

# MIT Life-Cycle Assessment Interim Report

## Talking Points

### WHAT

The Massachusetts Institute of Technology (MIT) has released initial reports of research efforts that will help set a new standard in life-cycle assessment (LCA) modeling.

Researchers at the MIT Concrete Sustainability Hub are working to quantify the full cradle-to-grave life-cycle environmental and economic costs of paving and building materials.

### HOW

The scope and focus of MIT's LCA model will set their current efforts apart from previous work and result in an assessment that more closely captures the actual environmental impact of these materials.

- Scope – 50-year life-cycle for pavements; 75-year life-cycle for buildings.
- Focus – Unprecedented focus on “use phase” costs, where the majority of impact lies.

### INTERIM REPORT HIGHLIGHTS

#### Life-Cycle Assessment (LCA) of Highway Pavements

- For high-volume roads, the use phase of the life-cycle can account for up to 85% of carbon emissions.
- Potential for significant fuel efficiency savings for vehicles on concrete pavements over asphalt. These fuel efficiency savings could lead to substantially lower life-cycle CO<sub>2</sub> emissions.
- Varying scheduled maintenance work and lane closures can reduce CO<sub>2</sub> emissions for concrete pavements over the life of the road.

#### Life-Cycle Assessment (LCA) of Buildings

- Residential Buildings – More than 90% of the life-cycle carbon emissions are due to the use phase, with construction and end-of-life disposal accounting for less than 10% of the total emissions.
- Residential Buildings – Concrete structures built with insulated concrete forms (ICF) enjoy long-term operational energy savings of 20% or more over wood-framed buildings.
- Commercial Buildings – Concrete structures realize HVAC energy savings of between 5% and 6% annually over steel structures.

### NEXT STEPS

MIT will supplement the ongoing environmental studies with economic analyses in 2011 using a life-cycle-cost analysis (LCCA) model that will be equally comprehensive.

The final studies will provide the scientific community, industry leaders, and policymakers with a much clearer understanding of the real life environmental and economic costs of building and paving materials.

MIT's efforts will incorporate researchers from three schools at MIT: the School of Engineering, the School of Architecture and Planning, and the Sloan School of Management.