



Chicago 2006

# Oil or Not Transportation Energy Crisis?

Todd Litman

*Victoria Transport Policy Institute*

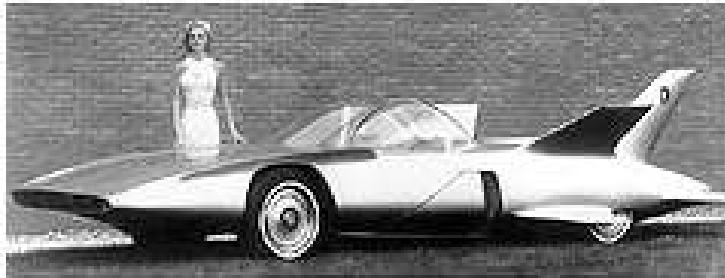
**Rail~Volution**

6 November 2006

# Past Visions of Future Transport



1949 ConvAIRCAR Flying Car



1958 Firebird

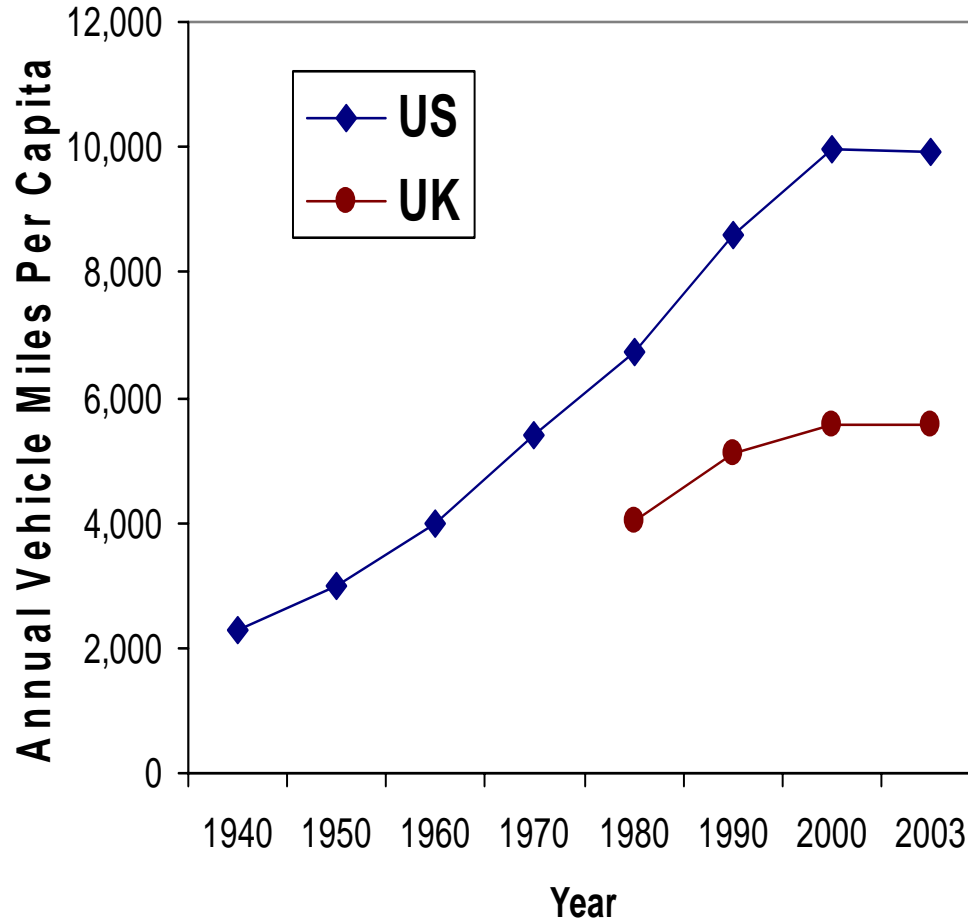


Segways

# Wheeled Luggage

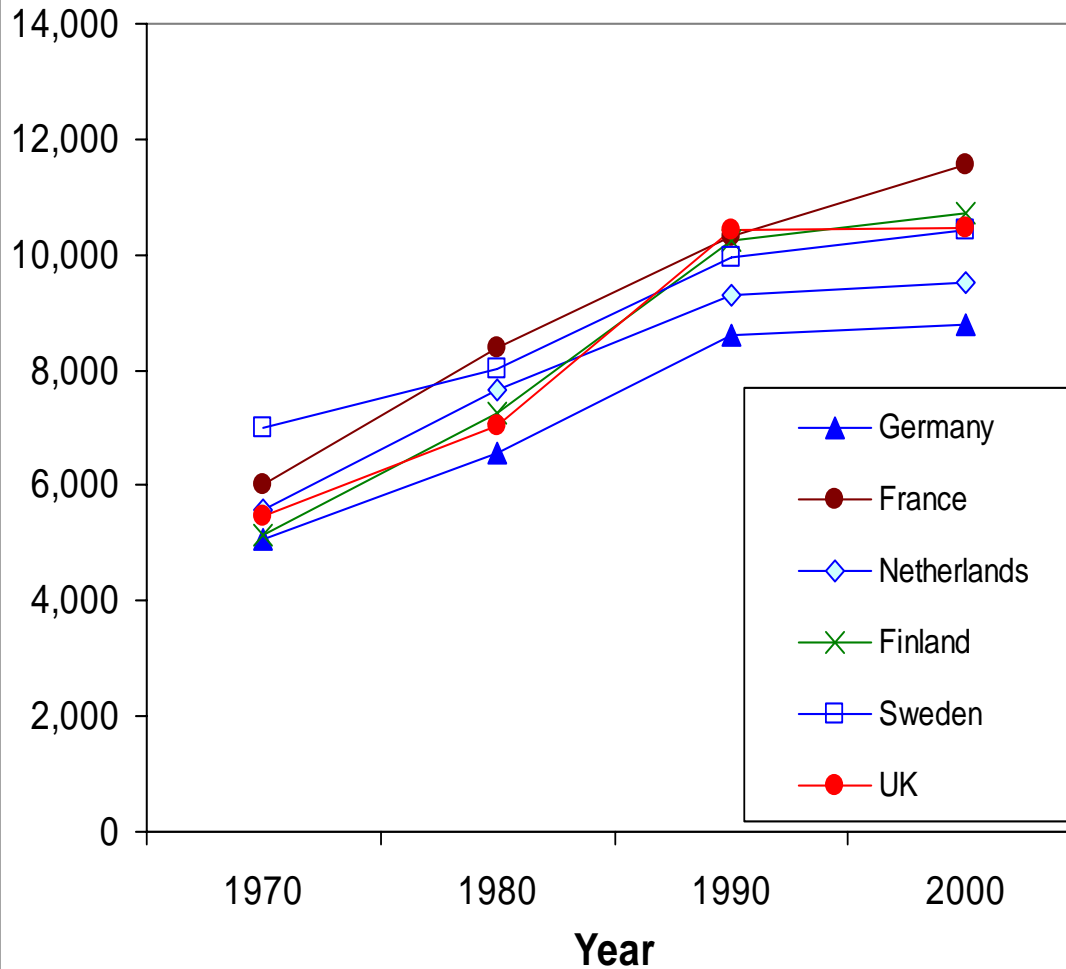


