INVEST Leads to Sustainability Success and Innovation at ADOT

The State of Arizona is home to a wide range of unique and extreme geographies, from the Sonora Desert to the Grand Canyon. Its transportation infrastructure is spread across 114,000 square miles, ranges from sea level to 6,000 feet, and must withstand temperatures from 0°F to over 120°F. Maintaining optimum health and efficient performance of this infrastructure is critical to Arizona's economic vitality, quality of life, and environmental health. Because of its unique landscapes and nationally significant environments, the Arizona Department of Transportation (ADOT) recognizes the critical need to consider sustainability in their efforts to expand, operate, and maintain their transportation network. To support their sustainability efforts, ADOT has turned to the Federal Highway Administration's (FHWA) Infrastructure Voluntary Evaluation Sustainability Tool (INVEST).

ADOT's Early Adoption of INVEST Leads to Agency-wide Improvements

ADOT initially became interested in using INVEST (see text box) in 2010 while in the midst of updating two of their long-term planning documents, *Building a Quality Arizona (bqAZ)* and *What Moves You Arizona?* At the time, the State of Arizona was going through a period of rapid demographic change and population growth. Simultaneously, many members of the public were becoming more informed about the transportation planning process and demanding that transportation projects address more than just mobility and accessibility needs, but also include environmental, social, and economic components. ADOT began discussing sustainability principles as FHWA first sent out a call to State DOTs to pilot the tool. INVEST provided the opportunity to connect the sustainability principles already under discussion at ADOT to actual activities. Key outcomes of ADOT's initial work with INVEST included:

- Scoring over 50 individual transportation projects using the PD checklist and developed recommendations for improvements to agency practices based on the evaluation;
- Integrating recommendations and sustainability concepts into ADOT manuals and guidance;
- Conducting sustainability trainings with internal ADOT departments and external stakeholders and partners; and
- Developing a Sustainability Award program to recognize ADOT projects and projects managers that go above and beyond, as measured by the INVEST score, best management practices, and collaboration.

What Is INVEST?

FHWA's INVEST is a web-based self-evaluation tool comprised of voluntary sustainability best practices, called criteria, which cover the full life cycle of transportation services, including system planning, project planning, design, construction, and operations and maintenance. FHWA developed INVEST for voluntary use by transportation agencies to assess and enhance the sustainability of their projects and programs.

The INVEST criteria are divided into four independent modules that are evaluated separately:

- System Planning for States (SPS);
- System Planning for Regions (SPR);
- Project Development (PD); and
- Operations and Maintenance (OM).

Although many agency and project efforts can already be considered sustainable, INVEST is focused on above and beyond efforts. INVEST will continue to raise the bar for agencies through future updates to criteria.

For more information visit the INVEST homepage.

ADOT Develops New Metrics to Measure Benefits of Sustainability Using INVEST

ADOT was an early champion of INVEST, and one of the few transportation agencies to use all of the INVEST modules to address sustainability goals across the entire transportation life cycle. ADOT is currently building upon prior sustainability efforts, including the previous use of INVEST, to develop quantitative measures for sustainability as a prioritization tool. As the transportation planning process becomes more focused on performance measures for project prioritization, there is a need to quantitatively measure the outputs of sustainability practices in order to have a more holistic view when conducting economic analyses. The initial measures ADOT's Sustainable Transportation Program is currently developing will enable practitioners to see the outputs of sustainability practices in terms of cost savings and accelerated project delivery, while also being able to report to the public and other stakeholders on the improved social and environmental conditions. In addition to the new economic measures, ADOT is further integrating sustainability into its work with the use of a project development checklist and improved education and outreach.

ADOT's PD scoring first focused on roundabout projects, such as this one. (Image courtesy of ADOT)

