Surface Transportation in 2020-2030: Drivers and Policy Implications of Advanced Technologies and Innovation

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Advanced Technologies

- Not known what new technologies will be critical 10-20 years from now.
- Transportation “path dependence” implies a mostly highway/vehicle based system like today, but with ongoing incremental improvements.
- Can analyze legal, economic, and social trends that will drive introduction of new technologies.
- Climate and energy policy may be among the most influential drivers of future transportation systems and technologies.
Transportation as culprit

- 28% of transport CO$_2$ and growing
  - 60% of this from cars and light trucks
  - 22% of this from medium and heavy trucks
- Transport consumes more petroleum than the nation produces — a major cause of energy dependence.
- 70% of total U.S. petroleum consumption from transport and this share is growing.
Drivers of New Technologies and Innovations

- Energy Independence and Security Act (EISA) of 2007
- Surface Transportation Authorization Act (STAA) of 2009 – Introduced by Chairman Oberstar
- Latter two are illustrative of climate, energy and reauthorization policy orientations that will influence surface transportation
EISA 2007

- Requires light-duty vehicle (LDV) new fleets to achieve 35 mpg by 2020. Obama administration intends to achieve it by 2016.

- Implications for 2020-2030 time frame: more hybrids, possibly plug-ins, and more fuel-efficient internal combustion engines (ICEs). Maybe not hydrogen fuel cells. Not at all clear how this will play out.

- DOE forecasts EISA will hold LDV energy consumption constant to 2030 even though population growth and economy increase VMT by 1.6% annually. Transport emissions overall increase 10-15% due to continued growth in trucking and aviation.
ACESA 2009

- Passed House. Senate version may well differ.
- Commits to 80%+ GHG reduction below 2005 economy wide by 2050; 42% by 2030; 17% by 2020.
- Cap and trade raises fuel costs, incentives for alternative fuels, plug-in hybrids.
- Transportation planning provisions (regulation) that require EPA to set targets for reduced transportation GHGs; states and MPOs to develop own plans and be monitored by DOT and EPA.
Oberstar bill expected to establish policy framework for legislation.

Funds to states to maintain highway and transit condition – allocated by formula. Less future capacity?

Money directly to MPOs for projects in their jurisdictions. Expansion of transit and highway capacity, with new federal oversight.

More multi-modal: transit, HS Rail, non-motorized.

Greater federal oversight and discretion.

State and MPO planning provisions mirror those in ACESA. EPA setting targets – not USDOT.
Drivers

- If nation commits to 40% reduction in transportation GHGs by 2030, it apparently won’t come from vehicles and fuels unless more stringent vehicle fuel economy standards required.
- What will states be required to do?
- What technologies and policies will help?
Scenario of Surface Transportation in 2020-2030

- Much greener, but not sure which technologies.
- More information dependent.
- More capacity constrained.
- More choices, but slower.
- More actively managed and priced than today to achieve climate, energy, and congestion relief goals.
Imagine that EPA sets a 20% transportation GHG reduction target for states and MPOs to meet by 2030 – above and beyond what might come from vehicles and fuels.

- Driver of new, advanced technologies beyond vehicles?

**Major Options:**
- ITS/Operations
- ICT (information-communication technologies)
- Transit/HS Rail, freight mode shift
- Smart Growth
- Pricing
Feasibility of Achieving Targets

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Implications

- **ITS** – technical and institutional capacity to actually manage traffic at regulated speeds much lower than currently posted limits. Wireless electronic control of vehicle speeds and accelerations?

- **ICT** – state and local tax credits to encourage/require telecommuting, but how enforce? Public investment in telework centers.

- **Transit/HS Rail/freight intermodal** – vastly expanded capital and operating subsidy costs for states. Expanded investment in freight intermodal.

- **Land Use** – greatly expanded state influence over local control.

- **Pricing** – real time charging for use of roads, with surcharges for fuel-inefficient vehicles.
Pricing Through Mileage Charging

- Charge vehicles for miles traveled rather than through imposition of a fuel tax.
- Needed to supplement or replace gasoline taxes.
- Supported in many recent reports, such as those of National Transportation Finance Commission and Bi-Partisan Policy Center.
- Charge adjusted to reflect vehicle fuel economy to reduce GHGs.
Mileage charging technologies

- VMT calculated by tamper-resistant, in-vehicle device;
- Wireless communication with billing system;
- Possibly, but not necessarily, requiring a GPS device in the vehicle;
- Possibly integrated with ITS or use ITS-enabling technologies.
Implications

- Privacy;
- Institutional Capacity;
- Equity;
- Governance;
- Administrative costs;
- Transition issues.
Demonstrations

- Test out different scenarios
  - Charges by jurisdictional area
  - Charges by corridor
  - Multi-state
  - Interstate trucking
- Test out different technologies
- Test out public acceptance