



The project is funded by the European Commission's  
Directorate-General Environment



# EU Transport GHG: Routes to 2050?

## Summary findings on policy instruments

Huib van Essen, CE Delft

Second large stakeholder meeting  
10 November 2009, European Commission

Partners

[www.eutransportghg2050.eu](http://www.eutransportghg2050.eu)



# Context

Recall the **definitions** used in the project:

- **Options** deliver GHG emission reductions in transport
- **Policy instruments** may be implemented to promote the application of these options

Assessment all type of **long term** (up to 2050) policy instruments that can be used to (in)directly reduce GHG emission of transport:

- Regulation
- Economic instruments
- Infrastructure and spatial planning
- Traffic management and policy
- Others: communication, R&D, pilots, public procurement, etc.

# Policy instruments: Papers and Technical Focus Groups

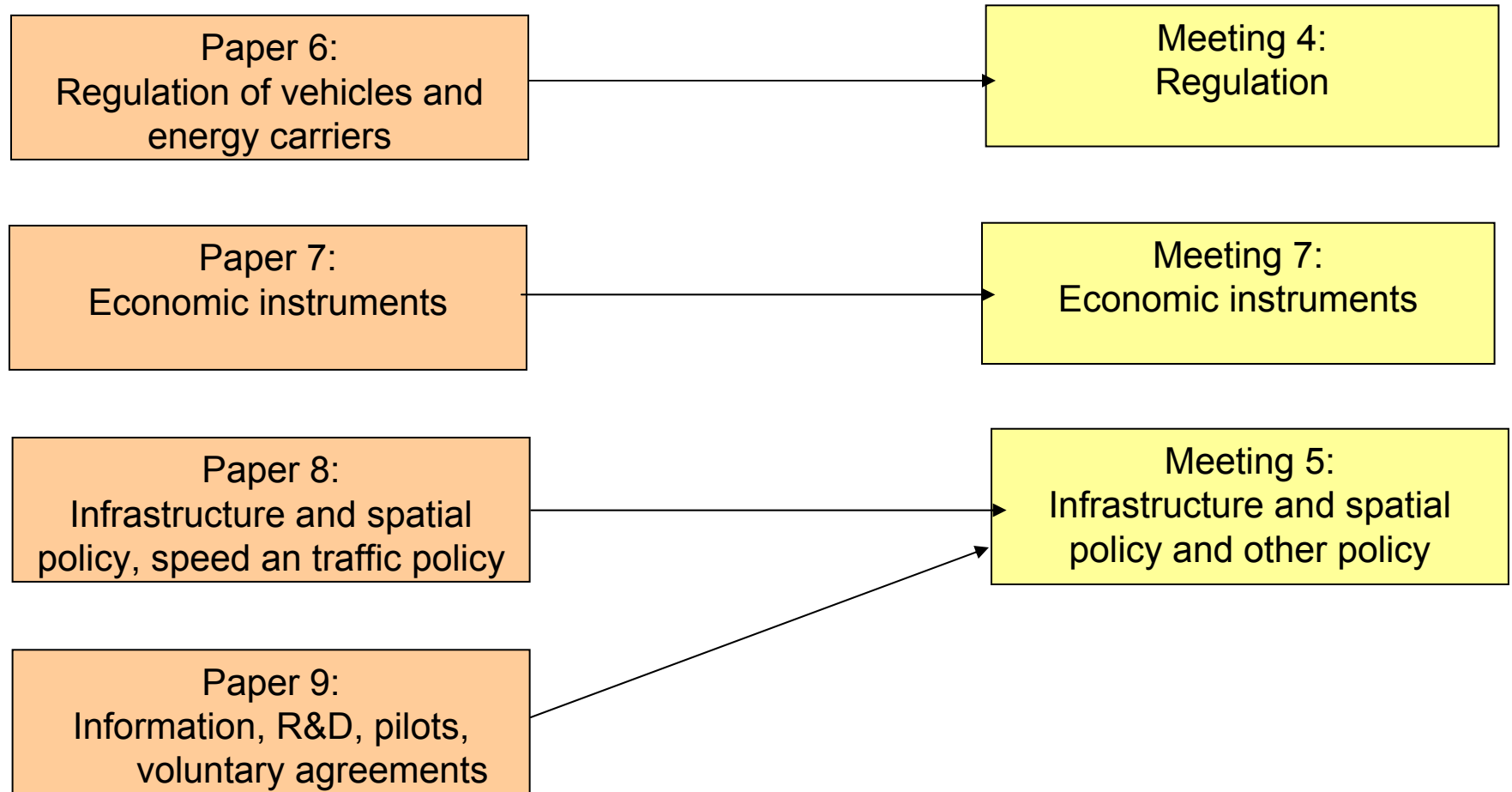
Paper 6:  
Regulation of vehicles and  
energy carriers

