# The Future Isn't What It Used To Be

*How technology and society will change the face of Urban Transport*


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Presented

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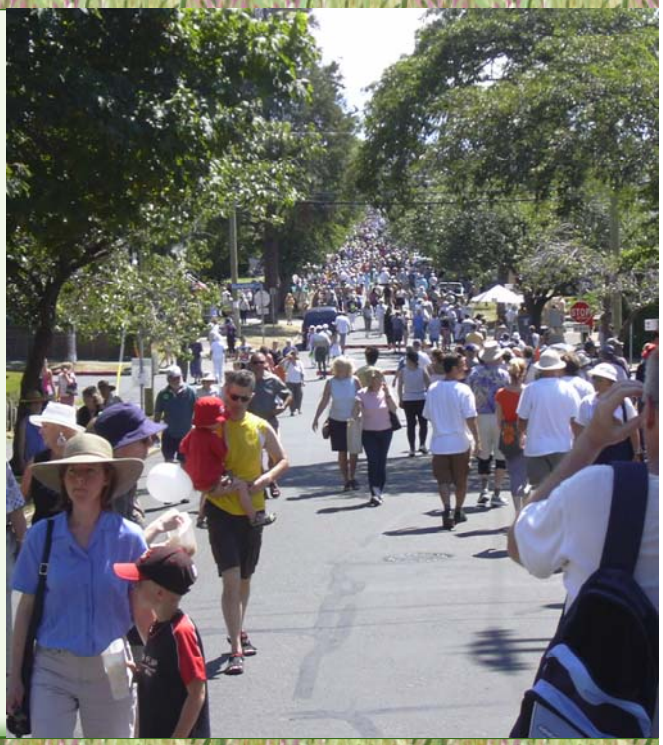
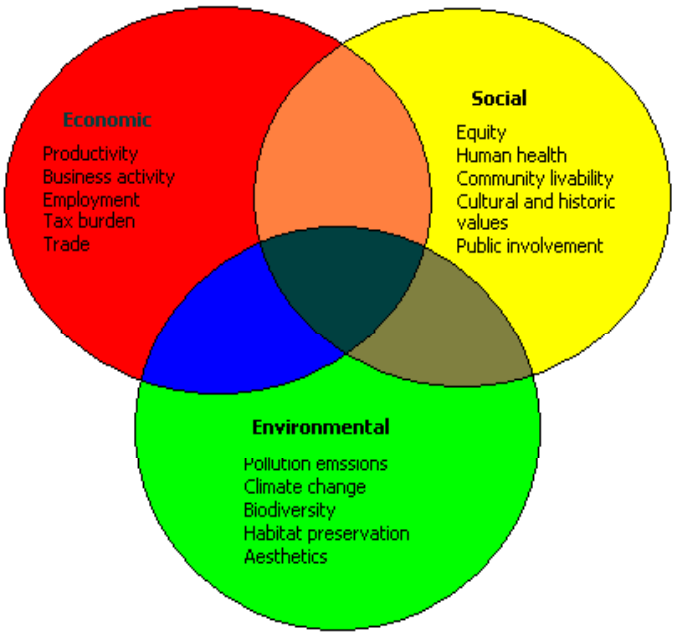
## *Creating Paradise*

Paradise is not a distant destination, it is something we create in our own communities.



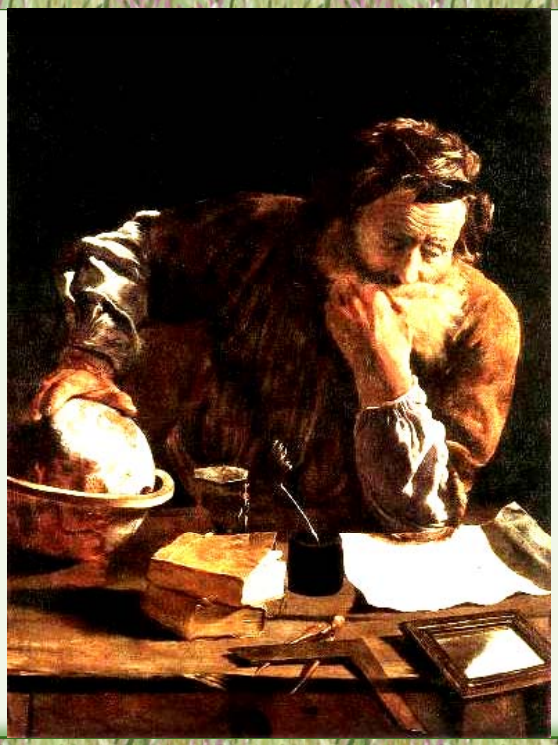
# Sustainable Planning

Sustainability emphasizes the integrated nature of human activities and therefore the need to coordinate planning among different sectors, jurisdictions and groups.






# Preventing Problems



Sustainability planning is to development what preventive medicine is to health: it anticipates and manages problems rather than waiting for crises to develop.

# Paradigm Shifts

- **Growth -** expanding, doing more.

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- **Development** - improving, doing better.

- **Mobility** - physical movement.

⇩

- **Accessibility** - obtaining desired goods, services and activities.

# Resource Sustainability

Would we have a sustainable transportation system if all automobiles were solar powered?

