Reducing air pollutant emissions of inland waterway transport in Europe

Technical Assistance for the Impact Assessment work to reduce emissions of inland waterway transport

Zoetermeer, June 2013
Without specific action the competitive position of IWT in the field of emissions to air will further deteriorate in the future

- Emission standards in IWT are lagging behind
- Long serviceability of IWT engines compared to road transport
- Lack of incentives for vessel owners/operators to increase the environmental performance of the engines
- Small market for inland vessels
Widening gap between IWT and road transport

- PM and NOx (health related)
- Development of the fleet over time
- Transport demand
- Monetization of the emissions results in external costs over time

Yearly external costs of air pollutant emissions in €/ 1000 tonkm

87%, factor 6.7 in 2030
Policy goal: close gap of air pollutant emissions external costs by the year 2030

• Technical assistance provided
• Intensive investigation of different options and measures to reduce emissions
• Iterative approach, first prescreening, followed by in-depth analysis
• Expert Group: many interviews with experts in order to assess performance of measures and costs
• Voluntary measures are not sufficient to close the gap, new standards are necessary for this

→ effectiveness in terms of discounted costs and benefits
→ for the in-depth analysis of options also other criteria play a role, such as level playing field
Options and measures for in-depth analysis

Effective Options
1. All vessel types included. Strictest level for largest ships, time to develop the strictest level is maximised (2022)
2. Optimised costs & benefits, smallest vessels are exempt. Strictest level for largest ships in 2020.
3. Mix between option 1 and 2

Measures
- LNG Dual Fuel to reduce NOx and PM
- SCR to reduce NOx
- DPF to reduce PM
- Others: Fuel Water Emulsion, Hydrogen injection, Gas or Diesel-electric configurations (monofuel LNG), Methanol
Effectiveness: external costs of air pollutants, in euro per 1000 tonkm

- ROAD BAU
- IWT BAU
- Alternative Baseline: IWT Stage 3B New engines only
- Option 1: IWT L Stage 5 New2022 + SML 4B New & Retrofit 4A 2017-2027 (maximised time to develop Stage 5 engine)
- Option 2: IWT L Stage 5 New2020 + ML 4B New & Retrofit 4A 2017-2027 + S 3B New only (optimised cost effectiveness)
- Option 3: IWT L Stage 5 New2020 + ML 4B New & 4A Retrofit 2017-2027 + S 3B New only <38 m (mix)
LNG application: win-win for larger freight vessels

Cumulative discounted cash flows for 110 metre vessel length (1178 kW), semi-continuous operation, for the relevant emission standards/technology

- Over time, Diesel with SCR and DPF shows increase in cumulative costs over time
- LNG with SCR and DPF shows decrease
Overview of main CBA results freight vessels: net present value for period until year 2050

- Societal benefits are large compared to the costs
- Good air, positive health effects

- Net present value for period until year 2050:
  - €3,000,000,000
  - €6,000,000,000
  - €9,000,000,000
  - €12,000,000,000
  - €15,000,000,000
  - €18,000,000,000

Alternative Baseline - Stage 3B New engines only
OPTION 1 - Optimised cost effectiveness
OPTION 2 - Maximised time for development Stage 5 large vessels
OPTION 3 - Mix of cost effectiveness and level playing field

- Societal benefits are large compared to the costs
- Good air, positive health effects
Conclusions and further steps

• The analyses show that it is possible to realize a very high reduction of air pollutant emissions
• In order to reach the policy objectives, new technologies and/or new fuels are needed
• The application of LNG looks very positive. A win-win effect could be realized
• For existing vessels/engines the application of AT systems can achieve a high reduction of air pollutants
• Further steps:
  • Strengthen R&D: develop clean diesels, GTL, EGR, FEW, Hydrogen, methanol, hydrogen, diesel-electric, etc. Methane issues for LNG
  • Financing issues: development of instruments
  • Legal issues: LNG safety, bunkering, crew training, other engines
Thank you for your attention

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