ENVIRONMENTAL DEFENSE

Strengthening Texas Environmental Stewardship in Transportation

Presentation to Texas DOT Environmental Coordinators Conference

By Michael Replogle

September 12, 2006 Austin, Texas

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environmental defense

finding the ways that work

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Questions of the Moment

- What are some key trends, impacts, and emerging factors affecting Texas transportation?
- How can Texas make transportation plans addressing mobility and economic development needs while cutting fuel use and emissions?
- How can Texas transportation be managed and developed for more effective environmental stewardship, winning public support?

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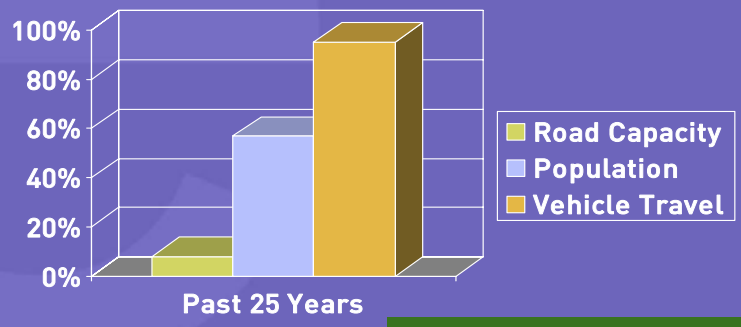
Texas Transportation: What's Happened, What's Next?

Miles Driven Per Person Nearly Doubled in Texas



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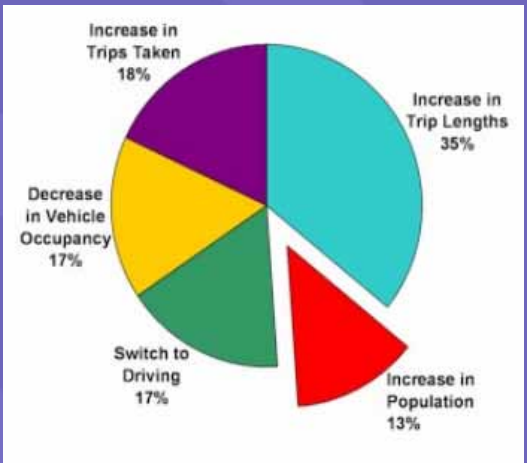
Factors Contributing to Growth in Vehicle Travel



- Population growth is a small factor in traffic growth
- Factors influenced by changes in land use, infrastructure, and transportation services and pricing play a bigger role

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Source: Surface Transportation Policy Project, *Why Are the Roads so Congested?*, November 1, 1999

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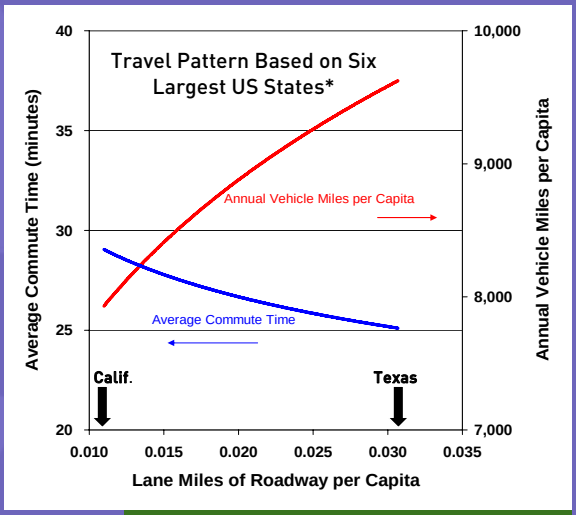
Induced Travel Matters

- Building more roads spurs more long-term travel
- Studies suggest that for every 10% increase in road capacity, a long-term 3-12% increase in traffic is induced (with 8% typical)



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* Analysis by William Barker , using *Highway Statistics 2000*, FHWA data, for 6 largest population states: CA, TX, NY, FL, IL, PA

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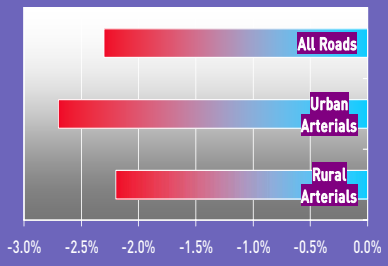
Traffic Growth Trend Changing?

