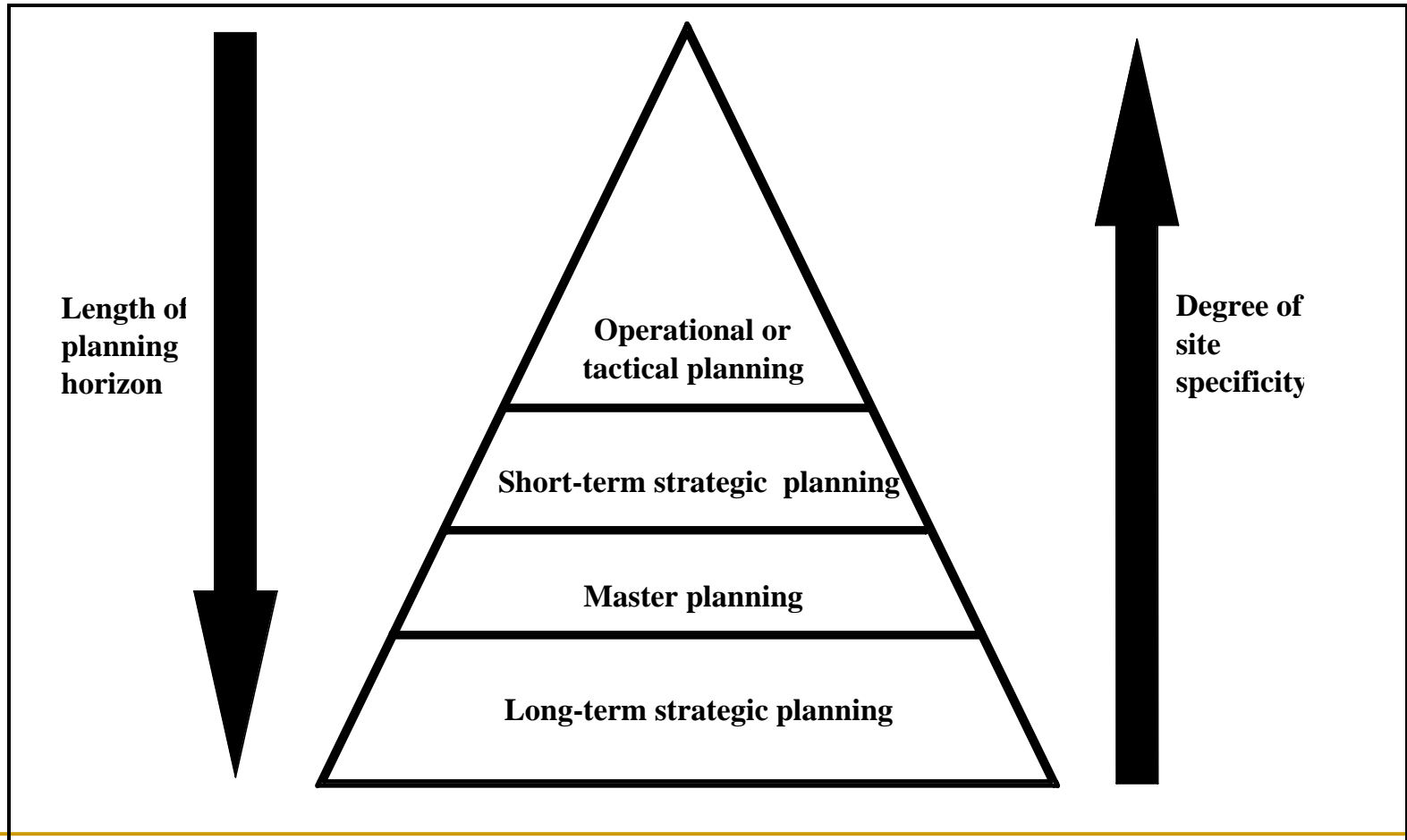
Long-term strategic port planning (1)

- Two types of literature:
 - Focus on the variety in port planning (e.g. Frankel, 1989; World Bank, 1993)
 - Focus on the 'process' of strategic planning (Winkelmans and Notteboom, 2002; Pellegram, 2001; Dooms, Macharis, Verbeke, 2003, 2004)
 - Dual focus: Moglia and Sanguineri (2003)
- Strategic planning types differ in function of:
 - **Time horizon** of the planning process
 - **Outputs** of the planning process

Long-term strategic port planning (2)

