Indicators for Sustainable Transport Policy Making and Performance Evaluation

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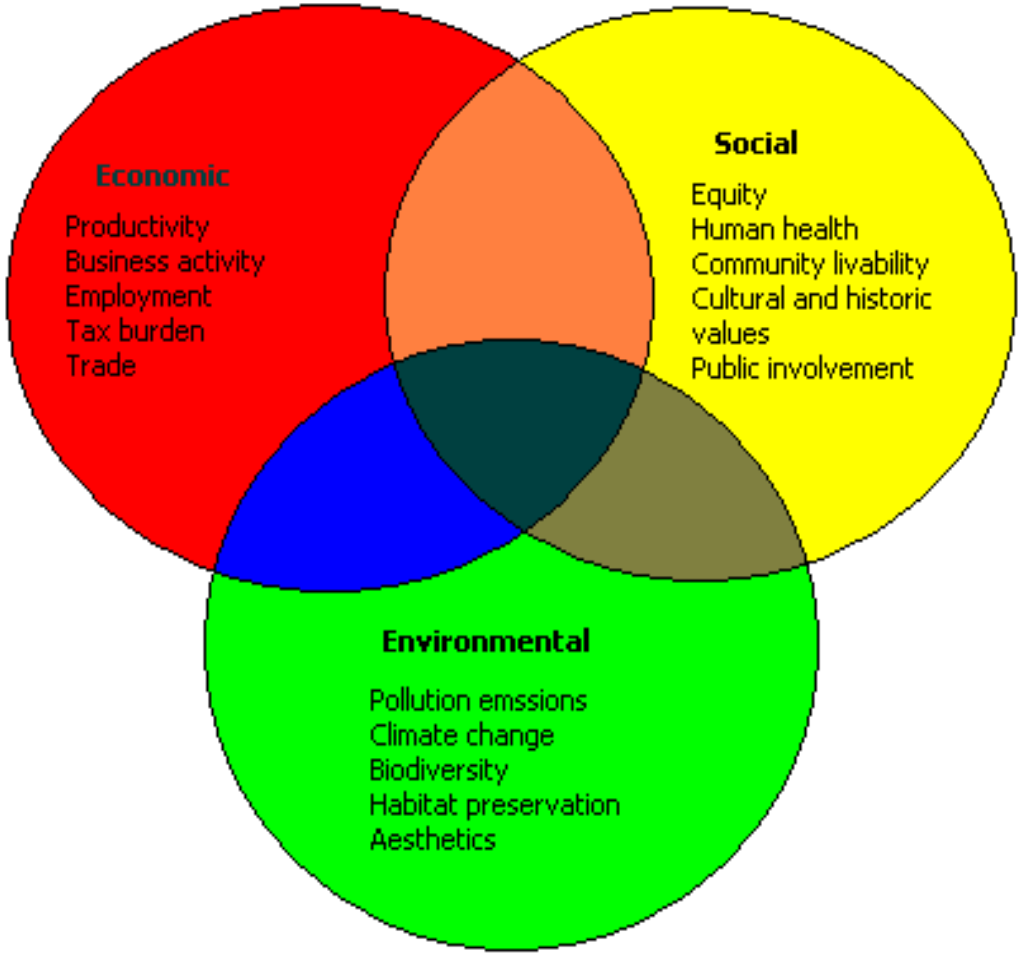
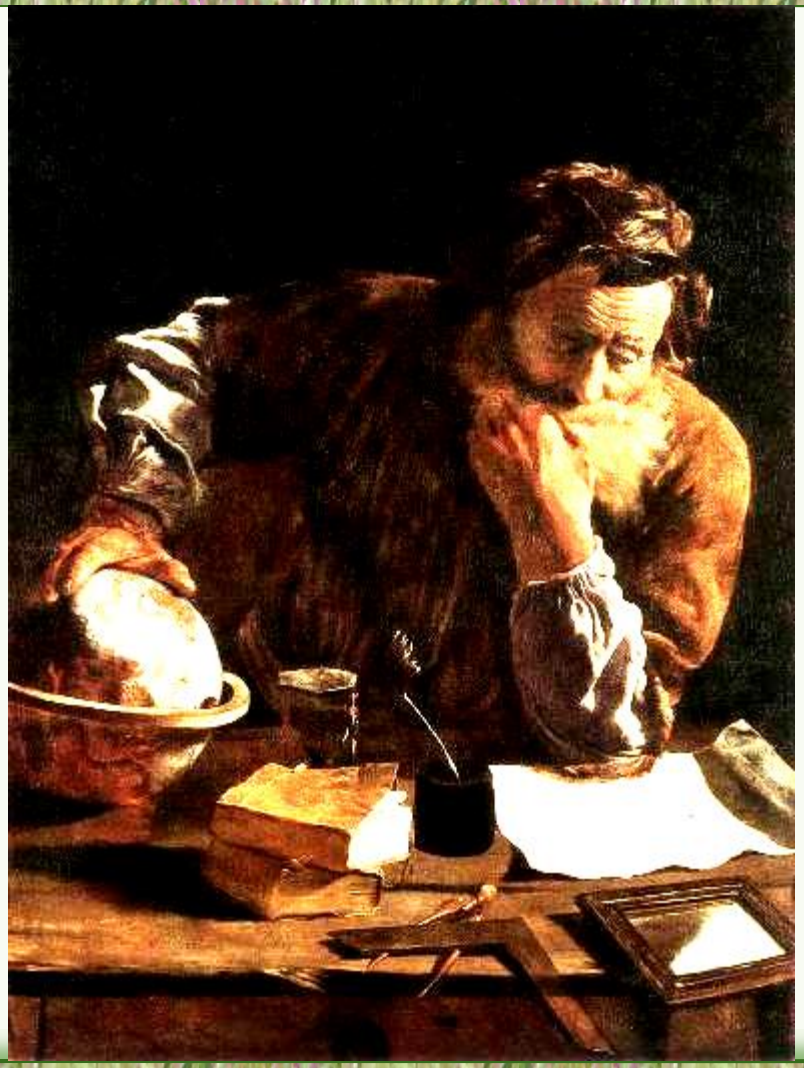
Sustainable Planning

