Sustainability, Mobility and the Megaregion

Catherine L. Ross, Ph.D.
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“Humanity has the ability to make development sustainable — to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs.”

What is Sustainability?

**Sustainability**
Describes a desirable state or set of conditions that persists over time.

**Sustainable Human Settlements**
Do not consume more than can be replaced and have prospects of continuing indefinitely.

**Sustainable Urban Development**
Implies a process by which sustainability can be attained and development continues.

3 Pillars of Sustainability
- Environment
- Economy
- Equity

SOURCE: World Summit on Social Development (1995)
What is Sustainable Transportation?

- Reinforces livable and economically strong communities
- Encourages modal choice
- Supports efficient land use
- Distributes benefits & burdens equitably
- Reduces greenhouse gases
- Protects air and water quality from pollutants

SOURCE: Oregon DOT
What is Sustainable Transportation?

- Is affordable
- Improves safety
- Operates with clean and fuel-efficient vehicles
- Uses maintenance and construction practices that are compatible with native habitats and species
- Applies life-cycle costs

SOURCE: Oregon DOT
## The Scales of Mobility

<table>
<thead>
<tr>
<th>Scale</th>
<th>Corresponding Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interregional</td>
<td>Megaregion</td>
</tr>
<tr>
<td>Intraregional</td>
<td>MSA</td>
</tr>
<tr>
<td>Intra–Zone</td>
<td>City</td>
</tr>
<tr>
<td>Local</td>
<td>Neighborhood</td>
</tr>
</tbody>
</table>
Challenges to Sustainability

- Transportation contributes to global warming
- Increasing traffic, poorly maintained vehicles and an aging fleet cause increases in vehicle emissions
- Congestion continues to spread temporally and spatially
- Substantial amounts of increased travel will take place in rural and suburban areas

The transportation sector is the second largest producer of CO$_2$ in the US.

Source: EPA
Challenges to Sustainability

- Demand for oil is rapidly using up the world's readily available reserve
- Emissions causing health problems increasing in specific areas
- Smog and acid rain are exported to other surroundings
- Deaths and injuries occur in unacceptable numbers

Asthma affects nearly 20 million Americans.

SOURCE: Asthma and Allergy Foundation of America
Sustainability, Transportation and the Megaregion

We must move towards sustainability emphasizing proactive measures at an appropriate spatial level – the Megaregion.

To accomplish this goal, sustainable transportation must support the global competitiveness of the region.
Interest in the United States

Mobility and the MegaRegion

10 Emerging Megaregions

- Cascadia: The states of Cascadia include Seattle, Portland, and Vancouver in British Columbia with high-speed rail, while promoting green and green building.
- Great Lakes: The Great Lakes region is exploiting ways to grow in the face of the declining role of the manufacturing sector. The region's assets include the environmental resources and amenities of the Great Lakes and a strong research and cultural tradition and roots facing public universities.
- Texas Triangle: By 2050, 500 million people, or 79 percent of the population, will live in the metropolitan areas that comprise the Texas Triangle. Three of the nation's 10 largest cities are in the Triangle, including Houston, which has seen a 5 percent increase in foreign born residents who have equal or better education than any other in the U.S. Central Houston centers the potential for collaboration among the metro regions of the Triangle in addressing land use, transportation, and environmental concerns.
- Northeast: The Northeast is a region of diversity and economic output, producing 20 percent of the nation's Gross Domestic Product with 10 percent of the population and only two percent of the nation's land area. Over the next generation, the Northeast will add 11 million new residents. This population growth will demand infrastructure investments and economic growth to accommodate these new residents while preserving quality of life.
- Piedmont Atlantic: The low cost of living and high return on investment in the Southeast are two reasons for the region's growing housing population, which is sustained by Atlanta and continues to Raleigh, North Carolina and west to Birmingham, Alabama. The region is facing challenges associated with growing population and at times traffic congestion, urban sprawl, and inadequate infrastructure, which it hopes to address with sustainable solutions.

Southern California: With some of the largest parts of the nation, the metro areas of Southern California are divided into the metropolitan and non-metropolitan industries. This region is taking aggressive actions to build multiple centers for export growth and to REDUCE GREENHOUSING.

Arizona Sun Corridor: The Sun Corridor is equivalent in population size and population but with different indexes to the nation's other leading metropolitan regions. Key assumptions include the use of desert landscaping and conservation measures to promote sustainability and future growth.

Gulf Coast: The concentration of Hurricane Katrina and Rita and the displacement of victims across the region highlight the environmental, economic, and human impact of the Gulf Coast. Despite the economic downturn, the region is expected to grow due to the continued reintegration of revenue from the Gulf.

