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EU Transport GHG: Routes to 2050 II

Risks/uncertainties associated with the achievability of considered policies and measures

Richard Smokers (TNO), Ian Skinner (TEPR), Bettina Kampman (CE)

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Objectives of Task 5

- **Main Aim**: Systematic exploration of risks and uncertainties, including lead times for GHG policy implementation and lags to the impact on emissions
  - Biofuels
  - Electricity and hydrogen in transport
  - Economic instruments, particularly usage pricing

- What are the factors that could cause the instruments discussed not actually leading to the expected GHG reductions?

- Assess the extent to which key factors outside the transport sector will affect decarbonisation of transport

- Develop approaches to address / mitigate those risks and uncertainties and optimize achievability

Objectives of this stakeholder meeting

- Present & discuss results based on draft final version of the paper

Biofuels

Biofuels as a means to reduce transport's CO_2 emissions

- A number of risks and uncertainties can reduce future GHG emission reduction by biofuels
- These may be related to:
  - the future biofuels volume (or share) in transport
  - the WTW GHG emission reduction of these biofuels
- These risks are based on a number of other risks, e.g.:
  - **Economical**: biofuels cost and availability, lack of investments, etc.
  - **Social**: impacts on food prices, socio-economic impacts in biofuel producing countries, public concerns about biofuel quality or impacts
  - **Environmental**: some biofuels may have negative impacts on GHG emissions, biodiversity, etc.
  - **Technical**: compatibility with existing vehicles and aviation requirements, development of 2nd generation biofuels processes
  - **Political**: long lead times or ineffectiveness of biofuels policies

Biofuels: Key conditions and policy timelines

- Four key conditions under which biofuels policy can deliver maximum GHG emissions reductions:
  - biofuels availability
  - biofuels sustainability and GHG reduction
  - technical compatibility
  - public support
- Timelines:
  - **Short term**: effective transposition of RED and FQD in the member states; further development of sustainability criteria; inclusion of indirect land use change in criteria (ILUC); communication
  - **Medium term**: monitor direct and indirect impacts and effectiveness of policies; promote use of non-food biomass, R&D, develop global land use change policies, address technical issues; develop post-2020 biofuels targets and policies
  - **Long term**: Continue development of targets, policies and market conditions, relevant R&D, investments in sustainable biomass cultivation and biofuel production capacities; biofuels in non-road transport modes

Biofuels: Elements of a strategy to reduce risks

- Short term: focus on effective implementation and improvement of biofuels sustainability criteria
- Develop and implement effective policies to prevent negative indirect land use change effects (ILUC)
- Monitor impacts and effects of biofuels policies
  - Take action (further research, policy improvements) if necessary
- Promote R&D into new biofuels processes and applications
  - 2nd generation: to limit competition with food and impacts from land use change
  - biofuels for aviation
- If necessary, address vehicle compatibility issues
- Longer term: manage risks by setting the right biofuels targets, policies and (sustainability) boundary conditions
- Support global initiatives that reduce GHG emissions and biodiversity loss due to land use change (e.g. IPCC and CBD)
- The result: maximisation of a sustainable and diverse biofuels supply, at reasonable cost, that can be used in all transport modes

Electricity and hydrogen in transport

Electricity & hydrogen: Introduction

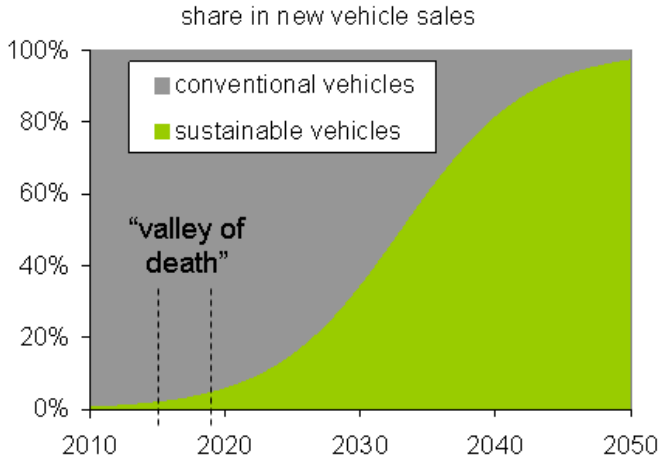
- Main risks and uncertainties related to:
  - policy development
  - market development
    - vehicle technology and cost development
    - infrastructure development
    - energy cost development
    - availability of resources
  - net environmental impact at vehicle level
    - need for low CO_2 electricity and hydrogen

Electricity & hydrogen: Risks and uncertainties associated with policy development

- uncertainty about long term targets
  - short term action required to get options ready for meeting LT targets
- lead time for policy development
  - e.g. for new fiscal systems needed to provide level playing field for different options and to reward options on basis of their real impact on GHG emissions
- availability of appropriate test and valuation procedures
  - necessary to enable development of long term fiscal systems
  - valuation of PHEV and EREVs
- quality of the policy instruments
  - flaws and loopholes leading to undesired effects
  - interaction with other policy instruments
  - fragmentation of policy development at different government levels and in different geographical regions

Electricity & hydrogen: Risks and uncertainties associated with market development

- vehicle technology and cost development
  - strength of learning effects
  - unpredictability of breakthroughs
  - development of alternatives (e.g. battery technology)
  - can EVs and FCEVs deliver **added value**?
- infrastructure development
  - many choices to be made for “dominant design“
  - business case & business models
  - underutilisation in first implementation phase