# Vehicle Travel Trends



Per capita annual motor vehicle mileage also grew substantially during the last century but has since leveled off in the U.S.

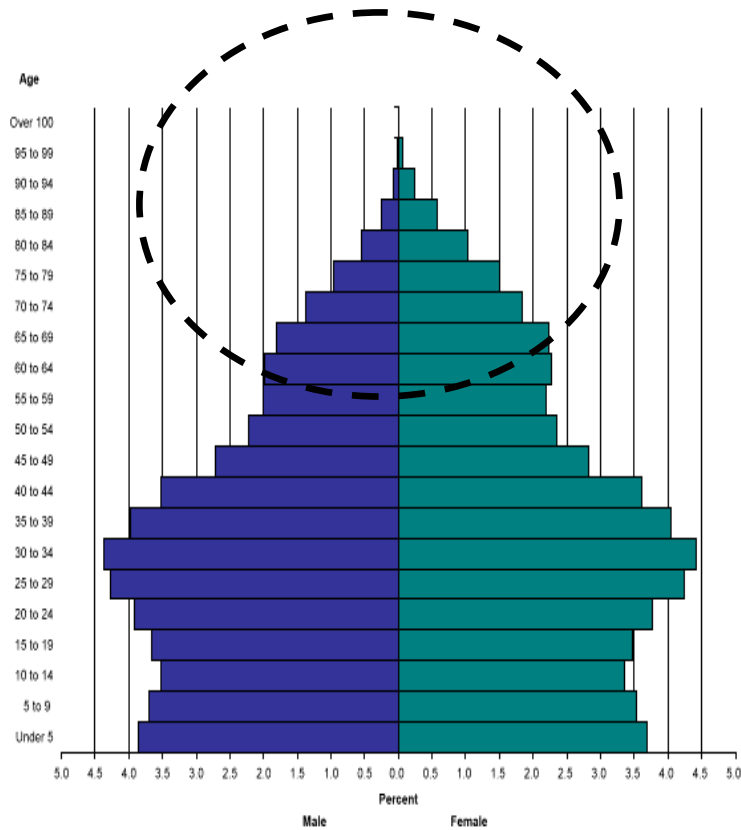
# International Travel Trends



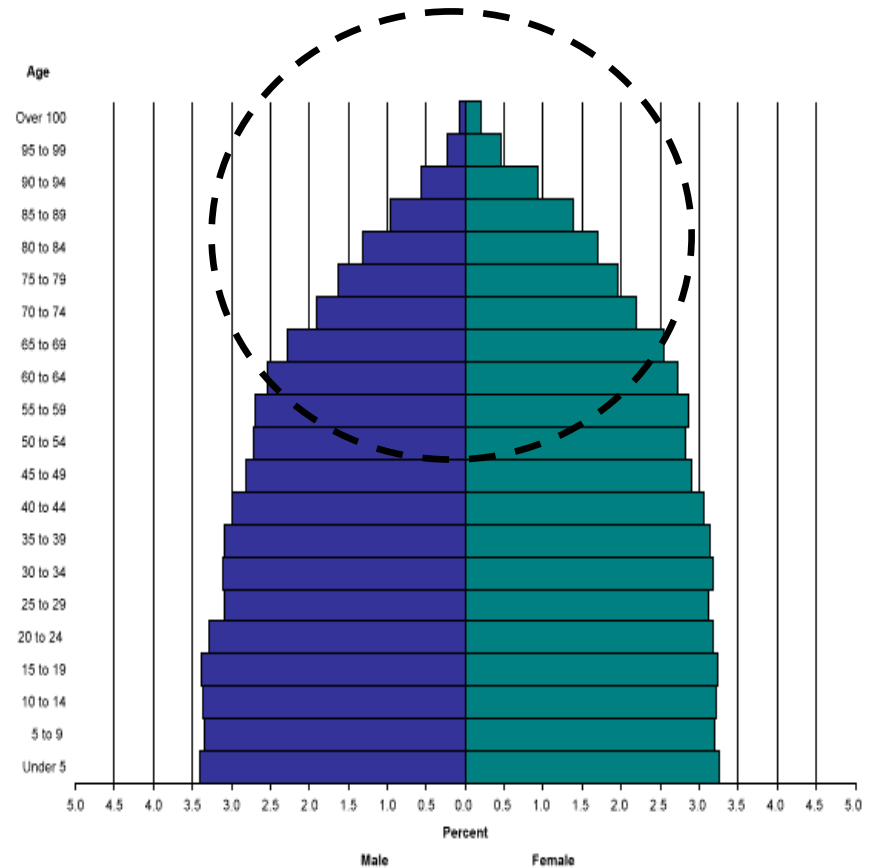
Similar patterns are occurring in other developed countries.