- Timing:
 - Short-term planning (1-3 years)
 - Medium-term planning (3-5 years)
 - Long-term planning (a) and (b) (10-25 years)
- Output long-term planning (a): **Master plans**
 - **10 year** development options, with a concrete port development scheme and detailed projects with milestones
 - High level of **site specificity**
- Output long-term planning (b): **Longer-term planning**
 - **25 year** time frame
 - Formulation and evaluation of alternative strategies
 - Identification of the general conditions to be fulfilled for each strategy to make sense
 - **Absence of site specificity and detailed projects**

Long-term strategic port planning (3)



Long-term strategic port planning - beyond masterplans (4)

- Methodological problems:
 - **Large number of parameters** in 'partial' studies
 - **Lack of integration** as well as (explicitly or implicitly) conflicting results
- => Long and difficult planning processes (e.g., Maasvlakte 2)
- **Integrative framework is beneficial** as parameters, assumptions and outcomes are accepted by the community of stakeholders
- **7-step process**

Long-term strategic port planning (5)

Step 1: Define integrative framework, that can 'absorb' partial studies

Step 2: Build an integrative calculation model; select parameters

Step 3: Define macro-economic demand-side scenarios

Step 4: Calculate impacts of demand scenarios

Step 5: Define alternative long-term port strategies (supply side)

Step 6: Evaluate demand/supply tensions in each port strategy

Step 7: Select long-term strategy and define boundary conditions

Background of Port of Antwerp case

- **Flemish Port Decree:**
 - All seaports must implement a planning process with horizon 2030
 - Different task-forces with stakeholders
- **Objective:**
 - Delineation of the port area, based on demand forecasts for 3 'functional areas':
 - 'Economy, Ecology, Mobility'.
 - Creation of a long-term, stable regulatory framework
 - Output: strategic environmental impact report (S-EIR) which sets the outer limits of the port area, adjudicates land to different functions and determines economic expansion possibilities.
- After 2 years of partial study work (more than a dozen studies), the ***lack of an integrative framework and calculation model became painfully apparent***

The port system (1)

- **Requirements** for an integrative framework and calculation model for longer-term planning:
 - Systematic, structured approach, including all the **port 'activity legs'**
 - **A minimum of site specificity**
 - **No detailed sectoral dis-aggregation** (focus on a few principal sectors)
 - **Calculation model must be transparent and easy to operate**
 - Easily **understandable**, no 'black boxes' (presence of non-experts in validating committees, e.g. green movement).

