Market development for green cars

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**Context, focus/status and next steps**

- **Context:** OECD Green Growth Strategy

- **Focus and status:**
  - **Objective:** analyse policies, programmes and approaches for development, introduction and diffusion of green cars
  - **Outcomes:** (i) better understanding of market for green cars; (ii) analytical instruments to identify policies and approaches; (iii) insights on efficiency and effectiveness
  - Draft report discussed at workshop “The Green Road Ahead – What Role for Government in Fostering Clean Vehicle Markets?”, held in Paris on 16 April

- **Next steps:**
  - Project to be finalised by June 2012
## Alternative systems of vehicle propulsion and fuel supply

<table>
<thead>
<tr>
<th>Type of fuel</th>
<th>Type of propulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Internal combustion engine</strong></td>
</tr>
<tr>
<td><strong>Liquid</strong></td>
<td><strong>Hydrocarbons</strong></td>
</tr>
<tr>
<td>Conventional</td>
<td>Hybrid electric vehicle</td>
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<tr>
<td>gasoline/ diesel</td>
<td>Hybrid hydraulic vehicle</td>
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<tr>
<td>vehicle</td>
<td>Fuel-cell electric vehicle</td>
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<tr>
<td><strong>Gaseous</strong></td>
<td><strong>Hydrocarbons</strong></td>
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<tr>
<td>LNG/LPG vehicle</td>
<td>-</td>
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<tr>
<td><strong>Hydrogen</strong></td>
<td><strong>Hydrogen</strong></td>
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<tr>
<td>Hydrogen vehicle</td>
<td>Plug-in hybrid vehicle</td>
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<tr>
<td><strong>Grid electricity (external supply)</strong></td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>Pure electric vehicle</td>
</tr>
</tbody>
</table>

*Source: Hasčič and Johnstone (2011).*
New innovative business models are emerging

Green cars disrupt automotive value chains and foster the emergence of innovative business models:

- Car sales (direct/vehicle leasing)
- Battery (leasing/swapping)
- Charging infrastructure (public/private)
- Car-sharing
Automotive manufacturers have different strategies

<table>
<thead>
<tr>
<th>Priority to less polluting fuels: gas, biofuels</th>
<th>Equip the entire range with hybrid engine and test plug-in hybridisation</th>
<th>Priority to hybrid but also all other types of engine, according to country and use</th>
<th>Priority to plug-in hybrid and electric</th>
<th>Priority to electric</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fiat</td>
<td>• Toyota</td>
<td>• Ford</td>
<td>• GM</td>
<td>• Renault-Nissan</td>
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<tr>
<td>• Chrysler?</td>
<td>• Honda</td>
<td>• PSA</td>
<td>• Mitsubishi</td>
<td>• Many Chinese</td>
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<tr>
<td>• Volvo</td>
<td>• Mazda</td>
<td>• Volkswagen</td>
<td>• BYD</td>
<td>and Indian carmakers</td>
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<tr>
<td>• Russian carmakers</td>
<td>• Porsche</td>
<td>• BMW</td>
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<td></td>
<td></td>
<td>• Daimler</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>• Hyundai</td>
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</tbody>
</table>

The need to consider the full life-cycle and possible trade-offs

• Energy efficiency of green vehicles should be assessed by performing a “well-to-wheel” calculation

• Policy trade-offs may emerge from a decision to pursue greening of road transport
Industrial and competition issues surrounding green vehicles

- **Proliferation of technological trajectories in the green car industry:**
  - Markets segments not fully substitutable
  - Little or no R&D scope economies or spillovers
  - Different infrastructure requirements

- **Public policy implications**
  - Importance of technological neutrality
  - But: role of government in overcoming specific failures and barriers
Overcoming specific market and system failures

Diagnostics for (green) growth

Low returns to “green” activities, innovation and investment

- Low economic returns
  - Inertia
    - Low returns to R&D
    - Network effects
      - Barriers to competition
      - Norms and habits
  - Low social returns
    - Inadequate infrastructure
      - Incomplete property rights, perverse subsidies, preferences to incumbents
    - Low human capital
      - Policy unpredictability and regulatory uncertainty
    - Low social capital and poor institutional quality
      - Information externalities and split incentives
      - Negative externalities

Overcoming specific market and system failures

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      - Low returns to R&D
      - Network effects
        - Barriers to competition
        - Norms and habits
    - Inadequate infrastructure
      - Low human capital
      - Low social capital and poor institutional quality
  - Low social returns
    - Government failure
      - Incomplete property rights, perverse subsidies, preferences to incumbents
      - Policy unpredictability and regulatory uncertainty
    - Market failure
      - Information externalities and split incentives
      - Negative externalities

Policies to stimulate the deployment and uptake of green vehicles

- Public procurement
- Performance-based regulations and standards
- Technology-based standards
- Price-based measures
- Financing commercialisation
- Infrastructure provision
- Information-based measures
- Networks and partnerships
Public procurement

- Can help carmakers recuperate sunk costs of large and risky investments
- Promote adoption by private motorists thanks to network effects
- Create a signalling effect through government’s purchasing power (lead user)
- Demonstration effect breaking psychological biases and overcoming information asymmetries
Performance-based regulations and standards

- Help to avoid irreversible effects and lock-in
- Can be designed to be technology neutral and flexible (focus on outcomes)
- Change consumers’ norms and habits and overcome information asymmetries by highlighting improved fuel economy and environmental performance
- Enhance regulatory certainty for carmakers and investors
Technology-based standards

• Enable positive network externalities by ensuring interoperability

• Facilitate the deployment of necessary charging infrastructure

• Provide long-term certainty and predictability to private sector operators

• Increase consumers’ knowledge and confidence in green vehicles reliability and reduce information gaps between manufactures and drivers
Price-based measures

• Tackle the high-cost barrier by:
  – Raising the price of the most pollutant and energy-inefficient vehicles (e.g. taxation)
  – Lowering the price of cleaner fuels and propulsion technologies (e.g. tax credits and direct subsidies)

• Help to put consumers in a better position to make a rational decision

• Correct un-priced negative environmental externalities
Financing for commercialisation

- Green car technologies crucially depend on venture capital investment
- Governments can overcome high entry costs by supporting commercialisation of innovative fuels and technologies
• Tackle network externalities by supporting the provision of refuelling infrastructure
• Provide private operators with incentives to invest in infrastructure
• Vehicle labelling schemes: can be tied effectively to other instruments (e.g. tax incentives and subsidies)

• Consumer education: can steer users’ behaviour towards sustainable consumption and raise awareness of negative environmental impact of car purchase and usage
Networks and partnerships

- Help overcome transaction costs and co-ordination failures
- Facilitate co-operation and optimise use of resources among a variety of actors
Preliminary lessons learned and conclusions

• Stringency, predictability and flexibility of instruments
• Stable, consistent and long-term policy signals
• Timing and sequencing of policy implementation
• Technological neutrality
• Ongoing monitoring and evaluation
• Cost-benefit and cost-effectiveness analyses
Thank you for your attention and for providing further input

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