# The Population is Aging

1990

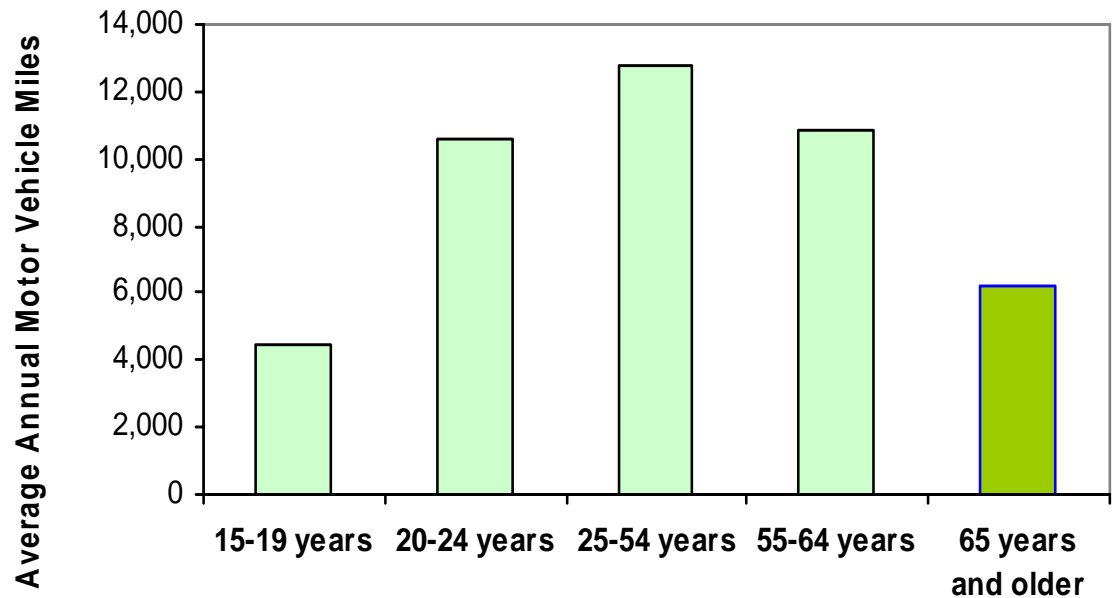


2050



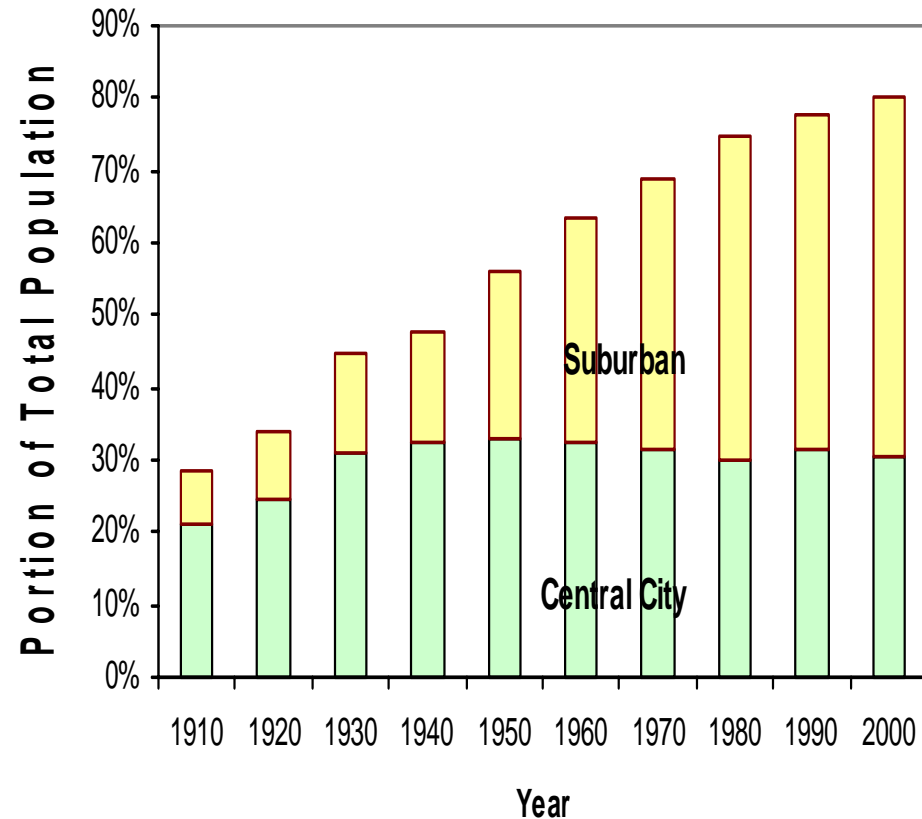
# Aging Reduces Vehicle Use

As people age they reduce their driving.



