

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 CO₂ 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
- American Clean Energy and Security Act (ACESA) of 2009 – Waxman-Markey. Passed House June 2009.
- 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.

STAA 2009

- 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.

State and MPO transportation GHG-reducing scenario

- 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

- ITS/Operations
 - ICT (information-communication technologies)
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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.
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Demonstrations

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