Paper 7:  
Economic instruments

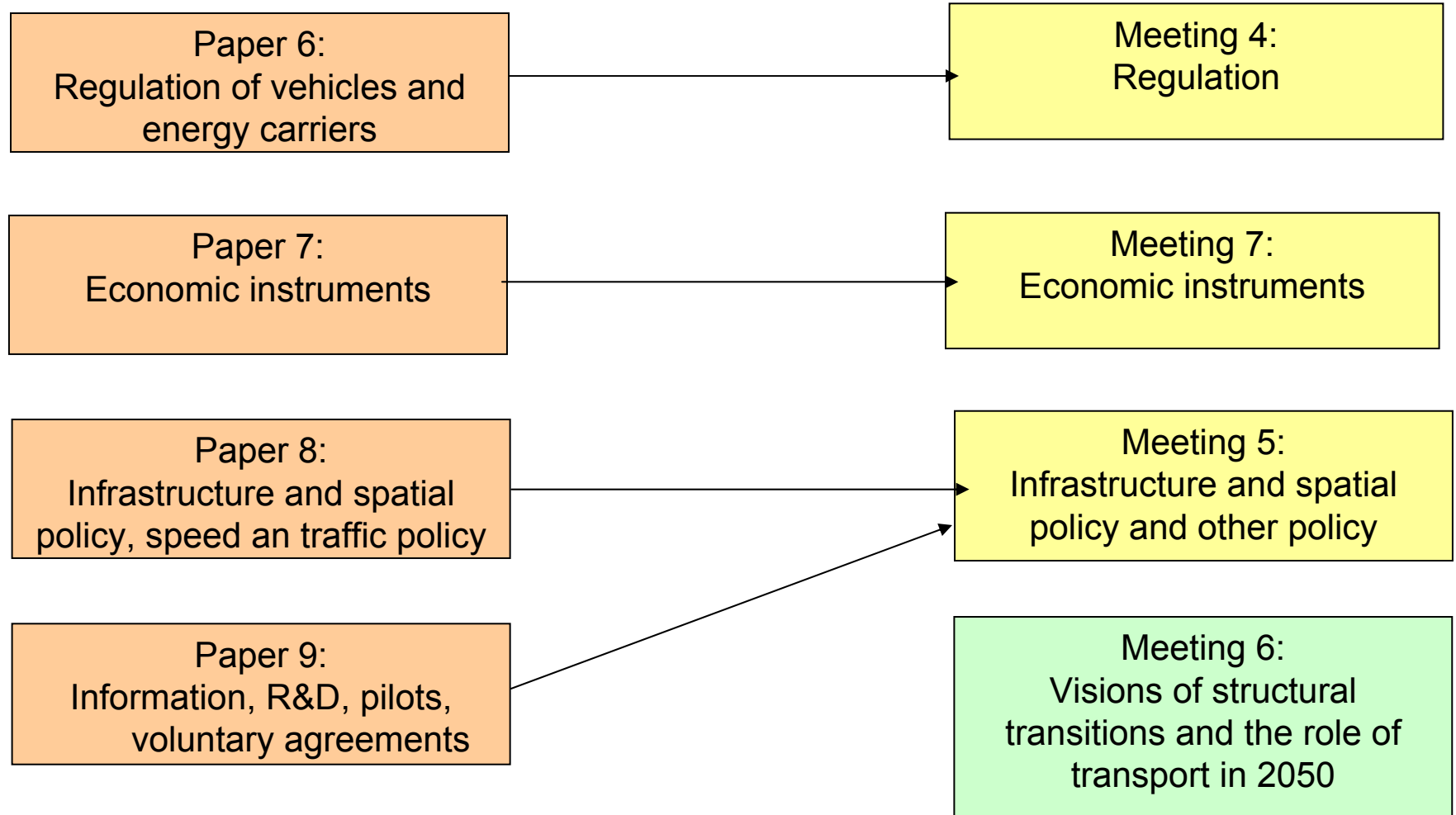
Paper 8:  
Infrastructure and spatial  
policy, speed and traffic policy

