



Transportonderzoek en -opleiding  
Transport research and training

# Intermodal waste transport in The Netherlands

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*Translating facts into vision*



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## NEA Mission statement

NEA Transport research and training contributes to sustainable mobility with fundamental and applied research and training in the fields of passenger and goods transport.

NEA:

- » Partner for European, national and regional authorities and the transport business
- » Supports policy developments in passenger and goods transport
- » Provides, as knowledge institute, high quality analyses, information and consultancy

## NEA Organisation

NEA houses about 70 professionals in a multidisciplinary environment, among whom, econometrists, engineers and legal advisors .

NEA is active in The Netherlands, the EU, Central and Eastern Europe, China, Turkey, Central Asia and parts of Africa

## Background waste logistics

- » Growing opportunities for intermodal waste logistics due to scale enlargement and internationalisation of the market.
  - ➔ longer transport distances and more consolidated flows.
- » Local authorities (can) play a big role. They have primary responsibility for the waste collection at households.
- » Waste transport costs are however only a small part of total processing costs of waste (+/- 10%). Logistic costs are not always the most important aspect.

# Waste transport: key figures

Figures for the “Randstad” area



- » 3.8 Mton domestic waste per year
  - +/- 500 truckloads /day
  - +/- 30 km line of moving trucks on the motorway each day
- » +/- 5 Mton industrial waste (construction, plants, industry, retail, etc.) to recycling, landfill, incineration

## Domestic waste transport: key figures

Average yearly 'production' of domestic waste per person:



- » 255 kg 'rest-fraction' (incineration plant)
- » 88 kg Green, fruit, garden waste (composting)
- » 54 kg paper (recycled into new paper)
- » 50 kg 'big waste' (landfill / recycling / incineration)
- » 21 kg construction waste (recycling / landfill)
- » 20 kg glass (recycling)
- » 10 kg wood (recycling)
- » 22 kg others (metal, textile, chemical,..)

Total: 520 kg of domestic waste per year per person

# Current intermodal waste transports in Randstad area

» Modal split:

	Volume	Road	Water
For incineration:	2.8 Mton 65%	35%	
For landfill:	2.4 Mton	50%	50%
For composting:	0.4 Mton	100%	0 %

» Inland navigation is used for transport over rather short distances for transport of domestic waste to incineration plants:

- Delft / The Hague ▶ ➡ Rotterdam: 350 Kton
- Utrecht ▶ ➡ Rotterdam: 350 Kton
- Lelystad ▶ ➡ Alkmaar: 140 Kton

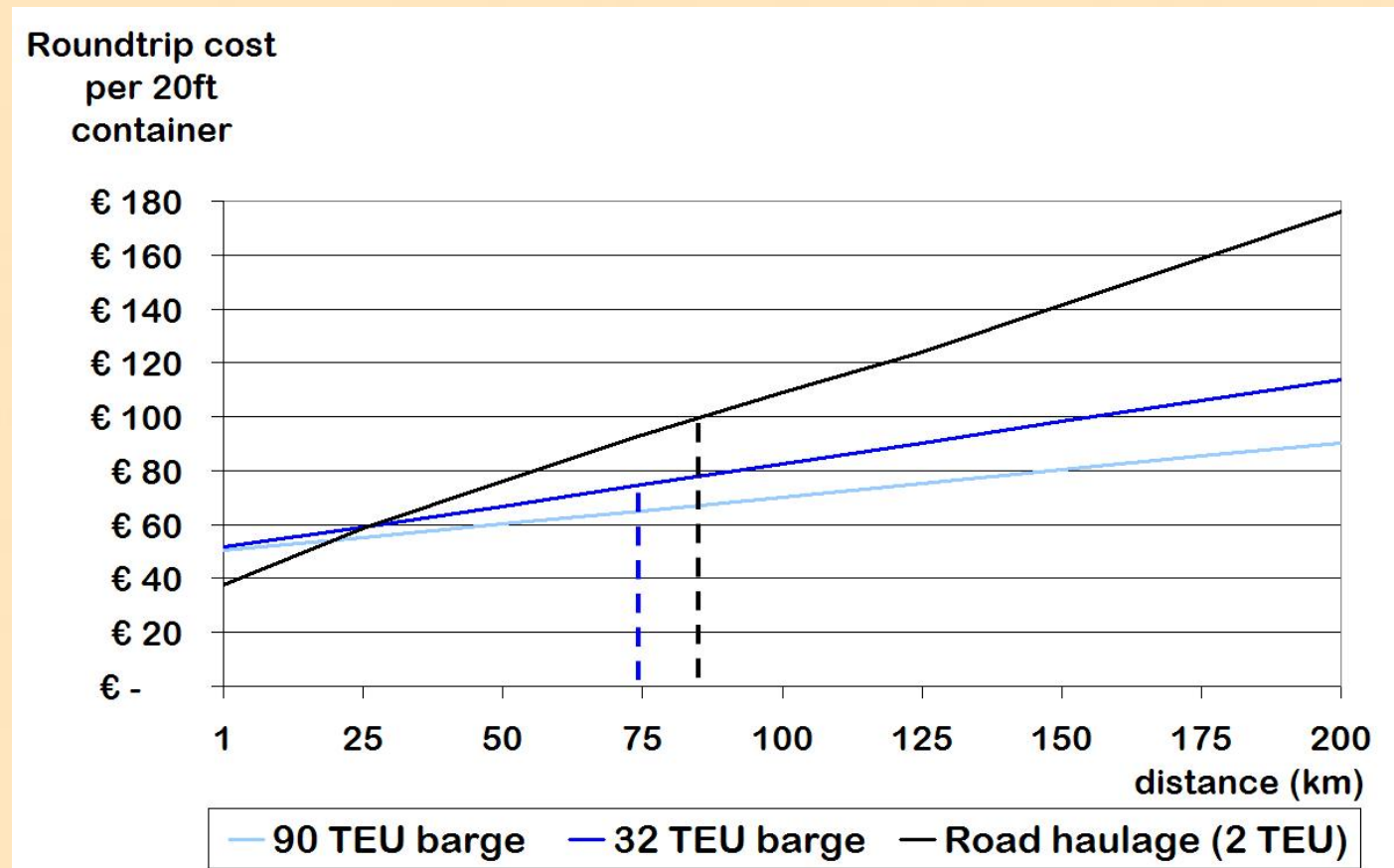
## Current intermodal waste transports in Randstad area

