The National Academies of
SCIENCES · ENGINEERING · MEDICINE

Sustainability at the Transportation Research Board

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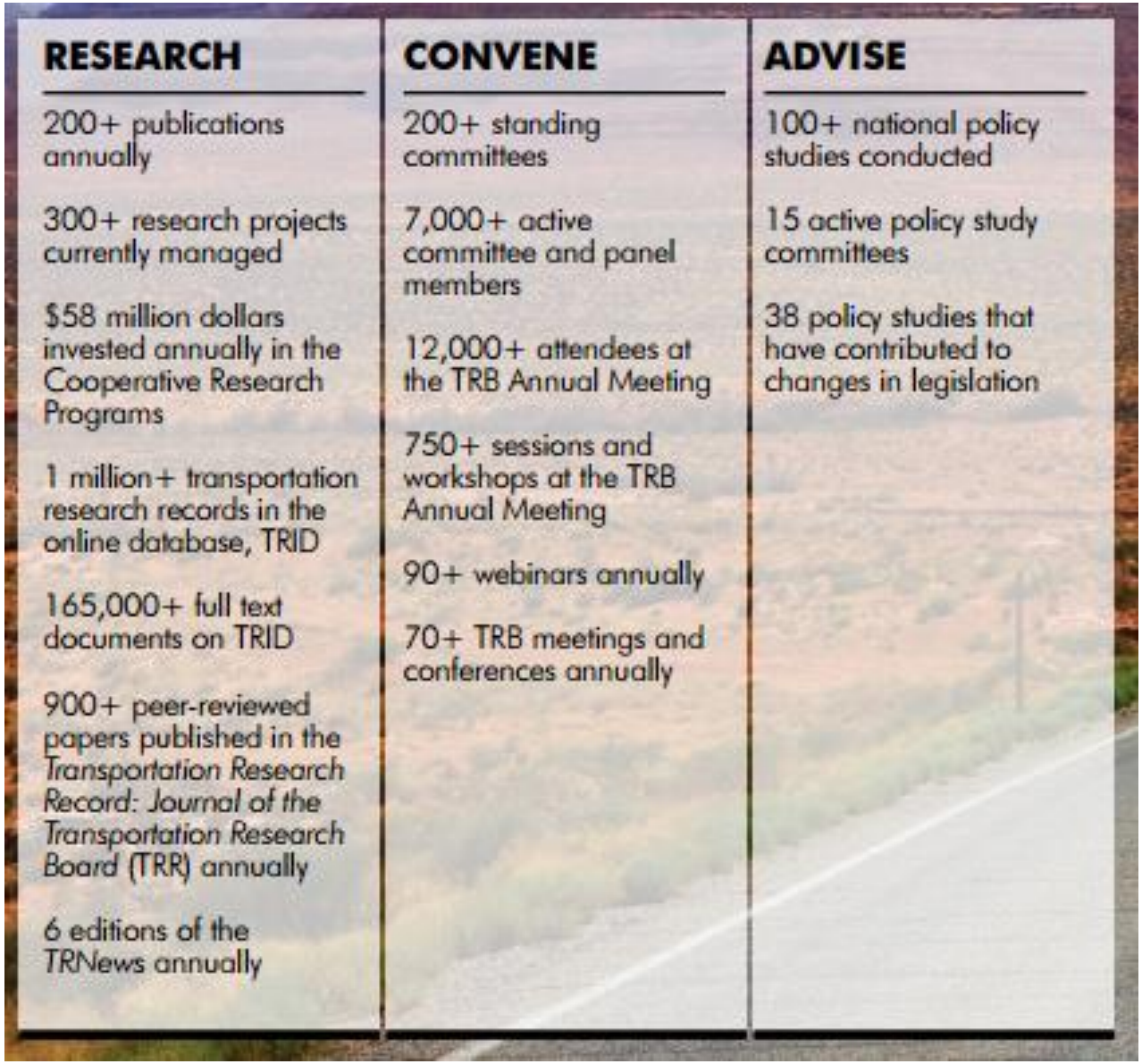
- Research
- Convene
- Advise



RESEARCH

Applied, Cooperative *research* to respond to the ***practical needs*** of transportation agencies and stakeholders.