Paper 9:  
Information, R&D, pilots,  
voluntary agreements

# Policy instruments: Papers and Technical Focus Groups



# Policy instruments: Papers and Technical Focus Groups



## Results presented by...

- Vehicle regulation
- Regulation of energy carriers
- Other types of regulation
- Economic instruments
- Infrastructure and spatial policy
- Traffic management and speed policy
- Information, R&D, pilots, voluntary agreements
- Conclusions

# Vehicle regulation

- Should be directly aimed at CO<sub>2</sub> emissions or energy efficiency (tank to wheel)
- Very effective way to reduce GHG emissions: directly affects all new vehicles
- Possible for all transport modes
- Requires test procedures:
  - Correlating with real life emissions (may require set of test cycles)
  - Proper ranking of vehicles and accurate information
  - Able to deal with all vehicle innovations and energy carriers
  - Already available for cars and vans, to be further improved
  - To be developed for other road vehicles and non-road modes (on-going)
- Stepwise tightening
- Well to tank emissions become more important, to be included:
  - separately (regulation of energy carriers) in combination with regulating energy efficiency
  - or in CO<sub>2</sub> regulation of vehicles with average WTT CO<sub>2</sub> impacts of energy carriers

# Overview of existing regulation and current developments for road vehicles in EU

- Regulation 443/2009 - CO<sub>2</sub> emissions from passenger cars
  - 130 g/km in 2015
    - mass-based limit function with 60% slope applied to set separate target per manufacturer
  - eco-innovations may contribute up to 7 g/km (until test amendment of TA test procedures)
  - 95 g/km in 2020, modalities to be defined by 2013
- Light commercial vehicles
  - proposal published 28/10/09: COM(2009) 593/3
  - similar system as for passenger cars
- Heavy duty vehicles and other modes
  - some initial studies carried out
  - preparatory work being started

# Regulation of energy carriers

- Renewable Energy Directive and Fuel Quality Directive provide good basis for the future
  - Can promote low carbon energy options
  - Need to develop methodologies and monitoring further
- After 2020: Further increase renewable energy and CO<sub>2</sub> reduction targets
- Other modes could be included in the future
  - If low-carbon energy carriers exist
  - If options for relocation of fuel bunkering are limited
- Continuous development of fuel quality standards and safety regulations essential
  - To ensure shift to low carbon fuels is technically sound and safe
  - Link with vehicle regulation to ensure compatibility

# Other types of regulation

- Important regulation in addition to vehicles and energy carriers:
  - Vehicle components
  - Intelligent transport systems (integrated with traffic management), e.g. standardisation or mandatory vehicle devices (long term)
- Several other more wild ideas for regulating CO<sub>2</sub> emissions:
  - Public transport
  - Logistics
  - Urban areas
  - Personal carbon budgets
- These seem inappropriate because:
  - Lack of data and monitoring mechanisms
  - Lack of comparability
  - Too much limiting freedom of choice

# Economic instruments – general remarks

- Transport is sensitive to price level and structure
- Transport pricing serves various aims:
  - Generate revenues for general budget, infrastructure cost or mitigation
  - Increase fairness (between modes and users: polluter pays principle)
  - Influencing behaviour to reduce environmental impacts and congestion
- Main principles:
  - Marginal social cost pricing (MSCP, internalisation)
  - Target oriented pricing
  - Combination
- Carbon-based fuel tax or emission trading optimal from perspective of MSCP
- Other types of instruments particularly relevant for:
  - Shift to fuel efficient vehicles and energy carriers (by tax/charge differentiations)
  - Limiting transport growth (variable infrastructure charges)
- Subsidies have important drawbacks, can in some cases be effective in (temporally) stimulating reduction options

