Oil or Not
Transportation Energy Crisis?

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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.
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.
Between the 1940s and 1980s the population became more suburbanized. Now, about half of North Americans live in suburbs.
After experiencing population declines, cities are once again growing in population.

50 largest U.S. cities growth trends
Building Livable Communities with Transit

Land Use Impacts On Travel

Daily Minutes of Travel

<table>
<thead>
<tr>
<th>Urban Index Rating</th>
<th>Least Urban</th>
<th>Mixed</th>
<th>Most Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Automobile</td>
<td>Transit</td>
<td>Walk</td>
</tr>
</tbody>
</table>
# Building Livable Communities with Transit

## Effects of Technology

<table>
<thead>
<tr>
<th>Increases Motorized Travel</th>
<th>Mixed Travel Impacts</th>
<th>Reduces Motorized Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased fuel efficiency.</td>
<td>Improved traffic signal control.</td>
<td>Telework.</td>
</tr>
<tr>
<td>Increased comfort.</td>
<td>Improved navigation.</td>
<td>Improved road and parking pricing.</td>
</tr>
<tr>
<td>Automated driving.</td>
<td></td>
<td>Transit service improvements.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rideshare matching.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery Services</td>
</tr>
</tbody>
</table>
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.
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.
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.
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

OGJ, 9 Feb 2004 (Jan-Nov 2003)
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.

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

Available at $40-70 per barrel:

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

<table>
<thead>
<tr>
<th>Planning Objectives</th>
<th>Improve Travel Options</th>
<th>Incentives To Shift Mode</th>
<th>Expand Roads</th>
<th>Alternative Fuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion reduction</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Roadway cost savings</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Parking cost savings</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Consumer cost savings</td>
<td>✓</td>
<td>✓/×</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Better mobility options</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Improved traffic safety</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Reduced pollution</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Energy conservation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>land use Objectives</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Public fitness &amp; health</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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</tbody>
</table>

✓ = Supports Objective  
× = 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.vtpi.org

“The Future Isn’t What It Used To Be”
“Online TDM Encyclopedia”
“Win--Win Transportation Solutions”
...and much more