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 a crisis to develop.

Accessibility-Based Planning

- **Mobility** - physical movement.

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

Sustainability Objectives

Economic	Social	Environmental
Mobility/Accessibility	Equity/Fairness	Pollution reduction
Congestion reduction	Affordability	Climate protection
Roadway cost savings	Human health	Habitat preservation
Parking cost savings	Community cohesion	Aesthetics
Consumer savings	Cultural preservation	
Energy conservation	Community livability	
Economic productivity and development	Public Participation	
Tax burden		

Sustainabile Transportation?

Is a transport system sustainable if all vehicles are electric powered?

Electric Power Does Not:

- Reduce traffic congestion
- Reduce accidents
- Reduce roadway costs
- Reduce parking facility costs
- Reduce vehicle purchase costs
- Improve mobility for non-drivers
- Improve social equity
- Improve public fitness and health
- Reduce sprawl
- Protect threatened habitat

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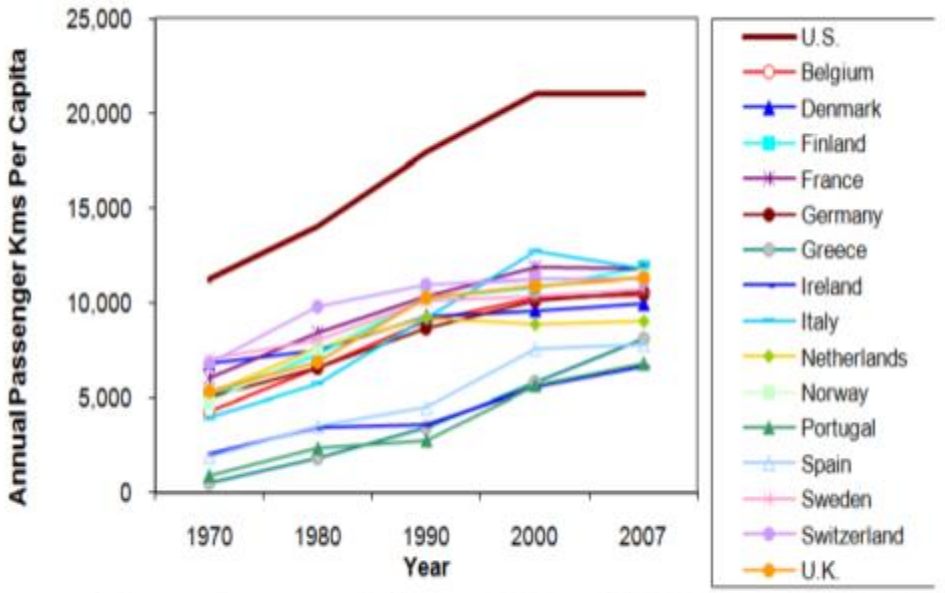
✓ **Energy conservation**	Community livability	
Economic productivity and development	Public Participation	
Tax burden		

Performance Indicators

- Statistics allow us to understand the world beyond our individual sight, hearing and touch.
- Performance indicators are statistics designed to measure progress toward goals.
- Which indicators are selected can affect which policies and planning decisions are considered desirable.

