Challenges and Opportunities

Regional Approaches to Transportation Systems
Regional Approaches

- Challenges
- Opportunities
Challenges

Regional Approaches
Challenges

1. Preparing for the post-petroleum era
2. Deciding where the people should live
3. Providing for prosperity
Challenge 1.
Preparing for the Post-Petroleum Era
Regional Approaches
US Annual Petroleum Consumption

- Consumption
- Foreign Imports
- Domestic Production
United States

Population & VMT

1955 1980 2005

millions trillions

166 227 296

0.6 1.5 3.0

178% 500% 300%

0.5 1.0 1.5 2.0 2.5

Population (millions):
- 166 in 1955
- 227 in 1980
- 296 in 2005

VMT (trillions):
- 0.6 in 1955
- 1.5 in 1980
- 3.0 in 2005

Growth:
- Population increased by 178%
- VMT increased by 500%

200% 500%
Colorado

Population & VMT

<table>
<thead>
<tr>
<th>Year</th>
<th>Pop. (millions)</th>
<th>VMT (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955</td>
<td>1.5</td>
<td>2.9</td>
</tr>
<tr>
<td>1980</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>2005</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

Population Growth: 313%

VMT Growth: 686%
Arizona

Population & VMT

<table>
<thead>
<tr>
<th>Year</th>
<th>Pop. (millions)</th>
<th>VMT (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>1.3</td>
<td>5.2</td>
</tr>
<tr>
<td>1980</td>
<td>2.7</td>
<td>18.8</td>
</tr>
<tr>
<td>2006</td>
<td>6.2</td>
<td>62.5</td>
</tr>
</tbody>
</table>

376% increase in population from 1960 to 2006.
1100% increase in VMT from 1960 to 2006.

1100% increase in VMT is much larger than 376% increase in population.

VMT growth rate is significantly higher than population growth rate.

Average annual growth rate in population:

(6.2 - 1.3) / (2006 - 1960) = 4.9 / 46 = 0.1064 or 10.64% per year

Average annual growth rate in VMT:

(62.5 - 5.2) / (2006 - 1960) = 57.3 / 46 = 1.248 or 124.8% per year
**Phoenix Valley Freeways**

*TTI Data - 2007*

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily VMT</td>
<td>19.4</td>
<td>28.4</td>
<td>+ 46%</td>
</tr>
<tr>
<td>Lane Miles</td>
<td>1,030</td>
<td>1,405</td>
<td>+ 36%</td>
</tr>
</tbody>
</table>

**New roads needed to avoid increase in congestion:**
412 lane miles per year
Daily Miles of Travel Per Capita

**Commute Trips**

- 1977: 5.2
- 1983: 5.0
- 1990: 6.5
- 1995: 8.7
- 2001: 7.7

**Discretionary Trips**

- 1977: 20.8
- 1983: 20.1
- 1990: 28.4
- 1995: 30.0
- 2001: 32.6

(NHTS)
Daily Trips/Person

Source: US 2001 NHTS

- Social/Recreational: 27%
- School/Church: 10%
- Family/Personal: 43%
- Commute: 16%
- Other: 4%
United States
Annual Rate of Change in VMT

June - July
3.35% 3.59% 2.39% 0.06% 0.03% 2.80%
Figure 1b. U.S. Vehicle Miles Traveled Per Capita, Annualized and Real Gasoline Pump Prices, January 1991–September 2008

Source: Traffic Volume Trends and Energy Information Administration
Monthly VMT Trend

Estimated Vehicle-Miles of Travel by Region - September 2008 - (in Billions)
Change in Traffic as compared to same month last year.

Source: United States Department of Transportation, Traffic Volume Trends, October 2008
Monthly VMT Trend

Estimated Vehicle-Miles of Travel by Region - December 2008 - (in Billions)
Change in Traffic as compared to same month last year.

