

Successes In Stewardship

Celebrating 10 Years

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Colorado DOT Analyzes Rest Area Sustainability

Across the country, State Departments of Transportation (DOT) are offering more amenities at public rest areas in order to meet the demands of travelers. Those amenities include more extensive landscaping, air conditioned facilities, and increased lighting. As a result, rest areas have become more energy-intensive. Many States are responding to this increased demand for energy by implementing initiatives to reduce or mitigate the environmental impacts of transportation infrastructure. In 2011, the Colorado DOT (CDOT) conducted the [Assessment of CDOT Rest Areas for Sustainability Improvements and Highway Corridors and Facilities for Alternative Energy Source Use](#). The study assessed the environmental sustainability at six of the 32 highway rest areas that CDOT owns or operates and included an assessment of alternative energy potential on CDOT rights-of-way. This issue of *Successes in Stewardship* highlights the rest area sustainability component of the study. The rest area sustainability study will guide the Agency in reducing greenhouse gas (GHG) emissions, energy use, and water consumption at CDOT rest areas, which will contribute to State sustainability goals while improving the efficiency of rest area operations.

Rest Area Sustainability Pilot Study

State agencies in Colorado have implemented a number of initiatives in response to several State Executive Orders, which influenced CDOT's rest area sustainability study. Beginning in 2005, the Governor of Colorado issued four State Executive Orders relating to sustainability. They outline State goals, objectives, and initiatives to reduce energy consumption by 20 percent below 2005 levels, water consumption by 10 percent, and petroleum consumption by 25 percent by July 2012. The State Executive Orders also include goals to decrease GHG emissions by 20 percent by 2020, construct all new State buildings to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver standards, and take other actions to reduce environmental impacts. CDOT initiated the rest area sustainability study to support the goals and objectives of the Executive Orders.



The Vail Pass Rest Area was built into a hill to help insulate the building, reducing heating and cooling costs. (Courtesy of CDOT)

To assess the sustainability of CDOT rest areas, CDOT hired Colorado State University researchers to conduct the study. The study was designed to evaluate each rest area using a broad understanding of sustainability. The team of researchers developed a sustainable criteria checklist, using concepts from LEED scoring criteria and the sustainability goals outlined in the four State Executive Orders. The checklist included questions about site conditions, recycling activities, environmental and context sensitivity, air quality, water and energy consumption, and the provision of services to the community.

After the research team created the criteria checklist, they conducted pilot analyses at six rest areas that represented a range of styles, sizes, and locations. Accounting for geographic diversity is particularly important in Colorado, due to the State's varied landscapes. The research team used the assessment criteria to conduct a site visit for each of the pilot rest areas. During the site visits, the team interviewed rest area staff responsible for site operations and maintenance, personal vehicle and truck visitation, landscaping operations, water and stormwater management, and other operational activities. The research team also reviewed utilities data, which provided insight into water, electricity, and fuel consumption at each

of the six rest areas. Using its findings from the site visits, the research team analyzed the financial, environmental, and social impacts of rest area operations.

In addition to tabulating and analyzing its observations, the research team calculated the carbon footprints of each of the six rest areas. The team considered Scope 1 emissions (on-site fossil fuel combustion), Scope 2 emissions (indirect emissions from electrical consumption), and Scope 3 emissions (uncontrolled emissions such as vehicle idling) in this analysis. Among the pilot rest areas, emissions ranged from 73 to 3,006 metric tons of carbon dioxide emissions per year. Emissions were substantially lower at recreational rest areas, which do not have areas for long-term freight parking. The team found that truck idling is the largest contributor to GHG emissions at rest areas.

Opportunities to Reduce Environmental Impacts

After conducting the site visits at the six rest areas, the research team identified a set of best practices to reduce energy consumption and environmental impacts at rest areas. Each of the rest areas in the study demonstrated good practices in sustainability. Some of the rest areas used native plants, which require less irrigation than non-native plants, and low-flow toilets to help reduce water consumption, which contribute to reduced energy costs. Similarly, some installed energy-efficient lighting to reduce energy consumption and overall operating costs. To reduce wildlife impacts, some of the rest areas provide open spaces for wildlife movement, minimizing the impacts to seasonal wildlife migration and helping to preserve the region's ecological balance.

