LECTURE 5

Sustainability and Transportation —
Frameworks, Indicators, and Performance Measures
Indicators and Performance Measures

• Quantifiable criteria used to evaluate progress toward goals

• The terms are sometimes used interchangeably, but performance measures can be viewed as an indicator used within a specific goal-oriented context

• A hierarchy of goals → objectives → performance measures can help define measures aligned with sustainability goals

Frameworks for Sustainable Transportation

• Frameworks can organize information and provide structure to a sustainability assessment

• Characteristics of a good sustainability performance measurement framework
  • Comprehensive and holistic
  • Connected to goals and objectives of an agency
  • Integrated vertically and horizontally in an agency
  • Capture interactions among variables
  • Reflect stakeholders’ perspectives
  • Consider capabilities and constraints
  • Be flexible and foster self-learning

Performance measures are:

- Easily understood
- Provide clear indication of moving toward the goal or objective
- Tracked using accessible and available data

Recognize that it is the application of a collective set of measures, aligned with the objectives and goals and viewed within the context of the sustainability principles, that makes them relevant to a sustainability framework.
Uses of Performance Measures

- **Description**: Describe the effect of program or policy
- **Evaluation**: Assess progress and diagnose problems or barriers
- **Accountability**: Set targets for specific staff or programs and measure how well they are reaching those goals
- **Decision Support**: Inform which approach supports the most sustainable outcomes
- **Communication**: Explain to stakeholders what the program or policy is achieving

Performance measures may be applied over:

- Different time frames
- Different levels
- Different types of operation
Performance measures must add value to decision making:

- Some agencies start by designing measures for one component of their overall program and build from there.
- Some agencies begin with an agency-wide, multiyear perspective and drill down.

*Whatever the approach, performance measures must be practical.*
Considerations for Using Sustainable Transportation Performance Measures

- What do we want to accomplish by using sustainability performance measurement?
  - Reduce long-term costs
  - Build public support
  - Address energy consumption
  - Respond to regulatory requirements

The approach to sustainability performance measurement should evolve over time.
Considerations for Using Sustainable Transportation Performance Measures (continued)

• In what phase of decision making do we want to use sustainability performance measurement?

The approach to sustainability performance measurement should evolve over time.
Considerations for Using Sustainable Transportation Performance Measures (continued)

• **How will we use the results?**
  • Understand/describe current conditions
  • Assess what is working or not working and why
  • Hold staff and other programs accountable
  • Make good decisions
  • Communicate the value of the work
Considerations for Using Sustainable Transportation Performance Measures (continued)

- Is this a new process for us?
- Have we defined goals?
- Are there external requirements?
- What partners are we working with?
- Are we integrating this into an existing performance measurement process?

- What data do we have available?
- How much/how soon?
- Are we ready for this?

Start based on data and resources you have on hand; buy-in from stakeholders and management is essential.
Application of the Sustainability Performance Measurement (SPM) Framework

This framework was developed to answer the question “What do transportation agencies need to successfully address sustainability issues through performance measurement?”

Three types of components:

1. Fundamental
2. Overarching
3. Auxiliary

## Framework Components

<table>
<thead>
<tr>
<th>Fundamental Components</th>
<th>Overarching Components</th>
<th>Auxiliary Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core elements required to apply the framework:</td>
<td>Items that need to be taken into consideration throughout the process, such as engagement of:</td>
<td>Optional components that supplement the process but are not central to it, such as:</td>
</tr>
<tr>
<td>1. Understanding sustainability</td>
<td>- Stakeholders</td>
<td>- Developing a working definition of sustainability <em>(optional as consensus can be reached on sustainability goals and objectives without developing a definition)</em></td>
</tr>
<tr>
<td>2. Developing transportation sustainability goals</td>
<td>- Industry and business</td>
<td>- Other sustainability initiatives that are independent of the transportation agency’s functions, such as energy-efficient buildings or recycling of office waste</td>
</tr>
<tr>
<td>3. Developing objectives</td>
<td>- Civic/religious organizations</td>
<td>- Organizational application of broader transportation sustainability performance measures for the agency’s employees, such as carpooling or ridesharing</td>
</tr>
<tr>
<td>4. Developing performance measures</td>
<td>- General public</td>
<td></td>
</tr>
<tr>
<td>5. Implementing performance measures</td>
<td>- Partners</td>
<td></td>
</tr>
<tr>
<td>6. Refining the framework and applying feedback</td>
<td>- Planners, designers, and contractors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Maintenance teams</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- External agencies</td>
<td></td>
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<tr>
<td></td>
<td>- Environmental</td>
<td></td>
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<tr>
<td></td>
<td>- Transit/rail/air/water</td>
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</tbody>
</table>
The SPM framework is based on the four principles outlined earlier

1. Preserve/enhance environmental/ecological systems (*environmental*)
2. Foster community health and vitality (*social*)
3. Promote economic development and prosperity (*economic*)
4. Ensure equity in population groups over generations (*equity*)
Mapping goals to sustainability principles

- Cross-check goals to ensure they address sustainability principles
- Do not force-fit goals to map them to sustainability principles
- Some goals may address more than one principle
Addressing equity

- Do not neglect equity impact for economic or environmental gain
- Address equity in present-day and future context of:
  - Income
  - Age
  - Race/ethnicity
  - Disabled/handicap populations
  - Gender
  - Geography

No one goal in itself is sufficient to achieve sustainability — it takes multiple goals, pursued in concert, to promote sustainability.
### Table 1. Recommended transportation sustainability goals.

