Disruptive End-use Energy Innovations and Potential Implications on Demand

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Session: Exploring future energy trends: innovation priorities and policy implications
New Trends in Social and Technological Change

• Changing consumer preferences (e.g. diets)
• Generational change in materialism (service rather than ownership, e.g. only 10% of 19-yr old in Stockholm have drivers license)
• New business models (sharing & circular economy)
• Pervasive digitalization and ICT convergence (Society 5.0)
• Rapid innovation in granular technologies and integrated digital services
Disruptive End-user Innovations

1. From ownership to usership – 2. Sharing Economy – 3. From atomized to connected

Source: Charlie Wilson
Resource Impacts of Digital Convergence

Source: TWI2050, 2019
The “Sharing Economy”: Mobility Case Studies

Reductions (%) in shared mobility scenario compared to status quo

<table>
<thead>
<tr>
<th>City</th>
<th>Vehicle Fleet</th>
<th>Con-mobility</th>
<th>Mobility Costs</th>
<th>CO2 Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>-95%</td>
<td>-49%</td>
<td>-43%</td>
<td>-54%</td>
</tr>
<tr>
<td>Dublin</td>
<td>-98%</td>
<td>-43%</td>
<td>-50%</td>
<td>&gt; -31%*</td>
</tr>
<tr>
<td>Helsinki</td>
<td>-96%</td>
<td>-37%</td>
<td>-43%</td>
<td>&gt; -34%*</td>
</tr>
<tr>
<td>Lisbon</td>
<td>-97%</td>
<td>-30%</td>
<td>-50%</td>
<td>-62%</td>
</tr>
</tbody>
</table>

* IC vehicle fleets, no electrification
Implications of Demand Transformations: LED Scenario
Low Demand Enables Meeting 1.5 °C without CCS with significant SDG Benefits
A Low Energy Demand Scenario for Meeting the 1.5°C Target and Sustainable Development Goals without Negative Emissions.

A. Grubler, C. Wilson, N. Bento, B. Boza-Kiss, V. Krey, et al., 2018.

*Nature Energy* 3, 515-527

Article + SI

online LED DB:
https://db1.ene.iiasa.ac.at/LEDDB/dsd?Action=htmlpage&page=10