Factors slowing growth in U.S. VMT:

- Baby Boom starting to retire
- Transportation impact of women entering workforce is complete
- Auto ownership at saturation
- Transit and transit use growing
- Continuing higher cost of fuel

Change in Traffic on Texas Roads
June 2005 to June 2006



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Texas Transportation, Sprawl and the Natural Environment

- Texas has recently been number one among states in amount of farmland lost
- Increased impervious surface harms aquifer recharge, stream flows
- Fragmented and lost habitat endangers biodiversity, threatened species

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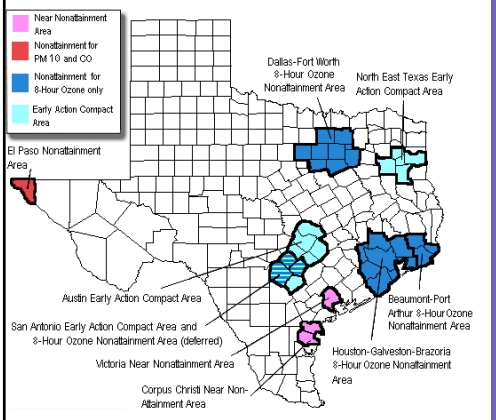
Texas Transportation: Hazardous to Public Health



- Texas is number two among states in health risks from air pollution
- 2.1 million Texans live in areas where cancer risk from hazardous air pollutants exceeds 1 in 1,000 (1 in 10 million is EPA standard for significant risk)
- 15.7 million Texans – 69% of the 2005 population - live in areas where air quality threatens public health

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Particulate & MSAT Pollution Hotspots: Measure, Monitor, Mitigate, Eliminate

- New scientific studies show large health impact and new EPA rules require project level conformity
- Current monitoring inadequate
- Regional, corridor, local strategies can cut PM, VOC, NOx
  - Diesel retrofits/cleanup
  - Traffic & freight management, truck tolls, truck lanes
  - Tunnel air filters
  - Exposure management

Link level benzine emissions Philadelphia

Source: Richard Cook, US EPA

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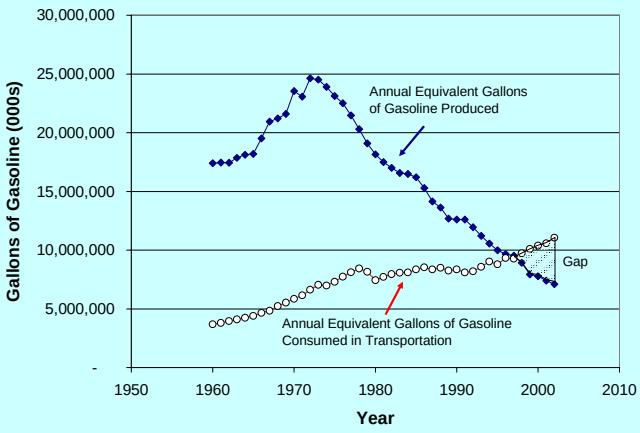
Oil-Dependent Transportation: A Hazard to the Texas Economy



Equivalent Annual Texas Production and Consumption of Gasoline for Transportation

Fuel use keeps rising because growth in traffic has outpaced improvements in vehicle efficiency

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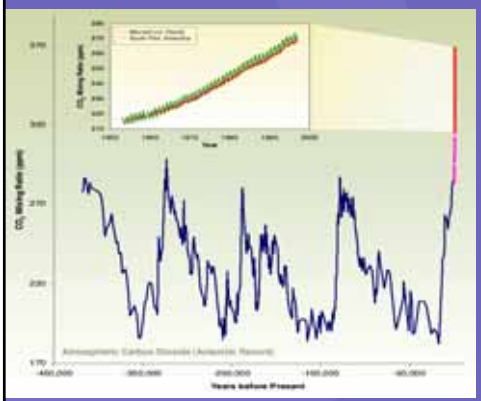
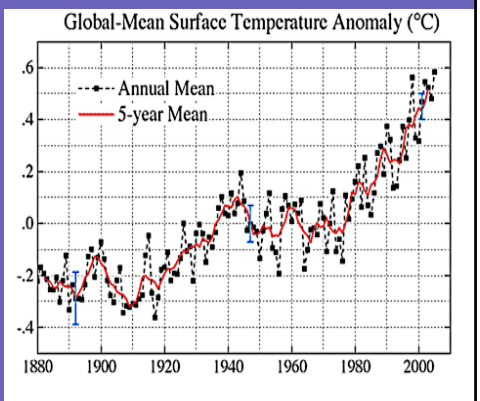
2005: Highest CO_2 & Warmest Year: Transportation A Major Contributor

Increasing fuel use increases CO_2, the leading greenhouse gas



Source: Ralph J. Cicerone, Finding Climate Change and Being Useful, National Council for Science and Environment, 2006



Source: NASA Goddard Institute for Space Studies

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Climate Change Threatens Texas

- More severe weather and heat waves
- Worse air quality
- More risk of disease, droughts, wildfires and coastal erosion
- Harm to commercial & recreational fishing, coastal tourism
- Agriculture losses
- Harm to wildlife migration & marine ecosystems