- ❑ Airports
- ❑ Freight
- ❑ Hazardous Materials
- ❑ Highways
- ❑ Rail
- ❑ Transit

CONVENE: Standing Committees

- Identify research needs
- Provide information to the transportation community on research priorities and procedures
- Review papers for presentation at the TRB Annual Meeting and for publication
- Sponsor annual meeting sessions and workshops
- Encourage incorporation of research findings into practice
- Develop special programs, conferences, and workshops.

CONVENE: Standing Committees

Design & Construction

- Bridges & Other Structures
- Construction
- Design
- Geotechnology
- Hydraulics & Hydrology
- Materials
- Pavements

Policy & Organization

- Administration & Management
- Data & Information Technology
- Education & Training
- Finance
- History
- Law
- Policy
- Research
- Transportation (general)

Operations & Preservation

- Maintenance & Preservation
- Operations & Traffic Management
- Security & Emergencies

Planning & Environment

- Economics
- Energy
- Environment
- Planning & Forecasting
- Society

Safety, System Components, and Users

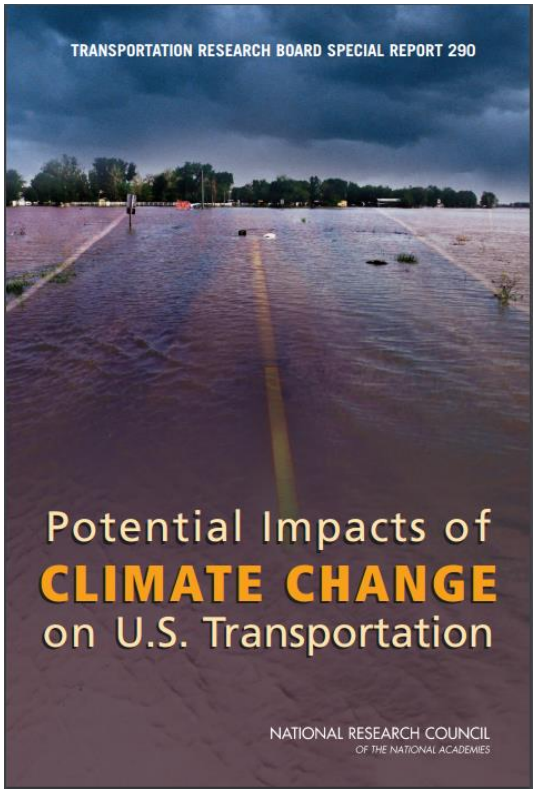
- Freight Transportation
- Passenger Transportation
- Safety & Human Factors
- Terminals & Facilities
- Vehicles & Equipment

Over 200 Committees each focused on a specific area or topic related to transportation.

- Aviation
- Highway
- Marine Transportation
- Motor Carriers
- Pedestrians and Bicyclists
- Pipelines
- Public Transportation
- Railroads

ADVISE: Policy Studies

TRB Special Report 290:
The Potential Impacts of Climate Change on U.S. Transportation



- explores the consequences of climate change for U.S. transportation infrastructure and operations
- provides an overview of the scientific consensus on the current and future climate changes of particular relevance to U.S. transportation, including the limits of present scientific understanding as to their precise timing, magnitude, and geographic location
- identifies potential impacts on U.S. transportation and adaptation options
- offers recommendations for both research and actions that can be taken to prepare for climate change.

Definition of Sustainability

- Sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

  Bruntland Commission report, *Our Common Future*, 1987

- The basic thrust of the Brundtland Commission definition is “generational equity,” which is achieved through consideration and balance of three policy dimensions – economic, social, and environmental -- a.k.a. “the triple bottom line (TBL).”