An Extended Gateway Approach to Longer-Term Planning

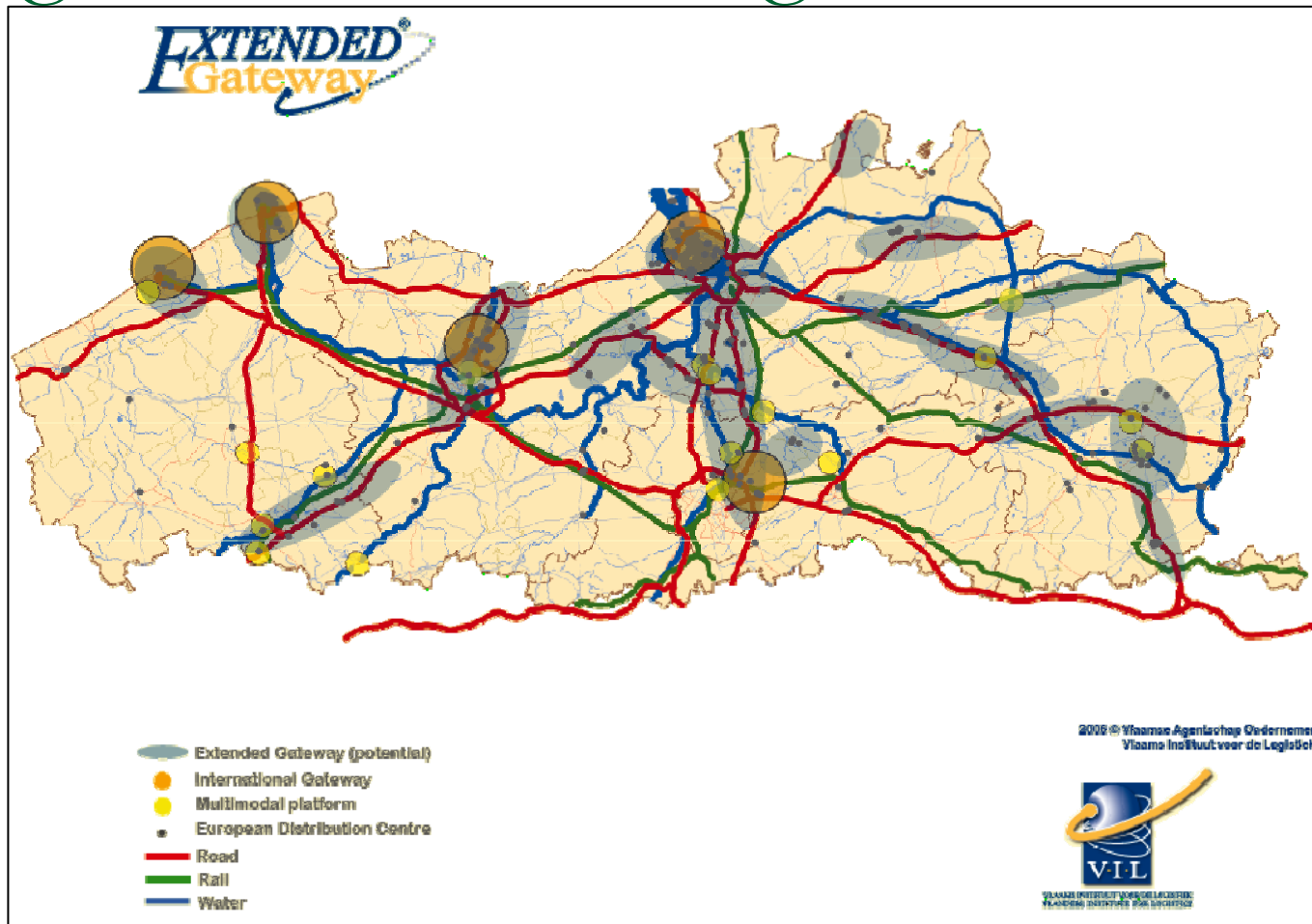


Table 1: A systematic approach to decompose the port system

The port system (3)

- Some **general modeling problems**:
 - **Unclear linkage** between traffic growth and land use requirements for some cargo categories
 - Some impacts have a high degree of **site specificity** (e.g., noise)
 - Definition of the **unit of land** (hectares):
 - Need for a transparent classification
 - Financial, social and economic impacts:
 - Particular sectoral **trends** can affect what activities are included in a specific cluster, and where these activities are performed (inside or outside the port)

The calculation model (1)

- Distinction between primary and secondary modules
- **Primary modules:**
 - Describe the basic linkages
 - Simple structure
- **Secondary modules:**
 - Are pegged onto the primary module system
 - Are easy to define, as separate sequential 'spin-offs' of the primary modules
 - This flexible structure allows for efficient recalculation during the planning process (stakeholder interaction)