- energy cost development
  - costs of fossil and renewable energy
  - affordable hydrogen from renewables requires chain efficiency improvements
- impact of supply and demand oriented policy measures on business case
  - business case at user level determined by costs and applicable tax regime
  - supply oriented measures (regulation) necessary to spur availability
- availability of resources
  - renewable energy will remain scarce
  - scarce materials: lithium, rare earth metals, copper and platinum
- "sustainability" of stakeholder attitudes and interests
  - investors: how to bridge the “valley of death”?
  - consumers: from hype to real demand

Electricity & hydrogen: Risks and uncertainties associated with net environmental impact

- timely availability of sufficient renewable energy
  - success of European policies and sector initiatives aimed at decarbonising the energy sector
- interaction with the energy system
  - nighttime charging + load management increases demand for and profitability of cheap e.g. coal-fired baseload power
  - can EVs / FCEVs create synergies with the simultaneous implementation of increasing amounts of renewable energy?
- LCA-aspects of vehicle manufacturing and decommissioning
  - use of batteries, fuels cells, power electronics and other new components will lead to net increase in absolute energy use and GHG emissions in production and decommissioning phases
  - chain management needed to make sure that production meets environmental standards consistent with sustainability goals

Electricity & hydrogen: Mitigating measures

- Early definition of long term climate goals, anchored in "climate laws“
- Timely start with preparing policy instruments for LT
- Future developments of RED and EU-ETS tailored to ensure that increasing amounts of renewable energy can be supplied to transport sector
- Avoid increases in the price of renewable energy resulting from competition over scarce supplies
- Harmonised approach at the European level may be necessary
  - to develop tax policy reforms that avoid structural reductions in fuel excise duty revenues due to increased use of electricity and hydrogen in transport
- Focus R&D on
  - creation of added value
  - product and production process innovations that reduce costs
  - alternatives for scarce materials
  - alternatives for lithium-based batteries with equal or better performance
- Invest in sufficient testing and evaluation of developed test and valuation procedures

Electricity & hydrogen: Mitigating measures

- Large scale field tests to experiment with different options for the design of future energy infrastructures
- Develop a suitable strategy for sharing the burden of underutilisation of infrastructure
- Joint European foreign policy may be necessary to assure the availability of scarce materials to the European industry
- Manage growth of production capacities
- Create consistent investment climate
- Avoid incidents that give electric / hydrogen vehicles bad press
- Assure that the demand from electric and hydrogen fuelled vehicles for renewable energy is met by additional supply capacity
  - rather than by shifting delivery of existing renewable energy supply from one sector to another
- Improve knowledge of life-cycle impacts and mitigate through chain management

Economic instruments

particularly usage pricing

Focus of assessment: Road user charging to reduce transport's CO_2 emissions

- Assessment assumes that road user charging is used **in addition to**, not instead of, fuel taxation, in order to ensure that CO_2 emissions reductions are delivered
- Various risks, of which two are often mentioned:
  - Public (and business) acceptability
  - Political risks
- These risks are based on a number of other risks, e.g.:
  - Business concerns (local and national) re economic impact of schemes
  - Public concerns re impacts on mobility, and thus on opportunities for employment and social interaction
  - Distributional impacts, particularly on low income drivers
  - Potential social and environmental impacts caused by diverted traffic
  - Risks associated with implementation, e.g. use of revenues, justifying on basis of external cost pricing
  - Concerns over privacy

Economic instruments: Nature of risks and policy timelines

- Nature of risks:
  - Many risks are potentially real (rather than perceived), but could be addressed through scheme design and/or complementary instruments once the actual situation has been properly understood
- Timelines:
  - Europe: No barriers to immediate implementation, as long as consistent with Eurovignette Directive
  - National: Legislation might be needed to allow respective authorities to implement road user charging
  - Regional/city: Schemes could take several years from conception to implementation, e.g. London congestion charge took 2 years, 7 months (including an 18 month consultation process)
  - Commission plans mandatory user charging for road (and rail) transport by 2020 (2016 for HGVs) – would provide a framework for national, regional and city charging schemes

Elements of a strategy to reduce risks of introducing road user charging

- There should be alternatives to travel and/or means to avoid charge
- Baseline should be well understood, including transport situation, wider economic, social and environmental situation, particularly population/businesses that might be significantly affected
- Rationale, potential impacts and objectives should be clearly and simply stated and communicated from the beginning of process
- Potential adverse impacts/barriers to acceptability should be addressed explicitly and communicated transparently from the start

Elements of a strategy to reduce risks of introducing road user charging (continued)

- Public/business/stakeholders should be engaged from the start; authorities should be flexible and dynamic in addressing concerns
- Recycling revenues, e.g. to fund non-charged modes, can improve the public/business acceptability
- Schemes should be introduced with complementary policy instruments to deliver a wide range of policy objectives
- Impacts (beneficial and adverse) should be monitored, based on objectives; alterations (e.g. to charging levels) made as appropriate

Risks, uncertainties & lead times: Conclusions

- for technical options cost development and net GHG reduction are common uncertainties
- for biofuels and usage pricing public support is important
- other risks / uncertainties / lead times different per option / instrument

- biofuels
  - costs / availability / sustainability / public support
- electricity and hydrogen
  - costs vs. added value / business case depends on fiscal regime / infrastructure investment / dependence on decarbonisation of energy sector
- economic instruments / usage pricing
  - acceptance by stakeholders / political risks