

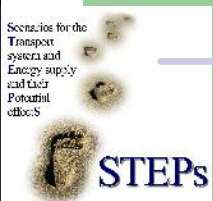
# Political, socio-economic and technological environments affecting transport energy use in Europe

T. Steenberghen

K.U.Leuven

E. Lopez

Universidad Politecnica de Madrid



Thérèse Steenberghen

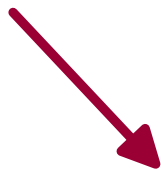
ERSCP-2005

Antwerp

5-7 October 2005

Slide 1

# Conceptual approach and relationships between the different drivers affecting energy use



**C**  
TRANSPORT ACTIVITY  
**C**



## Natural gas and LPG

- Market potential
  - ? **NG:**
    - filling stations available and suitable storage facilities
    - 2 important markets: vehicle fleets, conventional fuel supply stations which add gas to their supply
    - No tax on NG use as transport fuel
  - **LPG:** pilot projects in several EU cities
- Barriers
  - Financial barriers (vehicle cost vs. overall lifetime cost)
  - Cost of widespread infrastructure of filling stations
  - **NG:**
    - Price for transport use?
  - **LPG:**
    - Limited availability in refineries
    - Need for standardisation
    - Lack of legislation and safety certification
    - Lack of technical info



**STEPS**



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

# Hydrogen

- **Market potential**
  - ? existing technology, but application to transport recent and still in developing stage
  - Polymer Electrolyte Membrane (PEMFC) potential for cost reduction; acceleration, maximum speed and range improving
  - New research: Methanol (MFC); inexpensive mass production and easy storage
  - Environmental benefits
  - Long term
- **Barriers**
  - **Distribution and storage**
  - **Lack of operating experience**
  - **Cost: broad introduction into the market is needed**
  - **Uncertainty about future market requires clear policy measures, legislation and standards**



STEPs



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## Biofuels (biodiesel and bioethanol)

- Market potential
  - ? Indigenous fuel supply
  - ? Alternative for storage of crop surpluses
  - ? Environmental concerns
  - ? Agricultural lobby for re-introduction of set-aside agricultural land
  - ? Tax relief
  - ? Scale of industrialisation**
  - ? Conversion technology**
  - ? Distribution infrastructure**
  - ? Public support**
- Barriers
  - Information to potential investors
  - Uncertainty feedstock availability: set-aside scheme destabilised non-food crop industry (competition with food crops on remaining land)
  - Lack of common EU standard
  - Price distortions in feedstock market



STEPs



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## Electric and hybrid vehicles

- Market potential
  - ? Quite mature technology (electric: could be introduced into market, hybrid: diesel-electric drive in serial configuration)
  - Reduction in weight needed
  - Supply infrastructure for recharging batteries
  - Electricity price
  - Fleets of delivery vehicles with limited range
- Barriers
  - Profusion of technologies with insufficient experiences
  - Investment cost + uncertainty for further system developments
  - Vehicle price
  - EU market = multi-purpose family car ? limited functionality
  - Co-operation between vehicle manufacturers, electricity suppliers and policy makers needed
  - If successful: potential overload for electricity distribution



STEPS



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## Market incentives

- Fuel pricing measures : fiscal incentives
  - Energy products are heavily taxed
  - Tax varies from product to product and between Member States



**More harmonized Community framework on taxation of energy products is needed to prevent competition between member states**



Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## Market incentives

- Performance based tax incentives and credits for efficient technologies
  - To help jumpstart the introduction and purchase of advanced vehicles
  - Phase out as innovative products become established in the market
  - Example: hybrid and fuel cell vehicles



## Measures with potential major impacts



STEPS



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## **Policies targeting technology and vehicle efficiency**

- Energy efficiency standards (regulatory standards)
  - Widely used
  - Effective to address market failures and barriers associated with information, organization, ...
  - Need to be modified to technical progress to provide dynamic innovation incentives
  - Most effective in countries with growing consumption and/or limited consumer awareness



**Decisions to introduce standards = common**  
**Development and implementation ? always transparent**  
**Enforcement and monitoring = costly**

## **Policies targeting technology and vehicle efficiency**

- Voluntary agreements
  - Can be either between a government authority and private parties, or a unilateral commitment recognized by a public authority, to perform beyond compliance
  - Preferred by industries



**Usually lower cost than alternative instruments**

**Complex to assess effectiveness**



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## Policies targeting technology and vehicle efficiency

- Measures to improve in-use fuel economy
  - **Vehicle inspections and maintenance programs:** by adding a fuel economy test and maintenance requirements, fuel economy will probably improve by 1%-2% until 2010, and by 0%-2% afterwards.
  - **On-board driving technology, driver training, speed limits and enforcement:** lower speed limits = unpopular, most effect expected from enforcing speed limits
  - **Vehicle scrappage programs:** fuel economy as side effect



STEPS



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

## Overall system improvement

- Measures to improve in-use fuel economy
  - Vehicle inspections and maintenance programs: by adding a fuel economy test and maintenance requirements, fuel economy will probably improve by 1%-2% until 2010, and by 0%-2% afterwards.
  - On-board driving technology, driver training, speed limits and enforcement: lower speed limits = unpopular, most effect expected from enforcing speed limits
  - Vehicle scrappage programs: fuel economy as side effect



STEPs



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005

# Conclusions

- Energy-efficient products and solutions exist
- Critical factors:
  - end user information
  - infrastructure adaptations
  - investment risks
  - role of policy: decrease uncertainty through suitable and timely policy measures, legislation and standards



STEPs



SADL  
K.U.Leuven R&D

Thérèse  
Steenberghen

ERSCP-2005

Antwerp

5-7 October 2005