Global Mobility Scenarios

TCFD and BoE Conference on Climate Scenarios, Financial Risk and Strategic Planning
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Developing scenarios is about anticipating ....

Global trends

Policy & tech change

Markets and geopolitics
Global Policy Agenda on Sustainable Transport Development Has Shifted to Climate Abatement

• Economic & equity aspects, alongside the environmental (air pollution, congestion, etc)
  • Promoted by international organizations, development banks

• Paris Agreement @ UNFCCC COP21 sets up a new climate policy regime for transport
  • Based on nationally determined contributions (NDC) of parties
  • Parties’ individual & joint assessment of individual & collective progress is critical
NDCs Sees Potential for Ambitious Action and Huge Investment Needs in the Transport Sector
International Transportation Energy Modeling (ITEM)

Organized by

Contributors

Participants
iTEM Activities

**Academic**
- Comparison of projections,
- Discussion of methodological approaches of existing models,
- Analysis of the fundamental drivers, new technologies, and projected impacts of proposed and existing policies, and
- Exploration of new methods in improving estimates.

**Policy insights**
- Compare with planned policy targets to
  - Identify possible policy gaps
  - Feasibility of modeling results
- Insights about future trends of development
  - For future policy development
  - For strategic planning and investment decisions
- Shed lights on major sources of uncertainties and how they affects the outcome of the projections
Emission trajectories needed to meet the 2030 and 2050 targets

- 78-174 MMT CO$_2$e reductions in 2030 below the projected reference scenarios

- Cumulative emission reductions from 2010:
  - 270 MMtCO$_2$e by 2020
  - 450 MMtCO$_2$e by 2030
  - 5500 MMtCO$_2$e by 2050
Projected emissions by sector in 2030

Projected emissions in 2030 compared to 2015: BAU

* CA-TIMES applies a different system boundary to Industrial sector
Emission reductions needed across all sectors

Projected emissions in 2030 compared to 2015

- 8-45 MMTCO$_2$e
- 62-87 MMTCO$_2$e

California Case Study

* CA-TIMES applies a different system boundary to Industrial sector
## Transport Policy Gaps

<table>
<thead>
<tr>
<th>Models</th>
<th>Committed state policy/goal</th>
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<tbody>
<tr>
<td>Passenger VMT reduction (%)</td>
<td>8-23 %</td>
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<tr>
<td><strong>Light-duty ZEV</strong>&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1.2–4 million ZEVs (FCV&amp;BEV) 0.2–2.7 million PHEVs</td>
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<tr>
<td>Vehicle fleet efficiency</td>
<td>On-road efficiency increases to 46–53 miles/gallon in 2030</td>
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<tr>
<td>Medium- and heavy-duty ZEVs (000)</td>
<td>0–95</td>
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<tr>
<td>Biogas/biofuels (billion gge)</td>
<td>3.5–5.9 (17–20% of all transportation fuel)</td>
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<td>Carbon intensity of fuels (% reduction from 2010)</td>
<td>12–22%</td>
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<tr>
<td>Reduction in gasoline &amp; diesel use (% reduction from 2010)</td>
<td>30–53%</td>
</tr>
<tr>
<td>Mitigation Cost&lt;sup&gt;+++&lt;/sup&gt;</td>
<td>$112/tCO$_2$e in LDV sector (-$93–10/household/yr)(real, levelized) $315 (2012$/vehicle/yr) for trucking and busing</td>
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Major Uncertainty 1: Policy and Consumer Choices

- Vehicle cost
- Fuel cost
- Refueling station availability
- Range Anxiety cost
- Model availability
- New technology risk premium
- Towing capability
- Supply chain logistics
- Willingness to pay
Major Uncertainty 2: Demand Growth

- Huge uncertainty about China: China’s LDV stock
- Will there be 90 million cars or 500 million cars in China by 2050?
Major Uncertainty 3: Three Transitions

1. Electric vehicles
   • Emissions, efficiency benefits
   • Range, cost concerns

2. Autonomous vehicles
   • Safety, traffic benefits
   • Lowering Value of Time could have unknown impact on total distance traveled

3. Mobility as a service (MaaS)
   • Ride-sharing
   • Vehicle ownership model moves toward fleet, away from personal ownership
   • Fewer vehicles on the road, but each one driving more kilometers per year
   • Faster technology turnover
Final Thoughts

• Transport systems play a critical role in future energy transitions
  ➢ Emerging trends will hinge on the development of technology, policy, resource availability, consumer choice, and geopolitics
  ➢ The future is highly uncertain

• New trends and disruptive innovation bring opportunities and challenges