<table>
<thead>
<tr>
<th>Sustainability Goal</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Safety</td>
<td>Provide a safe transportation system for users and the general public.</td>
</tr>
<tr>
<td>2. Basic accessibility</td>
<td>Provide a transportation system that offers accessibility that allows people to fulfill at least their basic needs.</td>
</tr>
<tr>
<td>3. Equity/equal mobility</td>
<td>Provide options that allow affordable and equitable transportation opportunities for all sections of society.</td>
</tr>
<tr>
<td>4. System efficiency</td>
<td>Ensure that the transportation system’s functionality and efficiency are maintained and enhanced.</td>
</tr>
<tr>
<td>5. Security</td>
<td>Ensure that the transportation system is secure from, ready for, and resilient to threats from all hazards.</td>
</tr>
<tr>
<td>6. Prosperity</td>
<td>Ensure that the transportation system’s development and operation support economic development and prosperity.</td>
</tr>
<tr>
<td>7. Economic viability</td>
<td>Ensure the economic feasibility of transportation investments over time.</td>
</tr>
<tr>
<td>8. Ecosystems</td>
<td>Protect and enhance environmental and ecological systems while developing and operating transportation systems.</td>
</tr>
<tr>
<td>9. Waste generation</td>
<td>Reduce waste generated by transportation-related activities.</td>
</tr>
<tr>
<td>10. Resource consumption</td>
<td>Reduce the use of nonrenewable resources and promote the use of renewable replacements.</td>
</tr>
<tr>
<td>11. Emissions and air quality</td>
<td>Reduce transportation-related emissions of air pollutants and greenhouse gases.</td>
</tr>
</tbody>
</table>

• Objectives provide specific actions to meet established goals

• Objectives may be organized into focus areas
  • Planning, programming, project development, construction, maintenance, and system operations

• Consider how objectives may vary among activities
  • Objectives may be the same for different phases of work
  • Objectives may be different for different phases of work
Performance measures assess progress toward each objective and provide the ongoing data to help further improve performance.

In general, performance measures are classified as:

- **Outcome measures**
  - Provide information on the achievement of sustainability goals
  - Measure the result/impact of a program, policy, or decision

- **Output measures**
  - Relate to results/changes in terms of the system and its function
  - Measure a product or tangible item that results from an action

- **Process measures**
  - Relate to inputs/products related to an agency’s activities
  - Measure components of an agency practice that are deemed to support the related goal or objective
**Example Measures for Goal**

**Goal: Reduce waste generated by transportation-related activity**

<table>
<thead>
<tr>
<th>Measure Type</th>
<th>Example Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome measure example</td>
<td>Change in the amount of waste generated</td>
</tr>
<tr>
<td>Output measure example</td>
<td>Change in the percentage of operational activities with a recycling plan or waste diversion goal</td>
</tr>
<tr>
<td>Process measure example</td>
<td>Whether an asset management system exists (Y/N)</td>
</tr>
</tbody>
</table>
**STEP 4**

*Develop Performance Measures (continued)*

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**Inventory Existing Measures**

*Start with what you have!*

- Gather a list of all performance measures currently in use, including data sources, method of tracking, frequency of reporting, etc.
- Match these measures with your established objectives and goals.
- Identify areas where measures are lacking to support principles, goals, or focus areas.

**Select Additional Measures**

- There is no ideal number of performance measures, so keep the number to a manageable level.
- How will you calculate the measure?
- What data are needed? What other measures can benefit from the data?
- Where will you get the data? (Note: It is best to begin with data you have on hand or can easily obtain)
- How many departments/agencies will benefit from the use of the measure?
- Who will be in charge of tracking and reporting the data?
STEP 5
Implementing Performance Measures

- Consider the application of the performance measures:
  - Description, evaluation, accountability, decision support, and communication
- Determine the appropriate scale (e.g., by department or agency)
- Determine appropriate applications (if more than one) for each measure, goal, or focus area
- Establish a reporting system and schedule with roles and responsibilities for data collection, analysis, and reporting
- Set benchmarks and targets at the level of goals, objectives, or measures. In the SPM framework, these benchmarks and targets need to be tracked at the level of performance measures.
STEP 6
Refine Framework and Apply Feedback

Applying the SPM framework requires constant feedback and refinement to ensure that progress toward sustainability is achieved.
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