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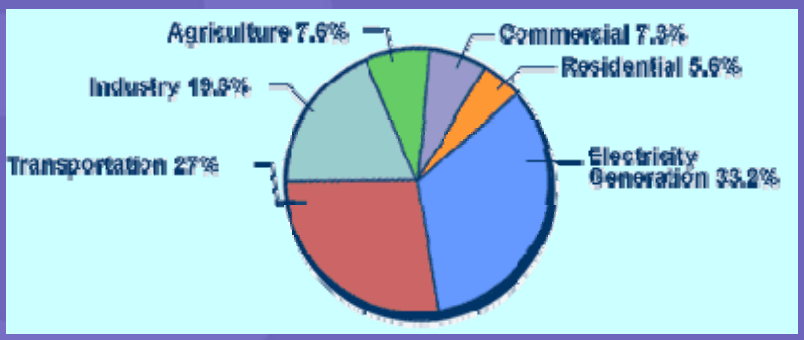
Texas Transportation: A Significant Source of the Greenhouse Gas Problem

Continuing to increase investment in Texas roads will spur more traffic, sprawl, and GHG emissions, even if these are tolled facilities



U.S. Greenhouse Gas Emissions, 2002

Source: EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks, 2004

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SAFETEA-LU: Transportation Plans Must Meet Federal Planning Objectives

New duty for state and metropolitan transportation plans to accomplish **all** the planning objectives in U.S. federal SAFETEA-LU law adopted in 2005:

- Serve mobility needs
- Foster economic development
- While minimizing fuel use and
- While minimizing air pollution

This is a major new system asset management challenge for states and Metro Planning Organizations

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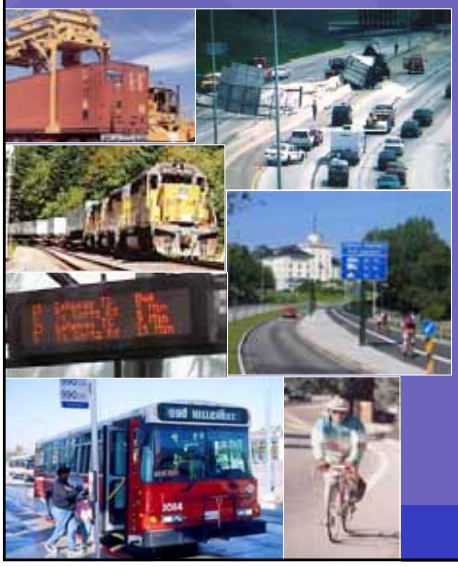
Planning Strategies Likely Capable of Achieving All Objectives Include



- Real time traffic operations management and monitoring, ramp metering, incident clearance
- Bus Rapid Transit (BRT)
- Improved rail, coastal shipping, truck lanes & intermodal freight
- Safe routes to schools & transit, complete streets for walk/bike
- Dynamic ridesharing, PAYD insurance, parking cash-out
- Smart growth transportation
- Tolls for congestion management on existing and new lanes
- Contracting for performance

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40+ Scenario Studies Show VMT, Fuel Use Can Be Cut By 20+% With Combined Strategies

Key Lessons from Synthesis of Regional Studies:

- Highest performance from combination of Transit Oriented Development (TOD) with expanded public transport and no expansion of roads
- Expanding road & transit capacity without pricing for efficient use of existing roads and parking yields costly transit systems with low ridership
- High fuel taxes, work trip parking charges, all-day tolls boosts transport system effectiveness
- Peak-period tolls by themselves spur more travel

Source: Robert A. Johnston, Review of U.S. and European Regional Modeling Studies of Policies Intended to Reduce Motorized Travel, Fuel Use, and Emissions, Environmental Defense, August 2006.

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Overall Freight Transportation Fuel Use and Emissions Can be Cut 20%+ As Well

- Existing technologies - roof deflectors, wide-base tires, low-friction lubricants, better driving practices, decreased idling - could cut truck fuel use and emissions by 10% by 2010 with only 50% participation
- A 10% shift of U.S. intercity highway freight to rail (due to truck tolls and investment in fuel efficient freight systems as in Europe) saves 1 billion gallons of fuel/year
- New German, Austrian, & Swiss truck tolls based on vehicle weight, distance traveled, emissions: Swiss cut distance traveled 5%, with 6-8% cut in NOx & CO; toll revenue largely invested in more fuel efficient new rail and waterway transport
- 20%+ reduction in fuel use & emissions with combined strategies: *why not apply approach to I-35 corridor instead of just building new bigger toll roads?*

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Source: Michael Replogle and Caroline Cheng, Opportunities Abound to Enhance U.S. Freight Transportation for Reduced Congestion, Emissions, and Fuel Use, Environmental Defense, September 2006