# Urbanization

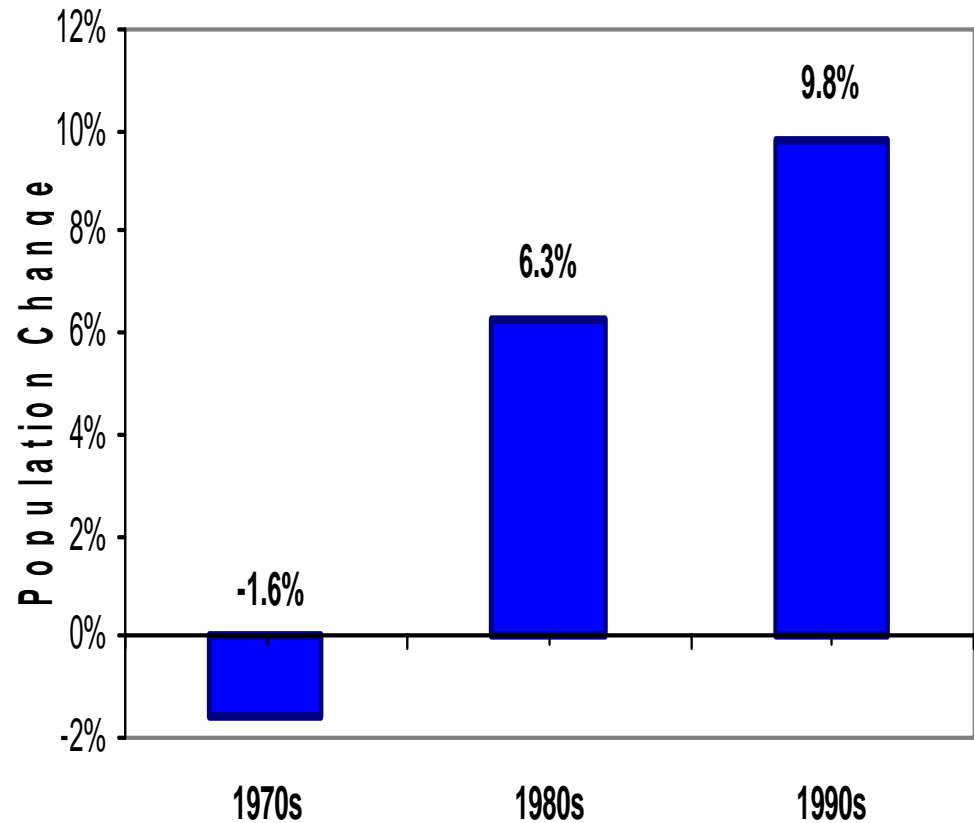
Between the 1940s and 1980s the population became more suburbanized. Now, about half of North Americans live in suburbs.