# Past Visions of Future Transport


1949 ConvAIRCAR Flying Car

1958 Firebird

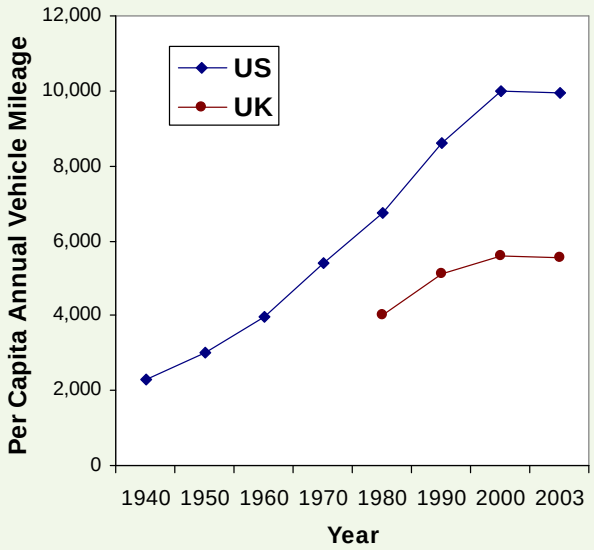
Segways


Supersonic Concord

# 2001 A Space Odyssey

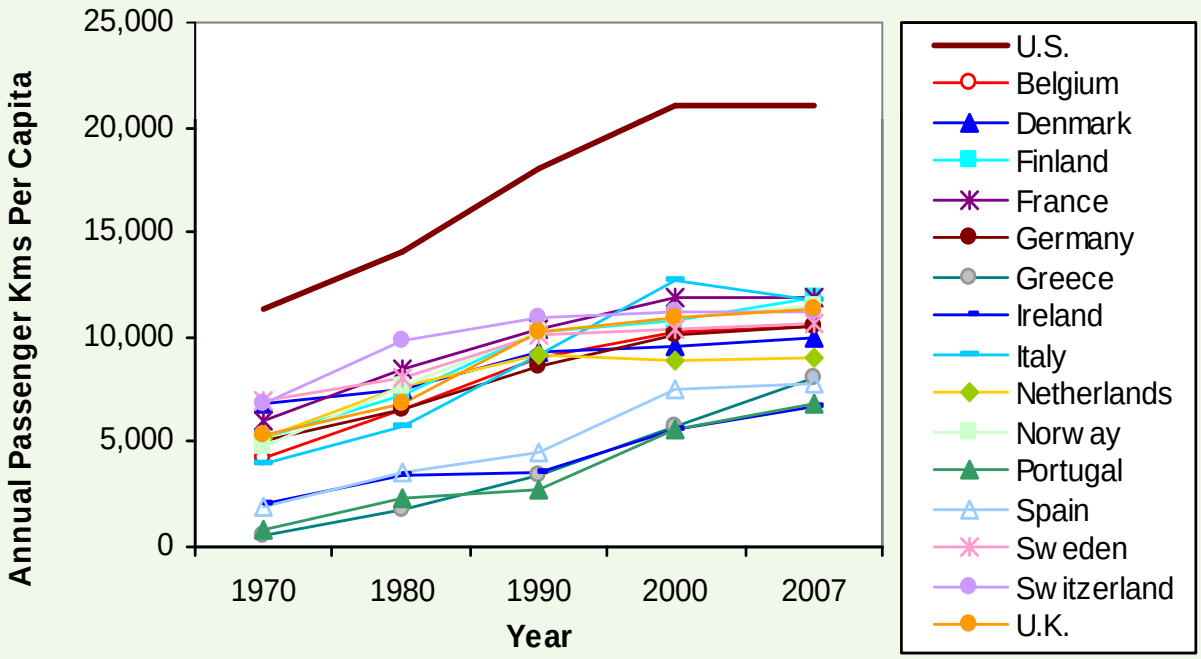
# Wheeled Luggage

# Trends Supporting Multi-Modalism

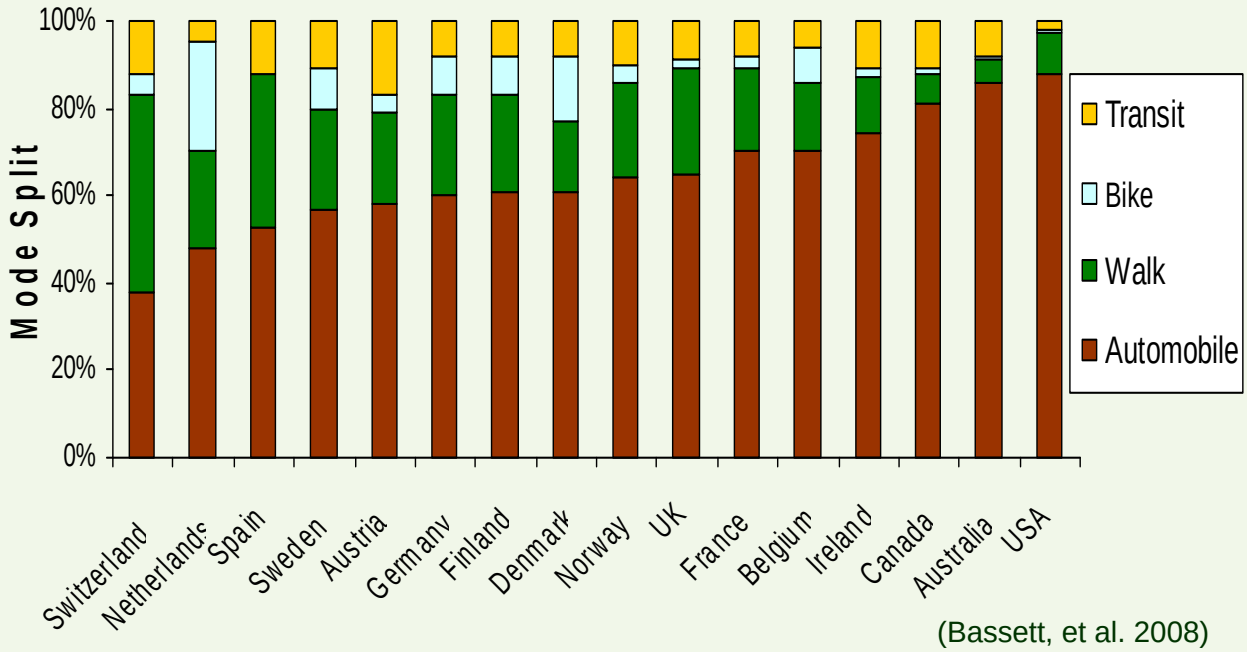



- Motor vehicle saturation.
- Aging population.
- Rising fuel prices.
- Increased urbanization.
- Increased traffic and parking congestion.
- Rising roadway construction costs and declining economic return from increased roadway capacity.
- Environmental concerns.
- Health Concerns

# OECD Travel Trends



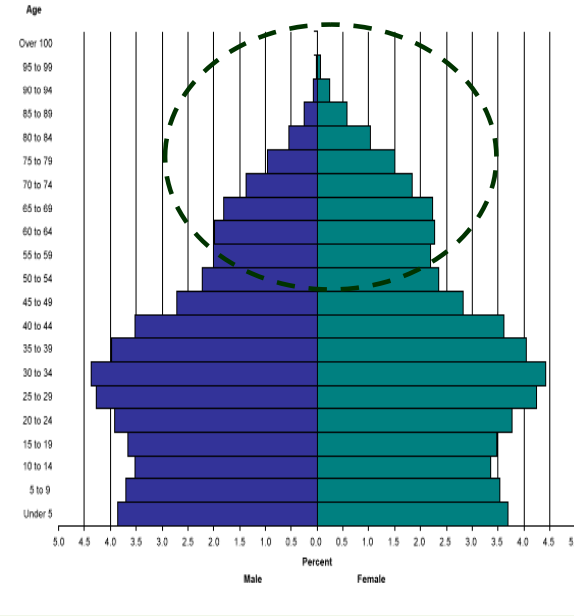

# International Mode Split



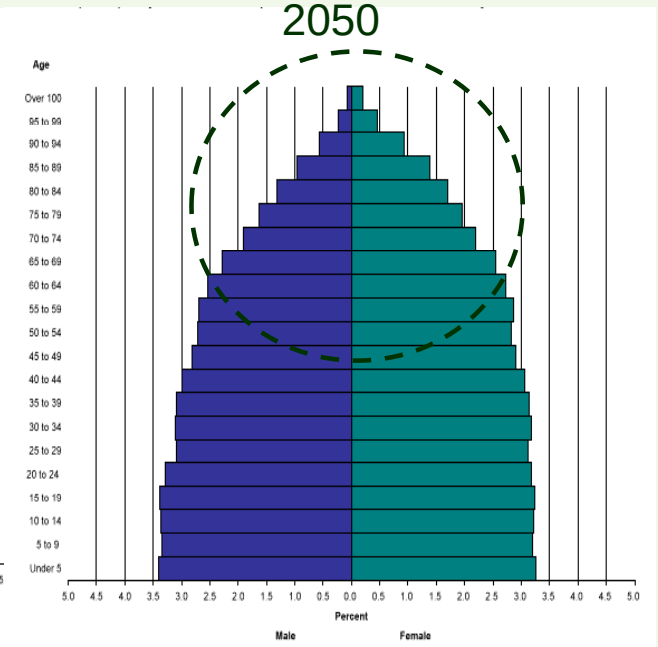

(Bassett, et al. 2008)

# The Population is Aging

1990

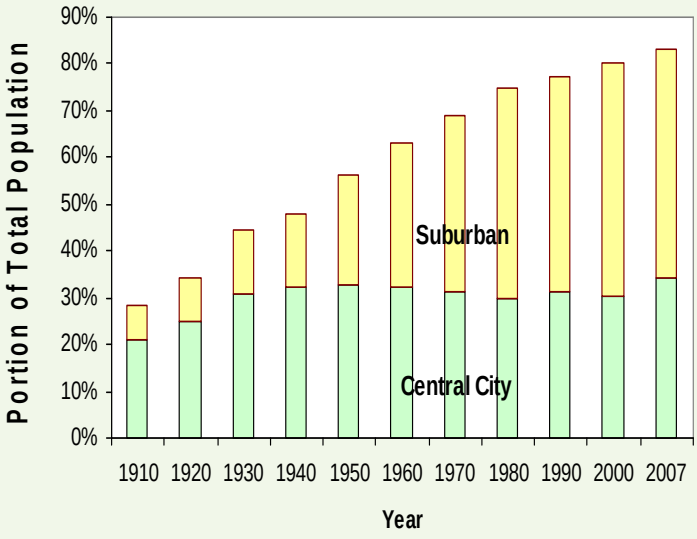



2050

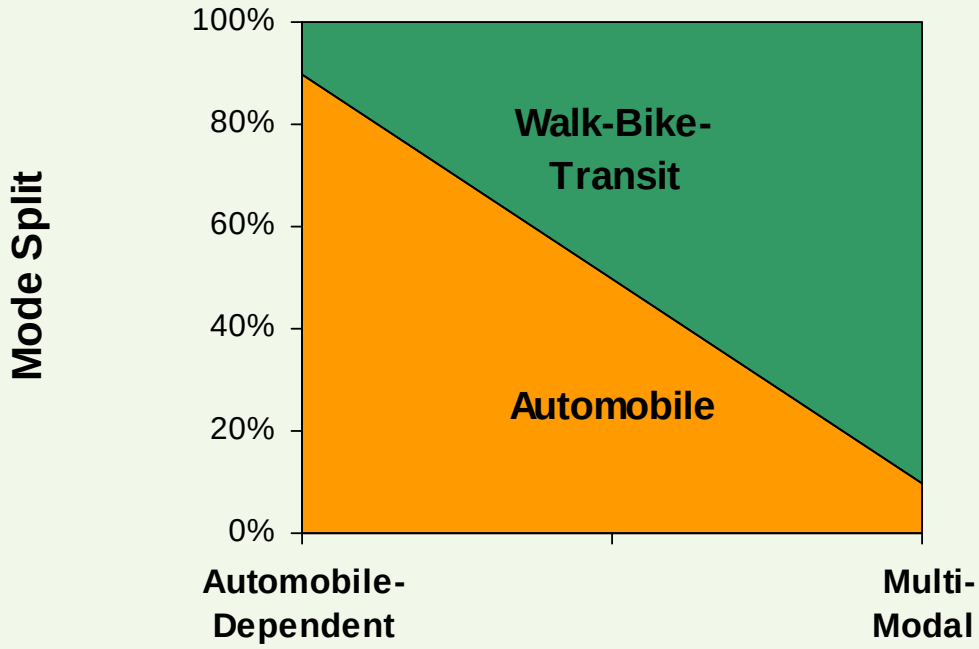



# Urbanization

Between the 1940s and 1980s the population became more suburbanized. In recent years, cities started gaining population and suburban jurisdictions started to urbanize.



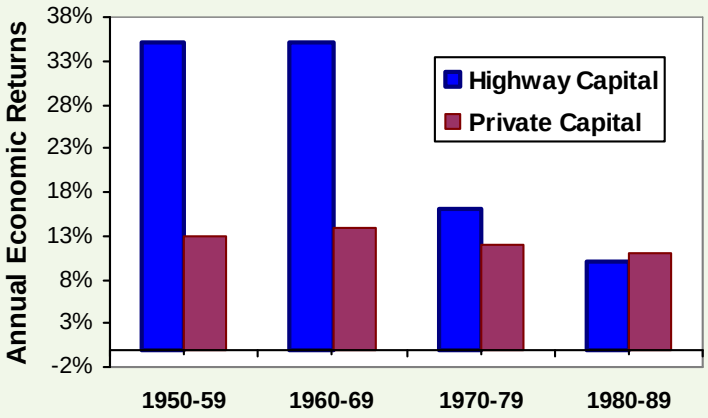
# Optimal Modal Split






# Value of Highway Expansion

When the highway system was being developed in the 1950s and 60s it provided high returns on investment. Now that the system is mature, economic returns have declined.



## What is "The" Transportation Problem?

- Traffic congestion?
- Road construction costs?
- Parking congestion or costs?
- Excessive costs to consumers?
- Traffic crashes?
- Lack of mobility for non-drivers?
- Poor freight services?
- Environmental impacts?
- Inadequate physical activity?
- Others?

