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EU Transport GHG: Routes to 2050?

Operational options for all freight transport modes

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Partners

www.eutransportghg2050.eu



Overview of presentation

1. Introduction to the presentation
2. Operational options for road freight transport
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5. Operational options for maritime transport
6. Conclusions/discussion/questions

Introduction to the presentation

- Based on:
 - Draft Paper 4 – Operational options for all modes
 - Authors: Bettina Kampman and Xander Rijkee, Alison Pridmore and Tom Hazeldine, Jan Hulskotte
- Presentation is based on draft findings set out in the papers
- Scope:
 - Operational measures for GHG reduction, not yet policy measures
 - Short term and long term: potential carbon savings, cost, barriers to implementation, etc.
- Aim of subsequent discussion is to:
 - Agree what we know and do not know
 - Identify any omissions in our information/sources
 - Review the conclusions that are emerging

Operational options for road freight transport

- Very few operational measures identified for road freight transport
 - logistics is discussed in paper 5
- Fuel efficient driving – ecodriving
 - see next slide
- Tyre pressure monitoring
 - will be obligatory for passenger cars (EU)
 - correct tyre pressure can improve fuel efficiency and safety by up to 5%
- Vehicle downsizing
 - buying smaller vehicles, or vehicles with less powerful engines
 - in HDVs, smaller trucks may be less efficient than larger trucks → logistical issue
 - perhaps some scope for downsizing of light commercial vehicles or busses?



Fuel efficient driving - ecodriving

- Ecodriving training can be very effective: 10% fuel savings on average directly after the course, 5-7% savings over a year or more.
- Very cost effective option: costs of training are low and fuel savings are high:
- Long term potential:
 - Fuel efficient driving will become part of compulsory periodic training courses for professional drivers (EU regulation)
 - An increasing part of eco-driving could be taken over by vehicle technology:
 - start-stop systems
 - gear shift indicators
 - tyre pressure monitoring
 - etc.



Operational options for rail transport

A large number of options was identified:

- Shorter trains when extra capacity is not required
- Energy efficient driving and train regulation
- Reduction in empty stock movements
- Intelligent engine control
- Better recording of fuel/power consumed and better energy monitoring
- Reduced traction maximum demand, reducing current (and thus losses) in the national grid
- Disconnecting electric vehicles from supply when stabled
- Reducing diesel engine idling
- Reducing energy demand for heating
- Control and Command signalling
- Train driver training



Operational options for rail transport

- Limited data on potential and cost

Savings Option	Timescale
Run shorter trains when extra capacity not required	Short
Energy efficient driving and train regulation	Short to medium
Reduction in empty stock movements	Short
Shutting down some engines on distributed power trains (intelligent engine control)⁶	Medium to long
Better recording of diesel engine fuel / power consumed	Short
Reduced traction maximum demand (25kV & 750V)	Long/feasibility questionable
Disconnect electric vehicles from supply when stabled	Short to medium
Reduced diesel engine idling	Short
Energy monitoring	Short
Reduced demand for heating	Short to medium
Train driver training	Short

Operational options for inland shipping

- Improved maintenance
 - of hull, propeller and engine
- Speed optimisation
 - speed reduction of 10% = fuel reduction of about 20%
 - Potential will depend on balance of costs and fuel savings
- Just in time routing
 - Routing optimised for fuel efficiency, taking the time constraints of the ultimate users into account.
- Improved fleet management - avoiding empty journeys
 - Significant potential: about 25% of CO₂-emissions is caused by empty travelling ships.
 - Barrier: measure to achieve this are probably out of reach of individual shippers
- Very limited evidence on potential and costs



Operational options for maritime transport

- Training of crews
- Voyage optimisation
 - with respect to weather, currents and speed selection based on tides, queues, etc.
- Energy management on the ship
- Fleet management and optimisation
- Improved maintenance for hulls and propellers
- Speed reduction
 - Potential will depend on balance of costs and fuel savings
- Electricity in port
 - GHG reduction will depend on electricity source (renewables etc)



Potential of operational options for maritime transport

Training of crews	Cost and potential unknown, but training will be prerequisite for effective use of operational measures
Voyage optimisation weather, currents, tides, queues, etc.	Is already common, additional potential unknown
Energy management on the ship	Potential about 1-2%
Fleet management and optimisation	Large range of potential in literature: 5-50%. High potential requires very significant speed reductions
Improved maintenance of hulls, propellers and engines	Potentials: hull: 3-5%, propeller 1-3%, engine: 1-2%
Speed reduction	Significant GHG savings associated with speed reduction, but the potential for implementation depends on a number of factors
Electricity in port	GHG reduction not yet quantified, but will depend on electricity source

Main conclusions

- Very limited evidence on potential and cost of operational measures in freight transport (apart from shipping)
- Potential of operational measures in road freight transport seems to be limited
 - high fuel cost provides incentive for fuel efficient driving
 - vehicle technology could automate fuel efficient driving
- Number of options and their potential seems to be higher in non-road modes
 - probably due to the lower share of fuel costs in the total, and more complex cost structure
- Potential of measures that impact on operations (namely speed in shipping) are high, but costs and cost effective potential are difficult to quantify in general terms

Questions for the discussion

- Are there any other operational options for road transport?
 - related to driving style, cooling, etc?
 - related to vehicle or engine downsizing?
- Are there any other operational options for rail transport?
- Are there any other operational options for inland shipping?
- Are there any other operational options for maritime shipping?

- Do you agree with our data?
- Have we missed any important literature?

- What options have the highest potential for (future) GHG reduction?
- What are the key barriers to these options?