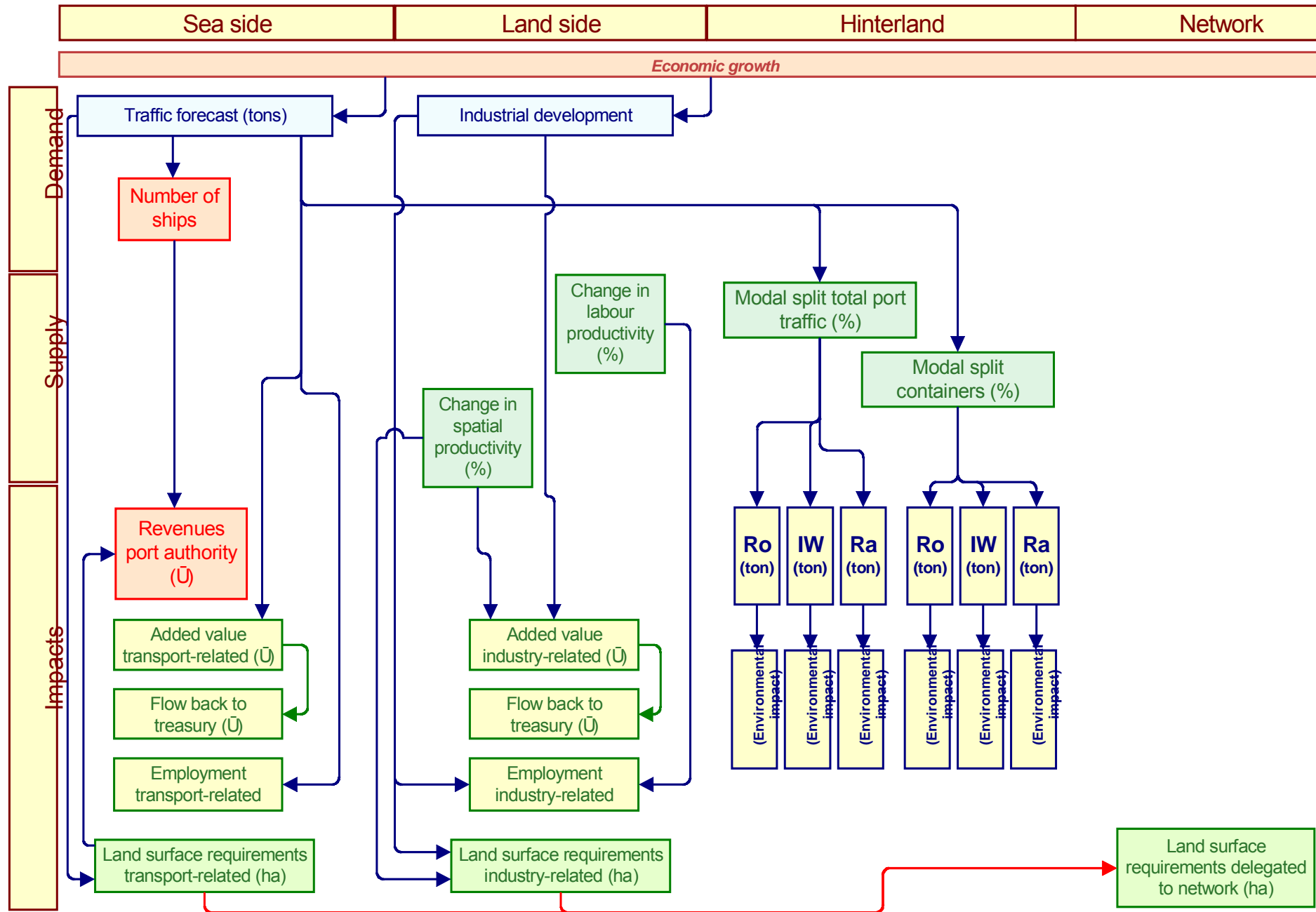
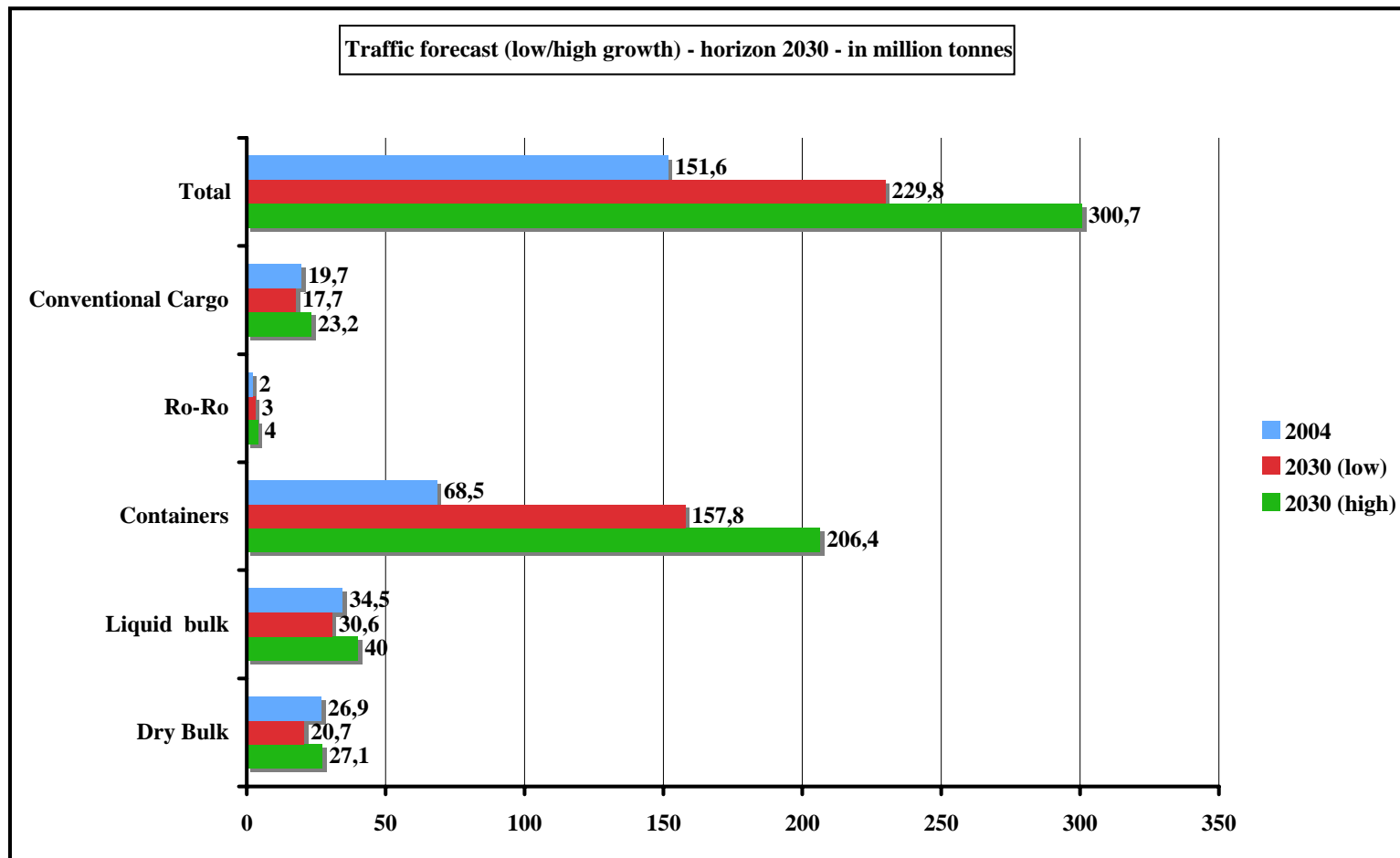
