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Integrated River Engineering Project on the Danube to the East of Vienna

Requirements from the Navigation Side

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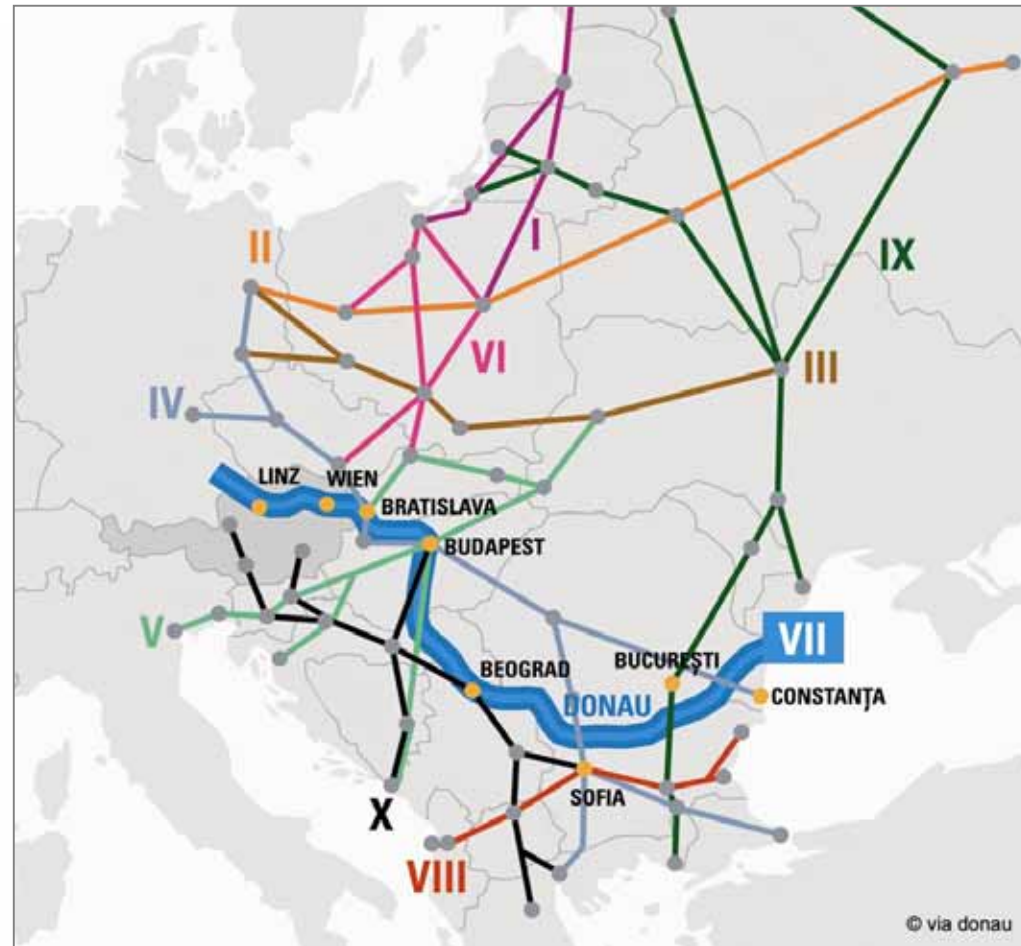
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Developments in the Danube Corridor

The Danube Corridor (1)

- 2.888 km length
- Economical and cultural backbone
- 10 countries
- Enlarged Europe
- Pan-European Corridor VII

