



TRACECA Project “Logistics Processes and Motorways of the Sea II”

# Cost-Benefit Analysis Case Study: Container Block Train Poti-Baku



This project is funded  
by the European Union

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A project implemented by  
Egis International / Dornier Consulting

## Project Overview

- Regular container block train service between the ports of Poti (Black Sea) and Baku (Caspian Sea), replacing transport by trucks and ordinary trains.
- Costs:
  - Investment in rolling stock EUR36M
- Benefits:
  - Much reduced operating cost.
  - Reduced road congestion and accidents.
  - Reduced pollution.
  - Faster, more reliable service.



## Methodology (1)

- Estimate existing demand.
- Estimate potential demand.
- Estimate capacity of proposed service.
- Is the proposed capacity well within existing and potential demand?
- Estimate Road/Rail share of existing transport.
- Collect and/or estimate a full set of unit cost data for road and rail transport of containers.



## Methodology (2)

- Estimate total cost of performing the transport task by existing means ('without project'):
  - Internal costs, born by operators.
  - External costs, born by the wider community.
- Estimate total cost of performing the same task by proposed means ('with project'):
  - Internal costs, born by operators.
  - External costs, born by the wider community.
- Calculate net benefits, EIRR, NPV, BCR.



## Traffic

- Demand estimation:
  - Potential traffic: 13.3Mt/year.
  - Equivalent to 1.33M TEUs (10t net per TEU).
- Block train service capacity:
  - Daily departure from each port.
  - 2 locos and 56 flatcars (platforms) per train.
  - 2 TEUs per flatcar.
  - Utilisation factor 0.80.
  - Annual capacity = 65,480 TEUs.
  - Share of estimated demand = 4.9%.



## Costs – Without Project

- Estimation of costs without the project:
  - Total 65,480 TEU/year
  - 77% carried by road.
  - 23% carried by ordinary train.
- Costs in 2015: Without project (EUR million)
  - Rai I (i n t e r n a l ) ..... 2. 6
  - Rai I (e x t e r n a l ) ..... 0. 7
  - Road (i n t e r n a l ) ..... 24. 2
  - Road (e x t e r n a l ) ..... 7. 2



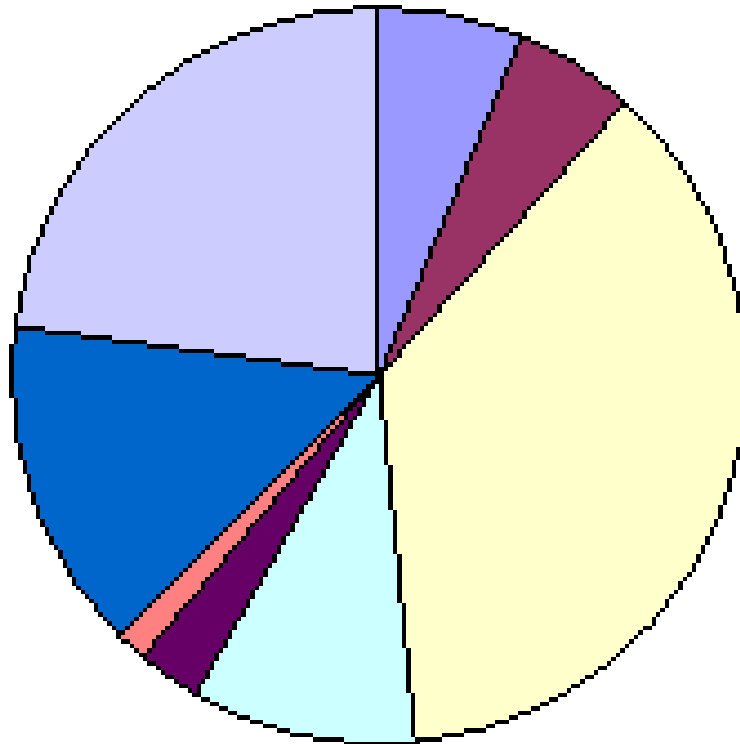
## Costs – With Project

- Estimation of costs with the project:
  - Total 65,480 TEU/year
  - 100% carried by block train.
- Costs in 2015: With project (EUR million)