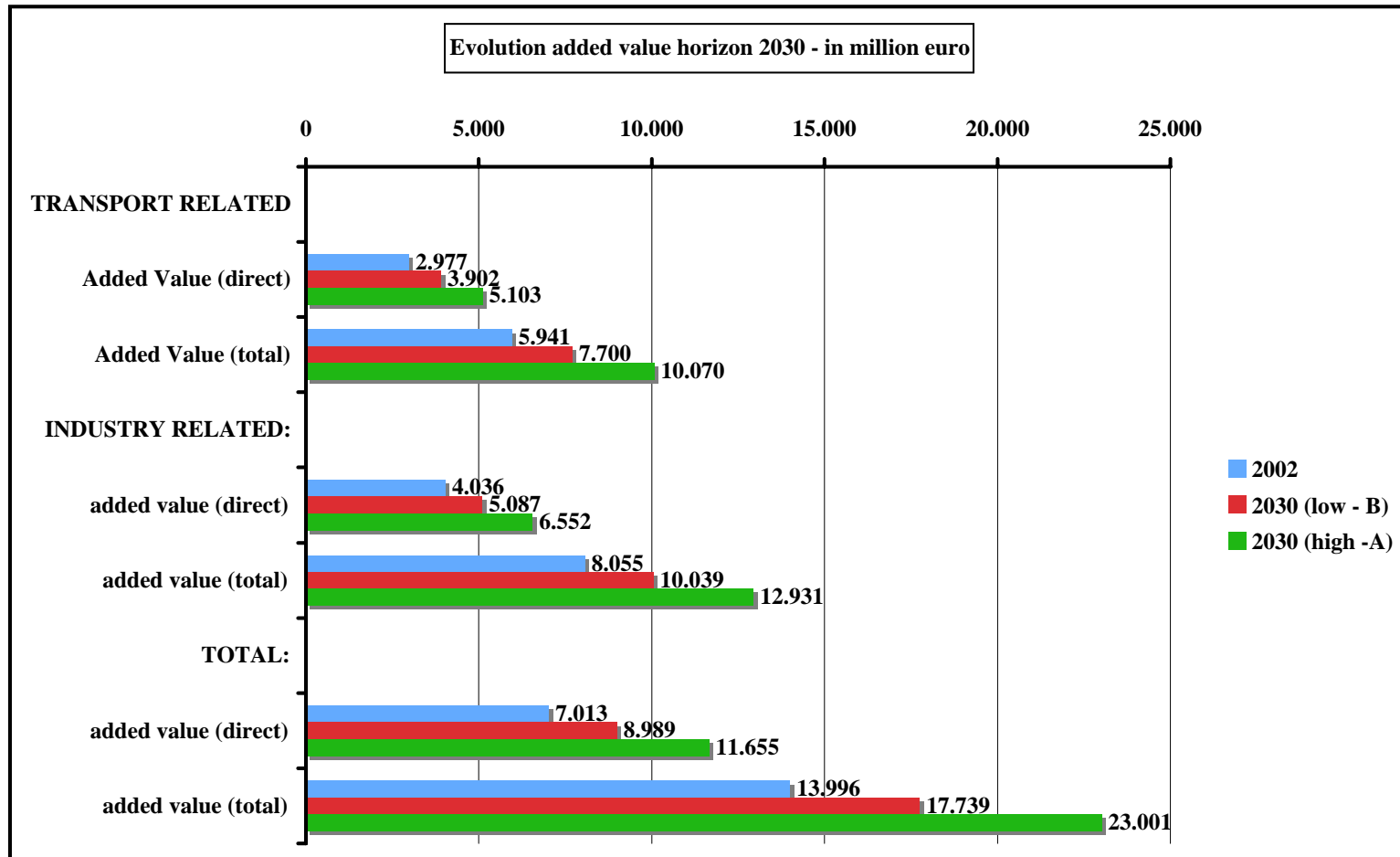


