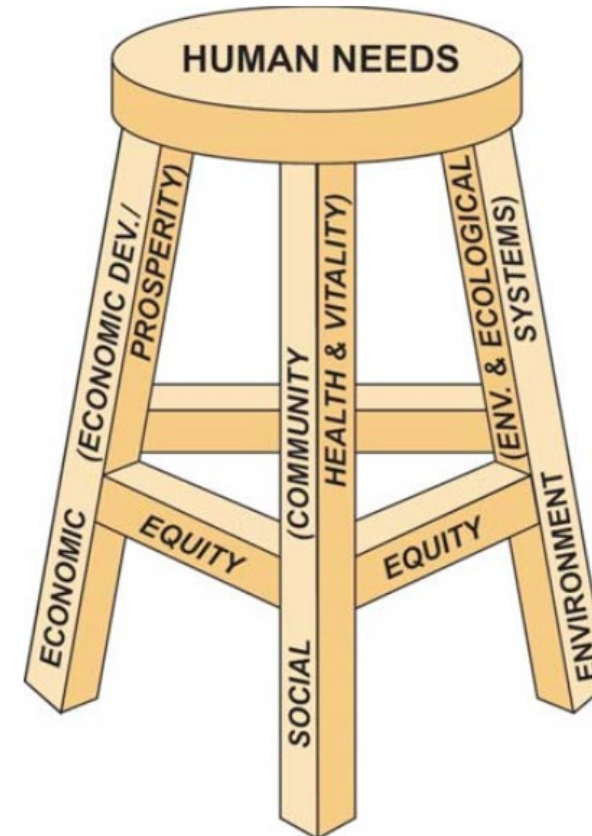


LECTURE 4

Sustainability and Transportation — *Key Concepts*

Sustainability

- Triple bottom line — environmental, economic, and social
- Principles
 - Preserving and restoring environmental and ecological systems
 - Fostering community health and vitality
 - Promoting economic development and prosperity
 - Ensuring equity among population groups over generations



Source: NCHRP Report 708:A Guidebook for Sustainability Performance Measurement for Transportation Agencies. National Academies Press.
<https://doi.org/10.17226/14598>

Transportation and Sustainability



There are several areas in which transportation impacts sustainability



Sustainability principles and considerations can apply to every stage of the transportation life cycle



Sustainable transportation reflects how sustainability principles are applied to the transportation sector

Transportation and Sustainability (Continued)

**Energy/climate
change**

Habitat

Water quality

**Hydrologic
cycle**

Air quality

**Mobility and
access**

**Community
impacts**

**Non-renewable
resources**

Approaches to Sustainable Transportation

May be holistic (viewing transportation as a part of a broader system) or sector specific (focusing on the transportation sector alone)

Sustainable transportation perspective <i>(the transportation-centered view; Three E's)</i>	Sustainable development perspective <i>(the holistic view; global perspective)</i>
<p><i>Advantage</i></p> <ul style="list-style-type: none"> – Provides sector-specific objectives and principles that guide the development of transportation policies and programs 	<p><i>Advantage</i></p> <ul style="list-style-type: none"> – Highlights the need to establish a national framework/policy to address sustainable development that can encourage sectors to coordinate/integrate their activities
<p><i>Disadvantage</i></p> <ul style="list-style-type: none"> – Does not explicitly connect impacts from the transportation sector with those from other sectors. Thus, transportation tends to be considered in a vacuum 	<p><i>Disadvantage</i></p> <ul style="list-style-type: none"> – Does not provide detailed sector-specific objectives and principles to guide the development of transportation policies and programs
<p><i>System Perspective</i></p> <ul style="list-style-type: none"> – Single system 	<p><i>System Perspective</i></p> <ul style="list-style-type: none"> – Multiple interconnected systems

Source: Gudmundsson et al. (2016). *Sustainable Transportation: Indicators, Frameworks, and Performance Management*. Springer.

Transportation Decisions and Sustainability

Long-range transportation planning

- Point at which expectations for sustainability performance can be discussed — particularly in terms of desired sustainability outcomes — and broad performance goals established that drive subsequent investment patterns

Short-range transportation programming

- Point at which broad expectations about sustainability established in long-range planning can be translated into explicit targets associated with implementation of a specific set of projects

Project-level planning

- Project-level sustainability performance may be used to inform project-level planning decisions

Transportation Decisions and Sustainability (continued)

Project-level review

- As in planning, project-level sustainability performance may be used to inform project-level environmental decisions

Design, land acquisition, and permitting

- Points at which the predictions made during planning and environmental review can be verified and translated into an outcome of sustainability

Construction, maintenance, and operations

- How construction, maintenance, and operations work is done can be designed to support an agency's sustainability goals

Policies and Programs Addressing Sustainability

Sustainability considerations overlap with several transportation-sector policies and programs, such as those addressing:

Climate change

Resilience

Context-sensitive solutions

Health

Equity

Environment

Connectivity

Neighborhood revitalization

Smart growth

Multimodal transportation

These usually cover only some aspects of sustainability, not the triple bottom line in a holistic manner

Challenges for Sustainable Transportation

Aspect	Challenges	Potential Solution
DEFINITION — conceptualizing and defining sustainable transportation	Unclear definition and misuse of the term. Also affected by inherent conflicts between sustainability dimensions, political factors, and alternative discourses such as resilience or climate adaptation.	Take a holistic approach — with consensus on fundamental issues
MEASUREMENT — assessing progress	Primarily affected by the multitude of frameworks and metrics present. It is also affected by the cross-cutting nature of sustainability, which may limit the scope of what is measured.	Focus on end goal (i.e., outcome focused)
IMPLEMENTATION — implementing programs and policies	Political issues and alternative discourses can affect how programs and policies are implemented.	Be context specific — consider local factors

Source: Adapted from Ramani, T. L., and Zietsman, J. (2016). Sustainable Transportation—Alternative Perspectives and Enduring Challenges. *International Journal of Urban Sciences*, 20(3), 318-333.

LECTURE 4

Sustainability and Transportation — *Key Concepts*