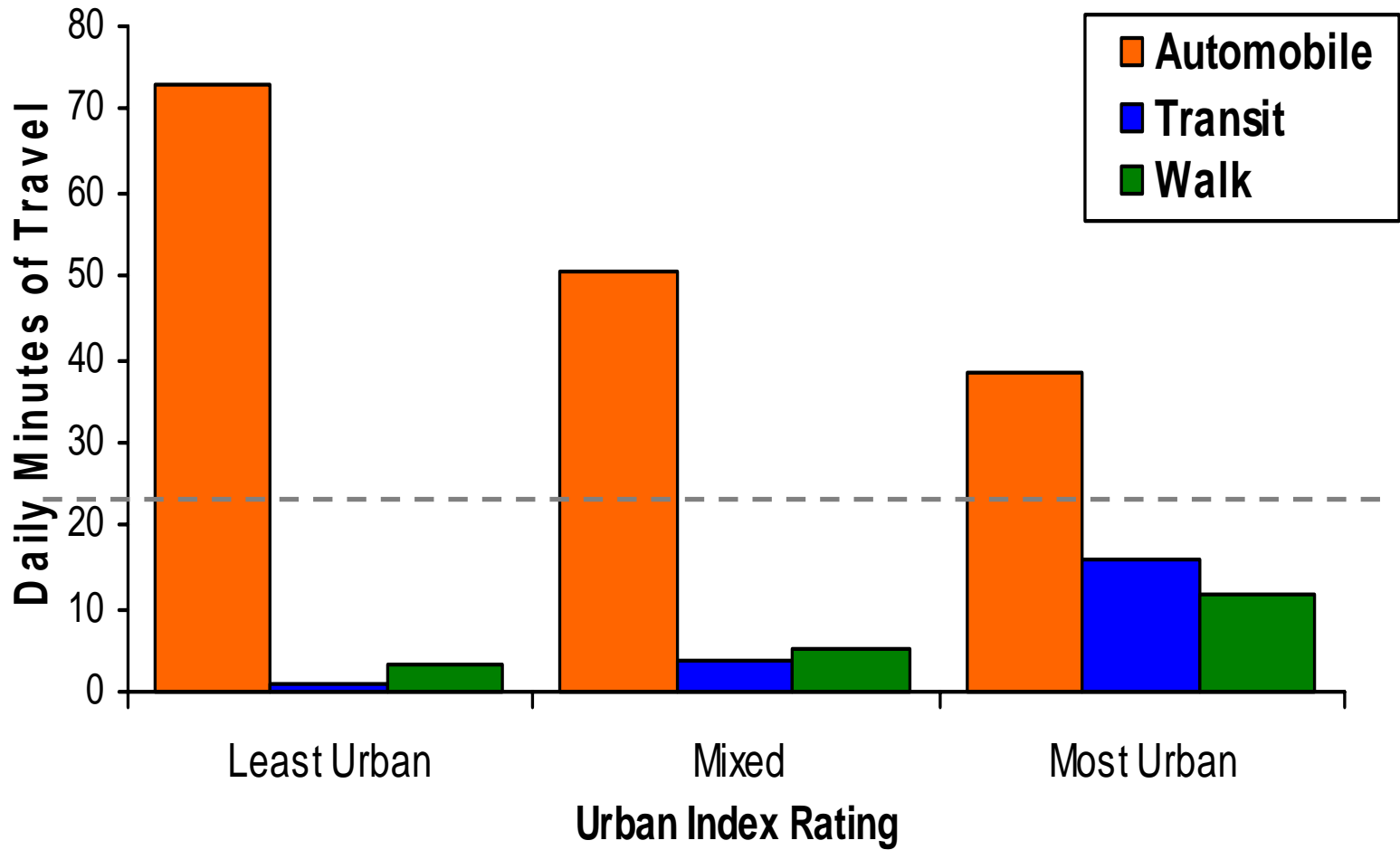
# Urbanization

After experiencing population declines, cities are once again growing in population.



**50 largest U.S. cities growth trends**

# Land Use Impacts On Travel



# Effects of Technology

## **Increases Motorized Travel**

Increased fuel efficiency.  
Increased comfort.  
Automated driving.

## **Mixed Travel Impacts**

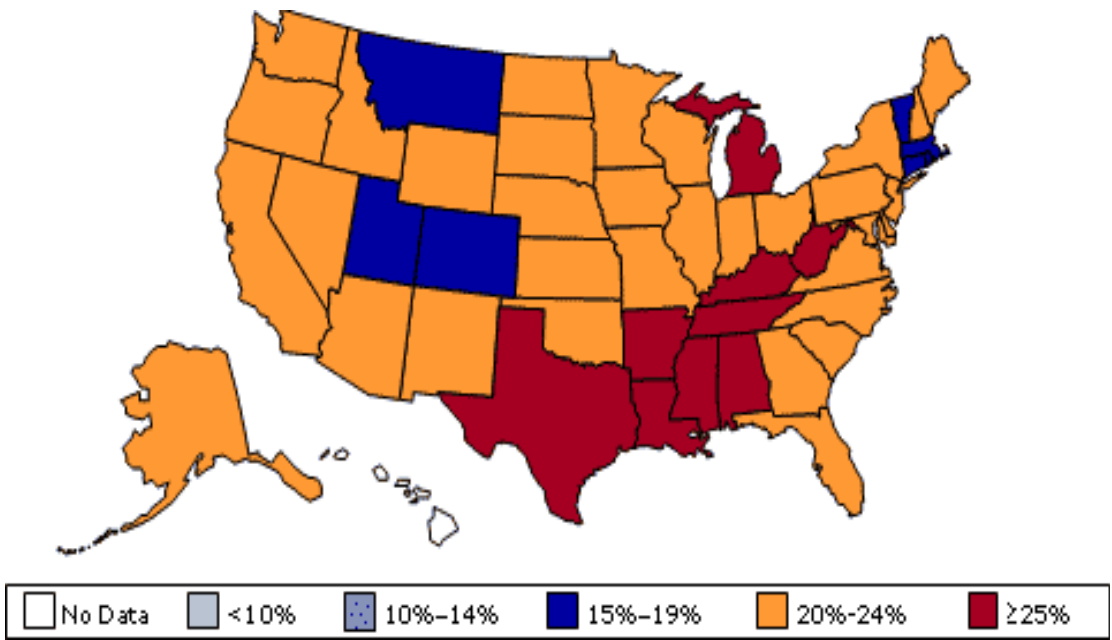
Improved traffic signal control.  
Improved navigation.

## **Reduces Motorized Travel**

Telework.  
Improved road and parking pricing.  
Transit service improvements.  
Rideshare matching.  
Delivery Services

# Health Concerns

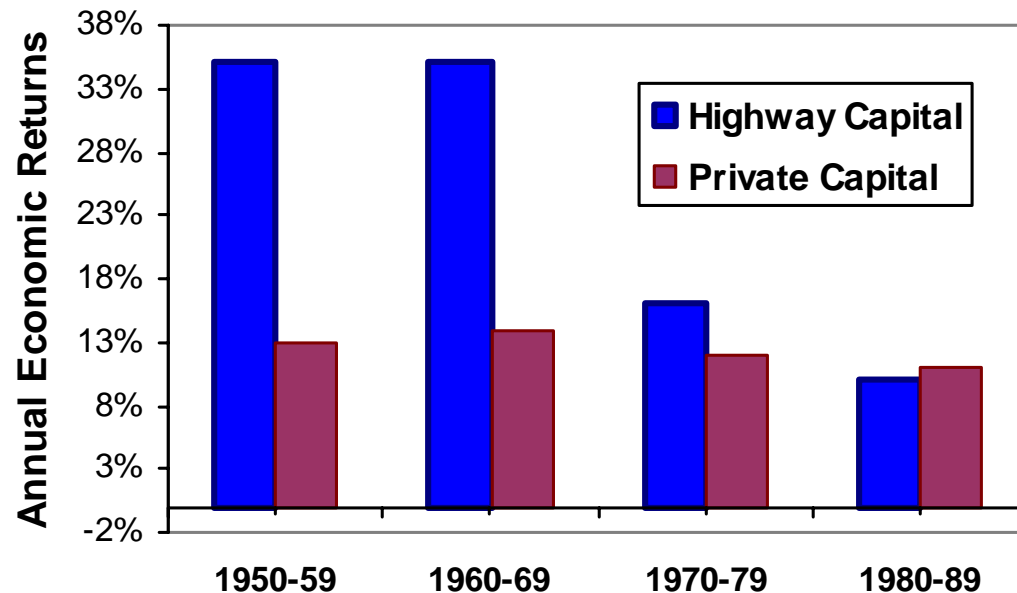
Obesity Rates (BMI > 30)



There is increasing concern about the health problems that result from reduced physical activity, and the value of transport systems that accommodate walking and cycling.