International Vehicle Travel Trends (OECD Data)



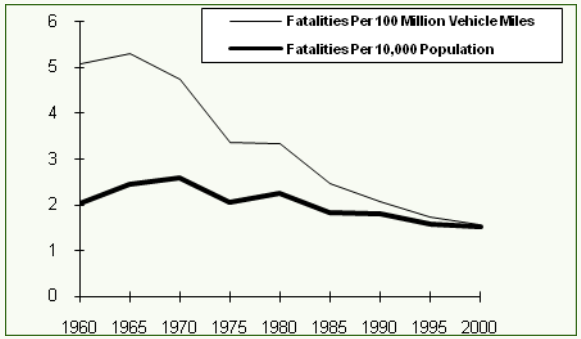
Per capita vehicle travel grew rapidly between 1970 and 1990, but has since leveled off and is much lower in European countries than in the U.S.

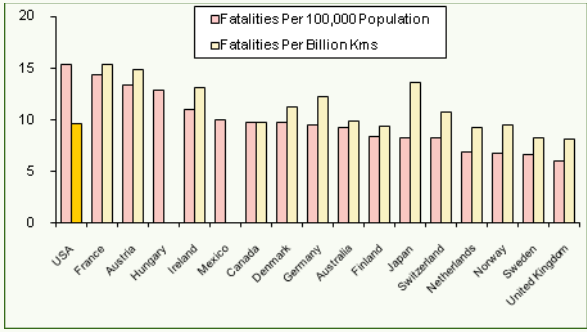
Keeping Score

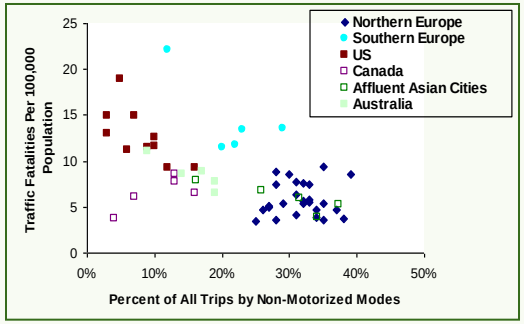
Performance indicators are like the score in a game. They define what must be accomplished to succeed.

Planning Applications

- Identify problems
- Track trends
- Predict future conditions
- Evaluate progress toward targets
- Compare with peers
- Compare impacts on different groups
- Reward achievements
- Define efficient user fees and taxes
- Evaluate policies and programs
- Research analysis



