TRANSIT INFRASTRUCTURE MAINTENANCE AND EXPANSION NEEDS
## TRANSIT ASSET CLASSES

### VEHICLES
- Rail
- Bus
- Paratransit
- Non-revenue

### FACILITIES AND STATIONS
- Operations and maintenance
- Public facility
- Signage
- Bus shelter

### GUIDEWAY ELEMENTS
- Track
- Bridge
- Tunnel
- Right-of-way

### SYSTEMS
- Security
- Signals
- Communication
- Monitoring
- Farebox
Determined by FTA
Applies to federally funded assets
Used for asset management and capital planning

<table>
<thead>
<tr>
<th>YEARS</th>
<th>MILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles</td>
<td></td>
</tr>
<tr>
<td>Facilities and Stations</td>
<td></td>
</tr>
<tr>
<td>Guideway Elements</td>
<td></td>
</tr>
<tr>
<td>Systems</td>
<td></td>
</tr>
</tbody>
</table>
STATE OF GOOD REPAIR (SOGR)

Asset Condition Rating

- **Excellent**: 5
- **Good**: 4
- **Adequate**: 3
- **State of Good Repair**: 5
- **Marginal**: 2
- **Poor**: 1

Rating
ASSET LIFECYCLE

TERM Asset Lifecycle

Source: National SGR Assessment, FTA 2010
SOGR IMPORTANCE

Safety
Efficiency
Reliability
Vehicle uptime
Customer service
Resource allocation
On-time performance
Stakeholder communications
- One third transit assets in marginal or poor condition
- Zero agencies in sample had comprehensive asset inventories

Source: National SGR Assessment, FTA 2010
NATIONAL FUNDING NEEDS

- Backlog $78B
- $14.4 in annual (normal) replacement

Source: National SGR Assessment, FTA 2010
REASONS FOR NATIONAL BACKLOG

- Investment decisions based on limited data and short-term focus
- Funding shortages
- Agencies lack integrated systems to strategically manage assets

Source: MARTA Asset Management Plan Evolution, MARTA 2012
## Texas Snapshot

### Urban and Rural Vehicles

<table>
<thead>
<tr>
<th></th>
<th>% of Min Service Life Years Utilized</th>
<th>% of Min Service Life Mileage Utilized</th>
<th>Average Vehicle Condition (1=Bad, 5=Excellent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Funded Urban</td>
<td>84%</td>
<td>59%</td>
<td>3.9</td>
</tr>
<tr>
<td>Mixed Urban/Rural</td>
<td>99%</td>
<td>76%</td>
<td>3.9</td>
</tr>
<tr>
<td>Rural Transit District</td>
<td>108%</td>
<td>73%</td>
<td>3.9</td>
</tr>
<tr>
<td>Specialized</td>
<td>196%</td>
<td>66%</td>
<td>3.6</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>122%</strong></td>
<td><strong>69%</strong></td>
<td><strong>3.9</strong></td>
</tr>
</tbody>
</table>

Source: Texas Public Transportation Resource Inventory, TTI 2013
TEXAS SNAPSHOT
RURAL FACILITIES

- 118 facilities
- Four facility types
  - Administrative
  - Bus yard
  - General purpose
  - Maintenance

Average Condition Rating

<table>
<thead>
<tr>
<th>Rating</th>
<th>Poorest</th>
<th>Marginal</th>
<th>Adequate</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 4.5

Rural Transit Facilities
## STATE FUNDING NEEDS THROUGH 2035

<table>
<thead>
<tr>
<th>Category</th>
<th>Funds Needed in $Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Urban</td>
<td>$38,309</td>
</tr>
<tr>
<td>Small Urban</td>
<td>$1,129</td>
</tr>
<tr>
<td>Rural</td>
<td>$731</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$40,169</strong></td>
</tr>
</tbody>
</table>

Source: Statewide Long-Range Transportation Plan 2035, TxDOT 2010
INVESTMENT PRIORITIZATION

- Theories
  - Mission critical assets (vehicles)
  - Safety
  - Maintain funding levels

- Types
  - State of good repair
  - Expansion
  - Core capacity improvements
  - Technology
<table>
<thead>
<tr>
<th>Formula Program</th>
<th>SOGR</th>
<th>Bus and Bus Facilities</th>
<th>Fixed Guideway Cap. Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• UZA formula</td>
<td>• Formerly Fixed Guideway Modernization</td>
<td>• Formerly Discretionary, now formula</td>
<td>• Discretionary</td>
</tr>
<tr>
<td>• Rural formula</td>
<td>• Fixed Guideway definition changed</td>
<td>• 10% to 5% of federal program</td>
<td>• New Starts</td>
</tr>
<tr>
<td>• Capital, JARC, and maintenance</td>
<td>• More than 7 years old</td>
<td>• Purchase, rehab, repair</td>
<td>• Less funding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Expanded eligibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Core capacity</td>
</tr>
</tbody>
</table>
FTA must
- Define SOGR
- Set asset condition measuring standards
- Define performance measures based on standards
- Provide technical assistance to recipients

Each FTA grant recipient must
- Set annual targets based on measures
- Develop asset management plan
- Develop asset inventory and investment prioritization
- Report inventory, condition assessment, performance targets
**DEFINING SOGR**

**MAINTENANCE FACILITY EXAMPLE**

1. **Asset age**
   - Good, 12 years old (4)

2. **Asset condition**
   - Marginal Condition (2.4)

3. **Performance**
   - 89 days without safety incident (3)

4. **Combined approach**
   - \(4 + 2.4 + \frac{3}{3} = (3, \text{ Adequate})\)
CLIMATE CHANGE
COASTAL VULNERABILITY

Source: Gulf Coast Climate Change Adaptation Pilot Study, TTI 2013
COASTAL EVENT FREQUENCY

Source: Gulf Coast Climate Change Adaptation Pilot Study, TTI 2013
TEXAS SNAPSHOT
HURRICANE IKE

- Lost
  - 9 of 21 transit buses
  - 6 support vehicles
- Damaged
  - 4 trolleys
  - Maintenance facility
  - Bus barn

$1.6 million in damages
1. Identify current and future hazards.
2. Conduct asset inventory.
3. Characterize risk of climate change impacts.
4. Develop adaptation strategies.
5. Identify opportunities for coordination.
7. Prepare and implement plans.
8. Monitor and reassess.

Source: Adaptation Assessment Guidebook, New York Academy of Science 2010
Lauren K. Cochran
Assistant Research Scientist
Texas A&M Transportation Institute
L-cochran@tti.tamu.edu
713-613-9209