Intermodal transport at distances of 50-100 km!  
How is this possible?

- » Transport costs of vessels are much lower compared to road haulage (scale advantage)
- » Regional consolidation locations and incineration plants / landfill areas are already connected to waterways.
- » No significant pre-end haulage costs, since consolidation / transshipment is often also economically needed in road haulage systems
- » In Holland there are many waterways; the distance for transport over waterways can be significantly shorter compared to road:
  - Delft / The Hague – Rotterdam: 33 km water vs 46 km road
  - Lelystad – Alkmaar: 140 Kton: 73 km water vs 93 km by road

## Current intermodal waste transports in Randstad area

- » Example: Rotterdam – Utrecht; road haulage or barge:



- » Cost advantage = 30 euro, 30%!
- » + reduction of external costs: lower congestion, emissions

# Current intermodal waste transports in Randstad area

Waterway network in The Netherlands



## Current intermodal waste transports in Randstad area

Current systems and logistic chains

Main types of waste collection systems:

- » Traditional garbage trucks  
(2 or 3 persons working at 1 vehicle).  
High collection productivity. Favorable at:
  - Short distances
  - High density
  - Tight streets
  
- » Automated garbage trucks  
with transhipable container on chassis (1  
person). Low collection productivity but  
favorable at:
  - Less dense regions
  - Longer distances
  - Intermodal transport chains