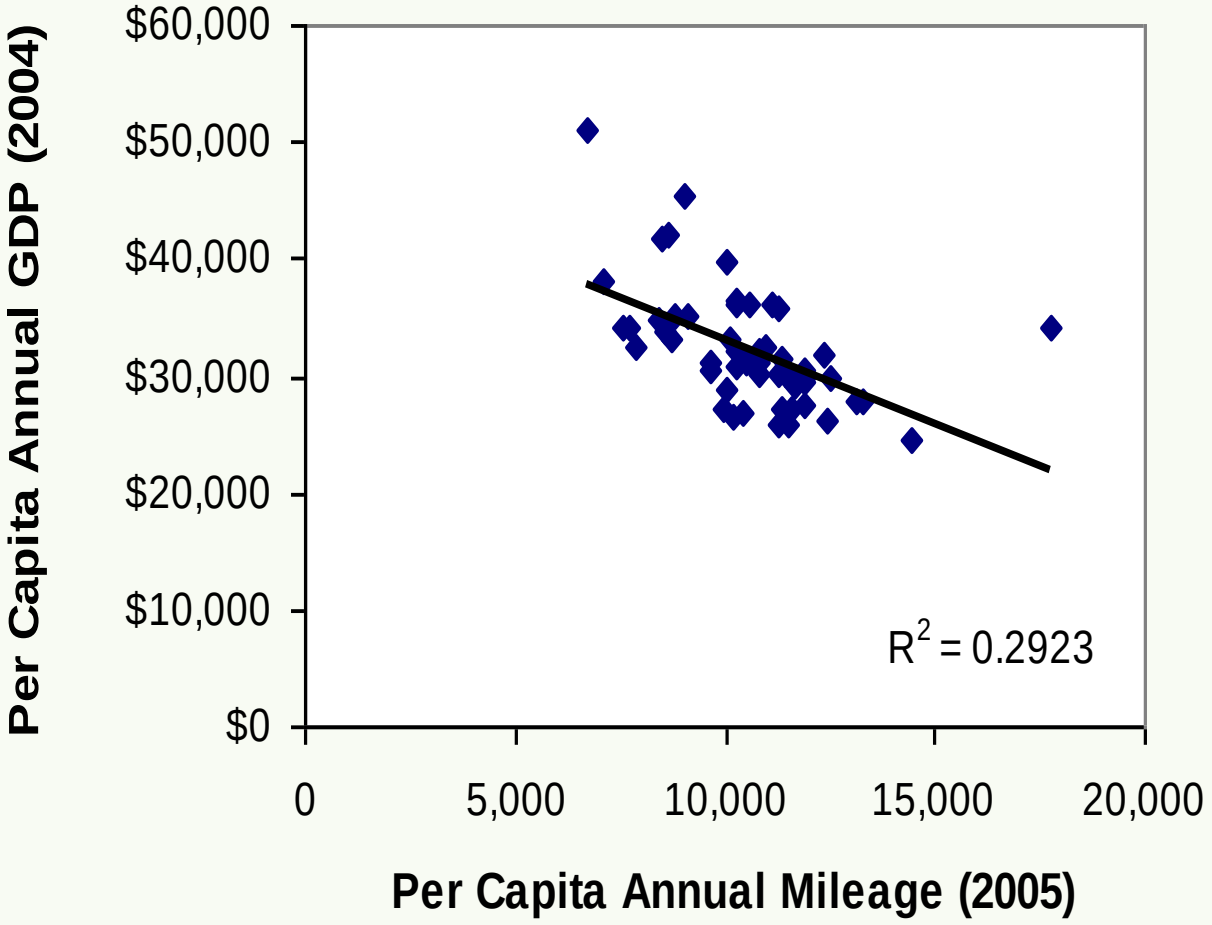




Per Capita GDP and VMT

Productivity tends to decline with increased vehicle travel. (Each dot is a U.S. urban region.)

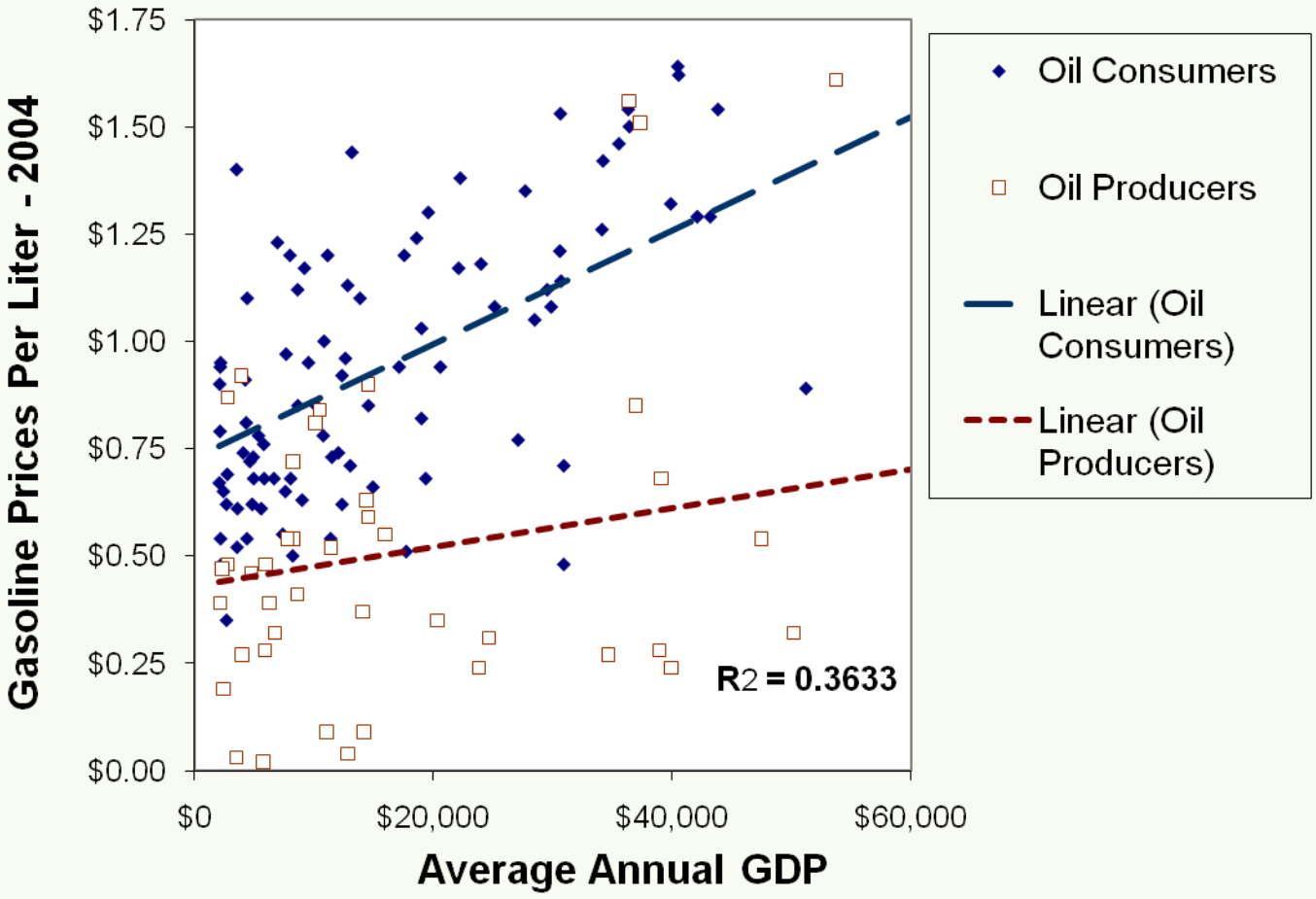
Bureau of Economic Analysis and FHWA data