# Economic instruments – external cost and carbon cost based incentives

- External cost of carbon:
  - Damage cost or mitigation cost
  - Both increase over time (increasing reduction targets and rising CO<sub>2</sub> levels)
  - Average estimates: €25 per tCO<sub>2</sub> in 2010 to €85 per tCO<sub>2</sub> in 2050 with large bandwidths
  - Damage cost estimates do not include all long term risks of catastrophic temperature rise and climate feedbacks
  - Mitigation cost estimates do not include all welfare cost of limiting volume growth
- Minimum fuel taxes for road:
  - correspond to carbon cost of €116 (diesel) - € 153 per tCO<sub>2</sub>
  - Serve also other aims: general tax, infrastructure, other external cost
- Three ways to give carbon based incentives (possible for all modes):
  - Carbon based fuel taxes (Exists in some countries, EU proposal discussed)
  - Transport in ETS (already for electric and from 2012 aviation)
  - Separate trading scheme for transport
- Direct and possibly strong impact on prices when effective in reducing GHG emissions

# Carbon tax on fuel or emission trading?

- Both fuel tax and emission trading schemes:
  - Give incentives for all (and most cost effective) GHG reduction options
  - May result in high prices when effective (e.g. road: € 85 per tCO<sub>2</sub>: 10% GHG reduction)
  - No solution for split incentives
- Carbon tax on fuel:
  - Easy to implement and low transaction cost
  - Higher fuel taxation always controversial
- Transport in ETS:
  - When cap is fixed, certainty on overall CO<sub>2</sub> reduction
  - Makes fuel price (even) less predictable
  - Risk of high carbon leakage and high opportunity cost because trade prices often expected to increase when transport is included
  - Competitive position of some industries may worsen, possibly negative impacts on employment and economic growth, as long global system is absent
- Separate trading scheme:
  - If traders are fuel sellers, scheme is almost identical to carbon tax on fuel, but more complex
  - If traders are end-users: very high transaction cost

# Other economic instruments

- Infrastructure charges (e.g. km-charges road)
  - First-best for internalising external cost of air pollution, noise , accidents and efficient way to reduce congestion without inducing more traffic
  - Important welfare benefits (particularly on congestion); GHG reduction is a co-benefit, particularly when applied on all roads
  - Eurovignet Directive currently main barrier
- Other instruments for improving fuel efficiency and limiting transport growth:
  - Vehicle taxation (differentiated to fuel efficiency)
  - Company car taxation (50% of new cars is bought by companies!)
  - Remove tax exemption for travel expense declaration
  - Same VAT regime al transport modes
  - Land use taxation
  - Parking fees and permits

# Relation regulation and pricing

- Regulation can be useful in combination with economic instruments
  - To make sure that options are available that enable actors to respond to economic instruments
- Other policy instruments may help manufacturers to reach regulatory target
  - Tax incentives, CO<sub>2</sub> differentiation of tax / road pricing, subsidies, labelling, awareness campaigns
  - Some at EU level but mainly at Member State level
- Regulation requires appropriate test procedures which are also relevant for labelling and CO<sub>2</sub> differentiation of tax / road pricing

# Infrastructure and spatial policy

- Infrastructure and spatial planning shape and enable transport
- Additional infrastructure creates additional transport
  - Reduces travel cost and time
  - Flanking policies important for GHG reductions
- GHG reduction in urban areas, various policy instruments:
  - Compact city: intensive use of available space in the urban area.
  - Minimize distance between functions (people, organizations and activities) and urban sprawl
  - Support cycling and walking
  - Reallocation of road and parking space to slow modes and public transport
  - Advanced distribution concepts
  - Co-benefits: livability in the city, health
- Interurban areas, various options:
  - Minimize distance between functions to reduce travel distances, prevent urban sprawl
  - Investments in (high speed) rail and inland waterway network may contribute to modal shift, but carry risk of increasing overall transport demand
- Spatial policy have long term scope, includes new buildings/infrastructure
- Potential of policy instruments difficult to quantify – very location specific

# Environmental and strategic impact assessments of infrastructure and spatial plans

- EIA, SEA and CBA could help to shape long term demand trends
- GHG impacts usually play no or a minor role in comparing various options
- Ensure that all long term GHG impacts are fully included, also all long term impacts on transport volumes
- Apply higher shadow prices
  - To reflect precautionary principle
  - Long term impacts should be weighted with higher shadow prices
  - Should always be based on sound cost estimation
- Introduce specific conditions:
  - Do not allow plans to result in an overall increase in GHG emissions
  - Allowing some types of compensation
  - Requires a clear definition on which emissions should be included, how they should be calculated and how there could be compensated for.