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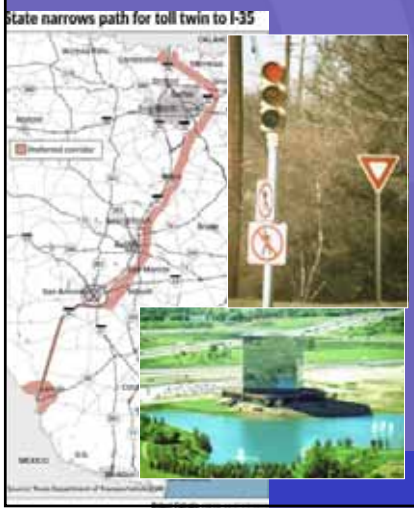
Strategies That Work Against Meeting These New Planning Objectives



- Tolls used only to build new motorways, especially sprawl-inducing outer beltways
- Design standards allow incomplete streets without accommodating walking, bicycling, and transit
- Urban designs foster car dependence
- Hidden subsidies and incentives encourage driving and sprawl
- Transportation, land use, natural resource plans and project reviews are weak and poorly connected

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Will TX DOT's Aggressive Toll Road Program Support Sound System Stewardship?

Lessons from Other Areas Suggest Not

- Intercounty Connector $3 b tolled outer beltway north of Washington, DC would boost 2030 transportation GHG emissions 5% for DC metro region compared to do-nothing
- Cheaper transit-oriented investment alternative that tolled existing motorways in study area to fund transit would do more to cut congestion and cut GHG emissions 6% for entire region compared to do-nothing
- ICC boosts 2030 CO2 emissions 11%: 260,000 million metric tons in 2030, compared to smarter alternative

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Lessons for Texas: Look at Alternatives, Consider Indirect Impacts

Costly tolled outer beltway (ICC Build) performed worse than no-build and all other options on most measures

Legal challenge to inadequate environmental review is in the making

Politics of ICC support likely to shift in light of cost escalation

Cardinal Scale Rankings

1=Best 6=Worst SCENARIOS	Avg. Rank	Vehicle Hours Of Travel	Vehicle Hours Of Delay	Vehicle Miles Traveled (VMT) All Facilities	VMT Local Roads	VMT Major Arte-rials	Total Transit Trips	Work Trip Transit Share	Travel Speed	Air Quality	Total Cost
Hybrid: Transit Oriented Hot Lane Rail and Express Bus	1.8	1	1	2	2	2	1	1	2	2	4
Transit Oriented Land Use And Investment	2.3	3	2	3	1	1	2	2	1	3	5
Add Toll Lane-Express Bus	3.3	4	3	4	3	3	3	3	3	4	3
Convert HOT Lane-Express Bus	3.6	2	4	1	6	6	4	4	6	1	2
No Build	4.6	5	5	5	5	5	5	5	5	5	1
ICC Build	5.4	6	6	6	4	4	6	6	4	6	6

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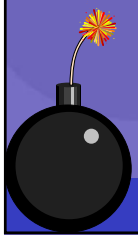
Toll Roads and Toll Managed Lanes Can Be Designed To:

- Maximize road system expansion and traffic throughput
- Limit use of toll revenues to road system investment alone
- Such systems are likely to spur sprawl, traffic growth, increased pollution and greenhouse gas emissions, worse inequality of access to jobs and opportunities
- This may spur opposition, project delays, and backlash against toll projects and public-private partnerships



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Or Toll Roads Can Be Designed To:

- Mitigate adverse impacts from expanded mobility
- Reduce and manage traffic growth and congestion
- Promote more efficient public transportation
- Expand transportation choices and value for all user groups
- Boost equitable access to jobs and public facilities
- Support compact, mixed use development, community reinvestment
- Incorporate these in community benefit agreements for public-private partnerships to cut opposition to projects

Good stewardship demands open consideration of alternatives with public involvement and sound analysis

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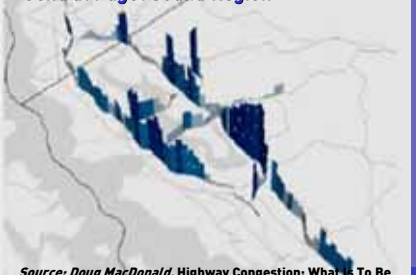
Congestion Management Toolbox Needed to Reclaim Lost Peak Period Road Capacity

Lost Peak Period Highway Productivity in Central Puget Sound Region



Source: Doug MacDonald, Highway Congestion: What Is To Be Done? *WS DOT, http://www.wsdot.wa.gov/secretary/*

Apply "fix-it-first" approach to existing roads before or as new capacity is added:

- Incident clearance
- Ramp metering
- Signal retiming
- Congestion charges
- Bus rapid transit
- Rideshare options
- Bike-transit linkage
- Commute and PAYD incentives
- Smart Growth transportation
- Performance based contracting

