Alice in Wonderland and the Cheshire Cat

Which Way Are We Going, and Does it Matter?

Thinking Globally, Acting Locally,

“Would you tell me, please, which way I ought to go from here?”

“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where...” said Alice.

“Then it doesn’t matter which way you go,” said the Cat.

– Lewis Carroll, Alice’s Adventures in Wonderland (1865)
Summary

• 1950's ethnic joke: "Are the streets paved with gold?"
• Problem is very big – John Heywood identified the need for 8 independent pattern breaks, each to get 25% real reduction, to achieve a total 80% reduction
• Lemons can sometimes make lemonade—Can Congestion become solutions?
• We need a comprehensive approach that is both directionally correct and of a suitable magnitude
• Construction of public transportation and improving Cities as in The Sarmiento Corridor may represent an opportunity to build political will to improve the economy and environment at the same time

Immigration:
In America the streets are paved in gold
1830s - 1870

Which way are we going?

• Greenhouse gas production and climate change
  – Total US production: 28% transport; 16% auto & truck
• Congestion increasing in all metropolitan areas
• Economic shocks as petroleum price spikes; new consumers in Asia
• Substantial growing inequality of income
• Unemployment high and persistent
• Dumb growth undermines public confidence and leads to agoraphobia
The Danielle Principle

- Wisdom from a 5 year-old attempting to eat (too much) spaghetti

What is sustainability?

- Brundtland Commission (1983) sustainability triangle
- Achieve Environmental, Economic, and Equity benefits simultaneously
- Both ethical and pragmatic: synergy, not compromise
“If you don’t measure, you can’t manage”

• But what if you measure the wrong things?
• What if you measure the wrong way?
• Enormous efforts have gone into short-range tools to predict behavior
• Much less effort has gone into long-range prediction, pattern breaks, and the proper evaluation of long range consequences

Environment

• Environmental impacts growing at rates lower than business-as-usual being considered “savings”
  – Political spin and misleading
• Substantial reduction in GHG is required
  – To 1790 levels, not 1990
Equity

• Equitable share of current level of GHG production requires a 90% reduction in the US (from 25 tons per capita per year to 2 tons), 75% globally (from 7-8 tons)
• Our US equitable share is more than used up by current auto and truck alone
• But access to opportunity within sprawling metropolitan areas is difficult to achieve without more VMT
• Many “solutions” raise equity issues
  – Congestion pricing
  – Remote housing locations
  – High transit fares

Economy

• GDP, rest in peace
  – Joseph Stiglitz & Amartya Sen, Nobel Prize winning economists
• GDP net of transport costs
• Hidden part of the iceberg
• Balance of payments
• Need for economic stimulus, and deflationary impact of auto and petroleum consumption
• Travel time saving are measurable and can help predict behavior, but are meaningless for evaluation purposes
• Need for accessibility, agglomeration benefits not yet easily measurable
What might we do within transportation?

- The external costs and benefits are huge, making prediction of behavior very disconnected from evaluation of benefits and costs
- Tax, subsidize, and regulate are key elements of policy
- But politics, values, condition options for all three
- Ten 80% solutions can get us to 10%
- There is no one 80% reduction “silver bullet”

Formula

\[ \frac{\text{GHG}}{\text{Pollution}} = \frac{\text{Petroleum}}{\text{VHT} \times \text{VMT} \times \text{VEH}} \times \text{POP} \]

- Fix the auto
- Fix the system

*Population is affected by per capita income and immigration*
Oil shocks of 1970s

• Instead of
  – Gas rationing with white market
  – Absolute fuel economy standards

• CAFE to get from 15 MPG to 27 MPG by 1987

• But truck exemption
  – Vehicle technology oriented to acceleration and speed
  – Myth of market forces (watch tonight’s 11 o’clock news auto advertisements)
  – Inspection and maintenance not dealt with
The California Car as National Standard

• After 30 years of foot dragging by the auto industry
  – 35 MPG by 2016 now seems assured as fleet average for new cars.
    • Supposedly includes auto company responsibility for inspection and maintenance

• Dwarfed by growth in VMT
  – 1979 → 2008, VMT increases by 91%;
  – 1979 → 2008, CAFE achieved 20.1 → 27.0 MPG
  – If by 2016 CAFE gets to 35 MPG, but VMT increases by 75%, we are worse off

• Clunkers will continue to circulate for another 15 years somewhere on planet earth

• Remember, consumption in 1979 was much too high; that’s why CAFE was developed.