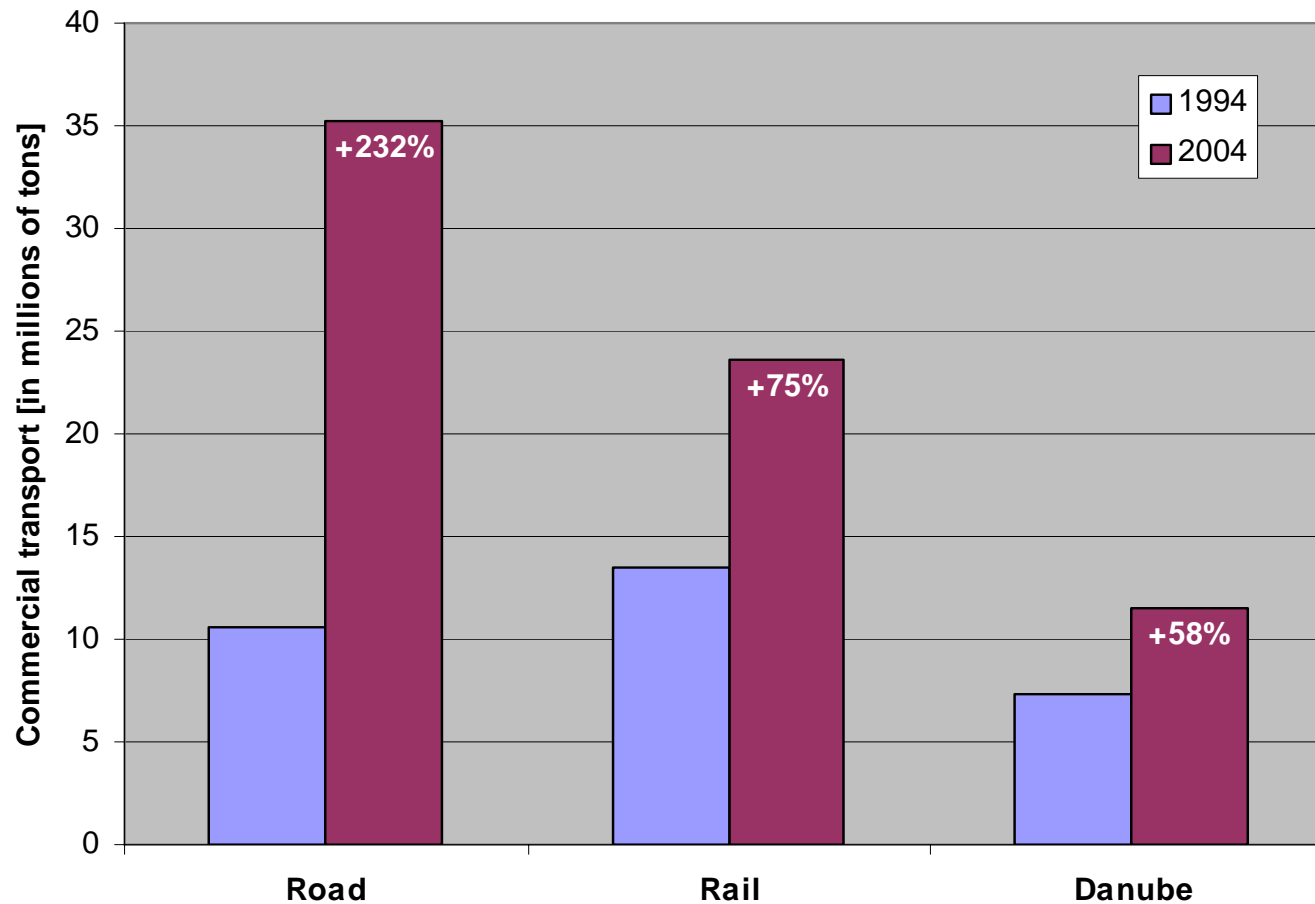


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The Danube Corridor (2)