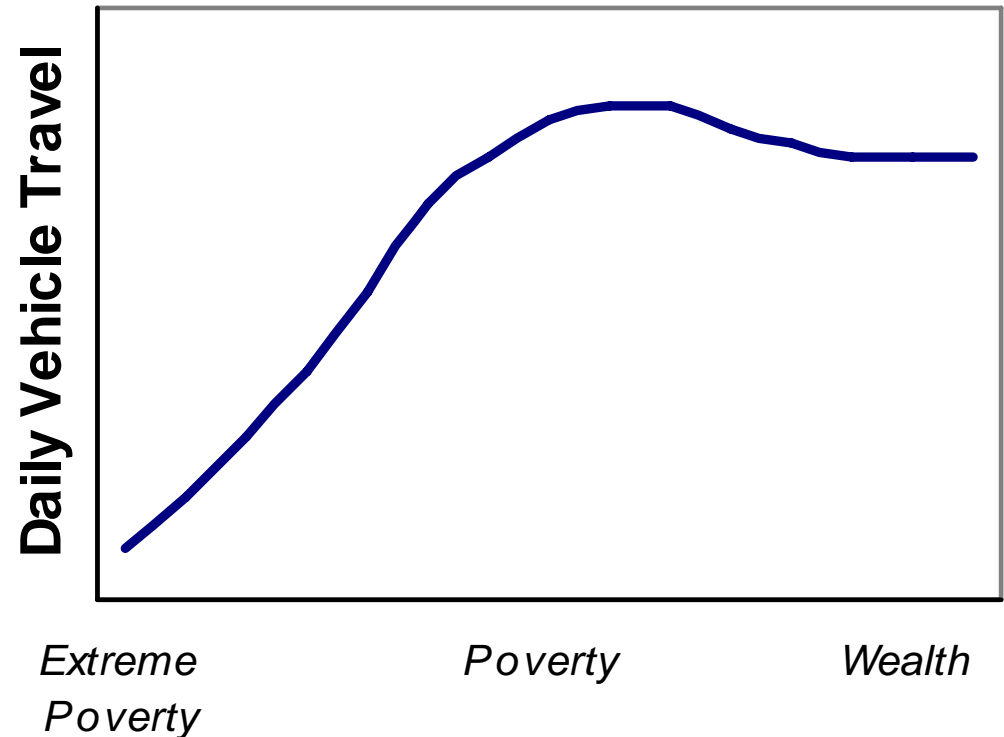
# Value of Highway Expansion

When major highway systems were being developed in the 1950s and 60s they provided high returns on investment. Now that the system is more mature, economic returns have declined.



# Wealth and Vehicle Travel

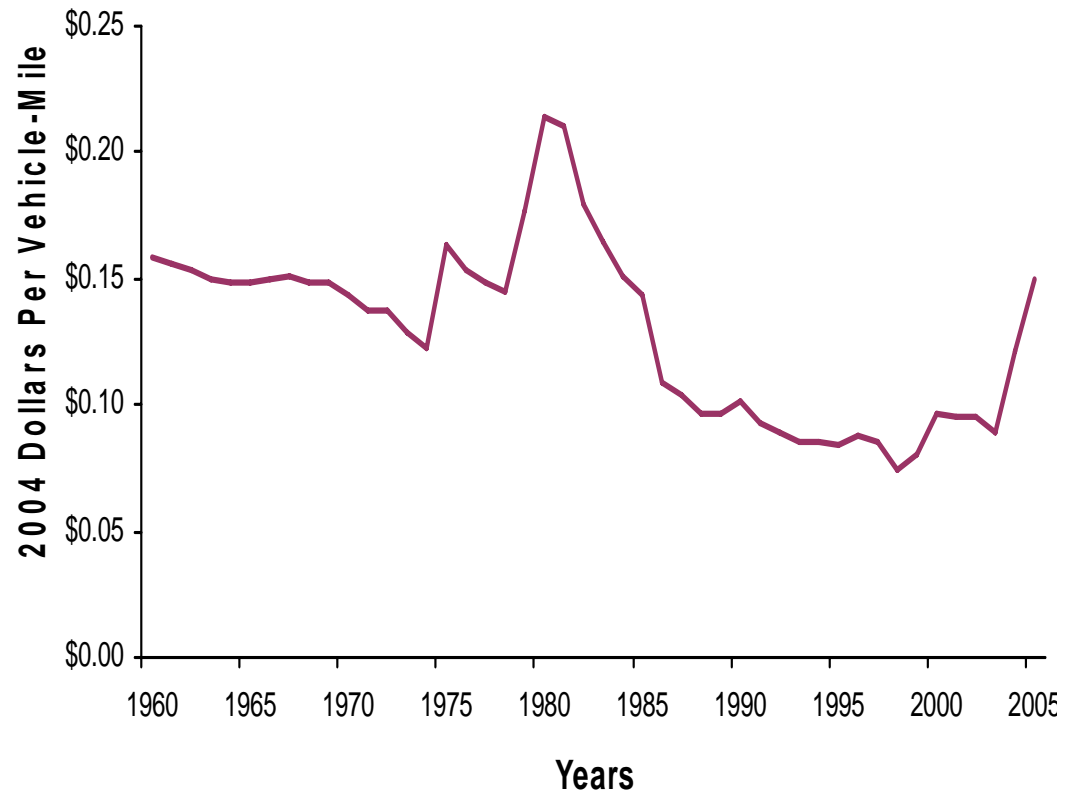
As wealth and knowledge increase, people initially increase their daily vehicle travel, but this peaks and declines somewhat as they are able to choose better travel options.