## Current Transport Planning

Current planning tends to be reductionist: each problem is assigned to a single agency with narrowly defined responsibilities. For example:

- Transport agencies deal with congestion.
- Environmental agencies deal with pollution.
- Welfare agencies deal with the needs of disadvantaged people.
- Public health agencies are concerned with community fitness.
- Etc.

# *Reductionist Decision-Making*

Reductionist planning can result in public agencies implementing solutions to one problem that exacerbate other problems facing society, and tends to undervalue strategies that provide multiple but modest benefits.


# *Win-Win Solutions*

Put another way, more comprehensive planning helps identify "Win-Win" strategies: solutions to one problem that also help solve other problems facing society.

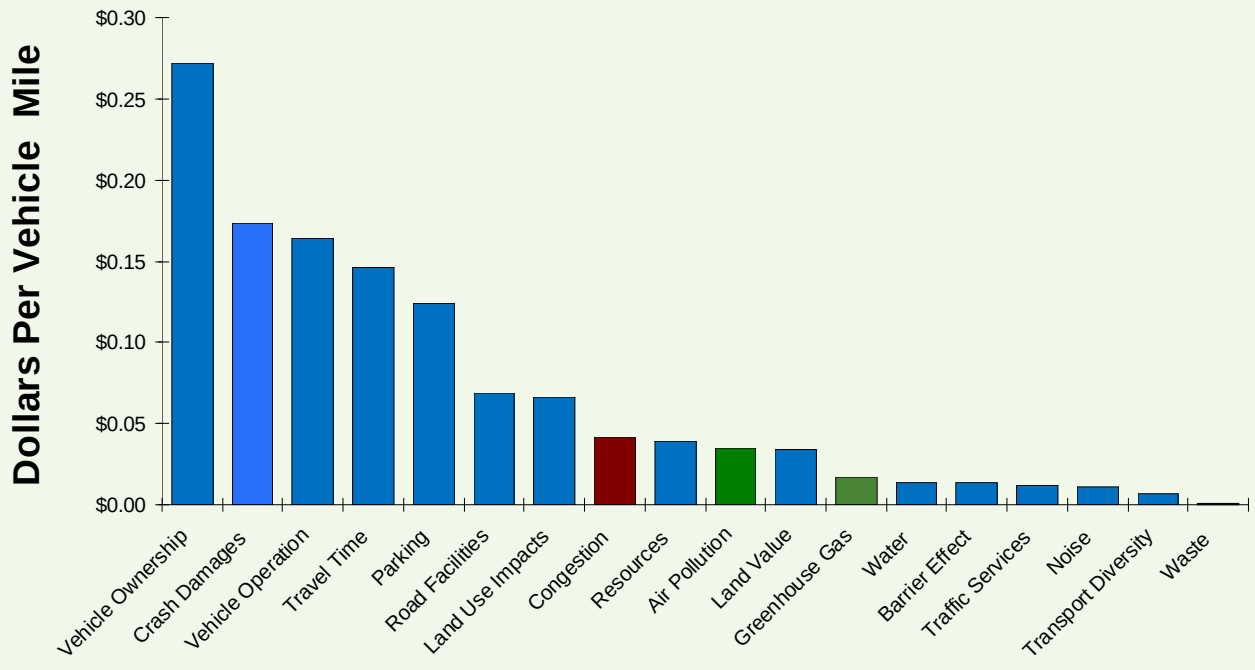
**Ask:**

*"Which congestion-reduction strategy also reduces parking costs, saves consumers money, and improves mobility options for non-drivers."*

# Comparing Benefits

| Planning Objectives | Expand Roadways | Efficient and Alt. Fuel Vehicles | Mode Shifts and Smart Growth |
|---|---|---|---|
| Reduce traffic congestion | ✓ | | ✓ |
| Roadway cost savings | | | ✓ |
| Parking cost savings | | | ✓ |
| Consumer cost savings | | | ✓ |
| Improve mobility options | | | ✓ |
| Improve traffic safety | | | ✓ |
| Energy conservation | | ✓ | ✓ |
| Pollution reduction | | ✓ | ✓ |
| Land use objectives | | | ✓ |
| Public fitness & health | | | ✓ |

# Comparing Costs



# Conventional Evaluation

## Generally Considered

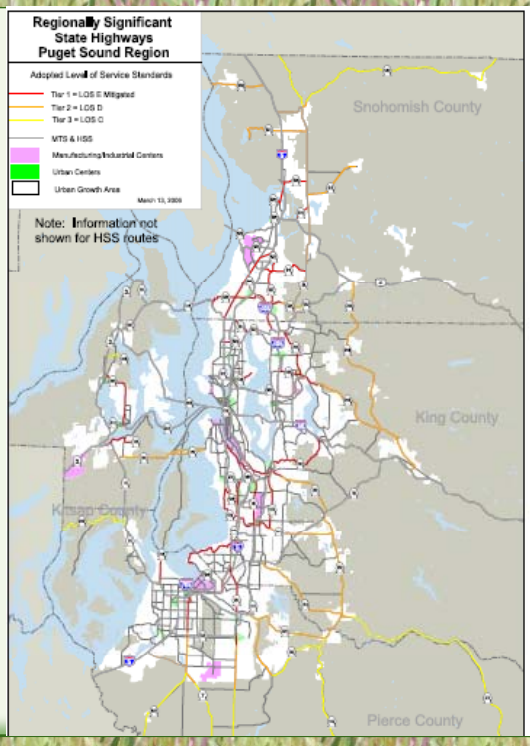
- Congestion impacts.
- Vehicle operating costs.
- Per-mile crash impacts.
- Per-mile pollution emissions.

## Often Overlooked

- Downstream congestion.
- Parking costs.
- Vehicle ownership costs.
- Crash, energy & pollution impacts of changes in mileage.
- Land use impacts.
- Impacts on mobility options for non-drivers/equity impacts.
- Changes in active transport and related health impacts.

# Conventional Transport Indicators

- Roadway Level-of-Service (LOS)
- Average traffic speeds.
- Per capita congestion delay.
- Parking occupancy rates.
- Traffic fatalities per billion vehicle-miles.



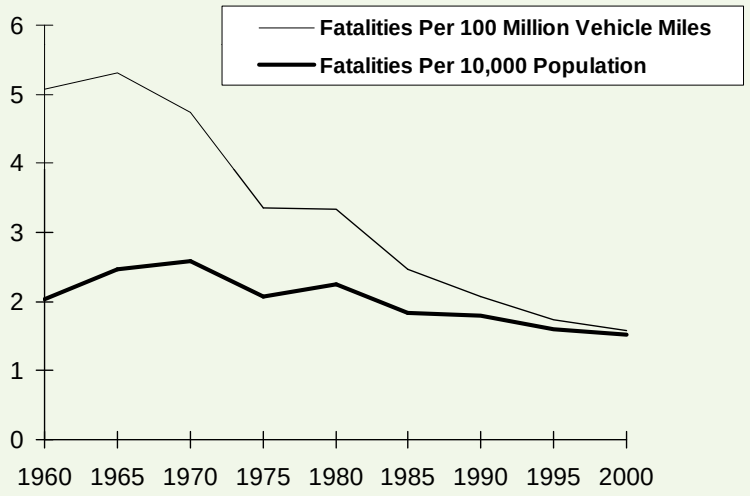
# Multi-Modal Level-Of-Service (LOS)

| Mode | Level of Service Factors |
|---|---|
| Walking | Sidewalk/path quality, street crossing conditions, land use conditions, security, prestige. |
| Cycling | Path quality, street riding conditions, parking conditions, security. |
| Ridesharing | Ridematching services, chances of finding matches, HOV priority. |
| Public transit | Service coverage, frequency, speed (relative to driving), vehicle and waiting area comfort, user information, price, security, prestige. |
| Automobile | Speed, congestion delay, roadway conditions, parking convenience, safety. |
| Telework | Employer acceptance/support of telecommuting, Internet access. |
| Delivery services | Coverage, speed, convenience, affordability. |

# Benefit Categories

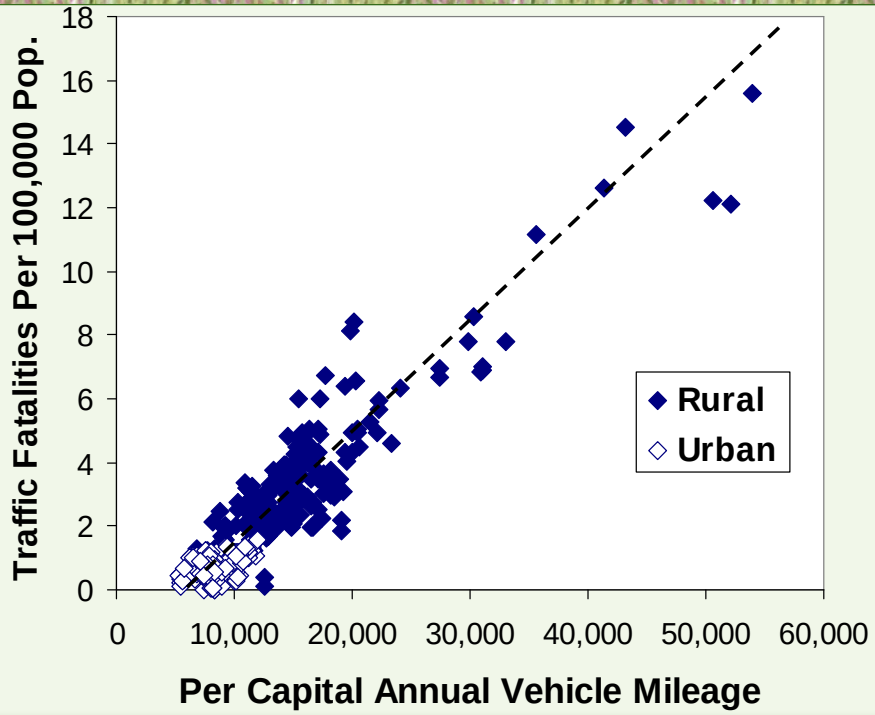
| Mobility Benefits | Efficiency Benefits | Land Use Benefits |
|---|---|---|
| Benefits from improved mobility options | Benefits from reduced automobile travel | Benefits from more compact development |
| • User benefits<br>• Equity benefits (helps disadvantaged people)<br>• Productivity benefits (non-drivers able to access education and employment)<br>• Option value (provides a service that people value having available, even if they do not currently use it) | • Congestion reduction<br>• Reduced barrier effect<br>• Roadway cost savings<br>• Parking cost savings<br>• Vehicle cost savings<br>• Traffic safety<br>• Energy conservation<br>• Emission reductions<br>• Public fitness & health | • Greenspace preservation.<br>• Reduced impervious surface (reduced heat-island effects, stormwater management costs)<br>• Increased accessibility (less travel is needed to reach destinations).<br>• Agglomeration economies. |

