Policy Challenges in Metropolitan Regions
Implications for Transportation Modelers and Model

Innovations in Travel Modeling
May 10, 2010
Confessions of a reformed modeler

IBM 704 - Electronic Computer central panel used for tabulating the Survey data.
We are Faced with Rapid Change & Increasing Complexity

- **Policy Questions**
  - More complex
  - Significance of decisions

- **Technology**
  - Computer access & capability
  - Data collection

- **Models**
  - Bigger with more components
  - Larger & more active research community
Socioeconomic Inputs

1960 Wilbur Smith Plan

<table>
<thead>
<tr>
<th></th>
<th>Projected</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980 Population</td>
<td>1,440.0</td>
<td>1,509.0</td>
</tr>
<tr>
<td>1980 Employment</td>
<td>310.0</td>
<td>710.0</td>
</tr>
</tbody>
</table>

- 4.6%
- 56.3%
1970 Population & Socioeconomic Factors Report

- 8.0%
- 32.9%
- 50.1%

1995 Population: Projected 2,347.0, Actual 2,552.0
1995 Employment: Projected 821.0, Actual 1,223.0
1995 Vehicles: Projected 1,043.0, Actual 2,092.0
Innovations in Travel Modeling

Potential Future Travel Demand Requirements

**Hassayampa Valley**
- Expected Population: 3 million
- Expected Households: 1.1 million
- Estimated Trips: 8.8 million
- Regional Freeway Requirements: 8 +/-

**Williams Gateway Area**
- Expected Population: 100,000
- Expected Households: 40,000
- Estimated Trips: 300,000
- Regional Freeway Requirements: 1 +/-

**Superstition Vistas**
- Expected Population: 1 million
- Expected Households: 400,000
- Estimated Trips: 3.2 million
- Regional Freeway Requirements: 2 +/-

**Northern Pinal County**
- Expected Population: 500,000
- Expected Households: 180,000
- Estimated Trips: 1.5 million
- Regional Freeway Requirements: 2 +/-

**Hidden Valley**
- Expected Population: 5 million
- Expected Households: 1.1 million
- Estimated Trips: 8.8 million
- Regional Freeway Requirements: 9 +/-

NOTE: Regional Freeway Requirements:
- Utilize the results of the MAG Household Survey to estimate the number of home-based work trips, home-based other trips, and non-home-based trips that might utilize the freeway network to access Metropolitan Phoenix and be captured on commuter rail.
- Assume new freeways built at 6 GP/2 HOV lanes accommodating 140,000 ADT.

**Legend**
- Yellow: Potential Commuter Rail
- Red: Future Freeway Network
- Green: Future LRT Routes
- Purple: Future Freeway Network (Proposition 400)
- Black: Existing Freeway Network
Distribution and composition of future growth?

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>90,100</td>
<td>49,400</td>
</tr>
<tr>
<td>2030</td>
<td>697,200</td>
<td>379,500</td>
</tr>
<tr>
<td>Build-Out</td>
<td>2,469,100</td>
<td>1,095,600</td>
</tr>
</tbody>
</table>
Future Fuel Prices?

Average Gasoline Price / Gallon

- Nominal
- Real
Factors Influencing Impact of Fuel Prices on Travel

Elasticity of Travel Demand with Respect to Fuel Prices

**Consumer Perceptions**
- Current price
- Future expectation
- Availability & Disruptions
- Alternatives

**Technology**
- Auto / engine / fuels
- Internet / WiFi
- Traveler Information
- New travel modes

**Travel Behavior**
- Reallocation of budget
- Trip chaining
- Telecommute / rideshare
- Alternative modes

**Land Use**
- Distribution of jobs & housing
Nature of Transportation Planning is Changing

Visioning & Frameworks
- Very long range (30+ years to build-out)
- High uncertainty
- Order of magnitude
- Technology and demographic change

Long Range Planning
- 20 to 30 year horizon
- Project Identification & prelim scope
- Some uncertainty

Operations Planning
- Real time information systems
- System reliability
- Travel behavior
Current Policy Issues

- Road pricing
- Air quality & greenhouse gases
- Land use policies and TOD
- Alternative mode strategies
- System operations and reliability
- Travel reduction / peaking strategies
- Evacuation / accommodation
- Economic development
- Demographic change
The Future

- Suite of modeling tools required for different applications
- Models will be looked to for more “answers” by policy makers.
- But models do not provide the answer – they provide insight.
- Modeling should support the policy discussion not replace it.
Prediction is very difficult, especially about the future.

Niels Bohr, Danish physicist

The best way to predict the future is to invent it.

Alan Kay, American Computer Scientist

The future ain't what it used to be.

Yogi Berra, New York Philosopher