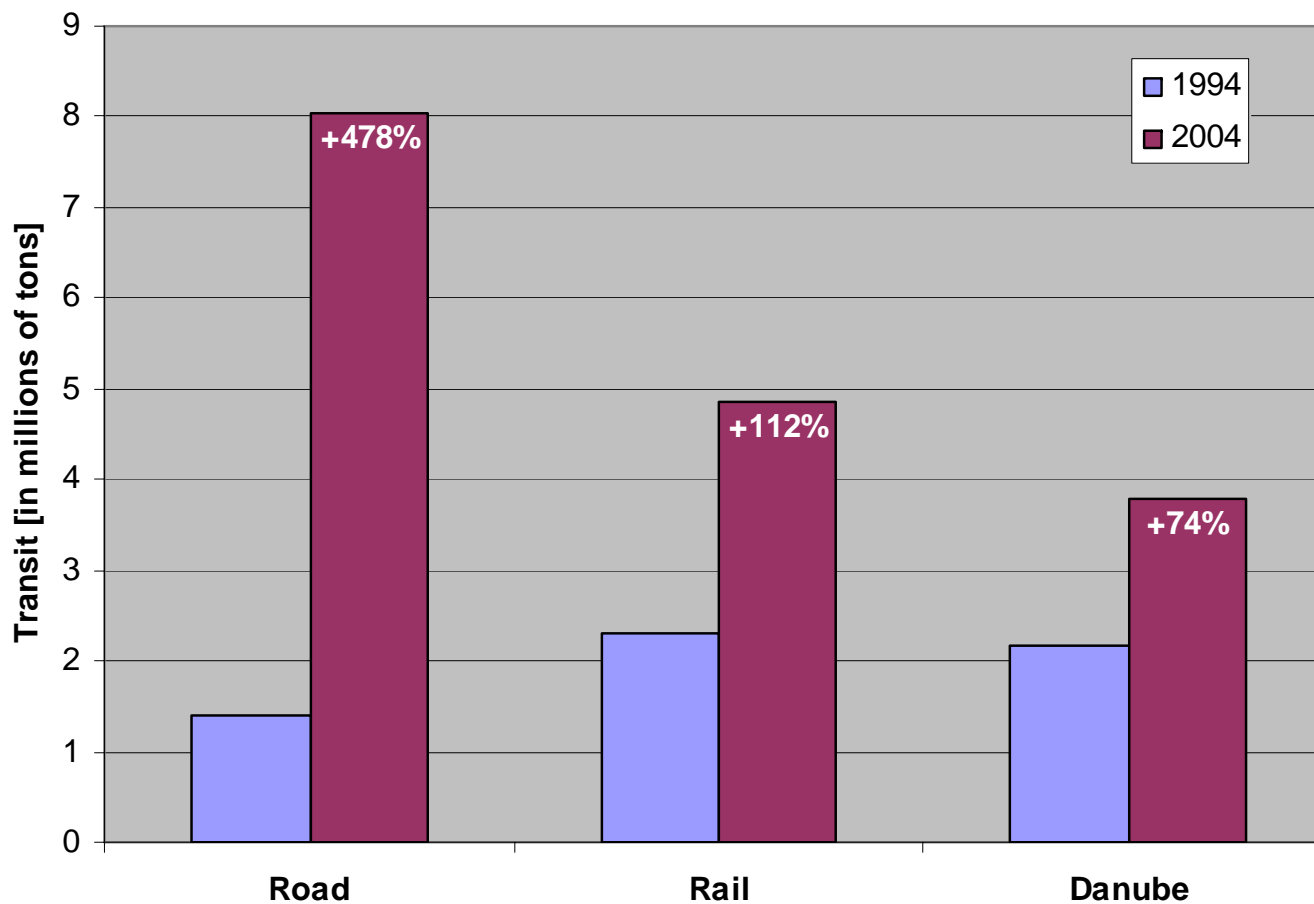
- Enlargement of the EU to the East (2004 & 2007)
- Increase in economic relations and in the exchange of goods
- Growth of trade of more than 10 % p.a.
- Sharp increase of the traffic-volume along the Austrian Danube Corridor + 124% 1994-2004; Road Transit + 478%
- Transport from East to West is getting more important
- Danube Corridor is the fastest growing transport corridor in Austria

Traffic Increase Austrian Danube Corridor Commercial Transport 1994-2004



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Traffic Increase Austrian Danube Corridor Transit 1994-2004



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Development of Danube Corridor

Forecasts show a continuously strong growth in traffic-volume in the Danube Corridor

→ in order to cope with the growing traffic-volume in a social and environmental sustainable way, multi-modal transport has to be intensified

→ thus an adequate proportion of the growth of traffic should be transferred to inland navigation

Inland Navigation Facts (1)

- Sufficient capacities on the Danube are available
- Compared to other means of transport, inland navigation generates less pollution and less noise
- No additional land consumption is needed
- Inland navigation can lead to significant cost reductions and thereby strengthens the European industry
- Last but not least inland navigation is one of the safest transport modes

Inland Navigation Facts (2)

Insufficient and extremely varying water depth on the free-flowing river sections restricts the market share and competitiveness of inland navigation

Impacts:

