

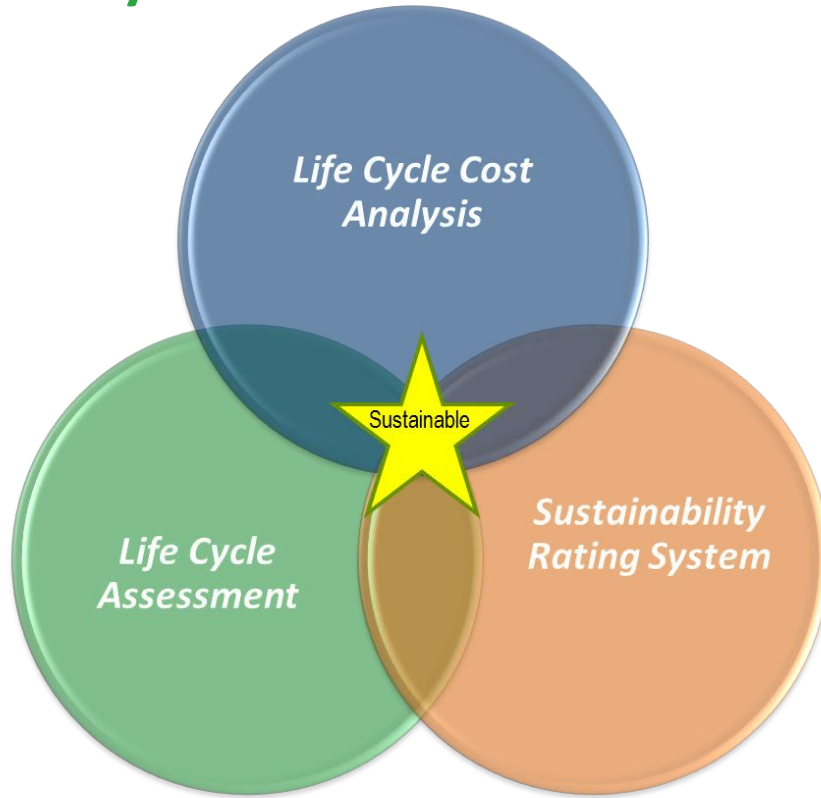


Tollway Application of Life Cycle Assessment for Flexible Pavements

Illinois Bituminous Paving Conference &
North Central Asphalt User Producer Group

Feb 03, 2015

Sustainability Tools to Measure



Rating System Implementation For Qualitative Measurements of Sustainability

■ Illinois Tollway rating system will be FHWA's

- Many systems evaluated for applicability
- \$150,000 grant received from FHWA to help implement



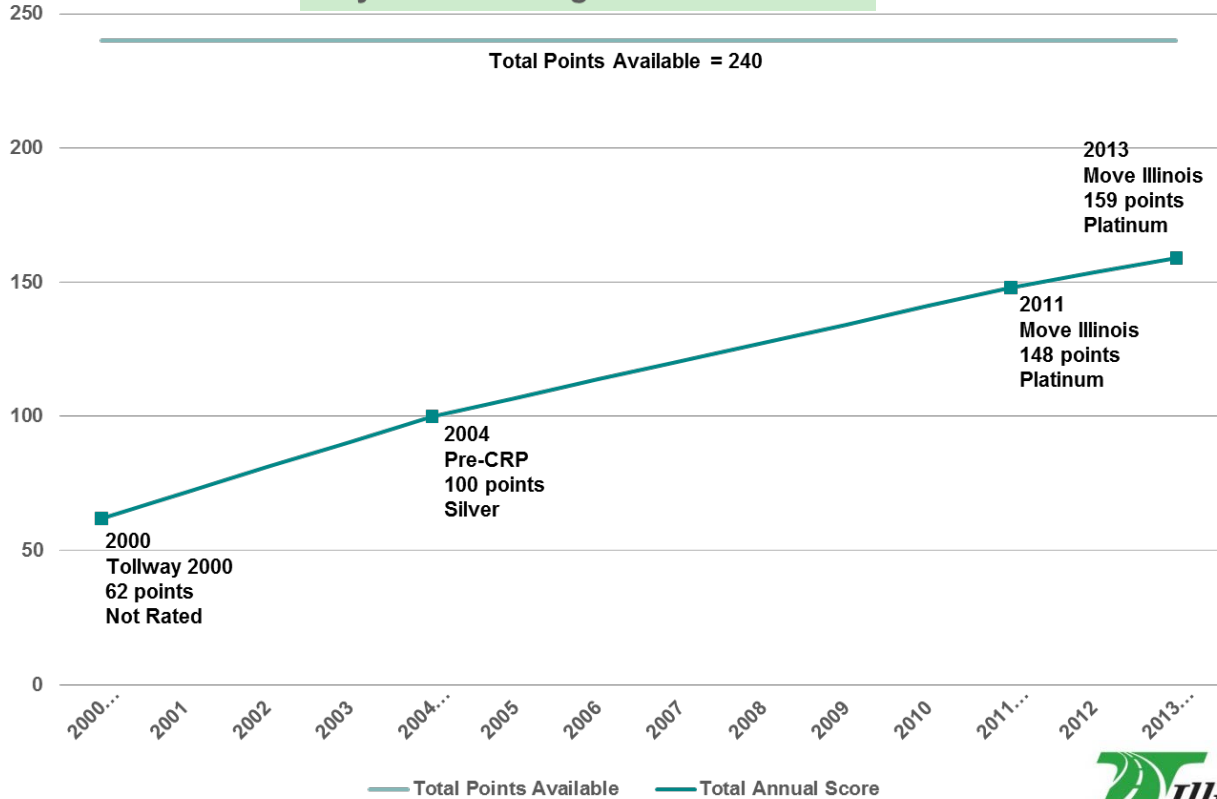
■ Includes economic, environmental and social impact

