Encouraging Innovation for Sustainable Transport & Mobility

25 November 2010

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Overview

1. Problems: Increasing demand exceeds efficiency improvement

2. Solutions: Diverse approaches to innovation

3. Policies: More intelligent, hybrid approaches to be explored
Impact in final energy consumption

41.3% Services, households & agriculture
27.9% Industry
30.7% Transport

2.6% Rail
82.5% Road
13.5% Air
1.4% Inl. Shipping

Source: Eurostat (2007)
Demand outpaces efficiency

Source: Enerdata (2006)
Two Billion Cars

Alone in Beijing, 1,000 new passenger cars hit the roads everyday.

Source: www.chinadialogue.net
Indirect & social impact is significant

**Systemic effects**
Infrastructure to use the product

- Construction and maintenance of motorway - traffic system - tunnels - etc

**Life Cycle Assessment (LCA)**

- Raw materials
- Production
- Fuel use
- Waste

Source: WWF-UK (2008)
Innovation is key to solutions

• (Absolute) decoupling of growth from environmental impact is essential ... “business as usual” doesn’t meet the challenge.

• All types of innovation – incremental, disruptive, radical / technological, organisational and institutional – need to be leveraged.

• Some market failures lie in technology lock-in and innovation system failures ... Need reprioritisation of investment and policy focus
4 types of technology application

Incremental innovation
- efficiency, technology-centred
- majority of policy focuses

Existing technologies in current applications

New technologies in current applications

Radical eco-innovation
- system, non-technology oriented
- new focus

Existing technologies in new applications

New technologies for new applications
Different types of innovation needed
Evolution of sustainable solutions

Pollution Control → Cleaner Production → Eco-efficiency → Lifecycle Management → Closed-loop Production → Industrial Symbiosis

Product & Service → Green Products → Eco-design → New business models → New modes of provision → Mass application

Organisational Boundary

Incremental innovation → Systemic innovation
Eco-innovation framework

- **Eco-innovation targets**
  - Institutions
  - Organisations & Marketing methods
  - Processes & Products

- **Eco-innovation mechanisms**
  - Modification
  - Re-design
  - Alternatives
  - Creation

- **Primarily non-technological change**
  - Higher potential environmental benefits
  - but more difficult to co-ordinate

- **Primarily technological change**
Eco-innovation examples

**Institutions**
- Michelin - industry standard for rolling resistance
- Vélib’ bike-sharing

**Organisations & Marketing methods**
- Xerox - managed print services
- Sharp - setup of recycling network

**Processes & Products**
- Toyota - vegetation and photocatalytic paint at plants
- IBM - energy management service
- The BMW Group - product improvements by EfficientDynamics
- Corex/Finex - direct smelting reduction
- ULSAB-AVC - Advanced high-strength steel
- Loremo - Structurally re-designed car
- BMW/Toyota - Hybrid propulsion
- Yokogawa Econo-Pilot
- Michelin Energy saving tyres

**Target Mechanism**

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Multiple actors & innovations

Eco-innovation

- Partnerships
- Technology
- Regulations, Pricing
- Business model
- Entrepreneurship
- Infrastructure

Change consumer behaviour
Levers in innovation value chain

Source: USEPA R&D Continuum
Different policy approaches needed

Incremental innovation

Existing technologies in current applications

New technologies in current applications

Radical eco-innovation

Existing technologies in new applications

New technologies for new applications

Market-based mechanisms

Targeted interventions
Challenges of eco-innovation policies

- Most policy initiatives organised around technology or sector (not solution-based); non-technological aspects ignored
- Investment in infrastructures requires long-term development planning ... New spatial and road planning, smart grid, bullet trains
- Need to understand supply-demand policy relations and how demand drives innovation and consumer behaviour can be changed
- Transition management: balance between short-term and long-term solutions
Rationales of demand-side policies

• Address problems related to diffusion of innovations
  – Lack of demand and user knowledge
  – High costs to switch technologies
  – Network effects and technology lock-in

• Accelerate addressing urgent societal needs

• Each instrument can target specific failures ... functioning is diverse

• Could be applied in a cost-effective way
“Getting prices right” instruments
Eco-taxes, cap & trade schemes
Removal of environmentally harmful subsidies

Public R&D

Regulations

Technical standardisation

Procurement

Equity support

Demonstration

Pricing

Performance standards, labelling & certification

Networks & partnerships

Infrastructure provision

Technology/knowledge transfer

Information & advice

Education & training

Macro approaches

Targeted approaches

Supply-push

Demand-pull
Case: France bonus-malus scheme

- “Carrot and stick” approach applied for personal vehicles according to CO2 emissions
- Possibility to make fiscally neutral
- Clear shifts in purchasing behaviour
- Plan to extend to other product categories
Case: UK forward commitment

• Agree to purchase non-existent products/services by specifying performance, costs and delivery dates

• Aim to stimulate development of new technologies by indicating future needs

• Applied in a few green areas
  – Energy-efficient lighting in NHS
  – Greener mattresses for HM Prison Service

• Discussion to apply a similar model to ODA
Policies for radical/systemic change?

- Stable long-term signals are very important for investment
- Long-term visions, foresight, roadmapping
- Predictable policies even if they may change
- More approaches from demand-side (mobility)
- Focus on infrastructures ... compact/smart cities, “green highway”
- Entrepreneurship and experimentation can help increase the range of future options.
- Encourage new partnerships and networks
- Be ready for transition impacts on supply chain
Innovation in the heart of Green Growth

Remove barriers to green growth
- Reform environmentally harmful subsidies
- Remove barriers to trade in environmental goods and services
- Strengthen policy coherence

Promote trajectory shift
- Adopt an integrated policy mix: market and non-market based instruments
- Accelerate the innovation and diffusion of green technologies
- Encourage measures for greener consumption and develop innovative financial mechanisms

Support the transition
- Smooth reallocation of labor through key labor market and training policies
- Upgrade workers' skills and competencies
- Address distributional effects of the associated structural change

Strengthen international co-operation
- Improve financing mechanisms for global public goods
- Enable pro-poor green growth
- Address potential competitiveness issues
- Promote technology transfer and R&D co-operation

Measure progress
- Develop a new accounting framework and a set of green growth indicators
- Measure impact of specific policies

Greener growth

Support the transition
Our contributions to Strategy

• Identify radical, systemic eco-innovations that could facilitate absolute decoupling

• Crystallise how supportive policies can help deliver eco-innovation and how they can be strengthened

• Provide evidence which helps policy-making in support of fostering new green firms & products and the restructuring of industries

• Provide practical tools that help policy makers and industry to take actions
Looking forward to learning

- Phase I report launched as the first GGS report
- Nomination for case studies is welcome
- Participation through community website
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www.oecd.org/sti/innovation/green