# Traffic Fatality Rates

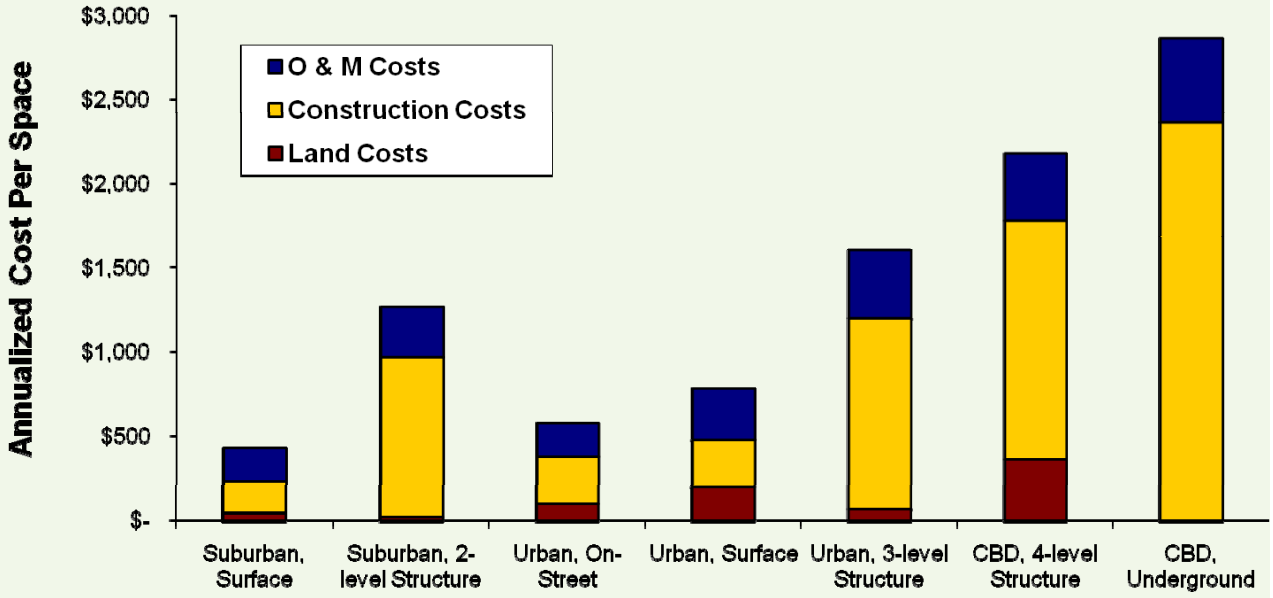



When crash rates are measured per vehicle mile, they declined significantly, but when measured per capita they show relatively little decline due to increased per capita vehicle mileage.

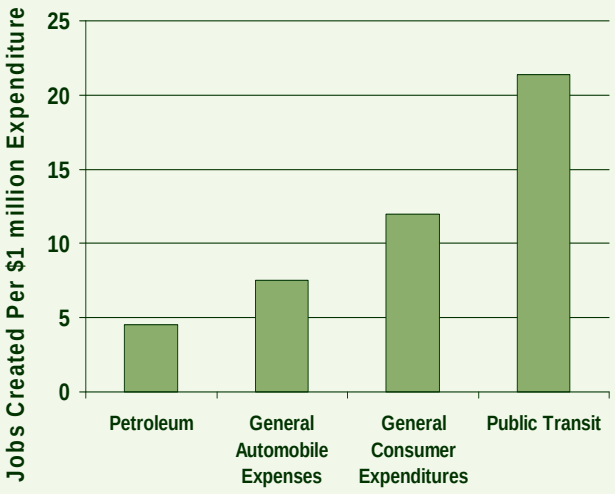
# U.S. Crash Rates



# Parking Facility Costs

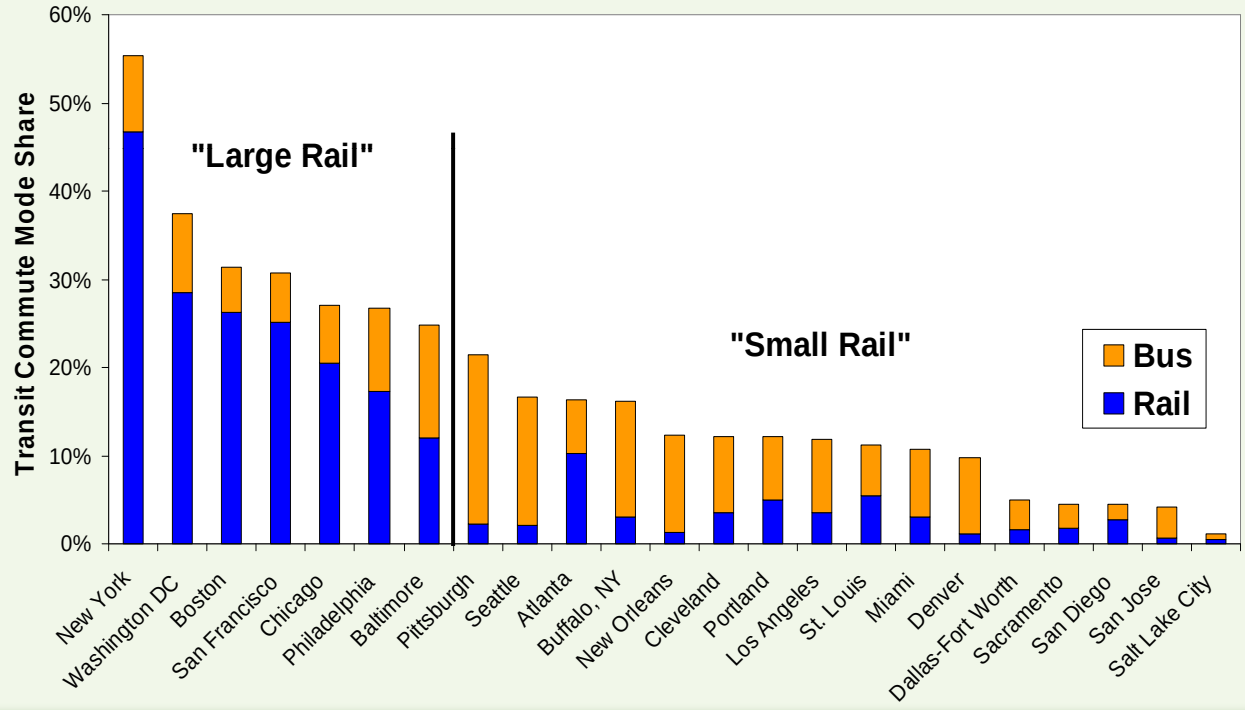



# Economic Development Benefits

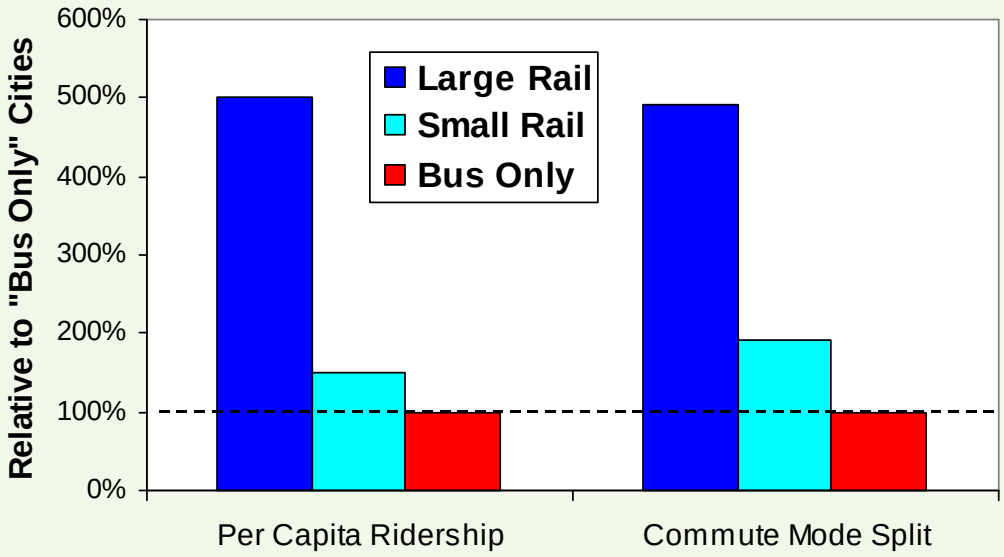



- Reducing vehicle expenditures and expanding transit service increases regional employment and business activity.
- Reducing business transport costs (congestion, parking, taxes) increases productivity and competitiveness.
- Agglomeration efficiencies.
- Stimulates development and increases local property values.
- Increases affordability, allowing businesses to attract employees in areas with high living costs.
- Shifting household expenditures from vehicles to housing increases household wealth.

