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Operations and Sustainability

Sustainability: Meeting the needs of the present without compromising the ability of future generations to meet their own needs.¹

Operations and Sustainability: Transportation professionals can promote sustainability by maximizing the efficiency of our current transportation system.

The environment, economics, and equity all play a role in sustainability. As an NTOC focus area, sustainability pertains to the environment, demonstrating how **Transportation System Management and Operations (TSM&O)** tools and strategies address climate change mitigation and adaptation issues. Transportation growth patterns and the development of transportation systems have a significant impact on our ability to sustain the world's environmental and economic resources. Transportation consumes 22 percent of energy, burns 25 percent of fossil fuels, and produces 30 percent of air pollution and greenhouse gases globally. To ensure sustainability, the transportation sector is pursuing strategies that address natural resource depletion, climate change, ecosystem disruptions, and pollution.

Transportation system management and operations is a suite of strategies that maximizes the efficiency of our existing transportation system, making it safer and more reliable for drivers, transit users, cyclists, and pedestrians. By reducing congestion and managing demand, operations strategies support sustainability through fuel savings and emissions reductions. Management and operations, while only one piece of the puzzle, offer sustainable solutions that can be put into place and expanded more quickly than many other measures, providing immediate greenhouse gas reductions and fossil fuel savings in the short term while other long-term solutions are being developed.

Examples of the operations strategies and their supporting intelligent transportation systems (ITS) technologies include:

- Traffic signal timing;
- Electronic tolling systems;
- Emergency and incident management;
- Improved traveler information;
- Speed harmonization via active traffic management;
- Access management;
- Integrated corridor management;
- Quick clearance; and
- Work zone management.

Operations strategies also have a role in adaptation to climate change through work zone management, evacuation plans, and emergency response plans.

TSM&O supports sustainability goals through:

Traffic Signal Timing

The 2007 *National Traffic Signal Report Card* found that improving traffic signal timing has a 40 to 1 or better return on investment, as state and local agencies that invested in signal timing found that every \$1 spent on technologies such as



1. World Commission on Environment and Development, 1987.



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synchronized and adaptive traffic signals returns \$40 or more to the public in time and fuel savings, while emissions are reduced by up to 22 percent. When combined with transit priority systems, smart signals can reduce fuel use for transit buses by up to 19 percent and reduce bus emissions by up to 30 percent.

Electronic Tolling

Electronic tolling reduces congestion, emissions, and fuel use, with the E-ZPass electronic tolling system reducing U.S. fuel consumption by almost 30 million gallons and eliminating nearly 265,000 metric tons of emissions in 2007. Baltimore, Maryland cut harmful emissions by 16 to 63 percent at upgraded toll plazas that implemented electronic toll systems. ITS systems such as PrePass, which electronically verifies the safety, credentials, and weight of trucks, reduced delays in 2008 by more than 4.6 million hours, eliminated nearly 111,000 metric tons of emissions, conserved more than 11 million gallons of fuel, and saved U.S. truckers an estimated \$486 million.

Incident Management

Traffic incident management programs have demonstrated success in improving mobility, safety, efficiency, productivity, energy and environment, and customer satisfaction. Traffic incident management programs make use of a variety of ITS technologies to successfully detect, manage, and clear traffic incidents, improving safety for travelers by reducing the risk of secondary crashes and reducing time lost and fuel wasted in traffic backups. The most significant findings of traffic incident management programs are the ability to dramatically reduce the duration of traffic incidents, from 15 to 65 percent, with the bulk of studies finding savings of 30 to 40 percent. In the state of Georgia, the NaviGator incident management program reduced annual fuel consumption by 6.83 million gallons and contributed to decreased emissions, as carbon monoxide emissions fell by 2,457 tons, hydrocarbon emissions declined by 186 tons, and nitrous oxide emissions decreased by 262 tons.

Traveler Information

Studies have shown that integrating traveler information with traffic and incident management systems could reduce emissions by up to 3 percent and could improve fuel economy by about 1.5 percent.

ABOUT NTOC

The National Transportation Operations Coalition (NTOC) serves as an important foundation for institutionalizing management and operations into the transportation industry. This alliance of national associations, practitioners, and private sector groups represent the collective interests of stakeholders at state, local, and regional levels who have a wide range of experience in operations, planning, and public safety.

For more operations benefits related to sustainability, visit the NTOC Web site at www.ntoctralks.com.