Source: United States Department of Transportation, Traffic Volume Trends, December 2008
Why the VMT Trend Has Turned

- People do not believe the recent drop in oil prices is permanent
- Households have less money to spend and are hoarding cash
U.S. Greenhouse Gases

- Transportation: 28%
- Utilities: 33%
- Agriculture: 8%
- Other: 1%
- Residential: 5%
- Commercial: 6%
- Industrial: 19%
- Residential: 5%
- Other: 1%
- Commercial: 6%
- Industrial: 19%
Residential 6%
Industrial 23%
Agriculture 8%
Commercial 3%
Electrical Generation 20%
Transportation 41%
Residential 6%
California
Arizona

- Transportation: 39%
- Electrical Generation: 38%
- Industrial: 6%
- Waste Management: 2%
- Agriculture: 5%
- Ind. Process/Fossil Fuel: 5%
Arizona Gross Greenhouse Gas Emissions

All Sources – Climate Action Plan

Governor’s Policy

1990: 66.0
2000: 89.0
2020: 160.3
2040: -80%

back to 2000 levels

50% below 2000
Arizona Gross Greenhouse Gas Emissions
Transportation Sources

Governor’s Policy

- 80%

50% below 2000

Million Metric Tons

1990: 25.3
2000: 35.0
2020: 58.6
2040: 82.2

back to 2000 levels
...Even With Very Stringent Standards

Sources: VMT: EIA with 10% rebound, MPG & Fuel: Trend Extrapolation
California’s Approach to Transportation GHG

Transp. GHG = \( \frac{\text{GHG}}{\text{Mile}} + \frac{\text{GHG}}{\text{Gallon}} \)

- AB 1493 Regulation
- Low-Carbon Fuel Standard
- SB 375

Vehicle Technology

Fuels

Vehicle Use

VMT

California ARB
Bottom Line:
Preparation for the Post-Petroleum Era

- The post-petroleum era IS NOT the post-car era, but VMT growth will abate
- Your traffic forecasts are wrong
- The VMT trend is being driven by household economics, not by policy
- Local & regional actions to reduce GHG emissions will be driven by economics & federal policy, not volunteerism
Challenge 2.
Deciding Where the People Should Live
Regional Approaches
They Are Coming

US Population

2005: 295 M
2030: 364 M (+23%)
Population Growth by States, 1990s

Figure 1. Percent Change in Resident Population for the 50 States, the District of Columbia, and Puerto Rico: 1990 to 2000

Percent Change
- Three Times U.S. Rate: 39.6 or more
- Two Times U.S. Rate: 26.4 to 39.5
- U.S. Rate (13.2): 13.2 to 25.3
- No Change: 0 to 13.1
- Less than 0

Prepared by Geography Division

Colorado State Demography Office
They Are Coming

Arizona Population

2005: 6.2 M
2030: 10.3 M (+ 66%)
5.1 Million People
14.1 Million People
Bottom Line:
Deciding Where the People Should Live

- Western states must absorb millions of new people within the next two decades
- Will we plan for them? Where?

Existing Cities
- TODs
- Other infill, refill

New Cities
- TODs
- Other

Sprawl
Challenge 3.
Providing for Prosperity
Regional Approaches
## TYPICAL HOUSEHOLD BUDGET IN 28 METROPOLITAN AREAS

*(Expenses as a share of income)*

<table>
<thead>
<tr>
<th></th>
<th>All Households</th>
<th>Working Families Incomes $20,000 – $50,000</th>
</tr>
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<tbody>
<tr>
<td>Housing</td>
<td>27.4%</td>
<td>27.7%</td>
</tr>
<tr>
<td>Transportation</td>
<td>20.2%</td>
<td>29.6%</td>
</tr>
<tr>
<td>Food</td>
<td>10.6%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>4.7%</td>
<td>7.7%</td>
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Source: A Heavy Load, Center for Neighborhood Technology
Share of Family Income Spent On Housing & Transportation

Family Income = $35,000 - $50,000

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<td>Central City</td>
<td>23 %</td>
<td>16 %</td>
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<tr>
<td>Near Jobs</td>
<td>26 %</td>
<td>23 %</td>
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<tr>
<td>Away From Jobs</td>
<td>25 %</td>
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Family Income = $20,000 - $35,000

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<tr>
<td>Away From Jobs</td>
<td>33 %</td>
<td>37 %</td>
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Source: A Heavy Load, Center for Neighborhood Technology
Family Costs Rising Faster Than Incomes

- Housing: +15.4%
- Transportation: +13.4%
- Income: +10.3%

Source: A Heavy Load, Center for Neighborhood Technology
Geographic Distribution of HOUSE PRICE RISK

LEGEND
- Light Green: 0.0% to 10.0%
- Green: 10.0% to 20.0%
- Yellow: 20.0% to 40.0%
- Orange: 40.0% to 60.0%
- Red: 60.0% to 100.0%
Bottom Line:
Providing for Prosperity

➤ Mobility is costing households & businesses too much

➤ If we are to have a large middle class, we must re-tool our jobs-housing relationships & our supporting transportation systems