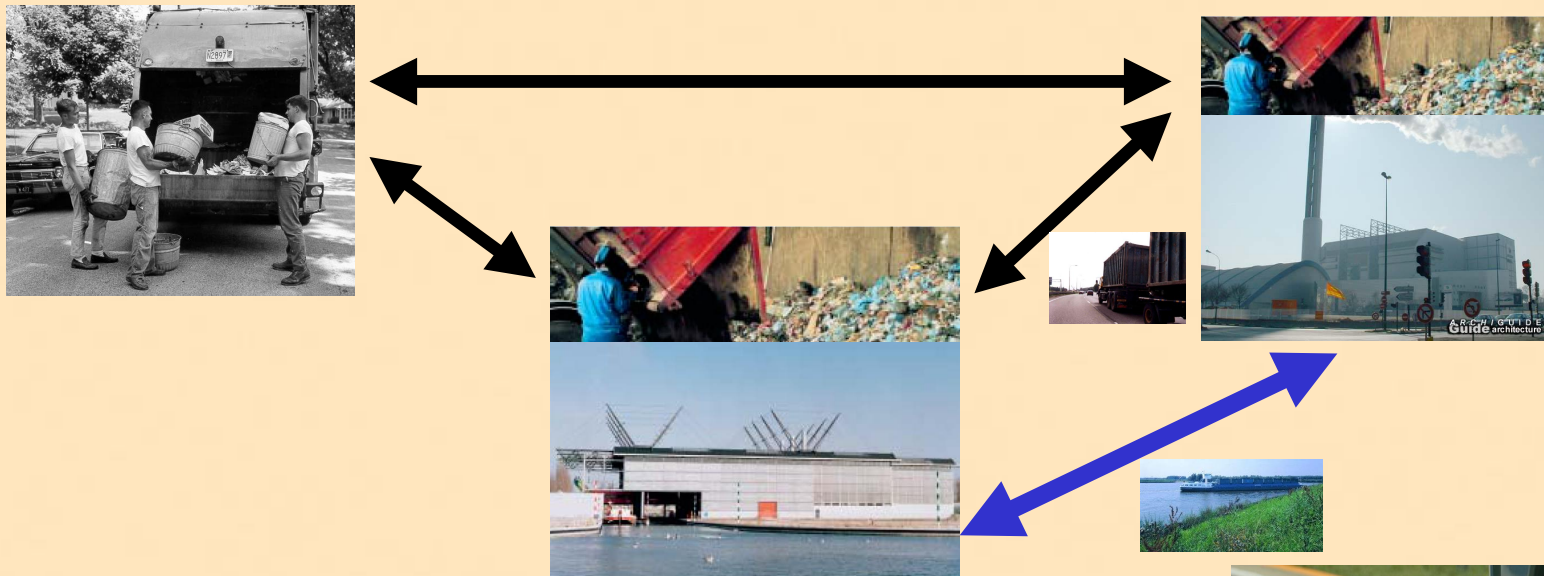


# Current intermodal waste transports in Randstad area

Main transport systems:

Traditional garbage trucks:

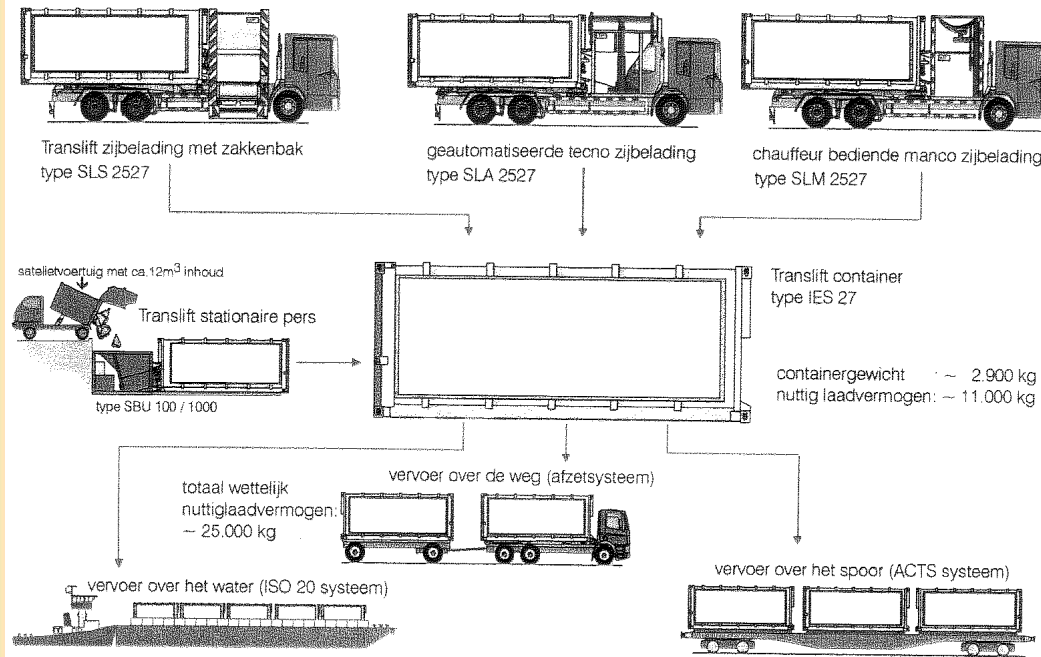
- » Directly driving to incineration plants
- » Empty truck at consolidation centre. From there road, rail or barge.
- » Break-even point for consolidation at +/- 25 km



# Current intermodal waste transports in Randstad area

Main transport systems:

Automated collection systems (e.g. Translift, MSTS):