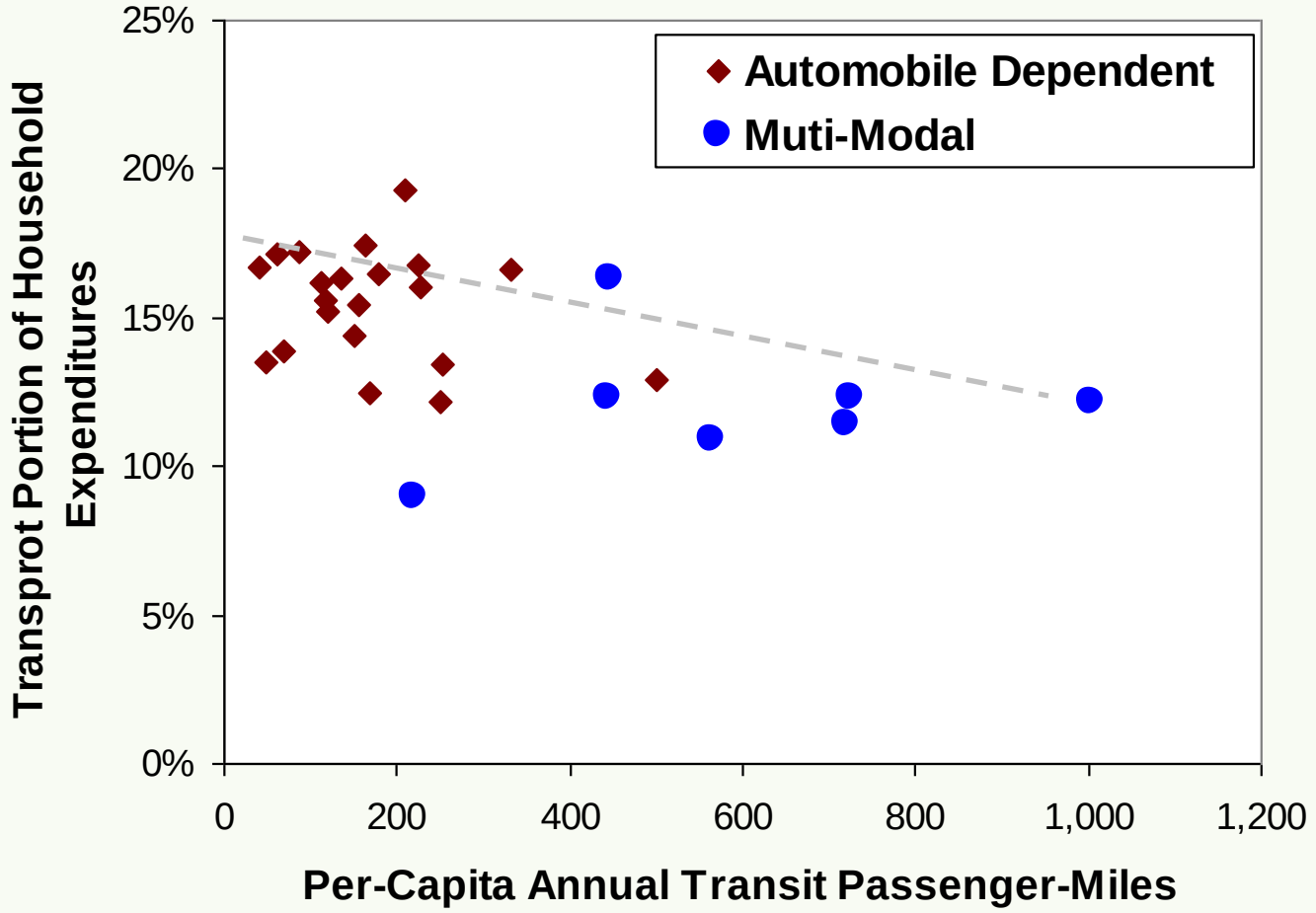
Per Capita GDP and Fuel Prices

Productivity tends to increase with higher fuel prices, particularly in oil consuming countries (each dot is a country).