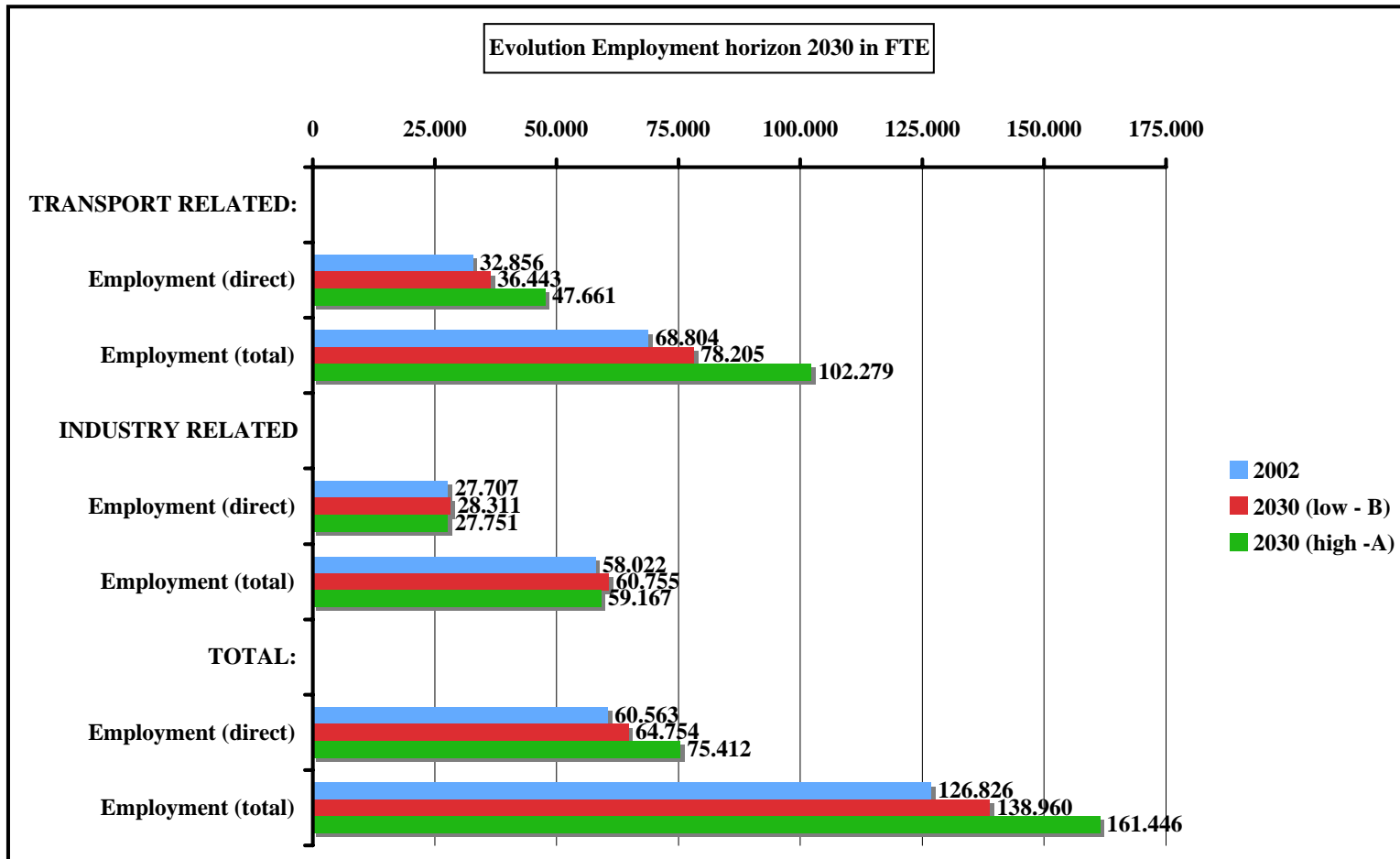
Figure 4: Traffic forecast for the port of Antwerp (horizon 2030)



