LAND USE AND ENVIRONMENT IN TRANSPORTATION PLANNING:
Rapidly Growing and Motorizing Cities

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Transport and Energy: The Challenge of Climate Change
OECD, Leipzig, May 2008
The Land Use-Transport Relation

- Land use pattern partly defines demand for transport, and constrains the transport modes in use.

- Transport modes in use and transport infrastructure location partly determine land use.
Land Use Tools for Reducing VKT and Emissions

- Clustering trip origins and destinations
- General urban densification
- Transit oriented development
- Urban extension boundaries
- Neo-traditional planning
Argument for different emphasis in seeking clean air

- US evidence: doubling density reduces VKT by only 10% (Pickrel and Schimek)
  Pollution has decreased while VKT rose dramatically (USDOT data)

- Difficult to raise densities substantially in most developing venues

- Reduction of pollutants by other means is more efficient: car use bans, technological change, parking policy, conceivably by road or congestion pricing...
Land use aspect more important in developing countries where there is …

- Rapid urban expansion--rapid because of increased vehicles and kilometers traveled.
- Greater social fragmentation over space between car users and non-users
- Large amounts of peri-urban land in the ownership of interests that can’t divest it
- Urban governments that count strongly on revenue from the urbanization process
- A need for serviced land for low priced housing
- Acute scarcity of agricultural land
- Possibility of proactive development action by governments
Structuring Informal Settlement

- For secondary cities doubling in population and tripling in size during next 30 years
- Where informal settlement and invasions will be the principal new areas
- Application in Ecuador
1. Nuevos límites urbanos

2. Red Arterial de vías primarias y secundarias

3. Localización y implantación técnica de vías

4. Compras y servidumbres
Expansión urbana en Ciudades intermedias del Ecuador
Preparación de alternativas de grilles infraestructura

Durán
Milagro
Government Proaction in Bangkok

Plan for Bangkok (1995), MIT team
Government Proaction in Bangkok

Plan for Bangkok (1995),
MIT team
Disagreement about land use will continue

Decisions need to be made on individual aspects of transport planning based on the differences among cities and the whole span of consequences of individual actions.

Has to be seen in a context of the entire campaign for reducing congestion and improving the environment.
Process Framework For Urban Transportation Planning

- Surveys, Projections and Forecasts
- Budget and Finance Possibilities
- Prior Land Development Plan
- Review Viability of Current Projects and Policies

- Design of Strategic Objectives
- Adaptation of Land Development Plan

Transport Plan Components:
- Infrastructure Plan
- Traffic and Demand Mgmt Plan
- Public Transport Mgmt Plan
- Freight Transport Plan

- Design and Choice of Plan Options
- Evaluation Procedures
- Priorities and Programming
# Focus on the Two-Wheeler Dilemma

<table>
<thead>
<tr>
<th>City</th>
<th>Belo Horizonte</th>
<th>Chennai</th>
<th>Dakar</th>
<th>Kuala Lumpur</th>
<th>Mexico City</th>
<th>Mumbai</th>
<th>Shanghai</th>
<th>Wuhan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Latin America</td>
<td>South Asia</td>
<td>Africa</td>
<td>South East Asia</td>
<td>Latin America</td>
<td>South Asia</td>
<td>Asia</td>
<td>Asia</td>
</tr>
<tr>
<td>GDP per Capita (US$)</td>
<td>$6,000</td>
<td>$800</td>
<td>$1,500</td>
<td>$8,000</td>
<td>$7,500</td>
<td>$1,200</td>
<td>$4,200 (2000)</td>
<td>$2,000</td>
</tr>
<tr>
<td>Population Millions</td>
<td>4.2</td>
<td>7</td>
<td>2.5</td>
<td>4</td>
<td>18-23</td>
<td>18</td>
<td>13-17</td>
<td>4-8.5</td>
</tr>
<tr>
<td>Average Annual Growth Rate</td>
<td>1.5%</td>
<td>2.4%</td>
<td>3.2%</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>0.42%</td>
<td>1%</td>
</tr>
<tr>
<td>Density (Population/Hectare)</td>
<td>4-63</td>
<td>59-288</td>
<td>35</td>
<td>10-58</td>
<td>50-120</td>
<td>120-460</td>
<td>14-460</td>
<td>10-160</td>
</tr>
<tr>
<td>Age Distribution</td>
<td>26%&lt;15 4%&gt;65</td>
<td>26%&lt;15 8%&gt;60</td>
<td>43%&lt;15 5%&gt;55</td>
<td>27%&lt;15 4%&gt;65</td>
<td>30%&lt;15 5%&gt;65</td>
<td>26%&lt;15 6%&gt;60</td>
<td>12%&lt;15 12%&gt;65</td>
<td>16%&lt;15 12%&gt;65</td>
</tr>
<tr>
<td>Personal Vehicles/1,000 Pop.</td>
<td>225 4-Wheelers 22 2-Wheelers</td>
<td>40 4-Wheelers 171 2-Wheelers</td>
<td>42</td>
<td>170 2-Wheelers 170 4-Wheelers</td>
<td>110 2-Wheelers 8 4-Wheelers</td>
<td>27 4-Wheelers 25 2-Wheelers</td>
<td>4-20 4-Wheelers 35 2-Wheelers</td>
<td>14 4-Wheelers 31 2-Wheelers</td>
</tr>
<tr>
<td>Rail Transit</td>
<td>1 line metro 3 suburban rail</td>
<td>1 line metro 2 suburban rail</td>
<td>1 suburban rail</td>
<td>3 lines LRT 2 suburban rail</td>
<td>11 line metro 2 suburban rail services 3 lines</td>
<td>3 metro lines</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>Fare (US$)</td>
<td>$0.30</td>
<td>$0.10</td>
<td>$0.20-0.60</td>
<td>$0.20</td>
<td>$0.12-0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Motorized Transport</td>
<td>5-7% (1995)</td>
<td>44%</td>
<td>44%</td>
<td>NA</td>
<td>NA (possibly 15%)</td>
<td>NA (26% in 1981)</td>
<td>72% (1995)</td>
<td>61%</td>
</tr>
<tr>
<td>Public Transport</td>
<td>69% (1995)</td>
<td>47%</td>
<td>45% (of motorized)</td>
<td>20% (of motorized)</td>
<td>70% (of motorized)</td>
<td>88% (of motorized)</td>
<td>17% (1995)</td>
<td>22%</td>
</tr>
</tbody>
</table>

Source: WBCSD—Overview of Main Traits of Developing Country Cities
Expectations for the Future

- With rising concern for pollution and global warming, a focus on higher achievement actions.
  --Less good faith actions, focus on performance
  --Probably focus on reducing VKT, less on land use

- More attention from national urban transport policy
  --Less expensive high volume transit by BRT
  --Secondary cities are larger
  --Fall out from globalism
Thanks for Your Attention!

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