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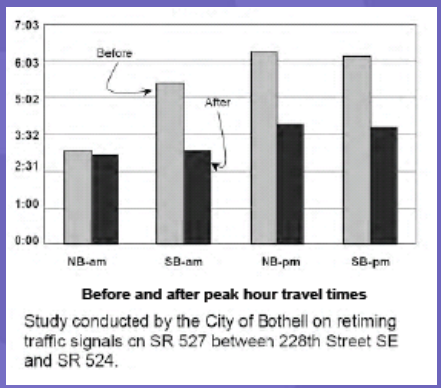
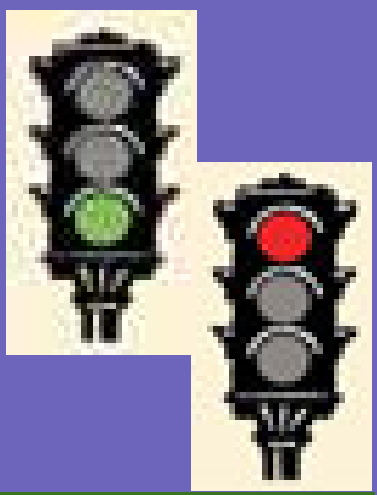
Signal Retiming Can Cut Congestion, Fuel Use, Emissions

Effect of Signal Retiming on Peak Road Travel Time



Before and after peak hour travel times

Study conducted by the City of Bothell on retiming traffic signals on SR 527 between 228th Street SE and SR 524.



Source: Doug MacDonald, Highway Congestion: What Is To Be Done? *WS DOT, http://www.wsdot.wa.gov/secretary/*

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Rapid Incident Management Can Cut Congestion, Fuel Use, Emissions

Potential impact of incidents on vehicle throughput capacity of 3-lane divided freeway:

- Car out of gas on shoulder: -20%
- Disabled car blocking 1 lane: -50%
- Accident blocking 2 lanes: -85%

Source: Doug MacDonald, Highway Congestion: What Is To Be Done? *WS DOT, http://www.wsdot.wa.gov/secretary/*

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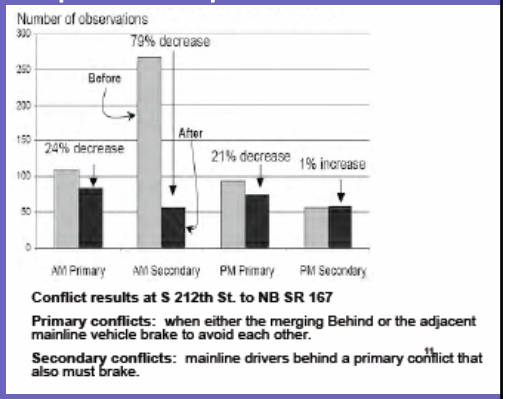
Ramp Metering Can Cut Congestion, Fuel Use, Emissions

Ramp Meters Improve Traffic Flow



Source: Doug MacDonald, Highway Congestion: What Is To Be Done? *WS DOT, http://www.wsdot.wa.gov/secretary/*

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Commute Benefit Incentives & Pay-As-You-Drive Insurance Cut Congestion, Fuel Use, Emissions

- Cash-in-lieu-of-parking and employer provided transit benefits can cut auto trips by 10-30%
- PAYD Insurance: potential 10% reduction in miles driven while saving consumers money

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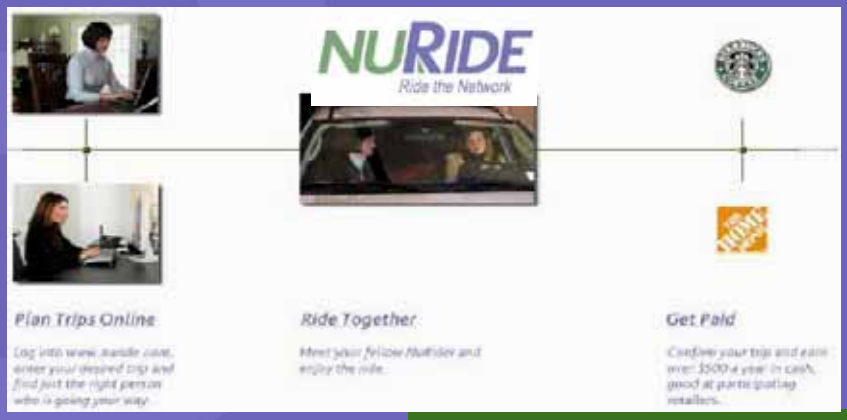
Dynamic Ridematching: Expanding Travel Choices Where Transit Does Not Reach

Pay-me-not-to-drive systems (*www.nuride.com*)