Piedmont Atlantic MegaRegion

The Piedmont Atlantic MegaRegion (PAM)
PAM’s Metro Corridor

Anchored by large metropolitan areas that create a chain of related urbanized areas.
Population growth creating a nearly continuous corridor of urbanization by 2030, growing from 8.2 million to almost 21 million.
Challenges facing the southeast

- increasing traffic congestion
- limited water resources
- degradation of air quality
- rapid land consumption
- large increases and shifts in population
## Transportation Challenges

<table>
<thead>
<tr>
<th>Four major MSAs of the corridor</th>
<th>1982</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>population (000)</td>
<td>2,925</td>
<td>5,195</td>
</tr>
<tr>
<td>daily VMT (000)</td>
<td>56,340</td>
<td>169,445</td>
</tr>
<tr>
<td>daily VMT per capita</td>
<td>19.3</td>
<td>32.6</td>
</tr>
<tr>
<td>annual excess fuel consumed (million gallons)</td>
<td>8</td>
<td>97</td>
</tr>
</tbody>
</table>

VMT increasing faster than population

Raleigh-Durham, Charlotte, Birmingham, Atlanta

**SOURCE:** Texas Transportation Institute, 2005 Urban Mobility Study
# Transportation Challenges

<table>
<thead>
<tr>
<th>Mobilty and the MegaRegion</th>
<th>1982</th>
<th>2003</th>
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</thead>
<tbody>
<tr>
<td>Raleigh-Durham</td>
<td></td>
<td></td>
</tr>
<tr>
<td>congested travel (% of peak VMT)</td>
<td>16</td>
<td>52</td>
</tr>
<tr>
<td>rush hours</td>
<td>2.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Charlotte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>congested travel (% of peak VMT)</td>
<td>25</td>
<td>66</td>
</tr>
<tr>
<td>rush hours</td>
<td>4.6</td>
<td>7.4</td>
</tr>
<tr>
<td>Birmingham</td>
<td></td>
<td></td>
</tr>
<tr>
<td>congested travel (% of peak VMT)</td>
<td>15</td>
<td>49</td>
</tr>
<tr>
<td>rush hours</td>
<td>2.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Atlanta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>congested travel (% of peak VMT)</td>
<td>24</td>
<td>88</td>
</tr>
<tr>
<td>rush hours</td>
<td>3.4</td>
<td>8</td>
</tr>
</tbody>
</table>

Congested travel triples in 20-year period

SOURCE: Texas Transportation Institute, 2005 Urban Mobility Study
Transportation Challenges

In the four core cities combined the cost of traffic congestion rose from $716 million in 1993 to over $2.3 billion in 2003.

That's a 234% increase in congestion cost with only a 28% increase in population.

SOURCE: Texas Transportation Institute
And We Continue to Grow…

Migration trends, 1995 to 2000

1.6 million people moved to PAM from the rest of the country

1.3 million people migrated to PAM internationally

SOURCE: U.S. Census Bureau
A new type of planning is needed

Current infrastructure planning and procurement approaches may **outgrow** their effectiveness.

The emergence of MegaRegions calls for a **broader** vision and planning framework.

Planning approaches must **evolve** over time to meet changing needs.
Transportation agencies in major, highly-congested metropolitan areas will need to fundamentally rethink the kinds of solutions that make sense. Planning approaches must evolve over time to meet changing needs.

- Requires a paradigm shift
- Requires a spatial shift
- Sustainable transportation in the Megaregion
Application of scenario planning methods

- Incorporating uncertainty
- Used to develop plausible scenarios and plan for robust outcomes independent of which scenario actually emerges in the future
Planning at the Megaregional Level

Broader federal role for establishing a new vision for the nation’s transportation system

- Recognizing the efforts of different regions
- Providing cohesive guidance and standards
- Use of spatial and megaregion planning to address global competitiveness
The mobility system is not only a system of transport…it’s the whole understanding of a city.

The future of mobility has to be considered in terms of integrated systems, where each piece – bikes, cars, taxis, subways, buses.

SOURCE: Jaime Lerner on public transport
The important questions are not about engineering, but about ways to live – health, education, housing, waste, and social needs.

SOURCE: Jaime Lerner on public transport
Strategies for Megaregions

- **Transportation Options:** Southeast High Speed Rail, New Technologies

- **Networks of Networks:** Create local, regional and global mobility and economic nodes and corridors

- **Green Infrastructure:** Innovative financing to protect lands

- **Spatial Planning:** A strategy for growth and development to decrease inequities and promote sustainability through multi-sectoral, multi-jurisdictional planning
Strategies for Megaregions

- **Connecting Transportation and Development**: spatial configurations that connect existing transportation systems and growth plans

- **Develop More Sustainable Mobility**: employ local, regional and community flex trolleys and trams

- **Explore New Strategies**: develop feeder and neighborhood shuttle systems, acquire hybrid vehicles, increase use of agrifuels

Infrastructure demands will continue to outpace the ability of traditional systems of long-range transportation planning and funding mechanisms.