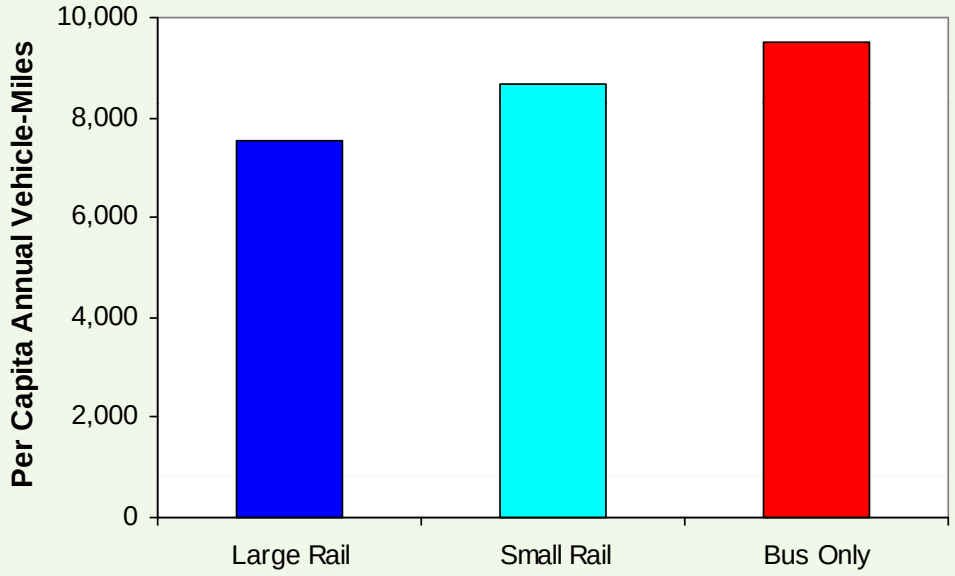
# Rail Transit Study




# Transit Ridership



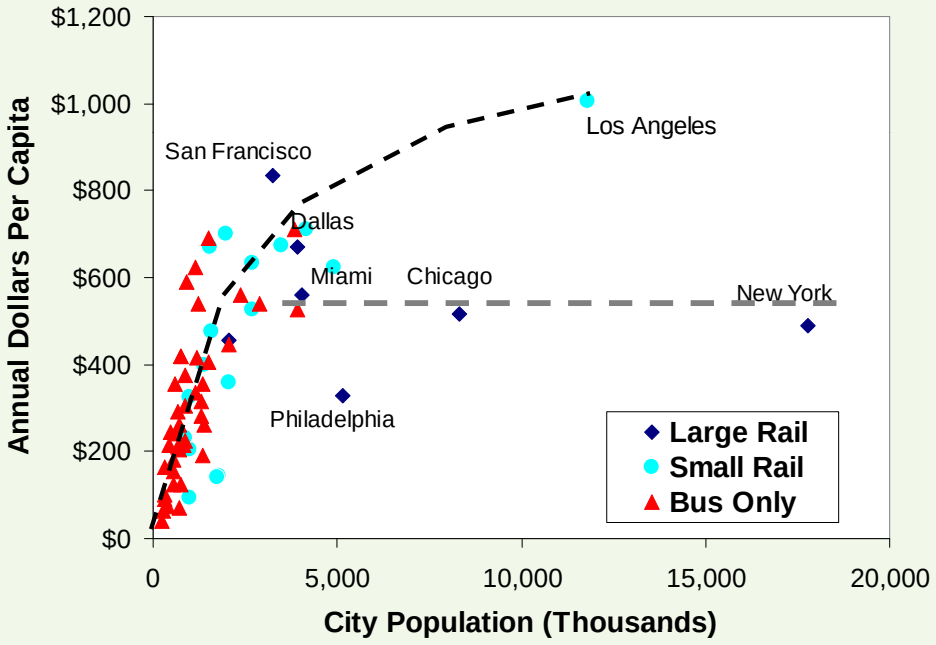
# Automobile Travel



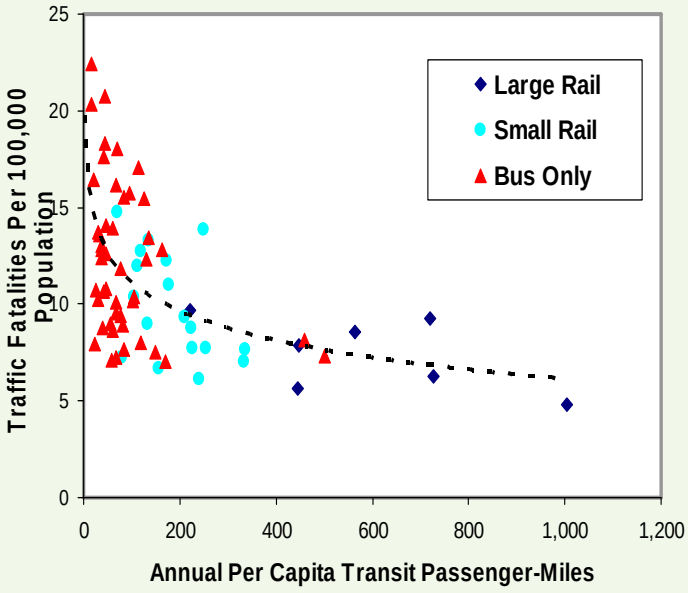

# Congestion Reduction

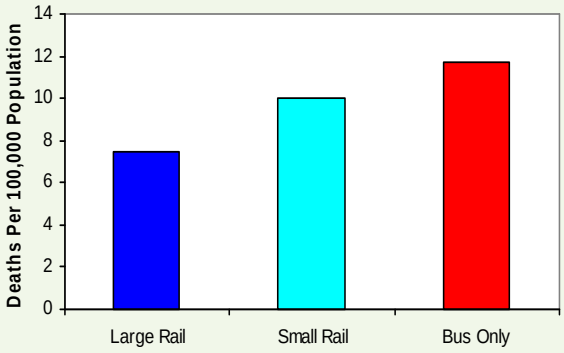
- Urban road congestion maintains equilibrium. It gets bad enough to discourage further vehicle trips.
- The quality of travel options affects this point of equilibrium: If alternatives are inferior, few motorists will shift mode and congestion will be severe. If alternatives are attractive, motorists are more likely to shift modes, reducing congestion equilibrium.
- The faster the transit service, the faster the traffic speeds on parallel highways. Several studies find that door-to-door travel times for motorists tend to converge with those of grade-separated transit.

