Performance-Measure Based Asset Management Tool for Rural Freight Mobility

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Background

• MAP-21:
  - Increase productivity and economic efficiency of freight infrastructure
  - Create performance-based tools to support transportation agencies
Objectives

• Develop asset management tool for rural freight network:
  ▪ Assess the performance of current transfer facilities
  ▪ Generate framework for improving network
  ▪ Provide data collection plan
Multi-modal Transport

• One shipment, multiple modes
  – Truck-rail, truck-barge, etc.

• Multiple agents

• Multiple planning horizons
Wheat Production and Intermodal Network (WA)
Typical Percentage of Wheat Shipped in Various Modes

- Eastern Oregon
- Northern Idaho
- Southern Idaho
- Northern Washington
- Southern Washington
- Pacific Northwest

Modes:
- Truck
- Barge
- Rail
Network Design Literature

• Minimize transport costs
• Include value of time/reliability
• Include gas emissions
• Urban: congestion
First Steps

• Identify stakeholders
  - State transportation agencies
    - Residents
    - Industry

• Their objective: maximize welfare
First Steps

Welfare

Transportation Efficiency

Nodes
- Location
- Mode type
- Capacity
- etc.

Connections
- Origin-destination pairs
- Capacity
- etc.
Next Steps

1. Measure efficiency and viability of current facilities
2. Identify opportunities for improvement
   - Cost minimization network model
3. Estimate benefit-cost ratios
   - General equilibrium (CGE)
<table>
<thead>
<tr>
<th>Attributes</th>
<th>Agricultural Assembly</th>
<th>Port Clearing</th>
<th>Distribution Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adequate Land / Space</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>2. Two Class I Railroads</td>
<td>C</td>
<td>B</td>
<td>C</td>
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<tr>
<td>3. Major Interstate Highway</td>
<td>C</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>4. Proximity to Population Center</td>
<td>X</td>
<td>B</td>
<td>B</td>
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<tr>
<td>5. Available Air and Water Transportation</td>
<td>X</td>
<td>A</td>
<td>B</td>
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<tr>
<td>6. On Nodes or Direct Line of Railroad Service</td>
<td>B</td>
<td>A</td>
<td>A</td>
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<tr>
<td>7. Public/Private Partnership</td>
<td>A</td>
<td>A</td>
<td>A</td>
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<tr>
<td>8. Magnitude of Public Participation</td>
<td>B</td>
<td>A</td>
<td>C</td>
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<tr>
<td>9. Positive Working Relationship with WSDOT and other Agencies</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>10. Need for Changing, Directing and Dividing Cargo</td>
<td>C</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>11. Clearly Established Demand Opportunities</td>
<td>A</td>
<td>B</td>
<td>C</td>
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<tr>
<td>12. Combination of Port and Distribution Efficiencies</td>
<td>X</td>
<td>A</td>
<td>B</td>
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<td>13. Labor Availability and Training</td>
<td>C</td>
<td>B</td>
<td>C</td>
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<tr>
<td>14. Quality of Life</td>
<td>X</td>
<td>B</td>
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<td>15. Distance to/from Production Points</td>
<td>A</td>
<td>C</td>
<td>B</td>
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<tr>
<td>16. Distance to/from Destination Market</td>
<td>B</td>
<td>B</td>
<td>A</td>
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<td>17. Degree of Facility Automation</td>
<td>C</td>
<td>A</td>
<td>A</td>
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<tr>
<td>18. Time to Build</td>
<td>C</td>
<td>B</td>
<td>B</td>
</tr>
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</table>
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Discussion

1. Best strategies for interpreting transport cost savings within a CGE model?

2. Other better approaches to performance-based infrastructure investments?
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