



Ministry of Infrastructure and the Environment



CO₂-Reduction of Inland Navigation in The Netherlands



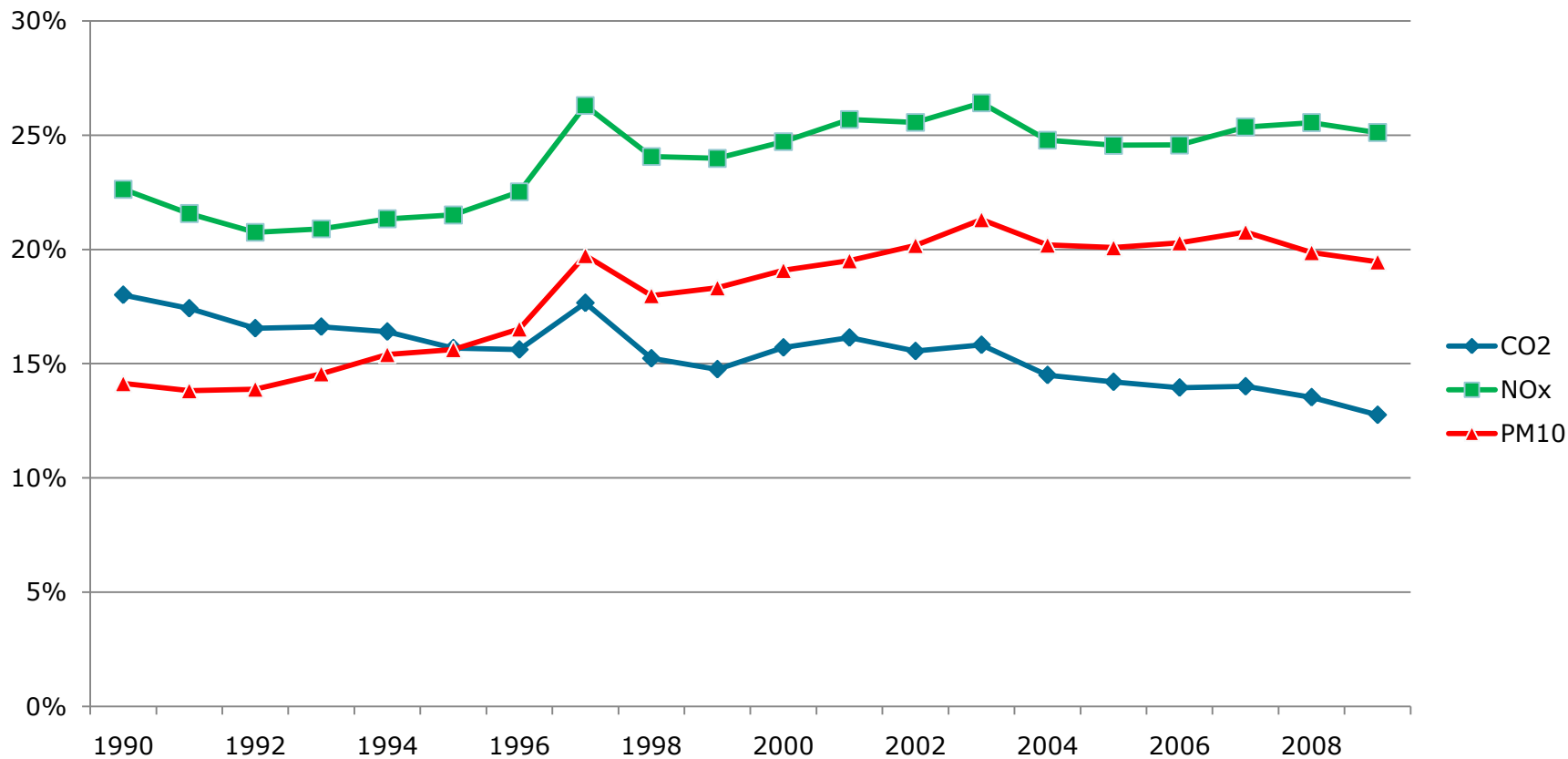
Image is everything

- Image: “Inland navigation is the cleanest mode of transport”
- Inland navigation sector in the Netherlands has been successful in conveying this message
- This image has obstructed innovation and has delayed regulations
- Engines have long lifetimes