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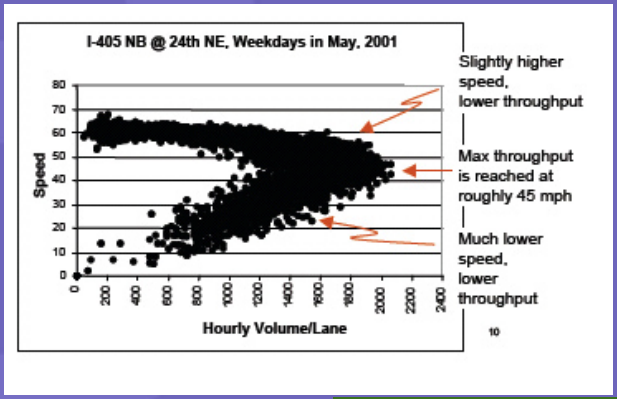
Congestion Management: Key to High Performance Corridors

If congestion reaches critical point, speeds drop, vehicles bunch up, and per lane throughput plummets



Source: Doug MacDonald, Highway Congestion: What Is To Be Done? *WS DOT, http://www.wsdot.wa.gov/secretary/*

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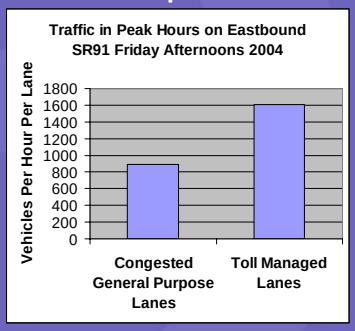
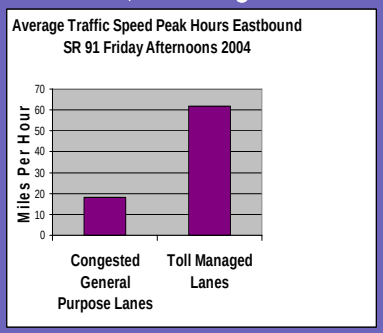
Tolls: A Traffic Management Tool or Just A Way to Build More Roads?

2 toll managed lanes carry as much peak hour traffic – at 3 times the speed - as moved in 4 free, but congested lanes





Report to Congress on the Value Pricing Pilot Program Through March 2004, US Federal Highway Administration (2004), available at: http://knowledge.fhwa.dot.gov/cops/hcx.nsf/All+Documents/AD276ECC2E3A077885257005006B5614/$FILE/March%202004%20Report%20of%20Congress.pdf

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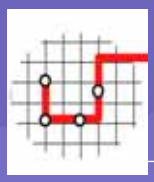
Bus Rapid Transit Can Cut Congestion, Fuel Use, Emissions

Vehicles

Running Ways

Stations & Terminals

Systems



Service Plan

Courtesy of Sam Zimmerman, DMJM+HARRIS

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Arterial vs. Motorway BRT

Arterial BRT

- Short inter-stop spacing
- Shorter distance travel
- Easy to serve with cheap walk/bike access
- Hard to site park-and-ride lots
- More opportunity for transit oriented development

HOT Lane BRT

- Long inter-stop spacing
- Longer distance travel
- More dependent on costly park-and-ride access
- More likely to spur sprawl, inequitable access to jobs
- May worsen unhealthful pollution hot spot exposure

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Better Bike Access to Transit Expands Market for Public Transportation

Bike-and-ride access far less costly than park-and-ride

Photos from Long Beach Bikestation and Los Angeles Orange Line BRT

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Smart Growth Transportation Patterns Boost System Performance

Study of 10 US regions considered vehicle travel, congestion, pollutant emissions, and vehicle fatalities system performance:

Higher density regions that do not have a transportation system with smart growth characteristics tend not to perform as well as areas that effectively combine density with a smart growth transportation system.

The effects of density and a smart growth transportation system on performance are not additive but synergistic, creating enhanced performance when the two are combined.

Source: U.S. Environmental Protection Agency, *Characteristics and Performance of Regional Transportation Systems*, 2004, Washington, DC

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Smart Growth Transportation System

- Multiple route choices between points
- Short blocks & frequent opportunities to cross streets on foot
- A wide variety of street types that provide both access and mobility
- Sidewalks and bicycle facilities provide direct, safe travel routes
- Use of access management; e.g., highways linking towns, but not bisecting or bypassing them, and driveways strategically located on commercial arterials
- A network of dense, frequent public transit service

Source: U.S. Environmental Protection Agency, *Characteristics and Performance of Regional Transportation Systems,* 2004, Washington, DC

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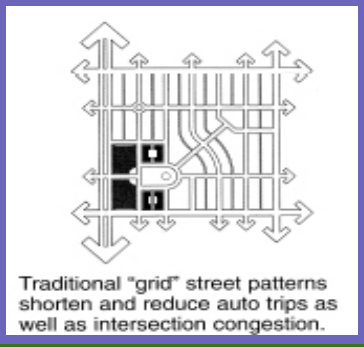
Street Grids Cut Congestion, Fuel Use, Emissions

Fine mesh small-scale street grids are more pedestrian friendly and provide twice the network throughput capacity compared to sparsely connected networks that force most traffic onto motorways and major arterials*

"Hierarchical" street-patterns with long, winding collectors, and cul de sacs provide fewer route options and make walking and bicycling difficult.