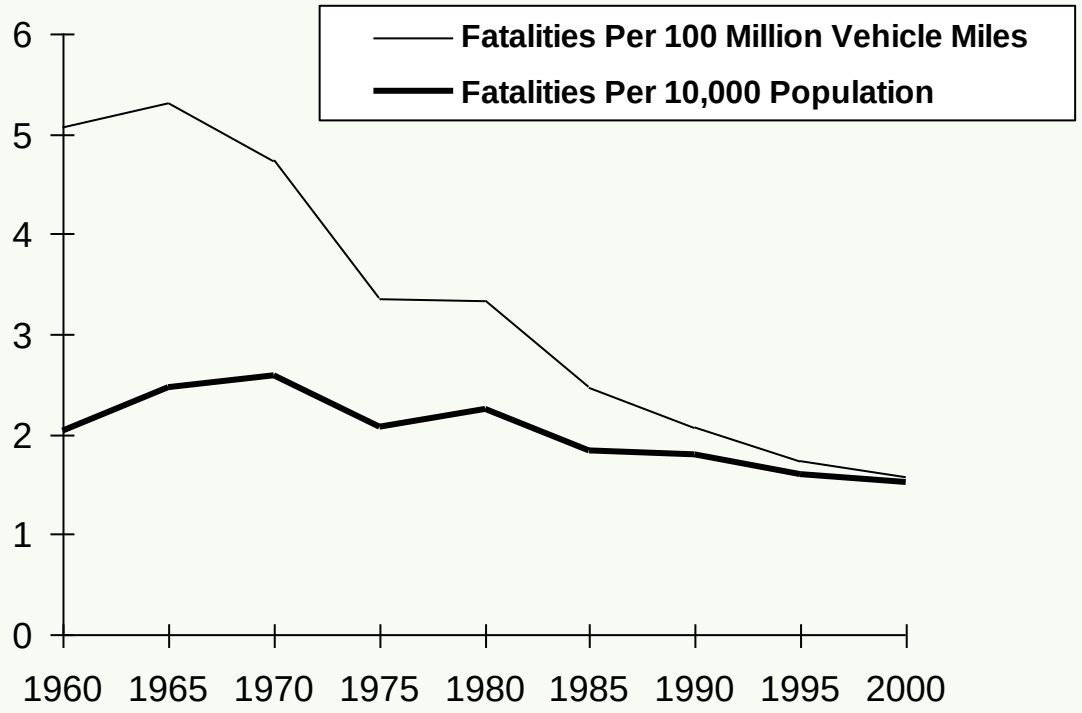
Fuel price data from Metschies, 2005



Transportation Affordability

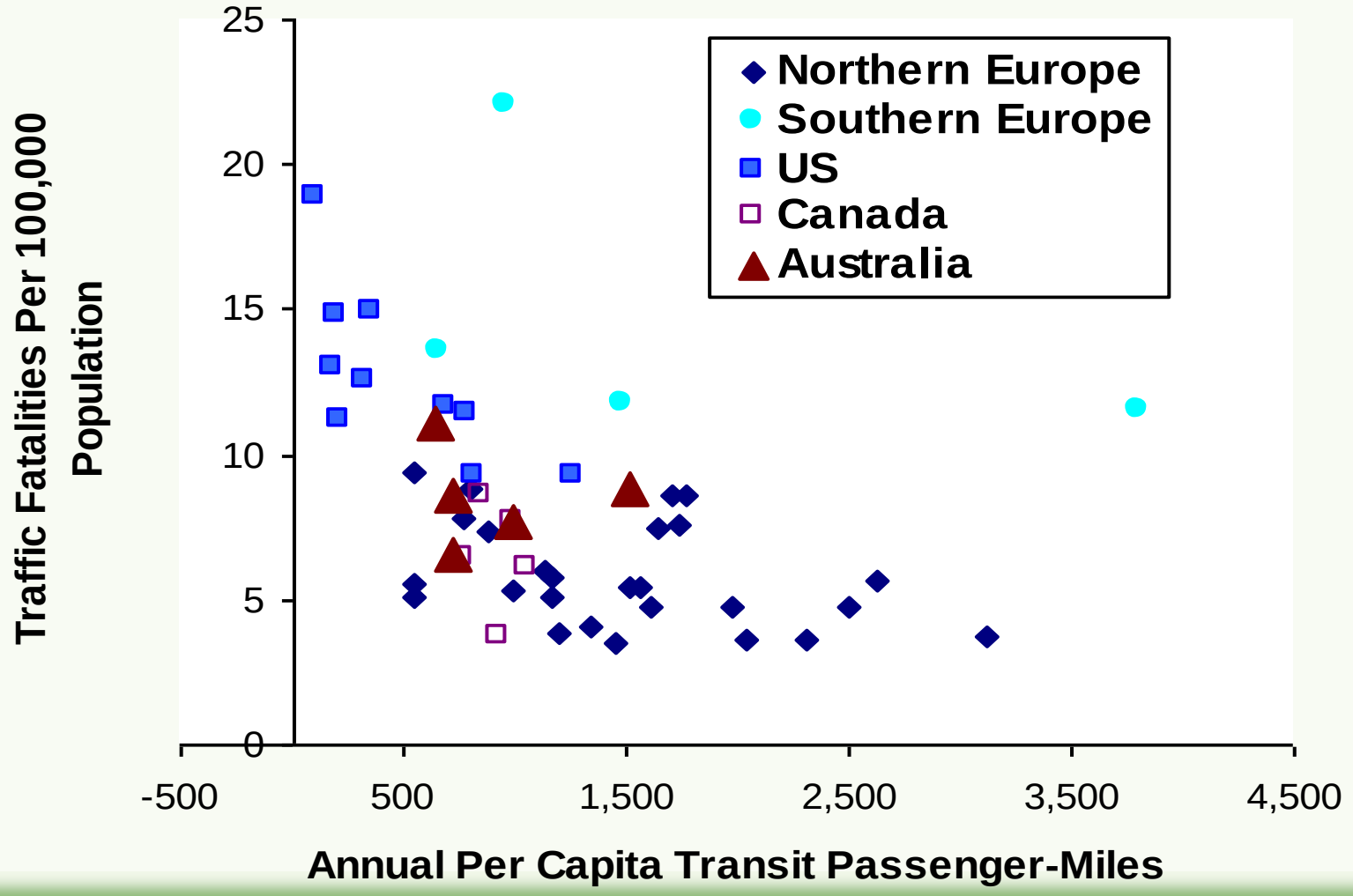


Traffic Fatality Rates



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.