*Infrastructure Voluntary Evaluation Sustainability Tool
(INVEST)*

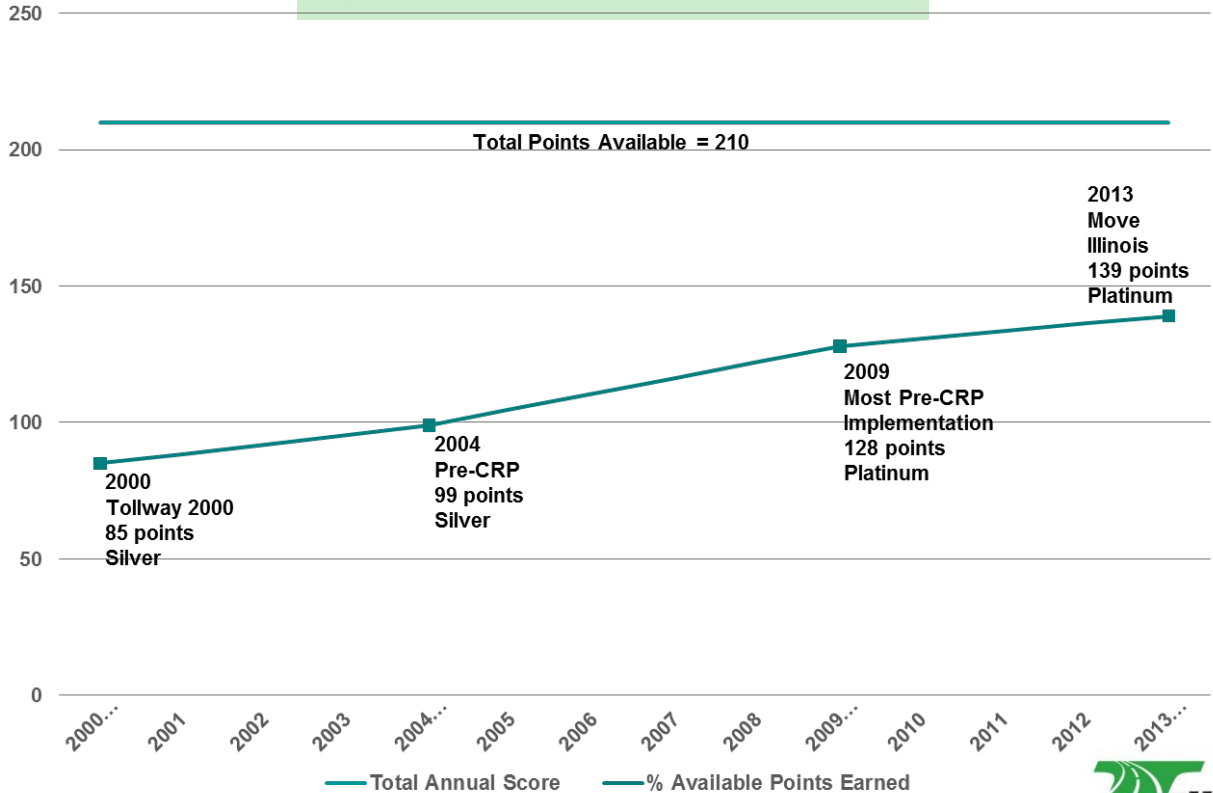
www.sustainablehighways.org



ILLINOIS TOLLWAY System Planning Baseline Scores



ILLINOIS TOLLWAY Operations & Maintenance Baseline Scores



Illinois Tollway Project Development Module Baseline Scores for 2013