Traditional "grid" street patterns shorten and reduce auto trips as well as intersection congestion.

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* Walter Kulash,"Will the Traffic Work?" Presented at the 11th Annual Pedestrian Conference, Bellevue WA, October 1990.

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Effect of More Public-Private Partnerships in Transportation

- Better system operations and performance?
  Or just more roads, sprawl, pollution?
- *Sharper clarity about objectives?*
  Or diminished public role setting priorities?
- Stronger accountability for outcomes?
  Or less transparency than ever?

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Engaging Communities and Environmental Stakeholders in PPPs

- Should public agencies alone be responsible for environmental and community process?
- Will badly handled engagements poison PPP concessions, increasing investment risks?
- Might PPPs be used to better address public concerns and boost environmental performance?

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Environmental and Community Performance Agreements

COMMUNITY BENEFITS AGREEMENT

LAX MASTER PLAN PROGRAM

- Cut political and regulatory risk & support Corporate Social Responsibility
- Ensure PPP toll roads comply with and exceed state & federal requirements
- Streamline compliance through community and environmental agreements with dedicated funding for monitoring and mitigation

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Los Angeles Airport CBA: Model for Other Infrastructure Deals?

20+ community groups, environmental organizations, school districts and labor unions signed agreement with city and airport authorities related to expansion of LAX airport in 2004

LAX Community Benefits Agreement includes:

- Sound proofing affected schools and homes
- Retrofitting diesel construction & operations vehicles to cut air pollutants by 90%
- Electrifying airplane gates to eliminate pollution from jet engine idling
- Studying health impacts of airport operations on communities and making studies public
- $15 million in job training funds, with local hiring and contracting program
- Monitoring LAX, enforcing the agreement's provisions and holding LAX accountable to the community

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Environmental Performance Standards and Agreements

- Environmental reviews: barrier to PPPs or a path to higher performance?
- Consideration of alternatives, secondary, indirect, induced impacts, mitigation, and ideas from all key stakeholders
- Post-concession agreement environmental management plans are weak:
  - incentive is to cut cost of environmental compliance, not boost performance
  - focused on "how" rather than "what"
- Why not design PPPs for performance?

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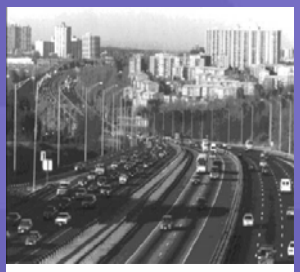
PPP Concessions: Designed for High Performance?



- Concessions: for what, how long?
- Contracts: aligned with planning goals?
- Non-compete agreements? Toll rate caps? Public sector equity stake?
- Environmental performance standards and agreements?
- Use of toll revenues?
- Disclosure, transparency, oversight?

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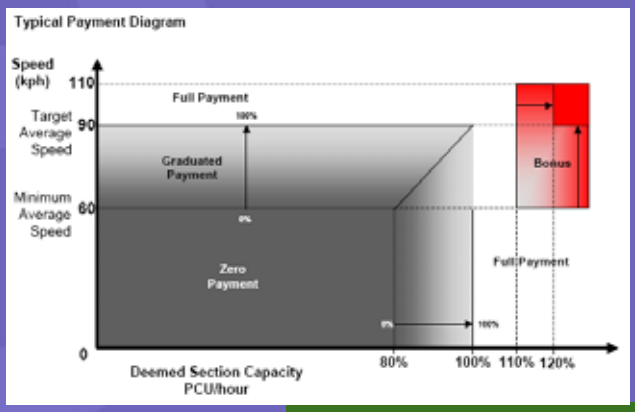
Congestion Management Payment: Rewarding Traffic Management

Payment to concessionaire based on measured actual hourly traffic speeds and flows by 2km road segment

Congestion Management Payment Contract Darrington to Dishforth A1 Highway in Yorkshire, UK

(a non-tolled road)



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Source: http://wip.tu-berlin.de/workshop/2005/papers/briggs_drewett_Private%20_Financing_of_Projects.pdf

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Why Not Link Concessionaire Compensation to System & Environmental Performance?