➤ The market for exurban sprawl has shrunk… and may be gone entirely

➤ Cities are about to become very popular places to live
Opportunities

Regional Approaches
Opportunities

1. Cities that work
2. Intercity rail corridors
3. Regional scenario planning
4. Reinventing transportation finance
Opportunity 1. Cities that Work

Regional Approaches
The 100 largest U.S. metros generate 75 percent of the nation's annual GDP

The size of each circle is proportional to each metro's share of the nation's gross domestic product (GDP)

- The 100 largest metros
- All other metros

Source: Brookings analysis of Bureau of Economic Analysis data.
Well Designed Density, Mixed Use

It is not this:
Well Designed Density, Mixed Use
Well Designed Density, Mixed Use
Well Designed Density, Mixed Use
Well Designed Density, Mixed Use
Well Designed Density, Mixed Use
Well-Planned Access & Circulation Systems

Charlotte
Opportunity 2. Intercity Rail Corridors

Regional Approaches
50s – 70s: Interstate Highway System
70s – Today: Urban Rail Transit
Rail Cities in the United States (as of 1971)
Interstate 40 corridor and supporting routes truck freight flow (tons per year)
Multi-axle trucks as a % of total traffic:

≥ 20% in many arterial corridors

≥ 40% on most of the rural interstate system
21st Century: Intercity Rail System
Amtrak Routes
Criteria for High Speed Rail

- Portal-to-portal distance
  - > 100 miles to compete with auto
  - < 600 miles to compete with air
- Major airports at or near capacity
- Sufficient population in centers
- Potential to operate @ 90 – 150 mph
California HSR
Intercity Rail Corridors

- Connect the economies of city pairs
- Operate @ 65 – 90 mph
- Serve double duty as commuter rail corridors
New Mexico RailRunner
New Mexico
Arizona, California, Nevada, New Mexico
Southwest Rail Corridor

June 2005
Colorado Rail Corridor Study
Many western city pairs fall into feasible HSR range (100 – 600 m).
Opportunity 3.
Regional Scenario Planning

Regional Approaches
Current Transportation Planning Structure

Federal Government – DOT Agencies
(FHWA, FTA, FRA, FAA, NHTSA, etc.)

State DOTs

MPOs
(Metropolitan Planning Organizations)

Transit Agencies

Districts

Regions

Cities

Counties
The 100 largest metros are located in every region of the country.
Arizona Sun Corridor
A New Era of “Regional” Planning

- Imperative for city pairs to collaborate on transportation & land use planning
- Need for cities in adjacent states (and state DOTs) to collaborate
- Moving beyond MPOs to megaregions
- Scenario planning (incl. California Blueprint Planning)
Old School Transportation Planning

Population & Land Use Forecasts (negotiations) → Modeling of Future Traffic → Alternative 1, Alternative 2, Alternative 3
Scenario Planning

- **COMMUNITY VISION**
  - Land Use Scenario 1
  - Land Use Scenario 2
  - Land Use Scenario 3

- **Modeling, analysis of multiple factors, including traffic**
  - Transportation Scenario 1
  - Transportation Scenario 2
  - Transportation Scenario 3
Scenario Planning Projects
DEVELOPMENT
Preferred Blueprint Scenario for 2050

Key to the Map
- areas of existing and future development
- green areas (e.g. open space, parks, wetlands, vernal pools, stream corridors, hardwood stands)
- agriculture and other undeveloped lands
- rivers, streams and lakes
- city boundaries
- highways
- county boundaries

Note: Some vernal pools in Yuba, Sutter and southwest Placer counties are preserved, but are not shown on these maps.

Note: El Dorado County elected not to directly participate in this phase of the Blueprint process due to ongoing issues associated with their General Plan.

For detailed information
To view the complete land use maps, including where industry, homes, shopping and other uses would be located in the region, please go to www.sacregion-blueprint.org and click on "The Project" tab at the top of the page. There you may view maps for each city and major county area in the region and a variety of statistical and narrative information about the scenarios.
- **Scenario B**
  - Created by Individual Counties
  - Increased residential densities
  - Limits agricultural and environmental impacts

[Map of San Joaquin Valley with legend and graph]

**Chart**: Represents new growth ONLY

<table>
<thead>
<tr>
<th>% of Density</th>
<th>Very Low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mega</td>
<td></td>
<td></td>
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</table>
Opportunity 4.
Reinventing Transportation Finance
Regional Approaches
Integrated, Strategic Investment

- Public Health
- Housing
- Transportation
- Energy
- Environment

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Thanking You

www.charlier.org