

LECTURE 6

Sustainable Transportation Rating Systems

Part 1

Introduction



Until recently, most rating systems, such as LEED, focused on *vertical* construction (buildings) and not *horizontal* infrastructure work (roads)

Introduction

- **Sustainability factors for infrastructure projects:**

Cost

Energy consumption

Resource requirements

Capacity

Service quality

Safety

Societal impacts

Environmental impacts



Introduction (continued)

Rating systems typically measure sustainability using five broad categories:



Resources



Energy



Transport



Water



Waste

Rating Systems for Infrastructure

Prominent sustainability infrastructure rating systems:

1. **BE²ST-in-Highways**
2. **Envision**
3. **GreenLITES**
4. **Greenroads**
5. **I-LAST**
6. **INVEST**

These systems employ different methods of determining sustainability, emphasizing different sustainable factors.

BE²ST-in-Highways

- **Building Environmentally and Economically Sustainable Transportation-Infrastructure-Highways**
- Main focus is to quantify sustainability impact of using *recycled materials* in pavements
- Developed by the Recycled Materials Resource Center (RMRC) at the University of Wisconsin
- Compares a reference (base) design project with no sustainability features to a proposed project incorporating sustainable features — base case vs. sustainability case

BE²ST-in-Highways (continued)

Projects evaluated on *nine* sub-criteria:

- Greenhouse gas emissions
- Energy use
- Waste reduction (ex situ materials)
- Waste reduction (recycling in situ materials)
- Water consumption
- Hazardous waste
- Life cycle cost (LCC)
- Traffic noise
- Social cost of carbon saving

Users may assign weights to each sub-criteria, but it is optional.

BE²ST-in-Highways (continued)

- A percentage score is calculated by dividing the actual score by the maximum possible score
- Results in the following ratings:
 - Bronze (50%)
 - Silver (75%)
 - Gold (90%)
- Applicable to projects in the design phase
- Offers third-party verification
- Entirely web based

<https://rmrc.wisc.edu/be2st-in-highways/>

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Envision

- Developed by Zofnass Program for Sustainable Infrastructure at Harvard Graduate School of Design and the Institute for Sustainable Infrastructure
- Used to rate infrastructure projects based on:
 - Water storage/treatment
 - Transportation
 - Energy generation
 - Information systems
 - Landscaping
- Encourages use of life-cycle analysis (LCA) in planning, design, construction, and operation phases
- Recognizes efforts to incorporate sustainable practices throughout infrastructure project life cycle

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Envision

(continued)

Distributes **60** credits under *five* categories:

1. Quality of life
2. Leadership
3. Resource allocation
4. Natural world
5. Climate and resilience

Two-stage assessment tool:

1. Stage 1 is a self-assessment checklist
2. Stage 2 entails third-party verification and public recognition

Results in *four* certifications:

1. Acknowledgement of Merit
2. Silver Award (8% minimum in each category)
3. Gold Award (15% minimum in each category)
4. Platinum Award (20% minimum in each category)

<https://sustainableinfrastructure.org/>

GreenLITES

Green Leadership In Transportation and Environmental Sustainability

Developed by New York State Department of Transportation (NYSDOT)

Three main purposes:

1. Encourages development with no negative environmental impacts/little disruption to society
2. Encourages appropriateness of design, safe multimodal transportation, and construction of low-cost/no-cost maintenance highways
3. Provides a medium for dissemination of information and funding for research

Distributes 175 points across five categories:

1. Sustainable sites
2. Water quality
3. Materials and resources
4. Energy and atmosphere
5. Innovation

GreenLITES (continued)

Award levels include:

- GreenLITES Certified
 - GreenLITES Silver
 - GreenLITES Gold
 - GreenLITES Evergreen
- **GreenLITES is mandatory for all NYSDOT highway projects**
 - **Projects assessed during conceptual and design phases**
 - **Project team** reviews plans, estimates, and specifications and gives one of four awards – self-certification program

<https://www.dot.ny.gov/programs/greenlites>

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Greenroads

- Developed by CH2M HILL and the University of Washington
- Evaluates and scores an operations and maintenance plan
 - Does not apply to day-to-day highway maintenance
- Awards credits to projects that use sustainable best practices

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Greenroads

Two main categories —
**required and
voluntary**

11 required credit categories:

1. Environmental review process
2. Life-cycle cost analysis
3. Life-cycle inventory
4. Quality control plan
5. Noise mitigation plan
6. Waste management plan
7. Pollution prevention plan
8. Low-impact development
9. Pavement management system
10. Site maintenance plan
11. Educational outreach

Most of these categories are derivatives of codes or laws and do not add an additional burden to the project team.

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Greenroads (continued)

- **Six *voluntary* credit categories:**
 1. Environment and water (8 criteria)
 2. Access and equity (9 criteria)
 3. Construction activities (8 criteria)
 4. Materials and resources (6 criteria)
 5. Pavement technologies (6 criteria)
 6. Custom credits (2 criteria)
- After *required* categories are met, *voluntary* credits are submitted to Greenroads for third-party review
- Greenroads weights credits on a scale of 1–5 depending on potential to influence sustainability

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Greenroads (continued)

Four award levels:

1. Bronze (32–42 voluntary credit points)
 2. Silver (43–53 voluntary credit points)
 3. Gold (54–63 voluntary credit points)
 4. Evergreen (64+ voluntary credit points)
- Greenroads is used primarily for highways but conceptually on bridges, tunnels, and other structures
 - Web based and may be used throughout project life cycle

<https://www.greenroads.org/3738/about.html>

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