THE TRANSPORTATION SUSTAINABILITY INDEX
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Abstract
Transportation systems have significant impact on environmental, social, and economic sustainability. However, conventional metrics typically only address the mobility aspect of transportation. Our research focuses on developing a comprehensive metric for assessing these broader outcomes of transportation systems. Our Transportation Sustainability Index (TSI), will be used to evaluate the performance of the transportation systems at the state-wide level. The metrics developed is designed to provide policy makers valuable information to support planning for more sustainable transportation systems. The TSI enables greater transparency in identifying the benefits and negative impacts of transportation choices.

The Definition of Sustainability
The underlying definition for our TSI is based on Low’s Nested Box Model, but also considers Haughton’s five equity principles:
- Intragenerational Equity
- Intergenerational Equity
- Procedural Equity
- Transfrontier Equity
- Interspecies Equity

Based on these considerations the TSI is structured as shown below in 3 Domains and 12 Elements:

<table>
<thead>
<tr>
<th>Domain</th>
<th>Elements</th>
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<tbody>
<tr>
<td>Environmental</td>
<td>1. Minimize consumption of resources</td>
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<td>2. Maximize land use efficiency</td>
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<td>3. Minimize impact on ecological systems</td>
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<td></td>
<td>4. Limit wastes &amp; pollution</td>
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<td>5. Protect human health &amp; safety</td>
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<td>6. Planning and management includes community input</td>
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<td>7. Promotes social interaction &amp; social equity</td>
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<td>8. Meets basic access needs of all individuals</td>
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<td>9. Is affordable for individuals</td>
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<td>10. Efficient movement of people &amp; goods</td>
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<td>11. Financially self-sufficient at local level</td>
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<td>12. Resilient against economic vulnerability</td>
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Low’s Nested Box Model of Sustainability
Low’s model is based on the three commonly accepted domains of sustainability: Environment, Society, and Economy.

According to Low, the environment is the controlling factor in sustainability since human action should be limited by the constraints of the carrying capacity of the planet.

“This is the end of favoring motorized transportation at the expense of non-motorized.”
- Ray LaHood, Secretary of Transportation

Rating the States
TSI for the Economic Domain

Top 5
- District of Columbia
- New York
- Massachusetts
- Oregon
- Washington

Bottom 5
- South Carolina
- Wyoming
- Arkansas
- Montana
- Mississippi

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