- **Payment to contractor based in part on person-km & ton-km moved at given level of service instead of toll collected**
- **Payment adjusted for pollution hot spot violations, noise, or community impacts, with incentives to cut GHGs**
- **Accrual of penalty points for exceeding key thresholds gives rise to default and remedy period**
- **Failure to remedy means contract termination**

Adapt from example of British Columbia's Sea-to-Sky Highway:

PPP deal total payment = *(Availability payment) + (Vehicle usage payment) +/- (Performance Incentive payments) + (End Payments)*

Enhancing Transportation Stewardship

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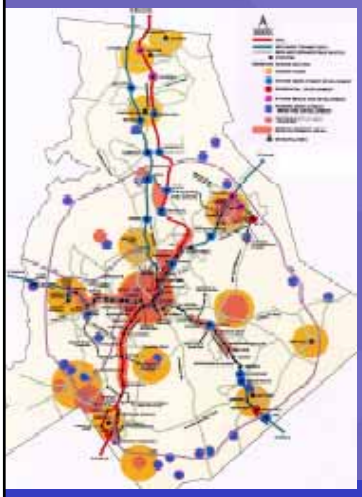
ENVIRONMENTAL DEFENSE

Integrating Transportation, Air Quality, and Land Use Planning



- Air quality conformity showed Charlotte transportation plan caused 4% annual traffic growth and violation of emission limits designed to protect public health
- Charlotte adopted 1998 Integrated Transit Land/Use plan to cut forecast traffic growth by 1/4:
  - Multi-family housing at stations, transit-oriented development
  - Rail & Bus Rapid Transit
  - Sales tax funds plan

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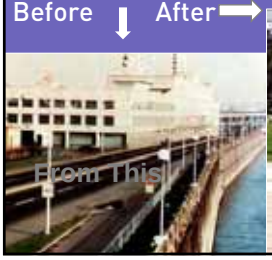
ENVIRONMENTAL DEFENSE

Oregon: Air Quality Problems Encouraged Integrated Planning Process

Facing air quality problem, in 1970s Portland tears out freeway, converts funds for another freeway to instead create busway, light rail, and urban growth boundary

Before ↓ After →



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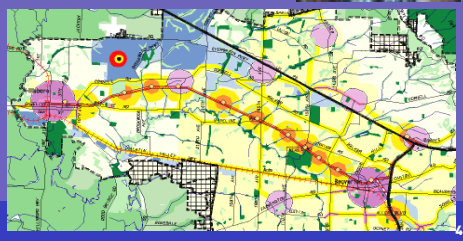
Portland 2040 Plan

- promotes transit oriented development
- links local and regional comprehensive plans
- protects growth boundary
- promotes transit priority, boulevards
- removes another freeway from old plan
- established limit on parking supply



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ENVIRONMENTAL DEFENSE

Portland: Focus on Outcomes Not Projects

- Plan accommodates 720,000 more residents and 350,000 more jobs in area with 1.8 million residents
- Cuts non-residential parking by 10% by 2015 and reduces VKT per capita by 10% by 2015 and by 20% by 2025, as required by state Transportation Planning Rule
- Plan designed to meet non-driver mode share targets:
  - 60-70% center city
  - 45-55% regional centers, town centers, main streets, station communities and corridors
  - 40-45% industrial areas, intermodal facilities, and inner and outer neighborhoods
- Protects open space, boosts density of developed land

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Oregon's Legal Frameworks for Integrated Planning

- Portland urban design code bans blank walls at street level in Central Business District, limits parking supply
- Oregon Transportation Planning Rule integrates performance goals/planning for traffic reduction, land conservation
- Air quality plan enforces TOD land use changes: funding contingent on local zoning changes
- Interagency collaboration links land use, transportation, natural resource plans

ENVIRONMENTAL DEFENSE

3 Key Ways Transportation Plans and Project Reviews Go Wrong

- ***Neglect alternatives that could reduce/avoid adverse impacts:*** Overly narrow purpose and need statements, disjointed planning and project reviews, premature frame of "project inevitability"
- ***Ignore indirect impacts*** on land use, induced traffic, emissions, PM hot spots, health impacts, distribution of benefits and burdens among different groups, with deficient analysis tools, excessively segmented projects
- ***Discourage stakeholder engagement:*** too many fragmented, uncoordinated project reviews, spurning of stakeholder input, withholding data, info

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Improving Project Planning, Development and Reviews for Stewardship

- Assess indirect & cumulative social, economic, and environmental impacts
- Analyze wider array of alternatives to avoid, minimize, mitigate adverse impact
- Encourage interagency coordination, public and local participation, with full documentation and disclosure
- Use asset management incentives & performance contracts to enable transport plans to achieve objectives
- Adopt integrated planning strategies

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For More Information

Michael Replogle
Transportation Director
Environmental Defense

1875 Connecticut Ave. NW
Washington, DC 20009
mreplogle@ed.org
202-387-3500

www.environmentaldefense.org/go/transportation