# Congestion Costs

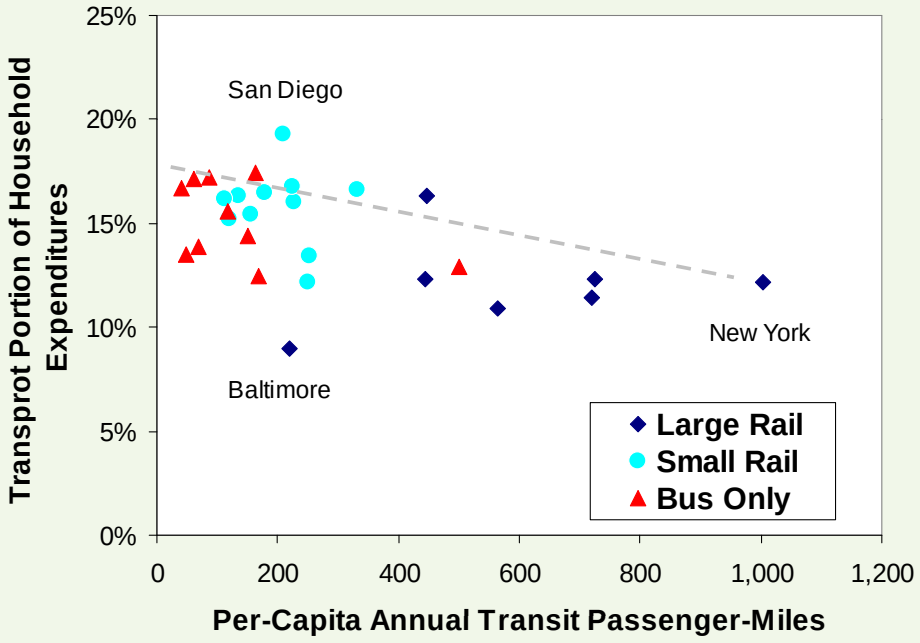



# Traffic Fatalities

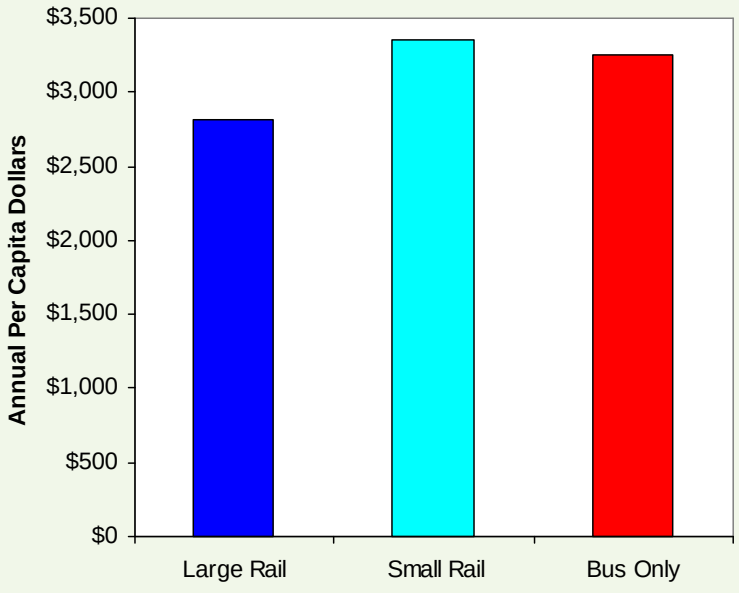


# Household Transport Costs




# Per Capita Transportation Expenses

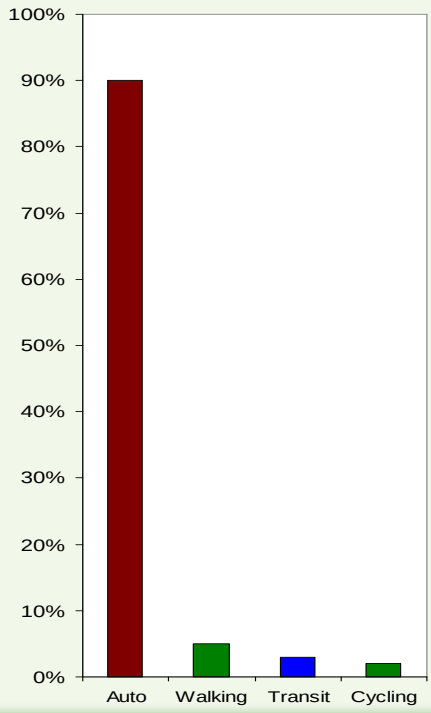


# Summary - Quality Transit

**Cities with high quality transit have:**

- Four times the per capita transit ridership.
- A fifth lower per capita vehicle mileage.
- 30-50% lower per capita congestion costs.
- A third lower per-capita traffic fatality rates.
- 20% smaller portion of household budgets devoted to transport, savings about $500 annually per capita.
- A third lower transit operating costs.
- 58% higher transit service cost recovery.
- More money circulating in the local economy.
- More per capita walking.
- More efficient land use and higher property values.
- Improved environmental performance.

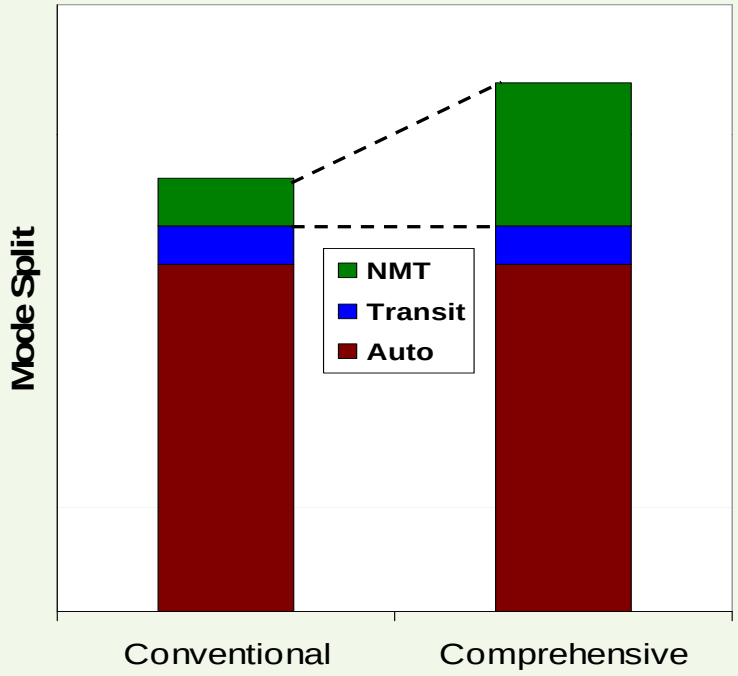
# What Mode is Most Important?




Conventional transport evaluation indicates that automobile travel is far more important than active transportation, providing **15 times** as many person-trips and **50 times** as many person-miles.

From this perspective, walking and cycling are minor modes of travel, and so deserves only modest public support.

# Counting All Walking




If, instead of asking, "What portion of trips are ***only*** by active transport? We ask, "What portion of trips involve ***some*** active transport?" the portion of active transport typically increases 2-6 times.

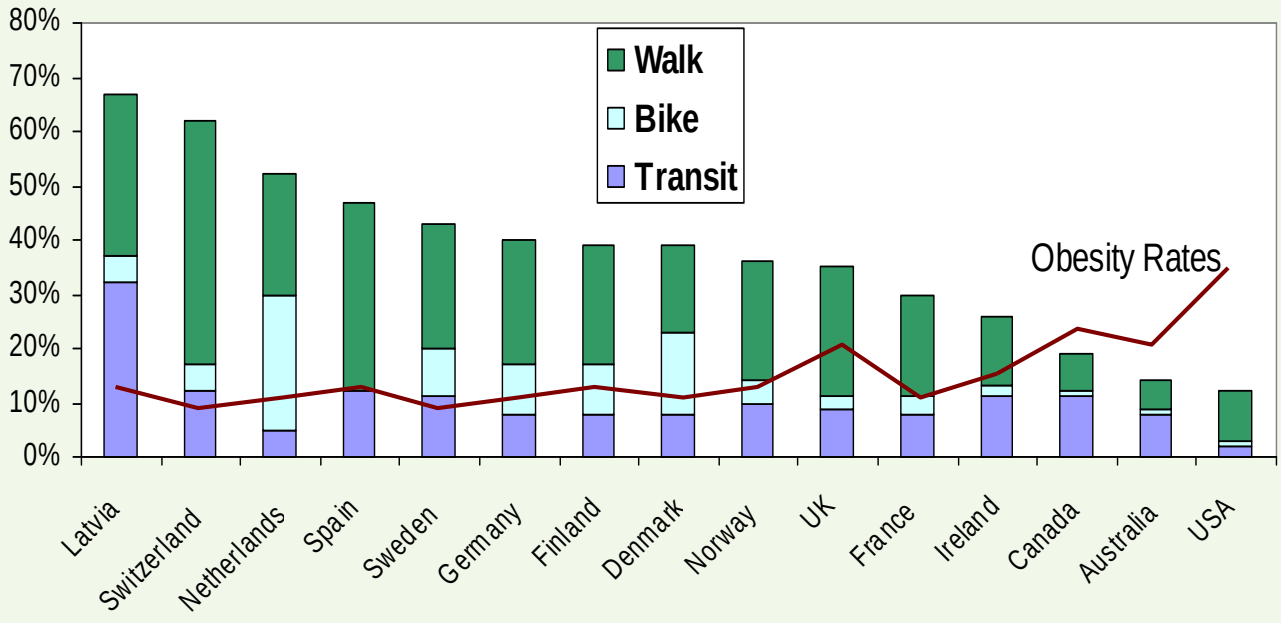
# Travel Distances Versus Time

Walking represents a small portion of travel distance but a large portion of travel time, particularly in urban areas

# Physical Fitness and Health

Improving walking and cycling conditions is the most practical way to encourage people to achieve the basic amount of physical activity (about 20 minutes daily) required for health.


# Obesity Rates Veruss Mode Split



# Nonmotorized Evaluation

To their credit, many planners support greater investment in nonmotorized planning than their evaluation tools justify. They intuitively know that walking and cycling are important in ways that are difficult to measure.

Better active transportation evaluation methods are need to justify even more nonmotorized improvements.

# Smart Growth Versus Sprawl

# Smart Growth (Density, Design, Diversity)

- More **compact**, infill development.
- **Mixed** land use.
- Increased **connectivity**.
- Improved **walkability**.
- **Urban villages.**
- Increased transportation **diversity**.
- Better parking **management**.
- Improved **public realm**.
- More **traffic calming** and speed control.



# Smart Growth Benefits

## Economic

- Increased resource efficiency.
- Lower development costs.
- Lower public service costs.
- Road and parking cost savings.
- Economies of agglomeration.
- More efficient transportation.

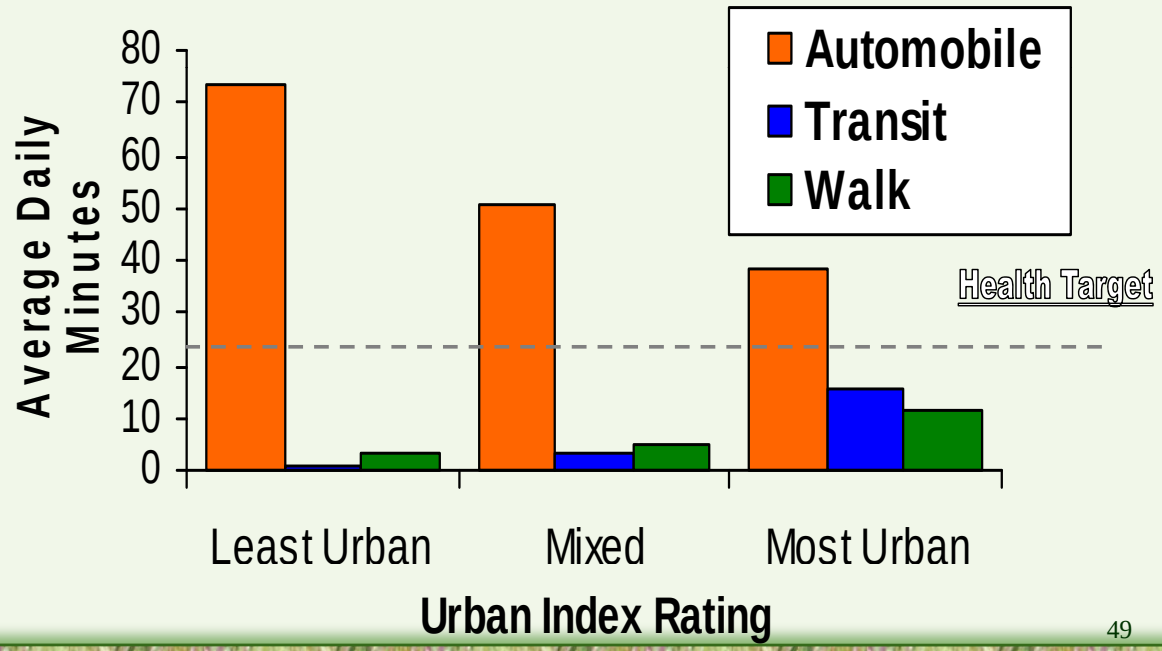
## Social

- Improved transport options, particularly for nondrivers.
- Improved housing options.
- Community cohesion.
- Preserves unique cultural resources.
- More opportunities to exercise.