International Traffic Death Rates



Conventional Evaluation

Generally Considered

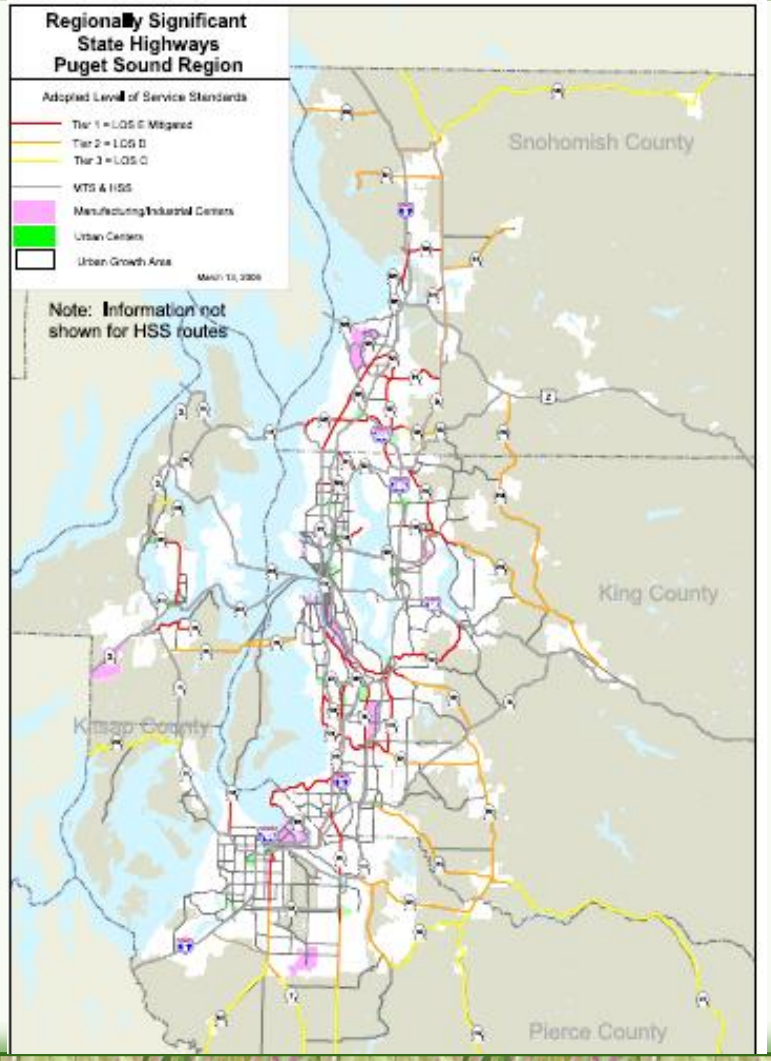
- Congestion impacts.
- Vehicle operating costs.
- Per-mile crash impacts.
- Per-mile pollution emissions.