- Failures in transport operation (waiting time, lighterage, substitute traffic)
 - wide spread of the price-performance ratio
 - reduced efficiency
 - reduced transport safety
 - Necessity of high storage capacity for companies
 - limited market potential
 - reduced competitiveness of inland navigation
- ↓
- Decision to opt for other means of transport!
 - shrinking proportion of inland navigation in modal split

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Promotion of Inland Navigation

Optimise the utilisation of free capacities on the Danube by

- modernising waterway transport and making it more attractive (e.g. by telematics)
- integrating inland navigation into sophisticated logistics chains

and:

- **improving insufficient fairway conditions** – certain bottlenecks along the Danube

→ **NAIADES / NAP** (National Action Plan Danube Navigation)
Eliminating the bottlenecks is a cornerstone in European transport policies



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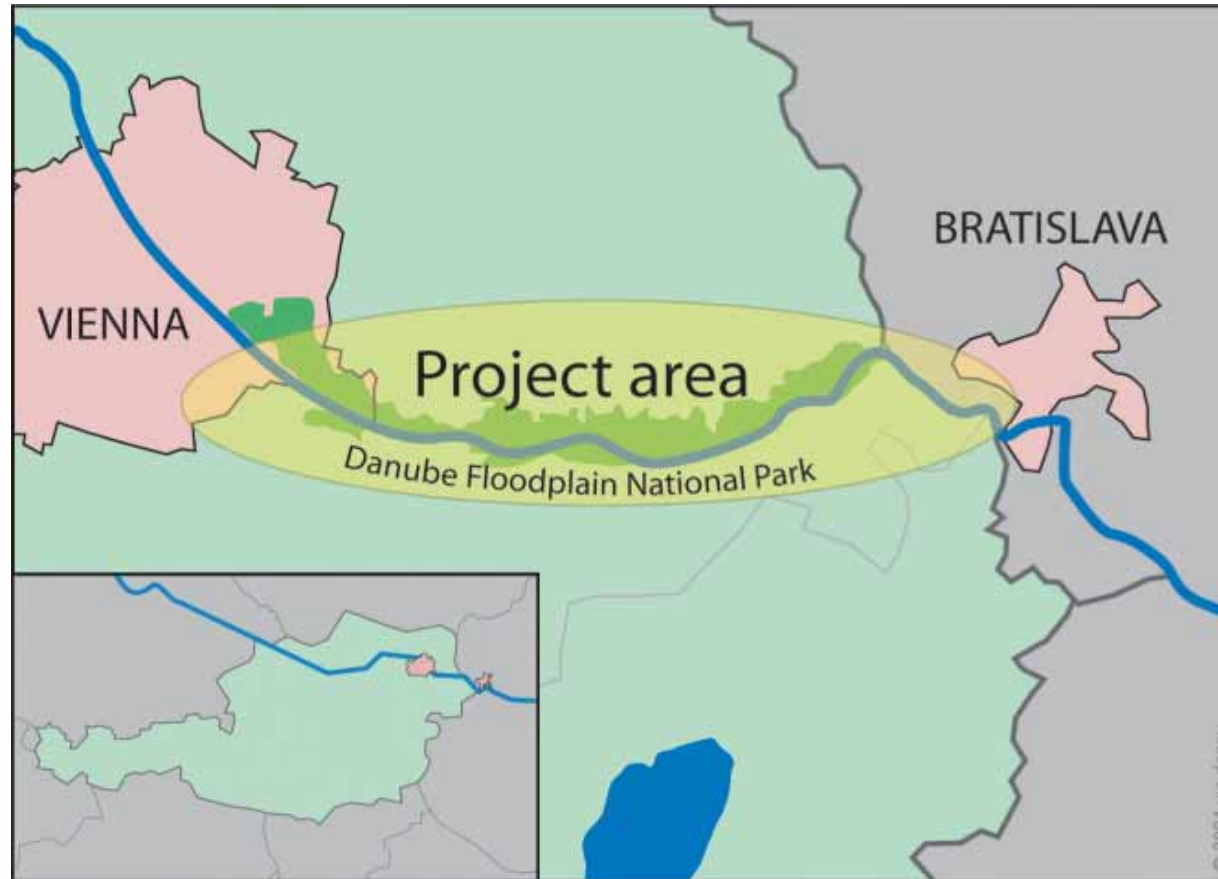
Requirements of Inland Navigation Danube East of Vienna

National Action Plan (NAP)

Within the NAP the Austrian transport policy takes measures

- to improve the most significant weak links on the Austrian Danube,
- to increase the efficiency and the competitiveness of inland navigation and thereby
- to benefit from the free capacities of the Danube river!

