Combining transitions case studies with transitions modelling: Mobility in the PATHWAYS project

PATHWAYS/SOER workshop
EEA, Copenhagen
21-22 November 2016

Andries Hof
Creating the scenarios: a joint effort

Socio-technical analysis of niche-innovations in mobility for the UK and the Netherlands

etc..

Integrated Assessment Modeling on global & European level: IMAGE & WITCH

etc..

Agent-based modelling on country-level: MATISSE-KK
Two “ideal-type” pathways as basis

- Pathway A / Technical component substitution pathway:
  - adjustment of existing regime without a full reordering of the existing societal structures (for instance adding CCS to coal or gas-fired power plants or existing owners of the land broadening the services they provide)

- Pathway B / Broader regime transformation:
  - a shift to a new socio-technical system by also including wider behavioural and cultural changes, new user practices and institutions (for instance decentralised PV installation, car-sharing)
## Summary from socio-technical analysis of niche-innovations

<table>
<thead>
<tr>
<th>Niche innovation</th>
<th>Pathway</th>
<th>Momentum Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Netherlands</td>
<td>UK</td>
</tr>
<tr>
<td>(Plug-in-)Hybrid Electric Vehicles</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Battery Electric Vehicles:</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Biofuels</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Hydrogen fuel Cells</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Car sharing</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Urban Cycling/Sharing Schemes</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Inter-modal Ticketing (Smart Cards)</td>
<td>A / B</td>
<td></td>
</tr>
</tbody>
</table>

**Momentum Legend**
- Very low
- Low
- Medium
- High
- Very High
### Scenario adaptations according to socio-technical assessments

<table>
<thead>
<tr>
<th>Scenario</th>
<th>IMAGE</th>
<th>PATHWAY A WITCH</th>
<th>PATHWAY B WITCH</th>
<th>MATISSE-KK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric (both BEV and PHEV)</td>
<td>25% purchasing price subsidy</td>
<td>+25% battery learning rate, +50% engine efficiency growth rate</td>
<td>Higher priority on environmental performance, increasing convenience as battery ranges improve and infrastructure develops</td>
<td>Improved environmental performance, high cost, lower convenience through lack of infrastructure (chicken and egg problem)</td>
</tr>
<tr>
<td>Bio</td>
<td>25% purchasing price subsidy</td>
<td>+50% engine efficiency growth rate (Not considered in WITCH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2</td>
<td>25% purchasing price subsidy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other**

<table>
<thead>
<tr>
<th><strong>Not modified relative to PATHWAY 0</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social and behavioural change (demand, preferences)</strong></td>
</tr>
<tr>
<td><strong>Regulatory change (intervention, governance)</strong></td>
</tr>
<tr>
<td><strong>Technical change (acceleration)</strong></td>
</tr>
<tr>
<td><strong>Shock (Shift away)</strong></td>
</tr>
</tbody>
</table>
Scenario results: passenger kms

Graph showing the development of travel demand for different pathways:
- **PATHWAY_0**
- **PATHWAY_A**
- **PATHWAY_B**

The modes are represented as follows:
- Passenger|Aviation
- Walking & Biking
- Passenger|Rail
- Passenger|Bus
- Passenger|Road

The graph compares the billion pkm for the years 2010 and 2050, across different scenarios.
Scenario results: share of vehicle types

PATHWAY_0
PATHWAY_A
PATHWAY_B

Vehicle
ICE/Oil
ICE/Biofuels
Hydrogen
PHEV/Oil
PHEV/Biofuels
PHEV/Electricity
BEV

2010 2050 2010 2050 2010 2050
Scenario results: Share of mobility lifestyles

[Graphs showing the share of mobility lifestyles for Pathway A and Pathway B in different countries (NL, UK).]
THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION’S SEVENTH FRAMEWORK PROGRAMME FOR RESEARCH, TECHNOLOGICAL DEVELOPMENT AND DEMONSTRATION UNDER GRANT AGREEMENT NO 603942