Often Overlooked

- Parking costs.
- Total consumer costs.
- Downstream congestion.
- 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 Performance Indicators

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.

Recommended Basic Indicator Set

Economic	Social	Environmental
• Roadway and pathway supply and condition. • Public transit service quality. • Personal mobility (annual person-kilometers and trips). • Vehicle travel (annual vehicle-kilometers), by mode. • Freight mobility (annual tonne-kilometers) by mode. • Average commute travel time and distance. • Portion of household budgets devoted to transport. • Public expenditures on transport (roads, parking, transit, etc.)	• Per capita traffic crash and fatality rates. • Quality of transport for disadvantaged people (disabled, low incomes, children, etc.). • Affordability (portion of household budgets devoted to transport). • Overall transport system satisfaction rating (based on objective user surveys). • Portion of people who walk or bike at least 20 daily minutes, to help provide basic fitness and health.	• Per capita energy consumption, by fuel and mode. • Energy consumption per freight ton-mile. • Air pollution emissions (various types). • Climate change emissions. • Land use density and mix. • Land paved for transport facilities (roads, parking, ports and airports). • Other land use impacts (sprawl and habitat loss)

Existing Data Sets

International	Europe	North America
International Road Federation	European Union Energy and Transport in Figures	Bureau of Transportation Statistics
Millennium Cities and Mobility In Cities Database	European Commission	Highway Statistics
EarthTrends Searchable Database	European Conference of Ministers of Transport	Census Bureau
OECD Transport Statistics	European Environment Agency	National Household Travel Survey
World Bank	Transport Statistics Great Britain	Department of Energy
		Statistics Canada
		Transport Canada

Defining Data Quality

- **Accuracy.** The methods used to collect statistics must be suitably accurate.
- **Transparency.** The methods used to collect statistics must be accessible for review.
- **Comprehensiveness.** An adequate range of statistics should be collected to allow various types of analysis.
- **Frequency.** Data should be collected regularly.
- **Consistency.** The range of statistics, definitions and collection methodologies should be consistent.
- **Availability.** Statistics should be available to users.

Data Problems

- Statistics are often incomplete, consisting of a limited set of information needed for analysis and planning.
- Some statistics are of questionable accuracy, based on inadequate methods or sample size.
- Transportation decision-making is skewed in favor of easy-to-measure impacts at the expense of more-difficult-to-measure impacts.
- Statistics are incompatible between different agencies, jurisdictions and time periods, making it very difficult to compare conditions, evaluate relationships and track trends.
- Statistics that do exist are often unavailable except to a limited audience, or they are made available in a format that is difficult to work with.
- There is seldom independent review or quality control.

Conclusions

- Performance indicators are essential for good transport planning.
- Which indicators are used affects how problems are defined and solutions evaluated. A particular policy or program may seem desirable when measured using one type of indicators and undesirable using another.
- Conventional transport indicators tend to reflect motor vehicle travel conditions and so support motor vehicle improvements. Sustainability requires a broader indicator set that reflects accessibility rather than mobility, and considers additional modes and impacts.
- Sustainable transportation indicators are often constrained by inadequate data quality.
- Establishing universal transport data quality standards is important for sustainable transport planning.

"Well Measured: Developing Indicators for Comprehensive and Sustainable"

"Measuring Transportation: Traffic, Mobility and Accessibility"

"Evaluating Accessibility for Transportation Planning"

"Transportation Cost and Benefit Analysis"

"Online TDM Encyclopedia"

and more...

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