Bottleneck on the Danube to the East of Vienna



Project area: stream-km 1.921,0 - 1.872,7
from the Freudenu Power Plant to the Austrian-Slovak border

Goal of the Integrated River Engineering Project

Improvement of waterway conditions hand in hand with the ecological situation of the Danube Floodplain National Park!

Planning Approach

During preparation of the Environment Impact Statement an interdisciplinary committee of prominent experts from water engineering, inland navigation, ecology and regional economy have analysed 11 scenarios for the Danube section to the East of Vienna regarding

- methods of the river bed stabilisation (the optimisation of the current status, addition of normal bed load or granulometric improvement of the river bed with the addition of coarse gravel),
- navigable water depth (of 25dm, 27dm or 32dm) and
- upgrade techniques (combination of variants of river regulation structures and modifications to the river bed)

Objectives form the Navigation side

Main goals:

- increase the average utilisation of inland navigation from approx. 60% close to 80%
- agree on fairway parameters which allow average cost structure and cost trends comparable to Rhine

Degree of Utilisation

Average degree of utilisation of ships being used for long-range transport on the Upper Danube:

year	number of loaded ships	capacity total [t]	average capacity / ship [t]	cargo total [t]	average degree of utilisation [%]
1997	218	280.205	1.285	161.119	57,4
1999	348	454.372	1.306	278.982	61,4

the average degree of utilisation on the Upper Danube amounts to approx. **60%** - on the Rhine approx. to **85%!**

Criteria of Navigation

Cost-effectiveness of inland navigation:

- fluctuation of possible draught
- fluctuation of costs
- reduced competitiveness

Reliability of inland navigation:

- failures because of low water periods
- average capacity utilisation over one year period

Flow of traffic:

- obstacles through the dislocation of the river bed and the resulting dredging (incl. maintenance costs!)

Transport safety:

- increased risk of transport failures and accidents

Methodical Approach of Navigation



Calculation of Possible Draught

2-step process:

1. conversion fairway depth → potential draught:

$$\text{pot. draught} = \text{Fairway depth} \\ - \text{underkeel clearance incl. squat (3dm)}$$

2. conversion pot. draught → possible draught:

safety deductions for:

- higher risk of rock damage (granulometric variants)
- uncertainty of water level forecasts for middle- and long-range transports

Planning Guidelines for Fairway Parameters

Central criteria:

Fairway widths and depths can be distinguished by nautical and morphological criteria



- a minimum fairway depth of 26 dm is required for a fairway width of 120 m during regulated low-water periods
- for sections with granulometric river bed stabilisation 28 dm for a fairway width of 100 m must be calculated due to the increased risk of rock damage

Planning Guidelines for Fairway Parameters

Effects:

- **for navigation:** due to reduced bedload transport and the reduced dislocation of the river bed, more reliable and safer transport by powered cargo vessels and higher possible draught for convoys!
- **for National Park:** the tailored agreement decreases the demands placed on river regulation structures (groynes, guide dykes) and on modifications to the riverbed (dredging)

Economical Benefits (1)

- **Traffic shift from roads to the Danube**
 - Double the transport of goods on the Danube Corridor in combination with means of logistics and telematics
 - Decrease of growth rate in road traffic
 - Reduce traffic jams
 - Increase transport safety
- **Reduction of emissions (noise, pollutants) and consumption of landscape**
 - E.g. possible reduction of CO₂ which is of particular importance in order to reach the Kyoto goal!

Economical Benefits (2)

- **Promotion of the competitiveness of the national economy**
 - Potential savings in transport costs
 - Investment in the future of the European economy
- **Reduction of maintenance costs**
 - Costs for dredging fords
 - Costs for fighting riverbed erosion

The Integrated River Engineering Project ...

- ... increases reliability and so the cost-effectiveness of inland navigation by
- ... improving fairway conditions and by
- ... reducing maintenance costs for maintaining.

Moreover the measures ...

- ... go hand in hand with enormous efforts to improve the ecological conditions in the Danube Floodplain National Park!

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