Relationship of Transportation to TBL

- Economy
  - Highly dependent on readily accessible and efficient movement of people and commerce
  - But economy very sensitive to availability and cost of resources—and transportation consumes about a quarter of all the energy we use
- Social well-being
  - Depends heavily on accessible and efficient transportation services
  - But extensive fixed infrastructure and operations intrude on quality of community life
  - Transportation planning and development focus on mitigation and improvement
- Environment
  - Does not benefit in many ways from transportation
  - Agencies focus on compliance with environmental regulations, mitigation, and enhancement initiatives where possible

Sustainable Transportation

"A sustainable transport system [is] defined as one that

(1) allows the basic access and development needs of individuals, companies, and society to be met safely and in a manner consistent with human and ecosystem health and promotes equity within and between successive generations;

(2) is affordable, operates fairly and efficiently, offers a choice of transport mode, and supports a competitive economy, as well as balanced regional development; and

(3) limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, and uses nonrenewable resources at or below the rates of development of renewable substitutes, while minimizing the impact on the use of land and the generation of noise."

European Union Council of Ministers for Transport and Telecommunications, 2001

Triple Bottom Line Sustainability

- The next step is to move from sustainable transportation to triple bottom line sustainability
- Transportation must support TBL sustainability, i.e. environmental, economic, and social sustainability
- The current policy system is far from able to support a TBL sustainable society
- A TBL policy system will evolve slowly, because of the significant changes needed in institutional, governance, and funding mechanisms.

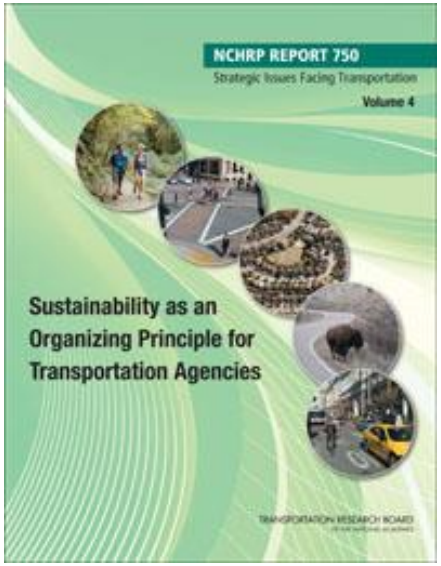
Key needs to support TBL sustainability

- Credible and widely applied performance measurement framework for TBL
- Application of Life Cycle Cost Analysis (LCCA), Total Cost Accounting (TCA), and sustainability accounting based on TBL
- Broad consensus on performance assessment processes to address TBL and the contribution of transportation to TBL
- Increased incorporation of TBL assessments in transportation planning and investment decisions
- Direct public and private sector engagement in needs development

Key needs to support TBL sustainability

- Market incentives for private industry to share and engage in TBL goal-setting and decision making
- Integration of sustainability tools in decision making
- Established multimodal, multiagency, multisector, and multijurisdictional planning and decision making
  - to address regional TBL needs
  - to better leverage resources

NCHRP Report 750, Strategic Issues Facing Transportation, Vol. 4



Includes an analytical framework and implementation approaches designed to assist state departments of transportation and other transportation agencies evaluate their current and future capacity to support a sustainable society by delivering transportation solutions in a rapidly changing social, economic, and environmental context in the next 30 to 50 years.

