Economic and Environmental Impact Studies of waterways projects in Europe

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http://www.stratec.be
Content

• What is Stratec?

• Assessing and financing the inland waterways projects in Europe

• Seine-Scheldt project: economic assessment

• Upper Seine river project: economic and environmental assessment

• Internalisation of freight transport external costs in the Paris-Amsterdam corridor: multimodal pricing study
• A **Belgian consultancy** company

• Fully **independant** (owned by its employees)
• Main projects

> C/B A and EIA studies waterways:
  o Waterways: Seine-Nord Europe, Seine-Scheldt, Upper-Seine
  o Ports: Paris, Liège, Nancy, Le Havre, Brussels
  o New river docks: Upper Seine (4), Oise (5), Meuse (3), Moselle (1)

> C/B A and EIA studies road and railway:
  o 170 km new metro-line in Paris (ongoing)
  o About 1 500 km of new HSL in France and Belgium
  o Upgrading of 2 000 km highways in Wallonie (Donor: EIB)

> Pricing studies:
  o infrastructure managers: rail tunnel in Antwerp (PPP), 1 000 km HSL in France (most are PPPS), road network of Brussels, road network of Wallonie, Port of Le Havre, Seine-Scheldt EEIG (PPP), Alpetunnel (LTF)
  o Transport operators: SNCB voyageur international, SNCF international, NS international, SNCB voyageur National, STIB, CFL, Car Postal, …
Assessing and financing inland waterways project in Europe:

- High priority for **decarbonising** transport
  > Modal shift from road to IWW and rail

- Emphasis on **protecting bio-diversity** (wetlands,..)

- **ESA 95** – Maastricht treaty: monitoring the EU public debts

- **New Eurovignette Directive**: allows the Member States...
  > to include **external costs in the charge levels** (on top of **infrastructure** costs)
  > to differentiate the charge level according to the **congestion** level

- **Public Debate**: dir 2001/42/CE (**SEIA**); dir 85/337 CEE (**EIA**)

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**European context**

**ECONOMIC AND ENVIRONMENTAL IMPACT STUDIES OF WATERWAYS PROJECTS IN EUROPE**
3. Internalisation of freight transport external costs in the Paris-Amsterdam corridor
   Multimodal pricing study

1. Seine-Scheldt project
   Economic assessment of a new canal

2. Upper Seine river project
   Economic & environmental assessment
**Aims of the C/B A**

- **Traffic forecasts** 2020 and 2050 for the SNE corridor
  - Inland waterways
  - Rail
  - Road

- **Impact assessments**
  - Traffic impacts on the **North Western Europe** transport networks
  - User benefits
  - External costs (energy and **climate**)
  - Regional development

- **Socio-economic profitability**:
  - NPV and IRR

*Source: www.seine-schelde.org*
• Results

Inland waterways network model
• Results

Rail network model

Year: 2000
• Results

> Road network model

The Seine - Nord Europe project
• Results

> Mode choice and user benefits model

Sources:
- Shipper survey (Stated Preferences):
  - Sampling in the INTRASTAT files
  - Face to face interviews: 2800 stated choices
  - Variables: mode, price, time, frequency, reliability
- National freight transport statistics + Eurostat

Model:
- Multinomial Logit
- 14 commodities
- Box-Cox for distances, time and price

Demand function « gravels » on the Péronne screen line
• Results

> Port choice model (containers)
• Results

> Traffic forecasts 2020

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2020 Référence (sans SNE)</th>
<th>2020 Projet (avec SNE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marchandises hors conteneurs (en Mt)</td>
<td>4,2</td>
<td>5,3</td>
<td>15</td>
</tr>
<tr>
<td>Conteneurs (en EVP-pleins et vides)</td>
<td>0</td>
<td>0</td>
<td>254 000</td>
</tr>
<tr>
<td>Total (en Mt)</td>
<td>4,2</td>
<td>5,3</td>
<td>16,7</td>
</tr>
</tbody>
</table>

All categories of goods
Central scenario + tolling of 1.75/ton on the canal

→ Market share of the waterways, except for containers: from **3,6 to 8,4 %**
→ Market share of the waterways for the containers: from **0 to 39 %**
• Results

> Long term forecasts

→ Between **19.5 and 30 MT in 2050** on the SNE canal
• Summary

➢ Investment cost: between 3,17 and 3,72 Md€

➢ External costs reduction: between 60 and 95 M€ / year in 2020

➢ User benefits: 300 M€/year in 2020 (of which 65 % in France)

➢ NPV: between 2,3 and 4,5 Md€

➢ SE IRR: between 6,4 and 8,7 %

Note: 2005 prices
Cumulative C/B A and EIA of the Upper Seine river projects

- Location

Le Havre

**Flood risks**

**Grain production area**

**Natura 2000 wetlands**

**Yonne river: cause of the flood risk**

Limited gauge of the canal

Location:
- Le Havre
- Paris
- Nogent-sur-Seine
- Bray-sur-Seine

features:
- Haute Normandie
- Picardie
- Ile-de-France
- Champagne Ardennes

- Cumulative C/B A and EIA of the Upper Seine river projects
- Natura 2000 wetlands
- Limited gauge of the canal
- Grain production area
- Flood risks
- Yonne river: cause of the flood risk
• C/B A of upgrading the small canal