• We only got the California Car because of the decentralized state-based efforts under the CAA of leaders like California and Massachusetts

Cash for Clunkers

Undermining a good idea with short term politics and dumb growth

• Supposed to be a win-win
  – Economic stimulus for the auto industry
  – Environmental gain by reducing pollution and GHG

• Original proposal
  – Replace 15 MPG vehicles with 35 MPG

• Outcome as reported
  – 15 MPG vehicles replaced by 25 MPG

• With no intervention, 15 MPG vehicles would have been replaced in 5 years with 35 MPG vehicles
Cash for Clunkers Analyzed

- Analysts complain that CO$_2$ reductions at $400$/ton > $28$/ton
  - “Low hanging fruit” is mostly a concern for fruit thieves
  - Farmers know that there is a lot of work required to plant and care for trees
  - Often the best fruit is on top, where the sun shines strongest

Embedded decisions

- Auto driven 12,000 miles per year for 15-20 years
Fix the system

- Shift towards transit oriented development

Who Decides?

- If analysis is supposed to speak truth to power, who has the power to decide to fix the system?
Who Decides? FEDERAL

DOT - National legislation & implementation
- Capital for highways and transit
- Highway costs, user financing is myth
- Transit as a rider on highways
- Highways are popular because they are like peanut butter
- Transit can help highways
- Transit can provide accessibility to suburban youth and elderly
- Feds can get into operations and maintenance

EPA – State by state potential initiatives
- CAA; parking limits; O&M
- Federal tax policy
  - Mortgage payment exemptions
  - Pre-tax treatment of employee transit and parking benefits

Who decides? State & Metro

- Capital > O&M
  - Expect federal capital
- Transit is lumpy
- Clean Air Act compliance can move behavior in a green direction
Who decides? Municipal

- Roads belong to cities & towns
- Density and parking are controlled by municipal zoning
- Transit belongs to non-existent metropolitan level

Who decides? Major employers

- Access to employees
- Parking costs money
- Synergy & agglomeration benefits
- Employee benefits
Who decides? Individual

- Save one car. Use transit
- Use car less. Use transit
- “I wanna be like you, rich man”
  - Advertising and values
- Individual as political actor is capable of action beyond narrow, short-term interest

Two views of cities and CO₂

CO₂ Generated by Automobiles in the Chicago Region per Year

Traditional View:
Cities produce large amounts of GHGs

Emerging View:
City-dwellers produce relatively low amounts of GHGs
Who decides? Individual

The HERO of the California Car?

OR

The VILLAIN who is dismantling the California transit system?

When God gives you lemons, make lemonade, and we have a lot of lemons

- We have a constraint on world petroleum production, and dirtier tar sands will worsen both cost and pollution
- As income rises, so does auto ownership and use
- Congestion is worsening, new highway capacity is much more difficult than in the 1950s and costs much more
When God gives you lemons, make lemonade, and we have a lot of lemons

• We can’t afford to maintain our highways
• Rebuilding old highways reduces capacity during construction
• Maintaining traffic during construction costs a lot of money
• High unemployment leads to political pressure to create unnecessary jobs
• Visible government waste leads to public agoraphobia

When God gives you lemons, make lemonade, and we have a lot of lemons

• The US transit industry is in trouble
• Baumol’s Cost disease (Import substitution, technology change, politically difficult for public agencies)
• Transit oriented development requires more public subsidy to build and operate transit
• But operating and maintenance subsidy causes Baumol’s disease to worsen
• Highway cost is the tip of the iceberg
Possible sources of lemonade

- Expanding transit and fixing infrastructure provides local permanent useful jobs
- London and Zurich seem to have reached a point of increased income accompanied by reduced auto ownership
- Cost of transportation plus housing is a constant
- Housing assets last longer than autos
- Land use policies in London, Zurich and many German cities provide high density, high transit use, less reliance on the automobile and high quality of open space