An organizing principle

- *"…a core assumption from which everything else can derive a classification or value…"*
- An organizing principle sits above statements of specific goals or objectives, decisionmaking tools, and policies
- It is a paradigm – *or Policy System* -- through which all aspects of a delivery system for a public good are considered

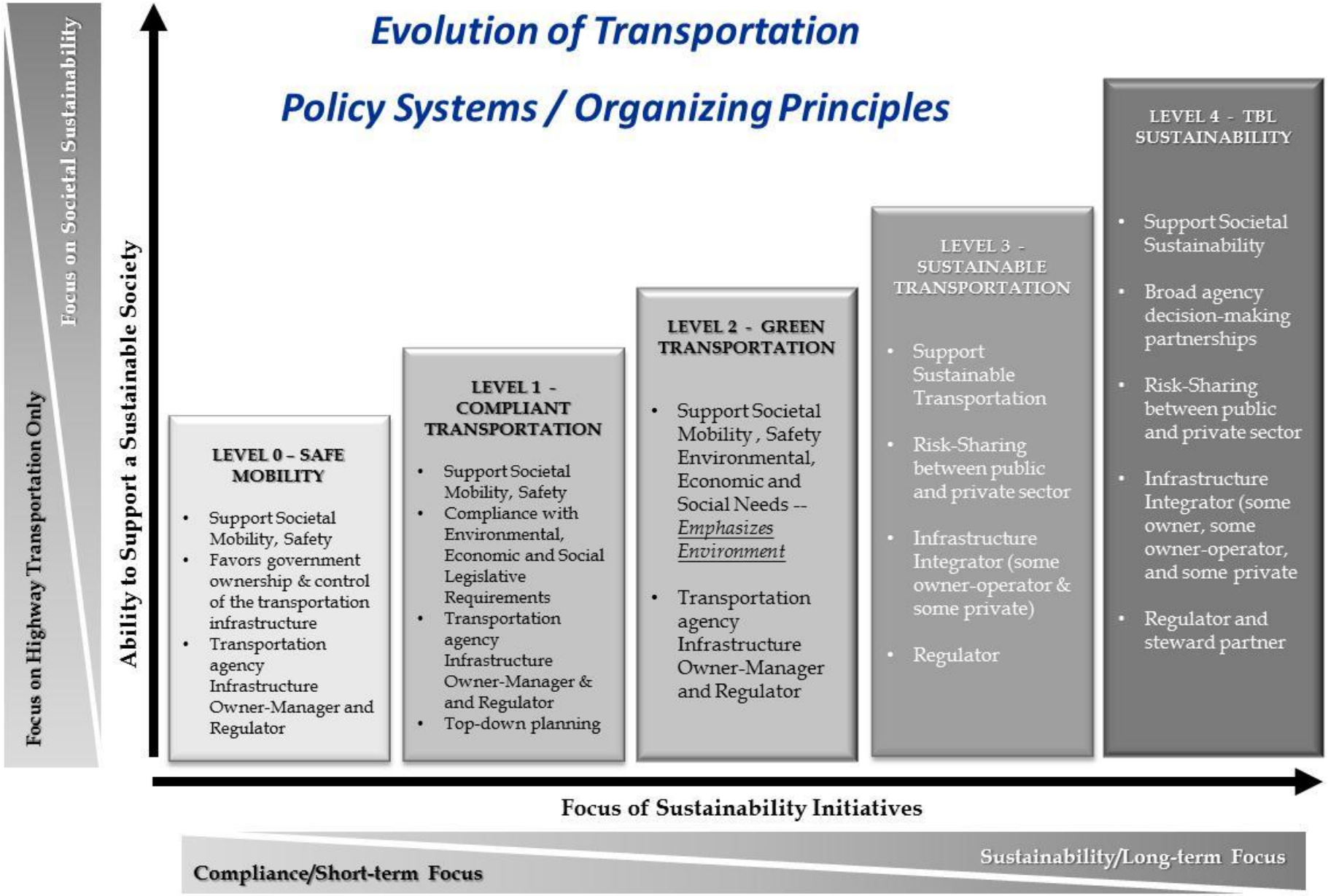

Evolution of Transportation
Policy Systems / Organizing Principles
Focus on Societal Sustainability
Focus on Highway Transportation Only
Ability to Support a Sustainable Society
LEVEL 0 – SAFE MOBILITY
• Support Societal Mobility, Safety
• Favors government ownership & control of the transportation infrastructure
• Transportation agency Infrastructure Owner-Manager and Regulator
LEVEL 1 - COMPLIANT TRANSPORTATION
• Support Societal Mobility, Safety
• Compliance with Environmental, Economic and Social Legislative Requirements
• Transportation agency Infrastructure Owner-Manager & and Regulator
• Top-down planning
LEVEL 2 - GREEN TRANSPORTATION
• Support Societal Mobility , Safety Environmental, Economic and Social Needs -- Emphasizes Environment
• Transportation agency Infrastructure Owner-Manager and Regulator
LEVEL 3 - SUSTAINABLE TRANSPORTATION
• Support Sustainable Transportation
• Risk-Sharing between public and private sector
• Infrastructure Integrator (some owner-operator & some private)
• Regulator
LEVEL 4 - TBL SUSTAINABILITY
• Support Societal Sustainability
• Broad agency decision-making partnerships
• Risk-Sharing between public and private sector
• Infrastructure Integrator (some owner, some owner-operator, and some private
• Regulator and steward partner
Focus of Sustainability Initiatives
Compliance/Short-term Focus
Sustainability/Long-term Focus

Table 11. Actors and relationships in transportation policy systems evolving toward sustainability.

	Level 0 Safe Mobility	Level 1 Compliant Transport.	Level 2 Green Transport.	Level 3 Sustainable Transport.	Level 4 TBL Sustainability
GOVERNMENTAL SECTOR					
State legislature, individual legislators, legislative committees	●	●	●	●	●
Governors	●	●	●	●	●
Transportation commissions (if present)	●	●	●	●	●
U.S. DOT and other federal transportation agencies	●	●	●	●	●
Other federal departments (e.g., Environmental Protection Agency)	●	●	●	●	●
State DOTs	●	●	●	●	●
MPOs	◔	◔	◑	●	●
Local governments	◑	◑	◑	●	●