# Traffic management

- Road traffic management policy to minimize fuel consumption:
  - Reduce number of kilometers driven
  - Favour low-carbon transport
  - Enable vehicles to operate at favourable and constant speed.
- Rebound effect: increase the capacity and thus the attractiveness
- Air traffic management can be improved to use more direct tracks, allowing substantial savings in fuel (6-12%)
- Optimizing of routes, better fleet planning and optimization of speed can help reduce emissions (up to 40%).



# Speed policy

- Traffic safety is the main driver for introducing speed limits
- Motorway speed limit of 100 km/h can save 7-13% GHG emissions compared with limit of more than 120 km/h
- Cars are most fuel efficient at 80 km/h
- Lower speed limits will lead to:
  - Lower emissions per vehicle-km
  - Improved traffic safety
  - Travel time will increase, so people will travel less kilometers (time budget theory)
  - Adapted design of vehicle engines
- User acceptance is expected to be a problem
- Overall high reduction potentials for most transport modes



# Information policy

- Pre-2020:
  - **Wider CC awareness raising**, e.g. of taking action to mitigate climate change impacts, increasingly important in light of potentially strict 2050 targets
  - **Proliferation of transport-specific** measures likely to expand, particularly
    - Travel planning related to specific locations, e.g. work places, schools, hospitals,
    - Personalised travel planning
    - Public transport information, integrated with other modes, e.g. cycling, car sharing
    - Increased action to encourage fuel efficient vehicle use (eco-driving) across the modes
    - Increased provision of relevant information via advertising
- Post 2020, to 2050:
  - Information provision aimed at awareness raising and behavioural change will need to be constantly **monitored and evaluated** and be **more sophisticated** to:
    - **Maximise its potential**
    - Reflect **relevant developments** in policy instruments, e.g. support of economic/fiscal measures; less relevant for regulation
    - **Reflect technical and other developments**, e.g. take account of new technologies
- EU action focused on **wider awareness raising, facilitating information exchange and good practice and product-focused measures?**

# Other policies

Pre-2020:

- Green Public Procurement:
  - Used to stimulate technologies that are (near being) ready for the market
  - Details need to be constantly reviewed and monitored to make sure that it is targeting the appropriate technologies
- Support for fleet tests/demonstration programmes/R&D:
  - Similarly used to bring technologies closer to the market
  - Details of (research) programmes and supporting measures need to be continuously reviewed to ensure that the proper (types of) technologies are being targeted
- EU action focused on providing added value (European research programmes and support) and removing unnecessary barriers (as identified)

# Conclusions

- No silver bullet available: mix of instruments needed
- Key elements for all modes:
  - Regulation of energy or GHG efficiency of vehicle and energy carriers
  - Carbon based economic incentives (fuel tax or emission trading)
- Other policy needed to improve market conditions for GHG reduction and to manage transport growth:
  - Infrastructure and spatial policy needed to manage long term demand
  - Traffic management and speed policy needed to further improve energy efficient use of vehicles and to limit demand growth
  - Company car taxation and vehicle taxation to stimulate fuel efficient vehicles
  - Removal of tax exemptions and subsidies
  - Infrastructure charging for infrastructure and other external cost and to combat congestion without increasing transport volumes
  - Information to increase acceptability and understanding and how to use new technologies and ITS
  - Policies to stimulate innovation to overcome barriers



The project is funded by the European Commission's  
Directorate-General Environment



# EU Transport GHG: Routes to 2050?

**Panel response**

Partners

[www.eutransportghg2050.eu](http://www.eutransportghg2050.eu)