## Further opportunities in Province Zuid-Holland

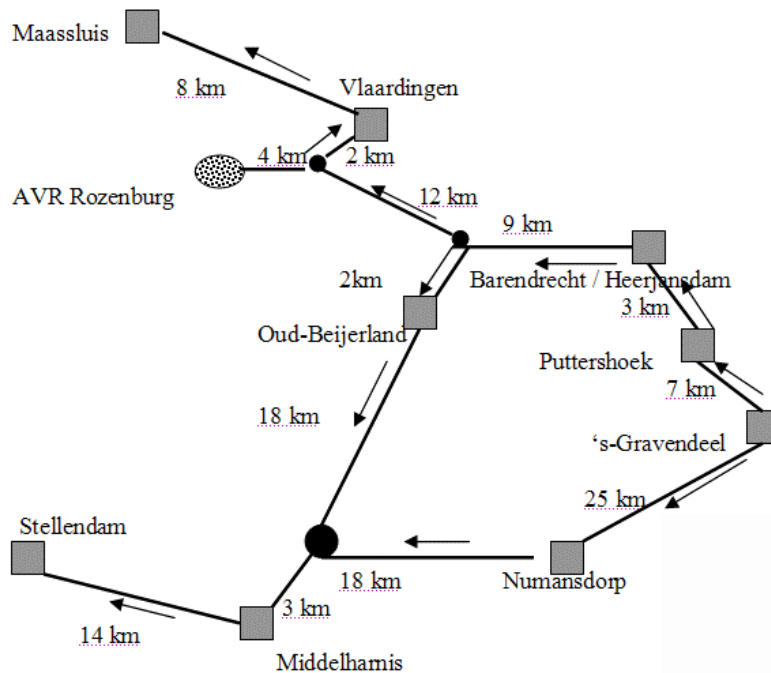
- » 'Traditional': Leiden / Alphen aan den Rijn / Gouda ▶ ➡  
Rotterdam: 340 Kton / year



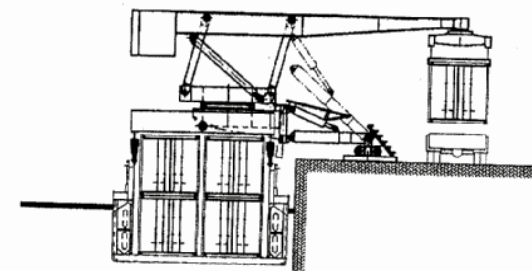
- » However:
  - incineration plant is not (yet) able to receive and unload additional vessels, capacity/ quay needs to be extended.
  - New locations must be built along the waterway for regional consolidation centres.

# Further opportunities in Province Zuid-Holland

- » Rural areas using automated systems, with transshipment to barges via self-supporting (crane-on-board) vessels operating in a roundtrip scheme.



Zelflossend schip met zijbelading (systeem Kieboom)



Dwarsdoorsnede schip en kade

## Further opportunities in Province Zuid-Holland

Results study “SHAFRA Zuid-Holland”:

- » Compared to the current waste logistics system (all road based), cost reductions can be achieved of 20%
- » System shift is needed from traditional collection methods to automated systems.
- » However, local collection companies (often public owned) need to co-operate
- » Surprisingly, standard inland navigation vessels are not more environmentally friendly (emissions) compared to road transport. Reason: low capacity utilisation in roundtrip scheme. However, with clean techniques (soot filters, catalyser) an improvement can still be realised.

## Conclusions

- » Intermodal transport is already common practice for major flows of domestic waste and industrial waste (bulk), even on short distances (30-50 km)!
- » By using innovative techniques, intermodal transport of thin flows can also be made economically and logistically feasible.
- » Innovating and optimizing the entire supply chain of logistics processes provides opportunities to obtain cost reduction economies of scale.

## Conclusions

- » However, shifting to another system requires a big investment, commitment and co-operation. Cost-benefits of the system should be proportional divided among the participants.
  
- » Taking into account distance and volume: most interesting flows for intermodality are:
  - Household waste:
    - Restfraction (incineration)
    - GFT (composting)
    - Glass (recycling)
    - Paper (recycling)
  - industrial/construction waste (recycling, incineration/landfill)

## Recommendations

- » It is worthwhile to study (intermodal) alternatives in order to save logistical costs but also to realize benefits for society
- » Strategic urban planning: save space for waste consolidation centres along rail and waterway infrastructure!
- » Local authorities and politicians are able to directly influence mode choice decisions via their responsibility and often share holdings in domestic waste collection/processing companies.
- » ...Take the opportunity!

**Thank you for your attention!**