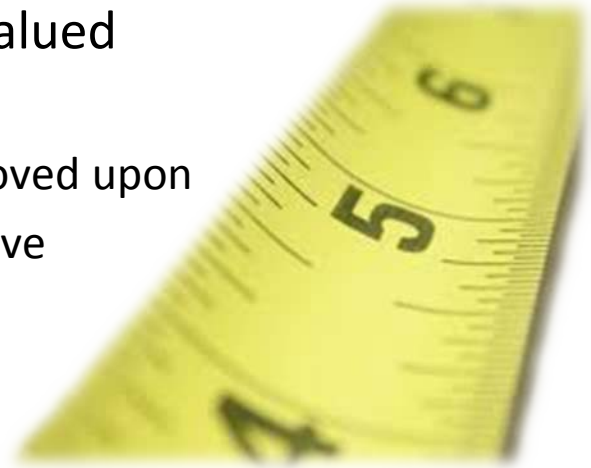
- Sharp increase in scoring is expected when comparing year 2000 project scores to 2013 scores.
- Scores will be available at the end of 2014.

Life Cycle Assessment

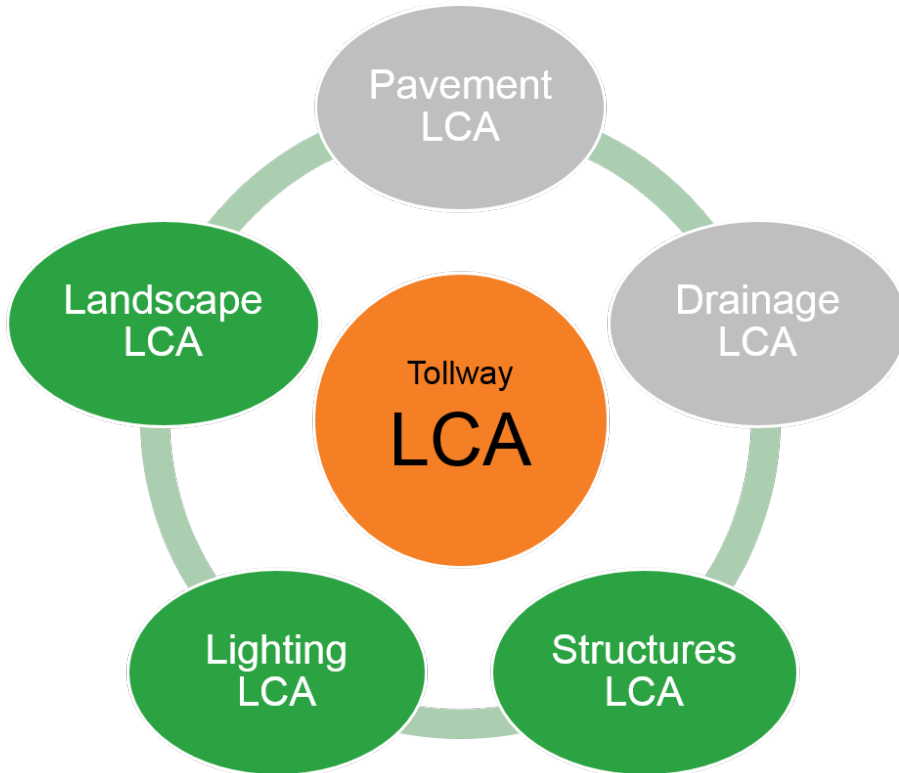
Quantitative Measurement of Sustainability

Why must we quantify?