## Environmental

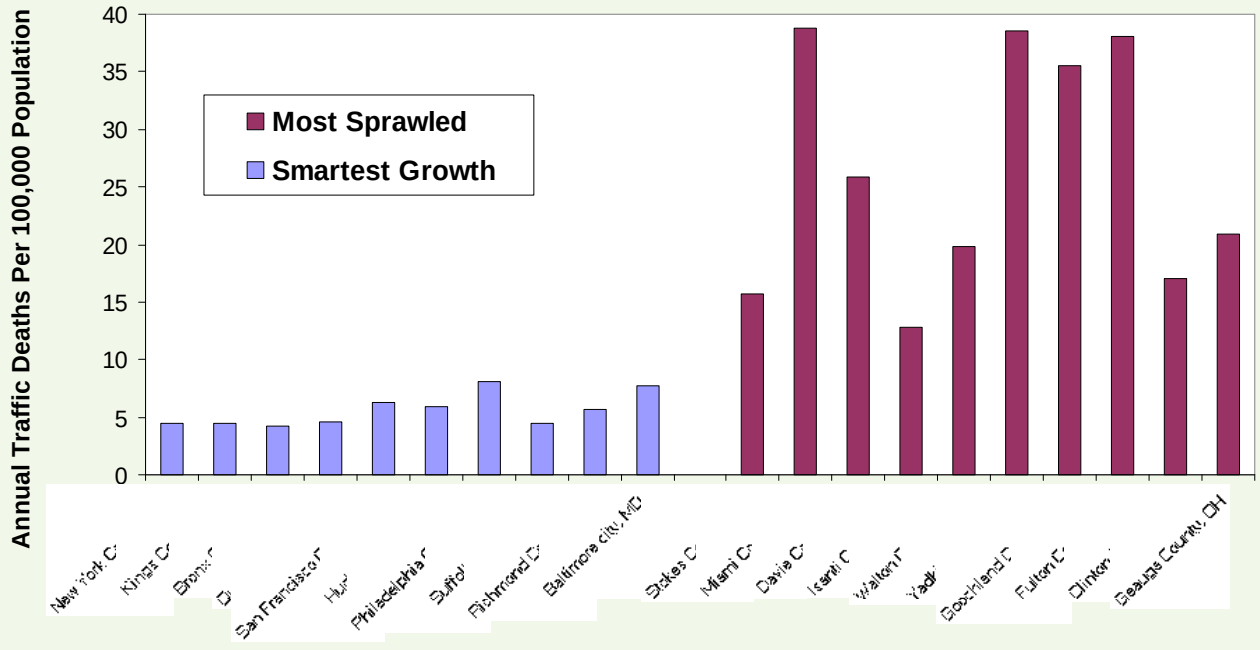
- Greenspace & habitat preservation.
- Reduced air pollution.
- Increased energy efficiency.
- Reduced water pollution.
- Reduced “heat island” effect.

# Land Use Impacts On Travel



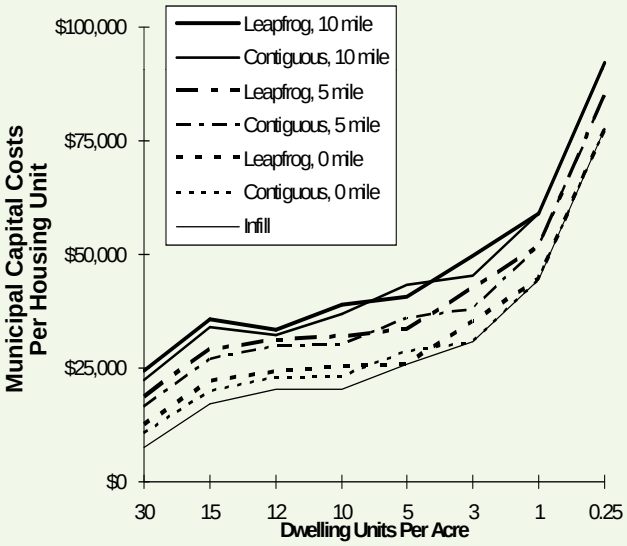



# Smart Growth Safety Impacts



# Infrastructure Costs

- Increased infrastructure and public service costs.
- Increased distribution costs to businesses.
- Increased transport costs to residents.
- School busing costs.
- Environmental costs.

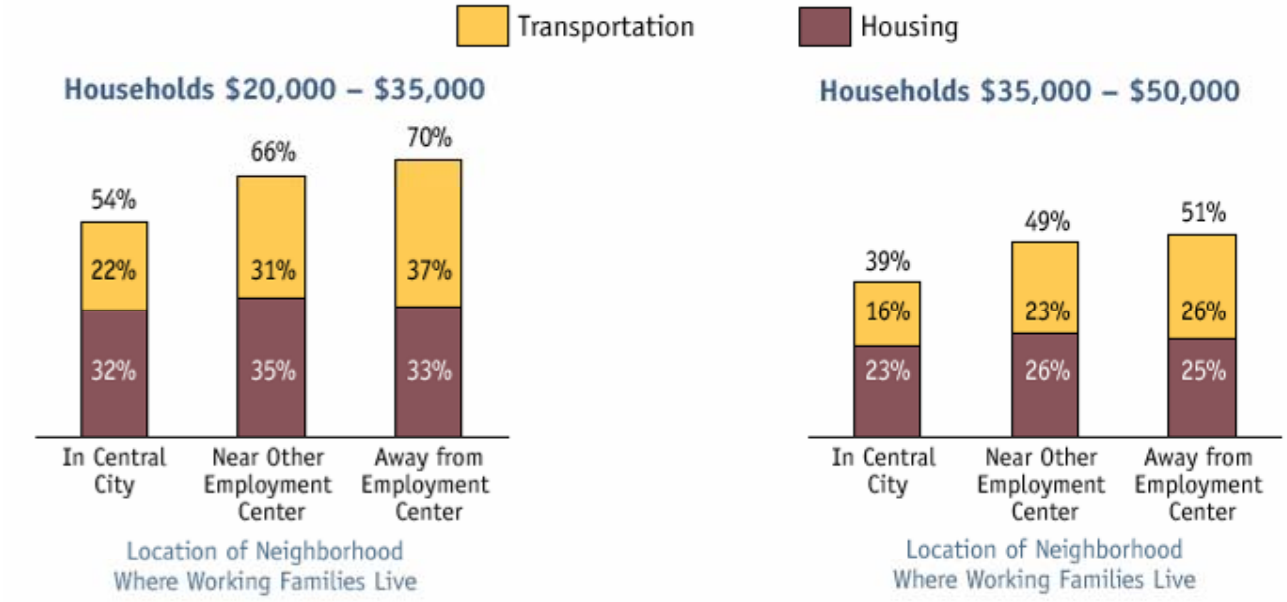



# Location-Efficient Development

- Locate affordable housing in accessible areas (near services and jobs, walkable, public transit).
- Diverse, affordable housing options (secondary suites, rooms over shops, loft apartments).
- Reduced parking requirements.
- Reduces property taxes and utility fees for clustered and infill housing.

# *"A Heavy Load" Report*

**Share of Income Spent on Housing and Transportation**




# *Impacts on Housing Affordability*

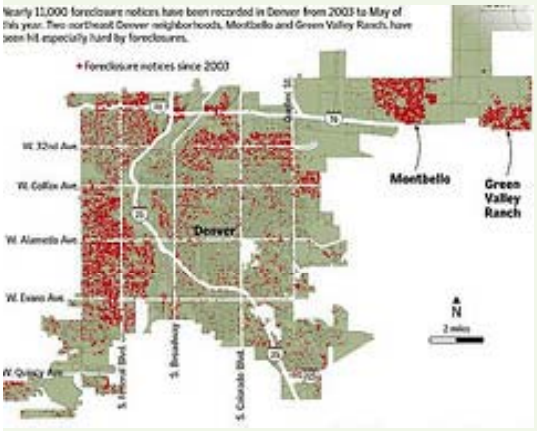
## Reduces Affordability

- Urban growth boundaries (reduces developable land supply).
- Increased design requirements (curbs, sidewalks, sound barriers, etc.).

## Increases Affordability

- Higher density reduces land requirements per unit.
- Reduced parking and setback requirements.
- More diverse, affordable housing options (secondary suites, rooms over shops, loft apartments).
- Reduces property taxes and utility fees for clustered and infill housing.
- Improved accessibility reduces transport costs.

# Housing Foreclosures




Denver

Housing foreclosure rates are much higher in automobile-dependent locations.


*Houston*

# Community Livability & Cohesion

*Community Livability* refers to the environmental and social quality of an area as perceived by residents, employees, customers and visitors.

*Community Cohesion* refers to the quantity and quality of positive interactions among people in a community.

Streets that are attractive, safe and suitable for walking and cycling increase community livability and cohesion.

# Streetscaping

Before

After

# Win-Win Transportation Solutions

Market reforms justified on economic principles that help provide various economic, social and environmental benefits.

- Improved travel options.
- Incentives to use travel alternatives.
- Accessible land use.
- Policy and market reforms.

# Mode Shifts

How do we convince people who drive luxury cars to shift mode?