Other state government agencies	◔	◔	◑	◑	●
Other modal authorities (e.g., airports, ports, passenger rail)	◔	◔	◑	●	●
PRIVATE SECTOR					
State and local economic interests and businesses	◔	◔	◑	◕	●
Transportation providers and system operators	◔	◔	◑	◕	●
INTEREST GROUPS					
Community and civic groups (e.g., community booster groups, chambers of commerce)	○	◔	◕	●	●
Environmental groups	○	◔	◕	●	●
Professional organizations and research organizations	○	◔	◕	●	●
Single-issue transportation groups	○	◔	◕	●	●
Social, economic, ethnic, and cultural interest groups	○	◔	◕	●	●

KEY:

○ No involvement in the policy process

◔ Minor involvement in the policy process

◑ Regular involvement in the policy process

◕ Significant involvement in the policy process

● Key actors in the policy process

Eight high-level conclusions

1. *The current policy system is far from able to support a TBL sustainable society*
2. *TBL policy systems will evolve slowly, because of the significant changes needed in institutional, governance, and funding mechanisms*
3. *When and if TBL policy systems do evolve, decision models for policy and funding will probably cross organizational and jurisdictional lines as we now know them*
4. *Transportation agencies are likely to always have similar roles and responsibilities to today, but the models to plan and execute these roles will need to change*

(Continued)

Eight high-level conclusions

5. *The concept of ideal TBL balance and optimization is not prescriptive – TBL priorities will be driven by the public will, based on existing conditions and outlook*

6. *High-level, data-driven policy evaluation models are needed to support TBL consensus and policy system development*

7. *User funded and financed transportation is a likely ingredient of effective transportation support of a sustainable society*

8. *Near-term strategies include TBL readiness monitoring, and building external dialogue and relationships on TBL decisionmaking*

Research Needs

- Models for the *contributions of transportation investments to TBL* require:
  - Quantifying the full life cycle cost of transportation programs (not necessarily projects)
  - Total cost accounting at program levels
  - Linking transportation performance and services to economic, environmental, and social bottom lines in simple and data-driven ways
  - Valuating future (generational) transportation performance and TBL impact