“Smart” economic growth ... making lemonade

... involves rural to urban migration

- **But what kind of cities?**

"Chicago is Manhattan surrounded by Phoenix"

- How do we grow more like Manhattan (London, Zurich) and less like Phoenix?
- How does Boston or Buenos Aires become more like Zurich?
Embedded decisions

- Highways 50 years
- Parking garage 25 years
- Parking lot 3 years
- Transit (rail) 75 years
- Transit (busway) 10-15 years
- An auto lasts 15 years

Embedded decisions

- A housing units lasts 50 years
- An office tower lasts 25 years
- A shopping center lasts 15 years
- A manufacturing center used to last 75 years
- A hospital lasts 150 years
- A university lasts 400 years
“There is nothing more difficult to take in hand, or more uncertain in its success, than to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old order of things, and lukewarm defenders in those who may do well under the new.”

-- Machiavelli, *The Prince*

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**Government vs. Private**

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F. Salmassi
Buenos Aires, AC&IA

Spring 2010, Lecture 9

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Let’s remember God’s advice to Saint Francis

• The church you must built in the minds and hearts of the people

1958 - 1995
1972 - present

- Post-Office Square by the Friends of Post Office Square
- Park rededicated in 1997 as the Norman B. Leventhal Park at Post Office Square
History of Boston Transportation and Analysis of Historical Developments

Photos from Mapping Boston by Alex Krieger and David Cobb with Amy Tumar and by Kenneth E. Kruckemeyer

Stone soup and lemonade

• We have the resources, if we are honest with ourselves
Unique role of universities

MIT  Charles River crossings
Harvard  Allston campus
Northeastern, BU  High-density campus
BC  Seminary grounds

- Major employment centers
- Centers of research & education
- Part of life experience of world leaders

Formation of attitude

- High density & open space
- Build high-density housing
- Transit, not auto
- Open, permeable campus
Role of students

• Insist that institutions walk the talk

New local lemons

• Every bridge over the Charles from Boston Harbor to Watertown except Mass. Ave needs major reconstruction within the next decade
  – Together they carry more traffic than the Central Artery

• The regional transportation plan relies on transit carrying 50% more people, but includes very little new central system transit capacity

• The regional transportation plan does not dealing with the crumbling Turnpike, but does include the Crosby Corner overpass

• It’s about peanut butter, not cost effectiveness
Possible lemonade

- River crossing mitigation can fund added transit
- Role of universities, hospitals, employers
- New federal surface transportation act expected next year
- New EPA Clean Air Act implementation initiatives are possible on a state-by-state basis
- New federal tax policies are possible

The River Crossing rebuild as an opportunity

- The loss of 20% of capacity for 5-10 years is not a policy debate; it is a fact
- If we can shift mode away from the auto enough to survive for 5-10 years, why not forever?
- To solve our global, national, and metropolitan problems, we need several “pattern breaks” -- could this be one?
Unique opportunity for MIT

- Mens et manus
- Walk the Talk
- Behavior as major employer
- Opportunity for research and education

Lemons

- Lack of transit capacity
  - Red & Green lines at capacity
  - Bus system at capacity and trapped in congestion
- Traffic accommodation on bridges had degraded environmental quality of parks, bridges, and approaches
- The auto user pays myth constrains funding for transit
Opportunities

- Understanding and measuring congestion externalities
- Zero marginal cost transit pass
- Parking reductions
- Carpooling initiative
- Improve transit priority on street
- Improved transportation information
- Street design for multimodal use
  - Transit, bicycle, pedestrian, and park amenities

- Real-time operator control
- Shuttle service integration with MBTA
- Re-use rail infrastructure – Grand Junction
- Defining and measuring agglomeration and accessibility benefits
- Identifying and offsetting Baumol’s Cost disease
- Use of cell phone data to monitor behavioral change

Each has potential for research and possible implementation, and monitoring of results

Is the Sarmiento Corridor a potential Buenos Aires building block for political, economic, and environmental sustainability?