Increased Wealth & Knowledge =>

# Per Mile Fuel Costs

During most of the last century, per-mile fuel costs declined, but this trend is not expected to continue in the future.



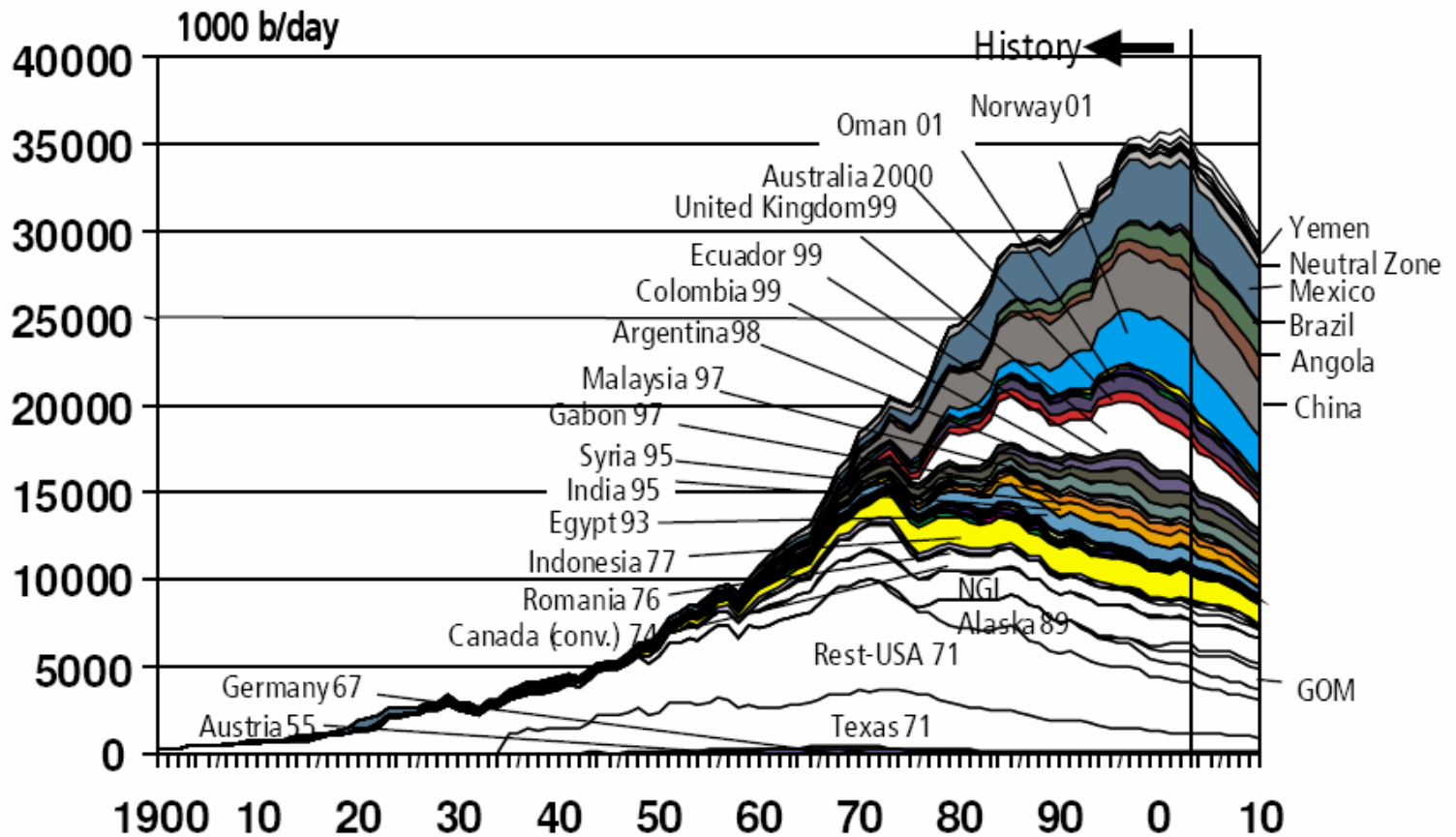
# Barrels of Oil

Barrel = 42 Gallons





# Peak Oil

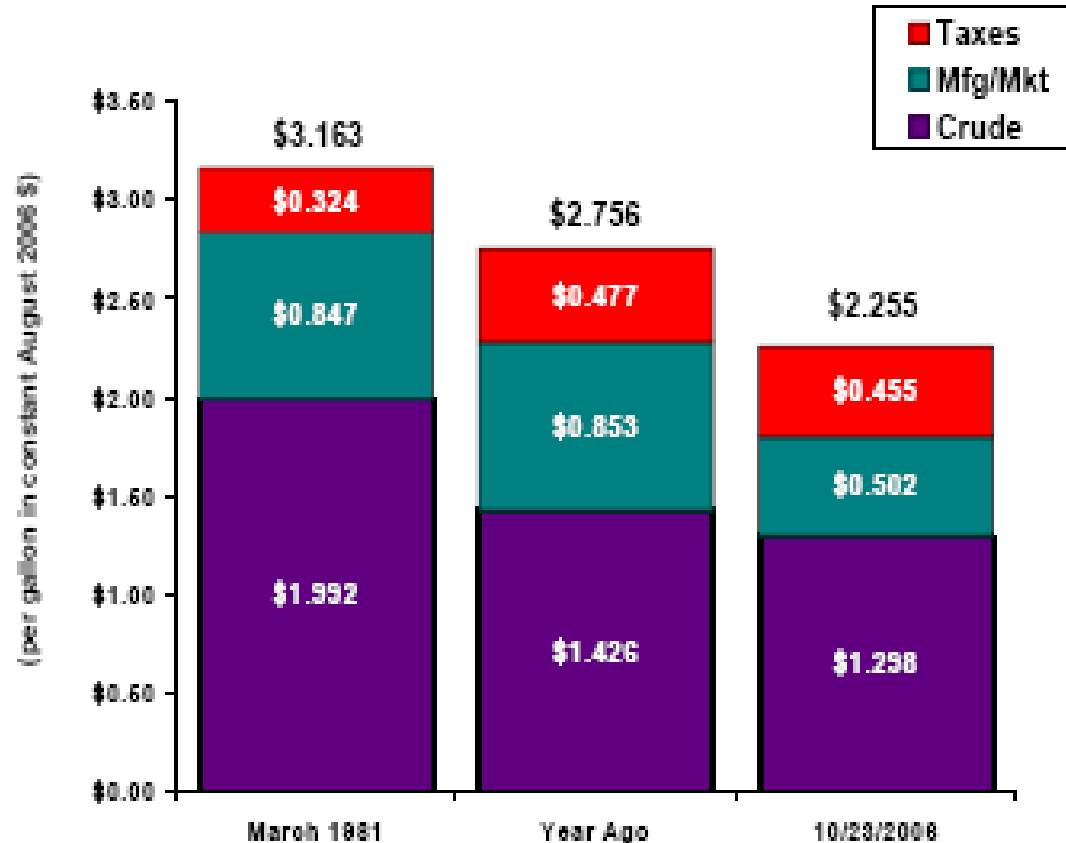


Source: Industry database, 2003 (IHS 2003)  
OGJ, 9 Feb 2004 (Jan-Nov 2003)

# Crude Portion of Fuel Costs

Crude oil represents about half of U.S. fuel prices, so doubling wholesale energy prices only increases retail prices 50-60%. Impacts are smaller in countries with higher fuel taxes.

Components of Retail Gasoline Prices



Sources: U.S. Dept of Energy, U.S. Dept of Labor, and API

# Alternative Fuels



**Available at \$40-70 per barrel:**

- Tar sands and oil shales.
- Coal gasification.
- Biofuels (ethanol and biodiesel).
- Nuclear- or coal-produced hydrogen.
- ???

## Oil Shales

**Available at \$40-70 per barrel:**

- USEIA estimates the world supply of oil shale at 2.6 trillion barrels of recoverable oil.
- Ratio of energy used to produce the oil, compared to the energy returned (Energy Returned on Energy Invested) reported to be about 3:1. That is, energy equivalent to one barrel of oil was used for every three gained compared with 5:1 for conventional oil extraction.
- Significant environmental impacts from extraction and processing.



## Biofuels (Biodiesel and Ethanol)

**Available at \$60-80 per barrel:**

- Industry depends on large explicit and hidden subsidies for production, processing and protection.
- Not very energy efficient (large energy inputs for production). Provides little or no GHG reduction.
- Production imposes significant environmental impacts.
- Displaces food production.
- Limited domestic production.



# More Fuel Efficient Vehicles

Commercially available vehicles that meet most travel needs have 2-3 times average vehicle fuel efficiency of the current fleet average.



2005 Toyota Prius  
Rated 60/51 mpg City/Highway

