

# ILLINOIS TOLLWAY SUSTAINABILITY INITIATIVE

## BACKGROUND

The Illinois Tollway is in the business of providing a safe and reliable highway network for the citizens and businesses of Northern Illinois, and in doing so, improving the quality of life of the residents of the region. Recently, the Tollway has begun a new initiative to further enhance the quality of life for the region by actively monitoring and documenting the sustainability of the Tollway network and the Tollway's everyday business practices. Moving forward, having this system in place will lead to Tollway decisions and policies that further improve regional sustainability, while still providing the highest possible level-of-service to their customers.

In addition to documenting the Tollway's current level of sustainability, historical eras have been identified for evaluating their impact of sustainability. The eras include the Congestion Relief Program (CRP), and the current Move Illinois program. These programs will be compared to each other, and all of them will be compared to a baseline level of sustainability from the late 1990's, referred to as Tollway 2000.

## TOOLS

The Tollway has chosen a two-pronged approach to documenting and monitoring the sustainability of their transportation network. First, the Tollway is implementing the FHWA-developed sustainability rating system INVEST v1.0 (INfrastructure Voluntary Evaluation Sustainability Tool) which was released in October 2012. Second, the Tollway is developing a Life Cycle Assessment (LCA) tool which will calculate the environmental impact via energy usage and emission generation for several significant Tollway activity areas.

### *INVEST 1.0*

FHWA developed INVEST as a subjective rating system which State Highway Agencies (SHAs) and Municipal Planning Organizations (MPOs) could use to rate their sustainability, and identify potential areas of improvement when making future decisions. INVEST is comprised of three modules: Operations and Maintenance (O&M), System Planning (SP), and Project Development (PD). The INVEST system requires an agency to answer a series of questions about the way their operations and business practices, and points are awarded for different levels of sustainable practices.

To date, the Tollway is one of only a handful of agencies to implement all three of the INVEST modules. Scoring of the Tollway O&M practices has been completed for all of the eras described above. Scoring for the Tollway SP is expected to be complete by the Fall of 2013. Scoring in the PD module will be done on a corridor-wide basis, with projects in two corridors—the Addams Expressway reconstruction and the Elgin-O'Hare improvements and expansion—to begin this fall. Going forward, it is expected that O&M and SP scoring will be done on an annual or every-other-year basis, with PD scoring to be performed each winter on the projects and corridors from the previous construction season.

## *LCA Tools*

All of the functions associated with the Tollway require energy and material inputs and produce emissions of some sort. For example, constructing or rehabilitating pavements requires electricity and fuel at the plant, fuel to transport raw materials from their source to the plant, more fuel to transport the finished materials to the site, and still more fuel to operate the machinery that places the material along the road. All of the Tollway structures require electricity and heat from the burning of fuel. And all of these fuels generate greenhouse gas emissions when burned to provide the energy that allows the Tollway to function on a daily basis. From this perspective, the Tollway is no different than any other home or business in the region.

In order to better quantify the impact of their decisions on sustainability, the Tollway is developing an open-source, spreadsheet-based, LCA tool to help project designers and Tollway contractors to modify materials, equipment, and procedures in order to reduce the amount of energy consumed and by extension, the amount of greenhouse gases released into the atmosphere. The Tollway has identified five areas for which energy and emissions will be calculated: 1) Pavements, 2) Structures, 3) Drainage, 4) Landscaping, and 5) Lighting.

Life Cycle Assessment (LCA) is the industry term for a program that calculates the global warming potential or carbon footprint of the Tollway's ownership and operation of Transportation Infrastructure. LCA is commonplace in Europe and other parts of the world and it used in manufacturing and other sectors of the U.S. economy. LCA is a quantitative assessment of the materials, construction, use, maintenance, and operations of our highway infrastructure. We can determine the actual carbon footprint of all of the activities of the Tollway and our customers. The benefits of using LCA include:

- Calculating the energy use and carbon footprint for construction, operation, and use of our roads. It is difficult to manage or improve things that we don't measure. LCA is a measure of energy use and carbon footprint.
- The Tollway has made public commitments to build the "greenest" program in the organization's history. The LCA provides the method to measure and validate that Move Illinois is the "greenest" program and to push innovations to make it greener.
- LCA measures allow the Tollway to make decisions on the construction, operation, and use of the highways and understand the environmental impact.
- LCA measures allow the Tollway to provide incentives for green construction.
- LCA measures would allow the Tollway to understand which green initiatives give the "best bang for the buck."

Tollway designers will have a tool for determining the impact of selecting different technically viable options in terms of energy use and emission generation. Tollway designers will be able to establish reasonable sustainability goals for all projects, which the contractors bidding on Tollway projects will be able to meet or exceed, using the same LCA tools to evaluate their specific material/ equipment/ procedure combinations. And finally, the Tollway will be able to use the LCA tool to provide incentives to contractors that achieve construction sustainability that exceeds the project targets. The completion of the LCA tool is expected in 2015 with implementation to follow.

## **BOTTOM LINE**

The Illinois Tollway serves a critical role in maintaining their portion of the transportation network in Northeastern Illinois. While providing a safe and reliable highway network for transporting people and goods across and through the region does add to an enhanced quality of life for the region, the Tollway has decided that it can do more, that it should do more, and that it is good business to do more to make their operation more sustainable. By implementing the INVEST system and developing their LCA tools, the Tollway will be able to identify areas where more sustainable they can make more sustainable decisions on construction projects and in their daily business practices, and more importantly, the Tollway will have a way of documenting their efforts and the results of those efforts for the citizens of the region.