Economic analyses, such as benefit-cost analysis, have long been used by State DOTs as a tool for prioritizing proposed programs and projects. These economic analyses allow practitioners to quantitatively show senior-level management, as well as the public, the value of proposed programs and projects, increasing buy-in from all stakeholders. ADOT has proposed using INVEST to introduce Life-Cycle Assessment (LCA) into project and program development and connect sustainability to Life-Cycle Cost Analyses (LCCA) as an additional prioritization tool through the LCA PD criteria (PD-02). As described in FHWA's *A Primer On Pavement LCA*, LCA provides a comprehensive approach to evaluating the total environmental burden of a particular product (such as a ton of aggregate) or more complex systems of products or processes (such as a transportation facility or network), examining all the inputs and outputs over its life cycle, from raw material production to the end of the product's life. LCCA evaluates agency expenditures throughout the life of the expenditure, rather than only considering the initial investment. The goal of the LCCA is to promote the efficient use of materials and resources through the informed cost of using a product or implementing a program. LCCA can be viewed as the economic component of both LCA analysis and the three pillars of sustainability. ADOT hopes connecting sustainability to the traditional prioritization tools will launch the discussion of sustainable considerations sooner in the project development process. In addition, improved development of benefit-cost analysis, LCA, and LCCA should form the foundation to explore sustainable return on investment dynamics.

Another way ADOT intends to incorporate sustainability into its projects is through the implementation of a Project Development Checklist (PD Checklist). The PD Checklist is incorporated at the kickoff meeting for new projects as a way to ensure project managers and contractors consider various sustainable practices, especially with ADOT's growing use of alternative delivery methods such as design-build and public private partnerships. The PD Checklist is flexible, so each new project would include customized criteria from the PD module that are relevant and specific to that project. The PD Checklist incorporates much of the project planning, scoping, and design elements of the *Complete Transportation Guidebook*, ADOT's reference for integrating sustainable transportation practices into the project development process.

ADOT has identified several new corridor development projects, including the I-11 corridor project, to pilot INVEST and National Environmental Policy Act (NEPA) connectivity. INVEST scoring activities have already made their way into Environmental Analyses and Environmental Impact Statements in Arizona. The results are used to inform the public and the Alternative Selection Report, which compares and evaluates the options for moving forward with a proposed program or project. ADOT has undertaken a significant education and communications effort to explain to contractors the new methodologies and to better inform the public about the alternatives selection process. ADOT's innovative work reflects the rapidly progressing field of sustainability and transportation.

ADOT Continues to Push the Boundaries of Sustainability Using INVEST

For ADOT, INVEST was only the starting point. They continue to push the limits of sustainability practices to go above and beyond expectations and advance the field of sustainable transportation. For example, ADOT is exploring, through a joint FHWA Office of Asset Management, Pavements, and Construction effort, the possibility of producing Environmental Product Declarations (EPDs) to standardize the full environmental impact, in terms of energy use, waste generation, and material content, of pavement materials to input into LCA and LCCAs modeling. While EPDs are becoming more common in private sector construction projects, they are still virtually nonexistent for public sector transportation projects. The EPDs would provide the LCA and LCCA inputs for the pavement material. ADOT's cutting-edge work with EPDs, even in its early stages of development, is sparking new conversations around sustainability that make it more commonplace in the transportation planning process. INVEST not only leads to more sustainable design, but also aids in furthering lines of communication and collaboration among agency staff.

INVEST's Flexibility Lends Itself to Both Newcomers and Experienced Sustainability Practitioners

Although ADOT had a relatively advanced planning process that included elements of sustainability prior to 2010, INVEST proved to be a valuable resource for taking the first concrete steps towards improving and promoting sustainability. For State DOTs, Metropolitan Planning Organizations, and other transportation agencies that are new to sustainability and want to initiate the conversation, INVEST provides not only a starting point, but a guide forward. One of the largest hurdles to overcome when establishing sustainability practices or goals, is simply deciding where to start. However, the use of INVEST alone will not automatically lead to positive results; agency-wide buy-in and senior management support is essential. Project managers and engineers must feel comfortable enough to explore the new sustainability practices such as those included in INVEST for progress to be made in meeting the environmental, social, and economic needs of the community.

As new strides are made in the areas of sustainability and transportation, INVEST will be updated to remain current and a valuable tool for transportation practitioners. For more information, visit the INVEST homepage.

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Look What's New!

- The FHWA Office of Project Development and Environmental Review (HEPE) recently published "In-Depth Questions and Answers on the Changes to 23 U.S.C. 139 Relating to FHWA, FRA, & FTA Projects" on the Environmental Review Toolkit.
- The latest version of eNEPA, the free, web-based interagency collaboration tool for developing environmental documentation, is now available. Using feedback received from users, HEPE updated the tool to include customizable workflows, improved document review functions, and a dashboard.

Successes in Stewardship is a Federal Highway Administration newsletter highlighting current environmental streamlining and stewardship practices from around the country. Click here to subscribe, or call (617) 494-2013 for more information.