CDOT used best practices to develop general recommendations, summarized in the box to the right, that could be incorporated at rest areas throughout the State to reduce energy consumption, curb GHG emissions, produce long-term rest area operation and maintenance cost savings, and improve the overall visitor experience. The Agency began implementing some of these recommendations, such as mulching lawn clippings and using energy-efficient lighting. CDOT is currently conducting further analysis to determine the cost-effectiveness and applicability of the study's other recommendations before making additional policy and management changes.

Learning from CDOT's Study and Others Around the Country

CDOT is not the only State DOT that is making its rest areas more sustainable; many States are reconstructing or retrofitting rest areas with facilities or technologies that reduce environmental impacts. Here are a few examples from other States:

- North Carolina DOT owns one LEED-certified rest area, which reports its real-time energy consumption on a public website (<http://www.nwncvisitorcenter.com>) and uses solar water heating.
- Minnesota DOT has a pilot program using geothermal and wind turbines at one rest area.
- New York State DOT is working on a sustainable design for rest area facilities.
- Vermont DOT uses a natural wastewater treatment process at one rest area.
- Pennsylvania DOT has a truck stop electrification facility, which has the potential to substantially reduce GHG emissions.
- State DOTs in Florida, Michigan, and Utah are researching alternative energy sources and energy-efficient practices at rest areas.

General Recommendations for Improving Sustainability at Rest Areas

- **Truck Electrification Facilities:** Provide truck electrification capabilities at rest areas.
- **Reduced Travel:** Develop strategies such as mulching lawn clippings to reduce fuel consumption for mowing and to transport personnel, equipment, waste, and other materials to and from the main CDOT maintenance facilities.
- **Efficient Lighting:** Use energy-efficient light bulbs, turn off the lights during daylight hours, install solar tubes or skylights, and use motion detectors to turn off the lights in restrooms when they are not in use.
- **Energy Audits:** Perform audits at all rest areas to reduce natural gas, propane, and electrical consumption.
- **Natural Shading:** Limit the use of air conditioning by using natural ventilation and tree shading. Trees can also sequester carbon from the atmosphere.
- **Alternative Energy:** Investigate the use of individual, solar-powered lights for walkways, parking, and safety lighting. Investigate on-site energy production. Explore ways to reduce the amount of fossil fuel consumption such as using biodiesel and electric power for rest area maintenance vehicles.
- **Vending Machine Location:** Place vending machines inside to avoid exposure to extreme outdoor temperatures.
- **Reduced Water Use:** Develop strategies to reduce water consumption, including low-flow toilets and less water-intensive landscaping.
- **Efficient Waste Treatment:** Ensure on-site wastewater treatment systems are optimized to reduce electrical consumption from pumps.
- **Reduced Hot Water Use:** Limit the use of hot water at rest areas or use solar-heated water systems and/or energy-efficient, on-demand heating systems.
- **Energy-Efficient Appliances:** Upgrade hot-air hand dryers to energy-efficient hand dryers for restrooms.

CDOT's rest area pilot study is a useful model for other States to assess the environmental impacts of State-owned transportation facilities. As States take a more active role in reducing GHG emissions, they can follow CDOT's lead to assess and measure sustainable activities and potentially save on costs in State-owned rest areas and other transportation-related facilities. Since rest areas receive many visitors annually, they can serve as effective places to raise awareness about programs aimed at reducing the environmental impacts of transportation facilities.

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Look What's New!

- The U.S. Environmental Protection Agency (EPA) recently issued [draft technical guidance](#) on using its Motor Vehicle Emissions Simulator (MOVES) model to estimate GHG emissions from on-road vehicles for developing inventories at the State and local levels. EPA is accepting comments on this draft guidance until March 31, 2012. Submit comments to Laura Berry at berry.laura@epa.gov.
- The Federal Highway Administration (FHWA) released the second edition of its [Eco-Logical Successes report](#) on Federal agency initiatives to promote the [Eco-Logical](#) approach to integrating ecosystem conservation into infrastructure development. The report highlights two programs: the Bureau of Land Management's program to develop a landscape approach for assessing and managing public lands and resources, and the U.S. Fish and Wildlife Service's Strategic Habitat Conservation Framework and Landscape Conservation Cooperatives. The report also provides an update on current FHWA activities promoting an ecosystem approach to conservation.

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