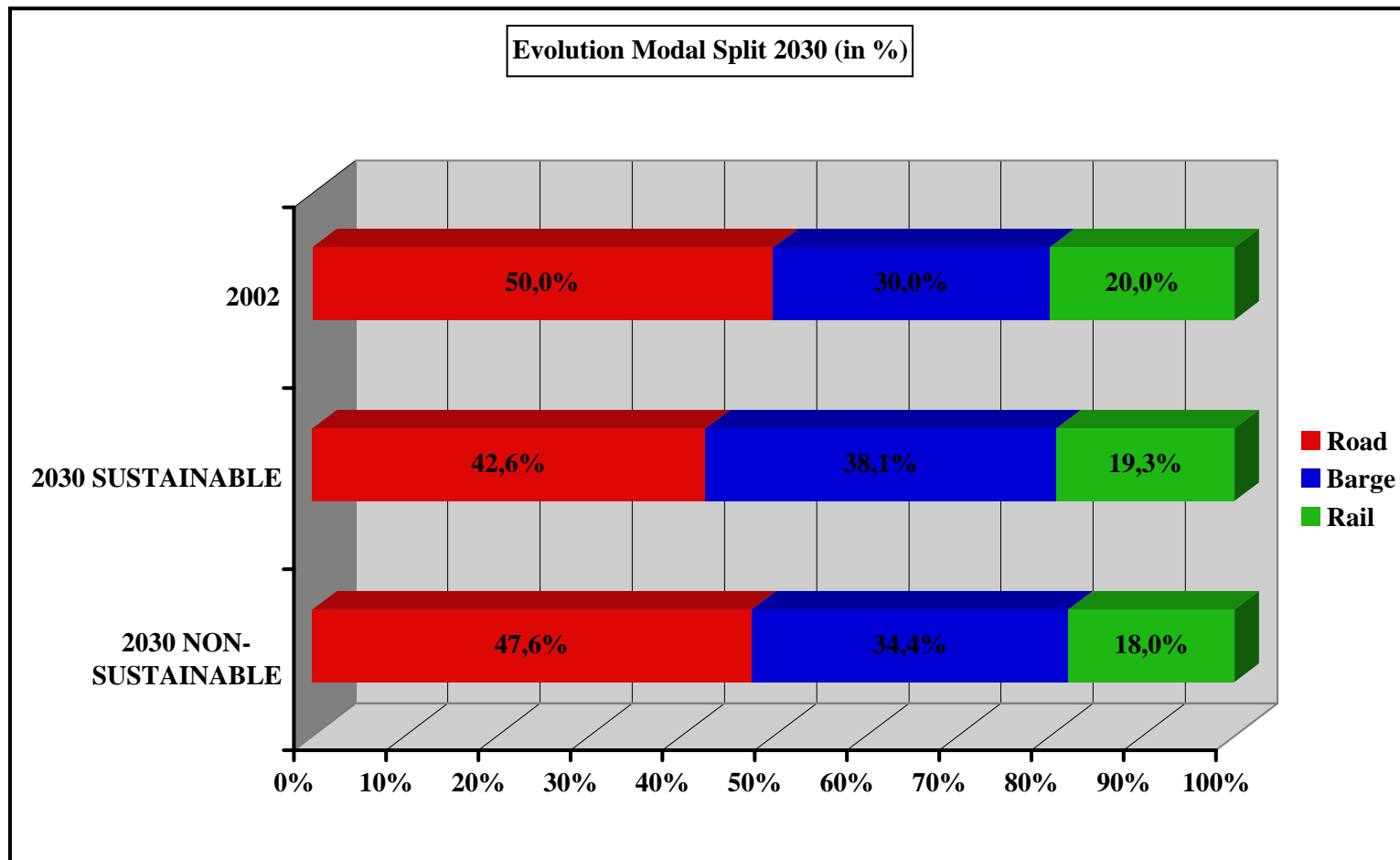
Evolution Value Added



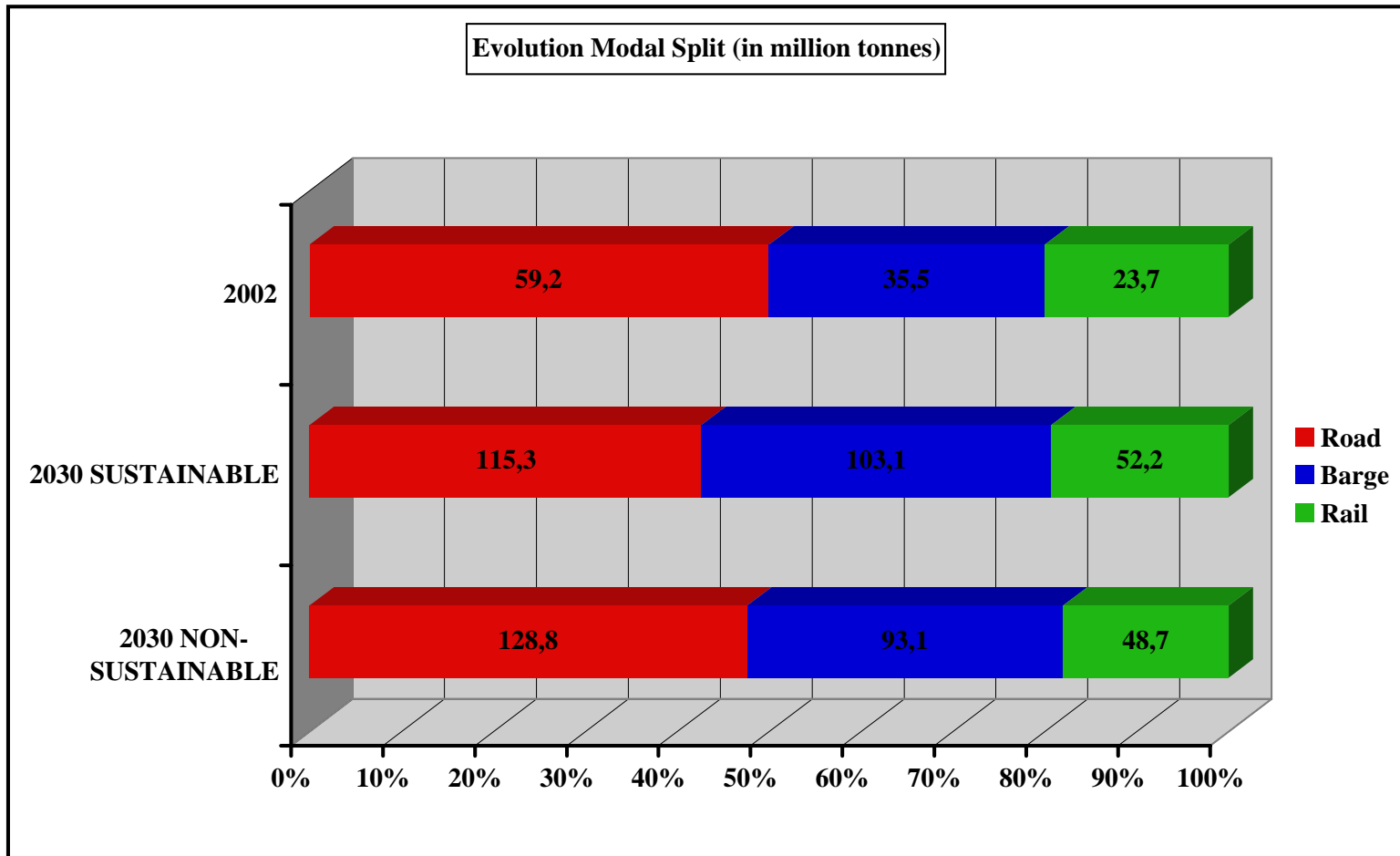
Evolution Employment



Evolution Modal Split (%)



Evolution Modal Split (million tonnes)



The calculation model (3)

- Secondary modules:
 - **Intermodal terminal capacity** in the port **network**, including social and economic impacts
 - **Land requirements** for economic activities in the port network (**Value Added Logistics, European Distribution Centres**), including social and economic impacts
 - **Emissions** of the principal sectors based on parameter values that take into account the (expected) evolution of environmental performance

Table 6: Extended gateway impacts

(Additional impacts in the extended gateway)	High growth		Low growth	
	Horizon 2015	Horizon 2030	Horizon 2015	Horizon 2030
Intermodal capacity demand (in TEU)*	884,346	1,806,816	732,771	1,381,538
Intermodal capacity demand (in net metres)	2,954	5,902	1,979	3,869
Intermodal capacity demand (in net hectares)	33.7	78.3	23.7	54.0
Employment impact intermodal terminals (FTEs)	/	517	/	395
Added Value impact intermodal terminals (million euros)	12.7	25.9	10.5	19.8
Land requirements for VAL – EDC	833	1,218	504	676
Employment impact VAL – EDC (FTEs)	44,763	65,448	27,103	36,328
Added Value impact VAL – EDC (million euros)	4,102	5,997	2,482	3,329

Including the demand from the port of Rotterdam affecting the Belgium intermodal barge network

Conclusion

- An ***integrative approach*** to port planning, implemented after a preliminary phase within which a variety of focused, but partial studies are undertaken, can ***enhance the validity and legitimacy of the long-term port planning*** process
- ***Scarcity of land inside the port legitimizes the extended gateway perspective***
- Developing such an integrative approach and ***calculation model***, as well as ***determining the value of parameters is time-consuming and costly***, given ***multiple interactions*** (both plenary and with individual stakeholder groups)
- The **benefits of the integrative approach are high**: the planning process is more efficient (approx. 3,5 years versus 7 years Maasvlakte 2)