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MA^{3}T

Introduction to MA^{3}T

Understanding the diverse purchasing behaviors among individuals is key for designing efficient and effective policies for promoting advanced vehicle technologies. To address this need, ORNL developed the Market Acceptance of Advanced Automotive Technologies (MA^{3}T) model, a market simulation model for the DOE Vehicle Technologies Program. ***Implemented using Microsoft Excel for Windows, MA^{3}T simulates market demand for advanced vehicle technologies by representing relevant attributes of technologies and consumer behavior such as technological learning by doing, range anxiety, access to recharging points, daily driving patterns, and willingness to accept technological innovation.***

MA^{3}T Resources

- MA^{3}T MiniTool (/minitool)
- User's Guide (assets/custom/pdf/MA3T User Guide v20130729.pdf)
- Fact Sheet (assets/custom/pdf/ma3t_fact_sheet.pdf)

MA^{3}T Model Framework

Distinguishing model characteristics

- ✔ Technology richness
- ✔ Detailed consumer segmentation
- ✔ Market dynamics
- ✔ Daily distance distribution
- ✔ Range-infrastructure characterization

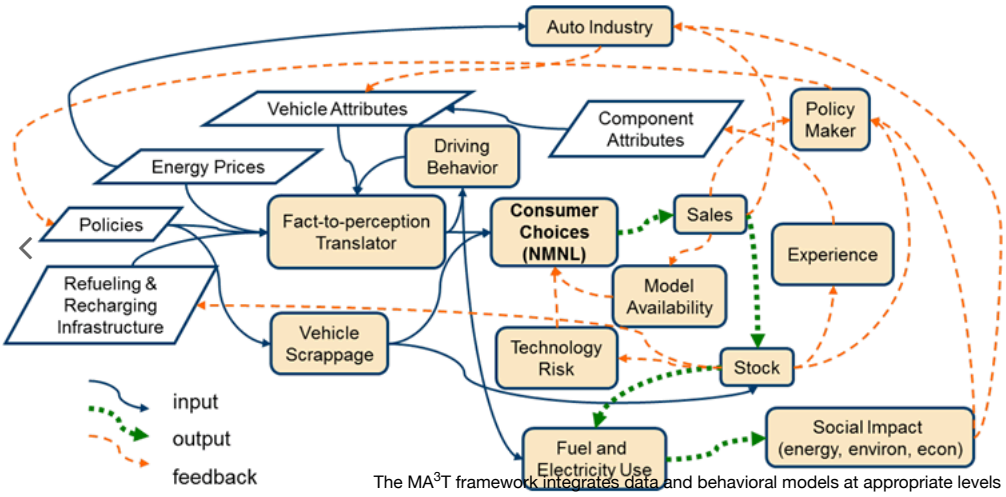
Market choices, segments, and dimensions

MA^{3}T includes 40 choices consisting of 20 powertrain technologies for each of two vehicle size classes, passenger cars and light duty trucks. MA^{3}T considers U.S. household users of these vehicles as the consumer market, which is disaggregated into 1,458 segments based on 6 dimensions:

- ✔ Census divisions
- ✔ Residential areas
- ✔ Attitudes toward novel technologies
- ✔ Driving patterns
- ✔ Home recharging situations
- ✔ Work recharging situations

Market penetrations, product diversity, and risk

MA^{3}T projections currently cover the period from 2005 to 2050 and capture the temporal interaction between market penetrations and product diversity and risk. MA^{3}T characterizes daily driving distance variation with the Gamma distribution, validated with real-world high-resolution travel data. MA^{3}T explicitly quantifies range anxiety for electric vehicles and reflects the effect of charging and refueling infrastructure on the appeal of plug-in electric vehicles and alternative fuel vehicles.



The MA^{3}T framework integrates data and behavioral models at appropriate levels of detail.

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