International Transportation Energy Modeling (ITEM)

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International Transportation Energy Modeling (iITEM)

Organized by

Contributors

Participants

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Activities (academic)

- **Comparison of projections**, as collected in a shared database,

- 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 **novel methods** in the transport energy area.
Activities (relevance to policies and decisionmaking)

- Impartial analysis and benchmarking of strategies
- Compare modeling results with planned policy targets to gain insights
  - Identify possible policy gaps
  - Feasibility of modeling results
- Insights to policymakers and decisionmakers about future trends of development in the baseline and policy scenarios
  - 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
Largest source of uncertainty in transport projections

- Vehicle ownership (demographic)
- Travel - Infrastructure constraints
  - Travel - Urban vs rural
  - Travel - Spatial patterns
- Cost and investment assumptions
- Travel per vehicle
- Heavy-duty focused topics
- Off-road
- Vehicle efficiencies
- Loads (especially in freight)

![Graph showing uncertainty sources]

- Policy shifts affecting behaviors
- Urban vs rural
- Supply constraints (resources)
- Behavioral/structural shifts
- Freight activities/technology shift
- Demographic classes
- Modal shift analysis

![Graph showing model improvements]

- Alignment on input assumptions
- Coordination on historical data
- Policy shifts affecting behaviors
- Indicator (ratio to GDP, pop, etc)
- Modeling approaches
- Effects of policy
Transportation in a Low-Carbon Economy

- Transportation emissions mitigation in the models is far more constrained than the remainder of the energy economy.
3 Billion Cars (or 1.5 billion) in 2050?
Large uncertainties in the projections of LDV stocks
Transportation in a Low-Carbon Economy

- Primary means of reducing transportation-related emissions in the models
  - Reduced activity levels (e.g., less passenger transport, fewer freight shipments)
  - Modal shifting, towards modes with lower emissions intensity
  - Vehicle drivetrain/fuel choice (e.g., electric vehicles vs. ICE)
  - Vehicle efficiency level (e.g., light-weighting, downsizing)
  - Reduced upstream fuel carbon intensity (e.g., CCS, biofuels)

- In the energy-economy models, all of these contribute to emissions mitigation to varying degrees
ITEM1: Models’ structures drive the choice of mitigation options

- Energy-economic models (GCAM and MESSAGE):
  - low carbon fuels
  - efficiency

- Scenario (expert)-based models (MoMo and Roadmap):
  - efficiency
  - modal shifts
Energy use in the policy case only decrease slightly (~10%) but major shifts in fuel types.. (and technology, activity)
Freight: Better understanding of shifts in activity and mitigation options of in technology, fuel, and system integration are needed
Current policy Evs/PHEVs commitments to 2020/2025 may be far below what’s needed to achieve 2° target suggested by the models

### Table 2. Comparison of announced policy targets with model-projected number of electric vehicles needed to be on the road by 2020/2025 in order for the transportation sector to be consistent with the 2 °C target. Average values across models are shown; full ranges in parentheses.

<table>
<thead>
<tr>
<th>Policy/Target</th>
<th>China</th>
<th>U.S.</th>
<th>Global</th>
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<tbody>
<tr>
<td></td>
<td>(2–47)</td>
<td>(9–42)</td>
<td>(35–180)</td>
</tr>
<tr>
<td>iTEM</td>
<td>28 million</td>
<td>29 million</td>
<td>113 million</td>
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<tr>
<td>Policy/Target</td>
<td>5 million by 2020*</td>
<td>1 million EVs by 2015†</td>
<td>20 million by 2020, 100 3.3 million by 2025**</td>
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* Indus. Dev. Strat. Plan (Tan et al. 2014);
† President’s pledge [https://www.whitehouse.gov/sites/default/files/other/fact-sheet-one-million-advanced-technology-vehicles.pdf](https://www.whitehouse.gov/sites/default/files/other/fact-sheet-one-million-advanced-technology-vehicles.pdf);
** MOU, 8 states [http://www.arb.ca.gov/newsrel/newsrelease.php?id=620](http://www.arb.ca.gov/newsrel/newsrelease.php?id=620);
Future activities

- Publication

- Develop a new data contributing/sharing platform, focusing on the issues of data quality, coverage, and integration.

- Develop an agreed data sharing policy

- Target specific research/policy topic

- iTEM3, Paris 2017