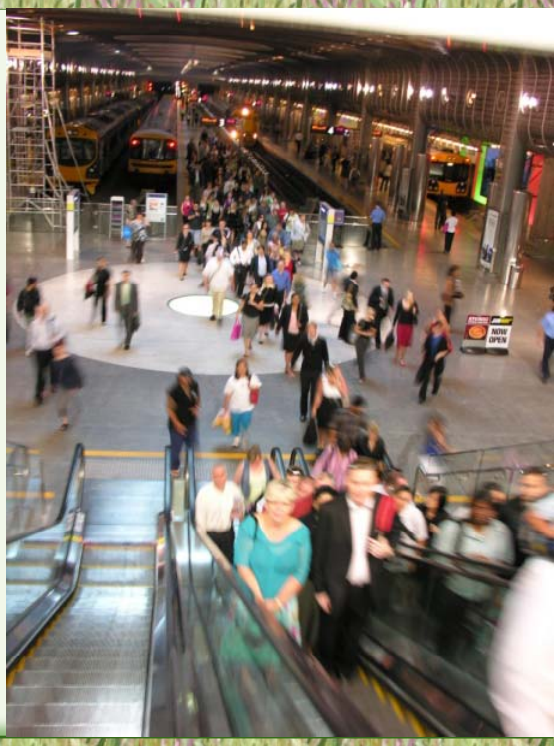


# Attracting Discretionary Riders

- Quality service (convenient, fast, comfortable).
- Low fares.
- Support (walkable communities, park & ride facilities, commute trip reduction programs).
- Convenient information.
- Parking pricing or “cash out”.
- Integrated with special events.
- Positive Image.

# Transit Station Level-Of-Service

- Clean
- Comfort (seating, temperature, quiet)
- Convenience (real-time user information, easy fare payment)
- Accessible (walkability, bike parking, nearby housing, employment, nearby shops)
- Services (refreshments, periodicals, etc.)
- Security



# Walking and Cycling Improvements

- More investment in sidewalks, crosswalks, paths and bike lanes.
- Improved roadway shoulders.
- More traffic calming.
- Bicycle parking and changing facilities.
- Encouragement, education and enforcement programs.

## School & Campus Transport Management

Programs that encourage parents and students to use alternative modes to travel to schools, colleges and universities.

## Employee Trip Reduction Programs

Employers encourage employees to walk, bicycle, carpool, ride transit and telework rather than drive to work.

## *"Raise My Prices, Please!"*

Of course, motorists do not like to pay more for roads and parking, but unpriced facilities are not really free, consumers ultimately pay through higher taxes and retail prices. The choice is actually between paying directly or indirectly.


## *Savings To Motorists*

Paying directly is more equitable and efficient. It gives individual consumers the savings that result when they drive less, providing a new opportunity to save money.

**Motorist Reduces Mileage**

⇩

**Reduced Congestion, Road & Parking Facility Costs, Reduced Crashes, etc.**

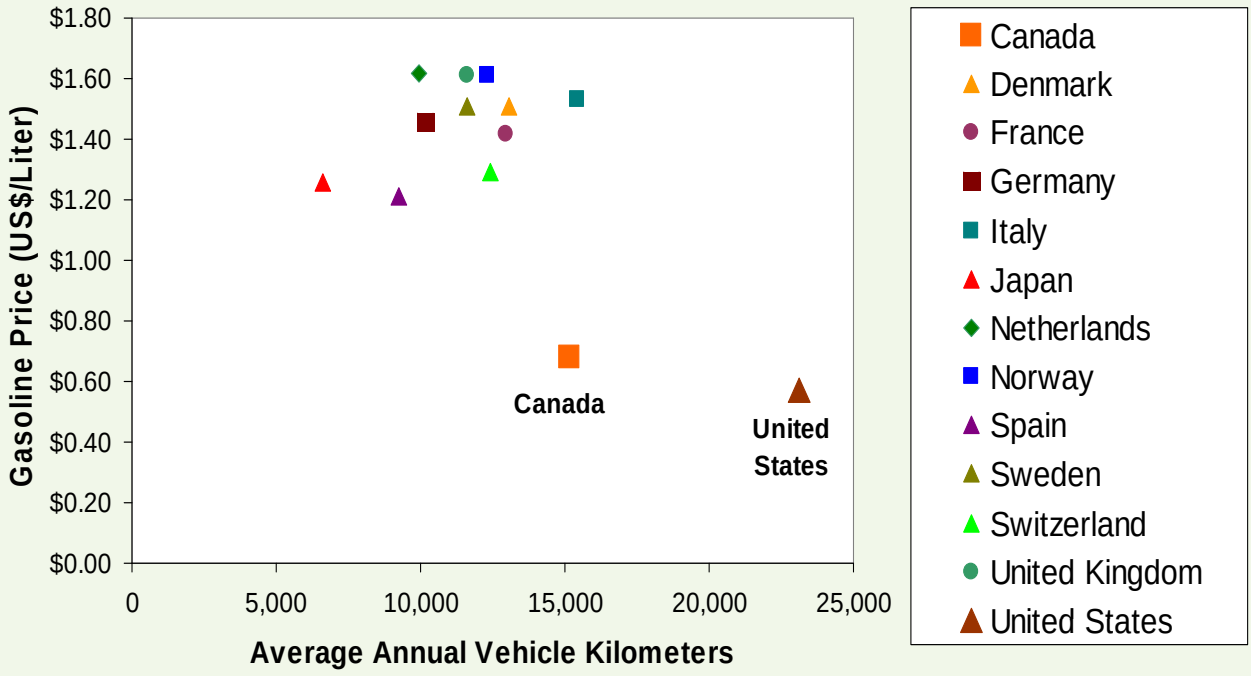
⇩

**Economic Savings**

# Distance-Based Pricing

Motorists pay by the vehicle-kilometre, so a $600 annual premium becomes 3¢/km and a $2,000 annual premium becomes 10¢/km. This gives motorists a significant financial incentive to drive less, but is not a new fee at all, simply a different way to pay existing fees.

# Fuel Taxes



# Parking Management

- More flexible parking requirements.
- Share parking spaces rather than having assigned spaces.
- Charge users directly for parking, rather than indirectly through taxes and rents.
- Parking Cash Out (Employees who current receive free parking are able to choose a cash benefit or transit subsidy instead.)

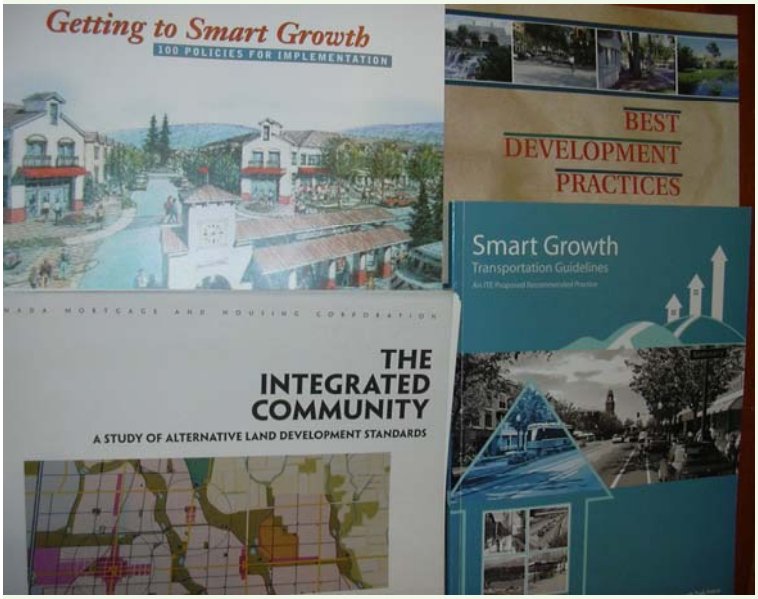
# Parking Pricing and Cash Out

Parking is never really free, consumers either pay directly or indirectly. Paying directly tends to be more fair and efficient, and typically reduces parking demand about 20%.

# Revenue Generation Strategies

| Planning Objectives | General Taxes | Vehicle Fees | Road Pricing | Mileage Fees | Parking Pricing | Fuel Taxes |
|---|---|---|---|---|---|---|
| Revenue Generation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Reduce congestion | | | ✓ | ✓ | ✓ | ✓ |
| Roadway cost savings | | | ✓ | ✓ | ✓ | ✓ |
| Parking cost savings | | | ✓ | ✓ | ✓ | ✓ |
| Improve mobility options | | | ✓ | ✓ | ✓ | ✓ |
| Improve traffic safety | | | ✓ | ✓ | ✓ | ✓ |
| Energy conservation | | | ✓ | ✓ | ✓ | ✓ |
| Pollution reduction | | | ✓ | ✓ | ✓ | ✓ |
| Land use objectives | | | ✓ | ✓ | ✓ | ✓ |
| Public fitness & health | | | ✓ | ✓ | ✓ | ✓ |

# Supported by Professional Organizations




- Institute of Transportation Engineers.
- American Planning Association.
- American Farmland Trust.
- Federal, state, regional and local planning and transportation agencies.
- International City/County Management Association
- National Governor's Association
- Health organizations.
- And much more...

# Motorists Benefit Too

More balanced transport policy is no more "anti-car" than a healthy diet is anti-food. Motorists have every reason to support these reforms:

- Reduced traffic and parking congestion.
- Improved safety.
- Reduced chauffeuring burden.
- Option value.
- Often the quickest and most cost effective way to improve driving conditions.


**"Comprehensive Transportation Evaluation Framework"**

**"Evaluating Public Transit Benefits and Costs"**

**"Smart Transportation Economic Stimulation"**

**"Transportation Cost and Benefit Analysis"**

**"Parking Management Best Practices"**

**"The Future Isn't What It Used To Be"**

**"Online TDM Encyclopedia"**

**and more...**

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