- Rai I (internal)	.....	4.2
- Rai I (external)	.....	1.9
- Road (internal)	.....	na
- Road (external)	.....	na



## Modal Cost Structures - Road



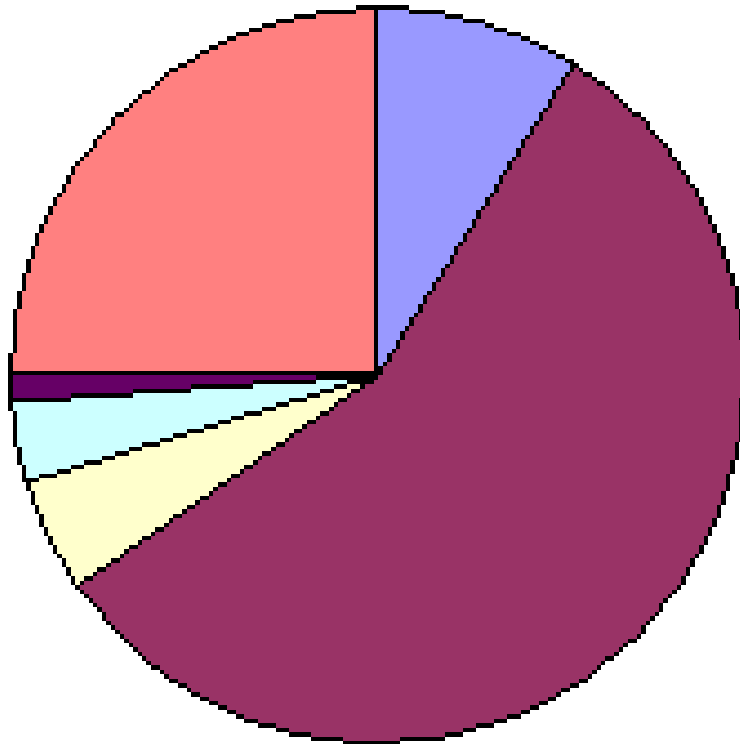
### Road Cost Structure

- Vehicle amortisation
- Vehicle maintenance
- Fuel & lubricants
- Labour
- Permits & insurance
- Administration
- Border crossings
- External costs





## Modal Cost Structures - Rail



### Railway Cost Structure

- Infrastructure A&M
- Rolling stock A&M
- Energy
- Labour
- Other internal costs
- External costs

Legend



## Incremental Costs = Variable Costs

- For both modes, a proportion of costs are fixed irrespective of the volume of traffic. The rest are variable, changing in direct proportion to traffic.
- We estimate the average variable proportions to be:
  - Road ... 88%
  - Rail ... 62%
- Road costs are dominated by vehicle amortisation and maintenance, fuel, wages and border crossing costs.
- Rail transport entails much more investment in fixed infrastructure; and most labour is an overhead.