# Resource Sustainability

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



# 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.





# Win-Win Strategies

- Pay-As-You-Drive insurance & registration
- Parking pricing & cash out
- Commute trip reduction programs
- School and campus transport management
- Transit service improvements
- Ridesharing (particularly vanpooling)
- Nonmotorized transport improvements
- Lease-cost planning practices
- Smart growth land use policies
- Fuel tax increases
- Road pricing
- Carsharing



# Comparing Benefits

Planning Objectives	Improve Travel Options	Incentives To Shift Mode	Expand Roads	Alternative Fuels
Congestion reduction	✓	✓	✓	
Roadway cost savings	✓	✓	x	
Parking cost savings	✓	✓	x	
Consumer cost savings	✓	✓/x		
Better mobility options	✓	✓		
Improved traffic safety	✓	✓		
Reduced pollution	✓	✓	x	✓
Energy conservation	✓	✓	x	✓
land use Objectives	✓	✓	x	
Public fitness & health	✓	✓		

✓ = Supports Objective

x = Contradicts Objective

## The Problem



The age of cheap oil is over. The age of dirty alternative fuels is beginning.

Defining the problem as a shortage of energy justifies costly and harmful energy subsidies.

# Conclusions

Rising crude oil prices will make environmentally harmful alternative fuels economically competitive, moderating further increases. Driving a large SUV may become less common, but fuel costs themselves are unlikely to significantly reduce vehicle travel.



# Conclusions

Other factors may marginally reduce per capita VMT and encourage use of alternative modes, including aging population, increased congestion, improving travel options and shifting consumer preferences. Transportation professionals can prepare for these changes by helping develop a more diverse transport system and more accessible land use patterns.





For more information

[www.vtppi.org](http://www.vtppi.org)

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

*"Online TDM Encyclopedia"*

*"Win--Win Transportation Solutions"*

...and much more