California’s Transportation Policy Model

...as seen by a policy wonk, regulator, and academic

Daniel Sperling
Professor and Director
Institute of Transportation Studies (ITS-Davis)
University of California, Davis
and
Board Member, California Air Resources Board

MIT-NESCAUM Summer Symposium Series

24 August 2010
The Problem!?
Good news and bad news
Soaring Global Demand for Vehicles (and Oil)

Sperling and Gordon (2009), based on DOE, JAMA, other
One solution .... a car “exodus”
Transforming Transportation

- Transforming vehicles
- Transforming fuels
- Transforming mobility
Vehicle policy solutions are easier and more effective than others.
California Leadership (patchwork success!)

• GHG *performance* standards (for mainstream market)
  ▪ Stds adopted in 2004 adopted by Obama as national atd
  ▪ New stds for 2017-2025 (Jan 2011?)

• “Kickstart” advanced vehicles
  ▪ ZEV mandate
  ▪ Special incentives in GHG/CAFE stds (EVs count as 0 g/mi)
  ▪ Rebates for EVs ($5000/veh) and other low-carbon, low-energy vehicles via AB118 (CARB and CEC)

• Feebates? (mechanism for reconciling regulations and markets)
Failed Fuel *du jour* Phenomenon

- 30 years ago – Synfuels (oil shale, coal)
- 20 years ago – Methanol
- 15 years ago – Electricity (Battery EVs)
- 5 years ago – Hydrogen (Fuel cells)
- 2 years ago – Ethanol
- Today – Electricity (Plug-in hybrid vehicles)
- *What’s next?*
California Low Carbon Fuel Standard (LCFS)
(Adopted April 2009, took effect Jan 2010)

Policy Design
• 10% reduction in carbon intensity of transport fuels by 2020
• Oil refiners are point of regulation
• Allows credit trading (harness market forces)

Why Important and Good Policy?
• Doesn’t pick winners: includes all fuels (unlike national RFS)
• Harnesses market forces (via tradable credit market)
• Stimulates innovation and investment
• Performance based
• Relies on lifecycle analysis (scientifically sound, important precedent)
Why is LCFS Controversial

- Fuel suppliers feel unfairly targeted because land use effects (iLUC) are considered for first time in climate policy
- Immature science underlying land use impacts
- Less economically efficient than cap & trade/carbon tax
- Raises question about tar sands (energy security vs climate change)
- **Threatens powerful interest groups** (mostly corn ethanol and small refiners)

My view:

- LCFS is best policy to guide transformation of transport fuels
  - More effective than cap & trade (and carbon taxes)
  - Better than RFS because fuel neutral and harnesses market forces
  - Provides incentive to innovate (tar sand production, alt fuels, etc)
  - provides durable policy framework
- Important to retain full lifecycle analysis (including iLUC) because:
  - Ignoring iLUC equivalent to saying land use impacts = 0, which is incorrect
U.S. passenger transport system is a very expensive transportation monoculture where “sprawl is the law.”

Many ways to provide equal accessibility at less cost—with less GHG emissions
Not all vehicle trips are “high value”!
California Leadership in Reducing VMT and Sprawl

- SB375 targets reductions in GHGs associated with passenger vehicle use (ie reduced VMT) via changes in land use, transit, and pricing
  - CARB proposed GHG targets for major cities (to be adopted sept 2010):
    - 2020: 7-8% reduction/capita (mostly VMT)
    - 2035: 13-16% reduction/capita (mostly VMT)

- But weak incentives

- Why good policy?
  - Provides performance-based mechanism for funding cities
  - Defers to local governments
  - Empowers local governments to do good planning and investment
    - Policies to reduce VMT and GHGs are aligned with good planning practices (generate large co-benefits (reduced infrastructure costs, healthy communities)

Model for rest of country?
California’s Comprehensive Program to Reduce GHG Emissions from Transportation

VEHICLES
• GHG light duty vehicle stds (soon extended to 2017-2025) (Jan 2011?)
• GHG requirements for trucks (mostly to improve aerodynamics)
• ZEV requirements (to be updated Jan 2011)
• $ for EVs and others (AB118)

FUELS
• Low carbon fuel standard
• Hydrogen fuel station requirements (“Clean Fuel Outlet”) (Jan 2011?)
• 33% renewable electricity stds for utilities (Sept 2010?)

VMT
• Reduce VMT and sprawl (SB375)

Plus carbon cap and trade?
Why Gov’t Initiative is Needed … and why prices are not enough

A Long List of Market “Failures”

• Environmental and energy externalities
• Principal agent problem (rental cars, truck trailers, leased vehicles, cars for legislators/execs)
• Network externality. Complementary products requiring large non-recoverable investments and investments that cannot be made by individual consumers—such as when different vehicles or different infrastructures are required (H2, bike paths for biking, smart paratransit, etc)
• Technology lock-in
• Market power (cartels, oligopolies, etc)
• High entry barriers in auto industry
• R&D under-investment due to:
  ▪ industry diffusion (ag industry)
  ▪ R&D spillovers. When R&D findings cannot be fully captured (leading to under-investment in R&D)
  ▪ Learning-by-doing spillovers where mfg savings not fully captured
• Consumer cognition (eg, buying cars), resulting in under-investment in efficiency (related to information and loss-aversion)
• Volatile oil prices create uncertainty which leads to under-investment in alternatives
Carrots and Sticks Needed

• Market instruments such as gas taxes ("carrots") are relatively ineffective in transport sector

• Mandates ("sticks") are effective at launching new technologies, but inefficient at creating markets

• Need sticks and carrots working in concert
Question of Will and Vision, More Than Cost!

• Consider hydrogen and fuel cells, which many think is most expensive and difficult transition ...
  ▪ $55 billion extra over 15 years for vehicles and fuels, to get to 10% market penetration (NRC/NAS, 2008)

• Meanwhile, US spends ~$8 billion/year on subsidies for corn ethanol

Thank You