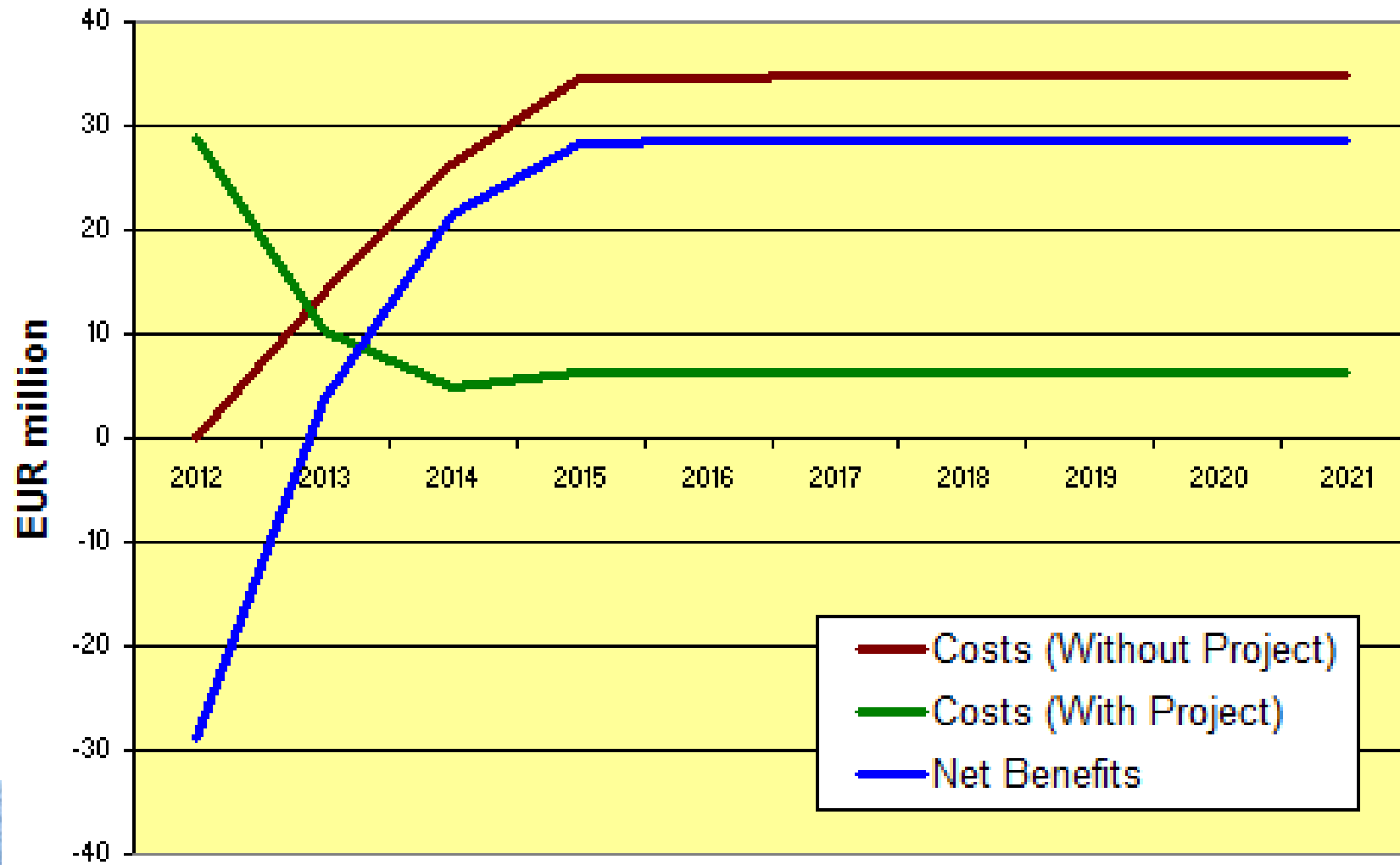


## External Costs

- External costs mainly comprise:
  - Infrastructure construction and maintenance.
  - Accidents.
  - Congestion.
  - Pollution, including CO<sub>2</sub> emissions.
- The EU's Marco Polo calculator uses the following default values:
  - Road ... EUR 0.015 / tonne-km
  - Rai I ... EUR 0.003 / tonne-km



## Costs and Benefits



## Economic Performance Indicators

- Standard economic performance indicators:
  - EIRR ... 61 % pa
  - NPV ..... 149 EUR million
  - BCR ..... 4.8
- Sensitivity tests show that the EIRR is 20%pa even if capital costs are 150% higher, or railway operating costs are 1,250% higher.