- If it is not quantified, it is not valued
 - Without value, it won't get done
 - Without value, it cannot be improved upon
 - Without value, there is no incentive



Tollway LCA Tools Being Developed



Preliminary Tollway Case Study – I-90

*Conducted by ARA

- Jane Addms MP 69.9 – 62.3 (1 contract of many)
 - 12" Full-depth HMA (97,986 sq. yds)
 - 15" Full-depth HMA (70,967 sq. yds)
 - 6-in HMA Shoulders (105,070 sq. yds)
 - 9-in HMA Shoulders (13,870 sq. yds)
 - Total asphalt production of 172,000 tons
 - Prime Coat (28,303 gallons)
- Included Materials & Construction
 - No Maintenance Activities, No Use Phase, No End-of-Life (yet)
- Investigating the effects of implementing improvements from 2000s to 2014 actual project



The difference in the mixes

■ 2000 Mixes

- No recycle content
- SBS-modified binder

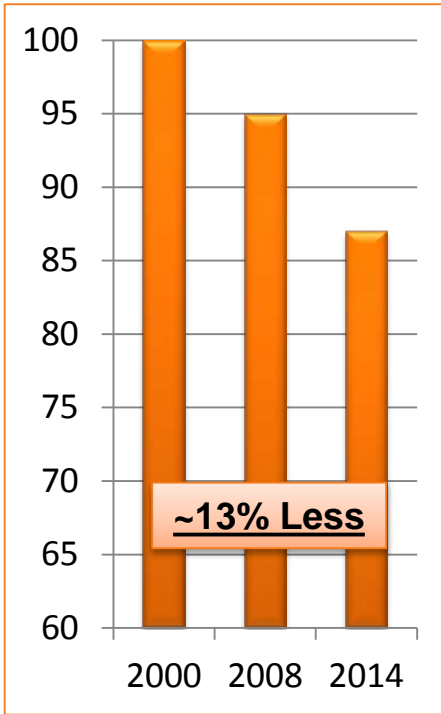
■ 2008 Mixes (as constructed)

- SMA surface and binder for mainline
- ABR content ranging from 15 to 47 percent
- GTR binder

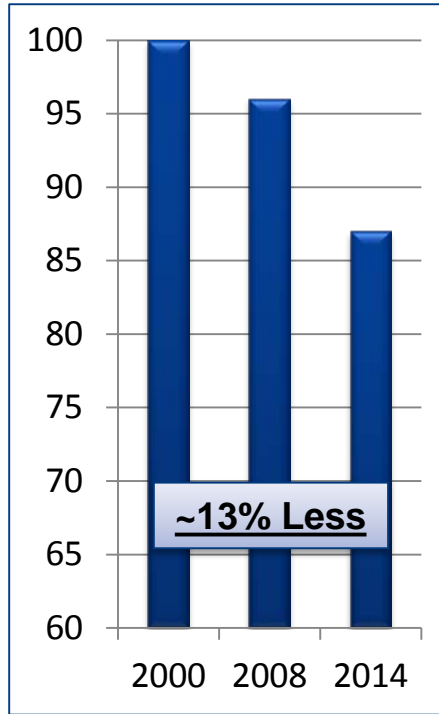
■ 2014 Mixes (similar projects)

- Warm-Mix Asphalt (WMA)
- ABR content ranging from 24 to 53 percent
- Includes RAS

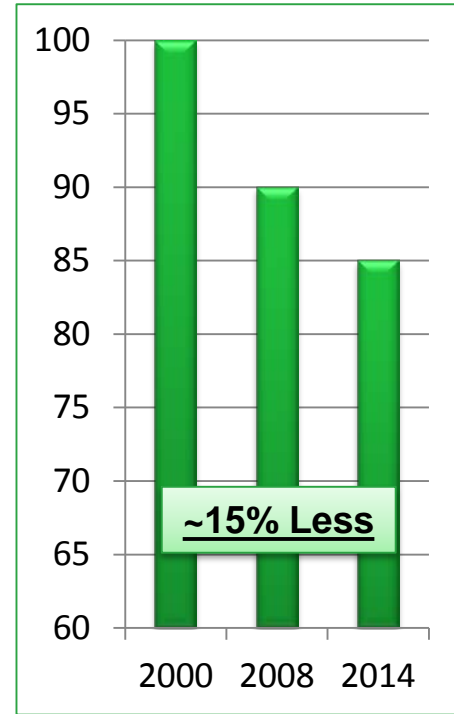
The results are remarkable



CO₂ Output



Energy Required



Single Score

What does this mean for that I-90 construction

- The environmental impact improvements between 2000 and 2013 construction equate to:
 - ❑ Burning **934** short tons of coal to produce electricity
 - ❑ Electricity use of **172** households for 1 year in IL
 - ❑ The production and use of **107,000** gallons of gasoline



Thank you