Nogent <-> Paris =
- 7.6 €/t
- 4.1 €/t
- 3.5 €/t
• Cumulative effects

*Floods and wetlands hydrography*

**Upper Seine river projects**
• **Cumulative effects**

*Direct economic impacts on the gravel quarries*
• **Cumulative effects**

*Faune & Flore - Hunting - Fishing*

- Perturbation d'espèces lors des inondations
- Destruction d'habitat due aux digues
- Présence faunistique ++

**Upper Seine river projects**

<table>
<thead>
<tr>
<th>Departement</th>
<th>Périmètres d'étude</th>
</tr>
</thead>
<tbody>
<tr>
<td>985</td>
<td>(locaux + invités)</td>
</tr>
<tr>
<td>4 500</td>
<td>(rattachés domaine public + étangs privés)</td>
</tr>
</tbody>
</table>

1.4M euros/an dépensés pour la pratique de la chasse *

2.3M euros/an dépensés pour la pratique de la pêche *

- Présence faunistique ++

- Perturbation d'espèces et d'habitat
Internalisation of external costs of freight transport on the Paris-Amsterdam corridor

• Aims

➢ Assess the external costs of freight transport in the corridor

➢ Assess the socio-economic impacts of transport pricing schemes based on external costs

➢ Search for a social optimal pricing strategy

• Scope

➢ Multi-modal: Road, rail and inland waterway transport

➢ International: France, Belgium and the Netherlands
• **Study co-funded by:**
  > the European Commission
  > Voies Navigables de France, Réseau Ferré de France
  > Service Public de Wallonie, Water. en Zeekanaal
  > Ministry of Transport of The Netherlands

• **Partners involved**
  2 groups of consultants:
  > Environmental external costs: CE Delft, Alenium, Infras & Max Herry
  > Internal costs and congestion costs: **Stratec** and Setec
  > Modelling and optimization: **Stratec**
  > Scientific validation: **International Scientific Committee**

• **Timing**
  > Sept.2009 - Dec.2010
• Overall approach

> Transport costs
  - Infrastructure
  - Environment: climate, air pollution, noise, accidents, and upstream
  -Congestion
  -Operation: taxes, charges and subsidies (→ BAU scenario)

> Freight transport model
  - a mode choice model
  - a multimodal assignment model
  (User Optimal Equilibrium + System Optimal Equilibrium)

> Pricing scenarios

> Scenario simulation and impact analysis
• Marginal external cost in 2020

Costs in Eurocent/ton-km – Scenario MSCP

→ in (highly) congested areas, the congestion cost is by far the largest component of the road external cost

Source: CE Delft + Stratec for the congestion cost
• Scenario overview

BAU
Base line
IWT: 0.3 cts €/tkm
Road: 1 ct €/tkm
Rail: 1.8 ct €/tkm

Scenario 1
Marginal Social Cost Pricing (MSCP)
IWT: 0.7 cts €/tkm
Road: 2 cts €/tkm
Rail: 1.9 cts €/tkm

Scenario 2
Eurovignette
IWT: 0.3 ct €/tkm
Road: 3 cts €/tkm
Rail: 1.8 cts €/tkm

Scenario 3
Eurovignette extended
IWT: 0.8 ct €/tkm
Road: 3.2 cts €/tkm
Rail: 1.9 cts €/tkm

Scenario 4
Target oriented
IWT: 0.8 ct €/tkm
Road: 6 cts €/tkm
Rail: 1.85 cts €/tkm

Scenario 5
Eurovignette extended
Boiteux values
IWT: 0.5 ct €/tkm
Road: 3.1 cts €/tkm
Rail: 1.83 cts €/tkm

Note: only the HGV’s are charged, not the light vehicles (private cars and light freight)
• Simulation results

> Significant **modal shift**

→ IWW and rail: +15 % in the Eurovignette scenario
→ IWW: +30 %; rail: +25% in the target-oriented scenario
• Simulation results

> Significant reduction in CO₂ emissions

→ Reduction in CO₂ emission (well-to-wheel):
-17% and -21% in the Eurovignette scenarios
-39% in the target-oriented scenario
• Simulation results

> Significant reduction of time losses

**Time losses cost reduction compared to BAU (€/average day)**

Both the Eurovignette scenarios are very near the Social Optimum
• Simulation results
  > Significant reduction of external costs

→ Up to 14% in the Eurovignette scenarios
Simulation results

> Higher revenues

**Variation in taxes compared to BAU (M€ 2007)**

→ Twice BAU in the Eurovignette scenarios
• Summary

> About methodology

Availability of tools to simulate optimal pricing scenarios and then compare politically/technically feasible scenarios to the optimum

> About policies

Pricing policy fits well in long term strategy for reducing environmental damages due to transport (among others, for decarbonizing transport) and other external costs
Obrigado pela vossa atenção