Relative emissions from inland shipping



Source: statline.nl



CO₂-emission reduction of inland navigation

- When it comes to emissions from inland navigation, CO₂ is the least of our problems
- Nevertheless, the Ministry of Infrastructure and the Environment has initiated a number of CO₂-reduction programmes:
 1. Energy reduction programme (“VoortVarend Besparen”) (= behaviour)
 2. Introduction of LNG (Liquefied Natural Gas) as a clean fuel (= technique)
 3. Lean and Green (= customer driven)



1. Energy reduction programme “VoortVarend Besparen”

- Energy reduction programme geared towards changing behaviour (supported by technological tools)
- Goal: CO₂-reduction of 5% in 2010 (compared to 2007)
 - in addition, a 5% reduction in emissions of NO_x and PM₁₀ is achieved
- Budget Ministry of Infrastructure and the Environment: € 3 mln
- Programme has been transferred to the Expertise and Innovation Centre Inland Shipping, November 2010

www.voortvarendbesparen.nl



Road equivalent: "Het Nieuwe Rijden"





Activities in the energy reduction programme

- Education and training
 - reducing energy is now fully integrated in the curriculum
- Inland navigation fuel CO₂mpetition
- Platform
 - broad representation from the inland navigation industry
 - “owner” of the programme
- Subsidy and SBIR
 - development of technological tools (e.g. fuel consumption indicators)
- Dissemination of information (conferences)



Inland navigation fuel CO₂mpetition



- Well organised publicity
- Number of participants has risen to 120
- Three classes:
 - individual ships
 - shipping companies
 - government ships
- Runs from 1 March till 31 October



2. LNG: A Norwegian success story

- First LNG-ferry in the year 2000
- Now *ca.* ten ships in operation (ferries, PSV, coast guard), with at least 20 more ordered
- LNG supply infrastructure along the coast
- Safety regulations developed within IMO
- Smart funding programme
- EU-project MAGALOG identified **inland navigation** in NW-Europe as a potential market for LNG





Emissions of an LNG engine

Engine type	SO _x (g/kWh)	NO _x (g/kWh)	PM10 (g/kWh)	CO ₂ (g/kWh)
Diesel engine running on gasoil (1,000 ppm)	0,4	8-11	0,15-0,25	580-630
LNG engine	0	2	~0	430-480
Stage IV engine (2016)	n.d.	1,8	0,045	n.d.

Source: Marintek



Why is LNG interesting for inland navigation?

- Extra CO₂-reduction of 20-25% compared to gasoil
- Possibility to use bio-LNG, thereby further reducing CO₂-emissions
- Very clean engine (air quality parameters)
- Caters for a growing demand for low-CO₂ transport from a number of very large companies
- Fits with the ambition of many operators to provide “greener” transport
- Tor Svensen (CEO of DNV) on LNG:

“Economically, it is better than the alternatives and it is an environmental winner, so why wait?”



Role of the Ministry of Infrastructure and the Environment

- LNG helps in reaching European air quality targets
- LNG helps in reaching European CO₂-reduction targets
- Promote the use of bio-LNG
- Remove a number of obstacles
 - ✓ fiscal treatment of LNG: no excise-duty (cf. gasoil)
 - ✓ availability of LNG: a subsidy programme was launched on 1 April this year, to help build an LNG supply infrastructure
 - development of international safety regulations
- Government fleet (“Rijksrederij”) as launching customer?



The future is now



- First inland ships using LNG are currently being built
- Ministry of Infrastructure and the Environment is supporting this development
- Innovation subsidy awarded to build a ship with a dual fuel engine



Rapid developments in China



LNG World News, 6 August 2010:

- **“China’s first liquefied natural gas (LNG)-diesel hybrid river vessel has started its 45-day trial voyage [...] in an effort to reduce exhaust pollution on river waterways.”**
- “After the trial voyage ends Sept. 16, and all going well, the Wuhan city authority will move to upgrade the engines of local vessels for inland water navigation. By the end of this year, six LNG filling stations will be set up along local river waterways.”



3. "Lean and Green" programme





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