



BlueTOAD is Green!

How BlueTOAD Minimizes Environmental Impact of Road Sensors and Supports Sustainability

BlueTOAD™ by TrafficCast is an advanced traffic monitoring technology that detects anonymous Bluetooth signals from passing vehicles. Subsequent detections by BlueTOAD devices along the road are matched through rigorous filtering and integrated processing to determine travel times, road speeds and route behaviors.

This note assumes understanding of BlueTOAD feature benefits and deployment strategies. Instead, it highlights environmental benefits of BlueTOAD and its potential contribution to sustainability in the planning and operations of road networks.

- **Value of Accurate Travel-time Information** – The most critical variable in commuters' choice of route and transportation mode as well as the overall management of a transportation network is travel time, as investigated across a number of studies in the Transportation Research Board's (TRB) second Strategic Highway Research Program (SHRP 2). Until recently, travel time could not be (or only very expensively) measured directly, but only derived from sensor determination of fixed-point road speeds. BlueTOAD enables direct travel time measurement through a cost-effective system that is flexible to install.

The environmental benefits of accurate travel time informing route choice are significant. In May 2009, McKinsey & Company published an extensive study of carbon emissions due to transportation, evaluating alternative approaches to carbon emissions abatement. It focused on factors such as benefit vs. investment, near- and long-term measures, new vehicle technologies and their influence on the universal vehicle fleet and finally the impact of traffic flow, travel times and driving behavior. One particularly relevant conclusion:

"...Improving traffic flow and driving behavior yield a per-tonne (of CO₂ abated) benefit to society that is greater than the average benefit from fuel-efficiency measures. A number of these <traffic mitigation> measures could be achieved in relative short order, making them especially attractive for the period from 2010 to 2020..."¹ (see chart on last page)

¹ *Roads Toward a Low Carbon Future: Reducing CO₂ emissions from passenger vehicles in the global road transportation system*, McKinsey & Co., May, 2009

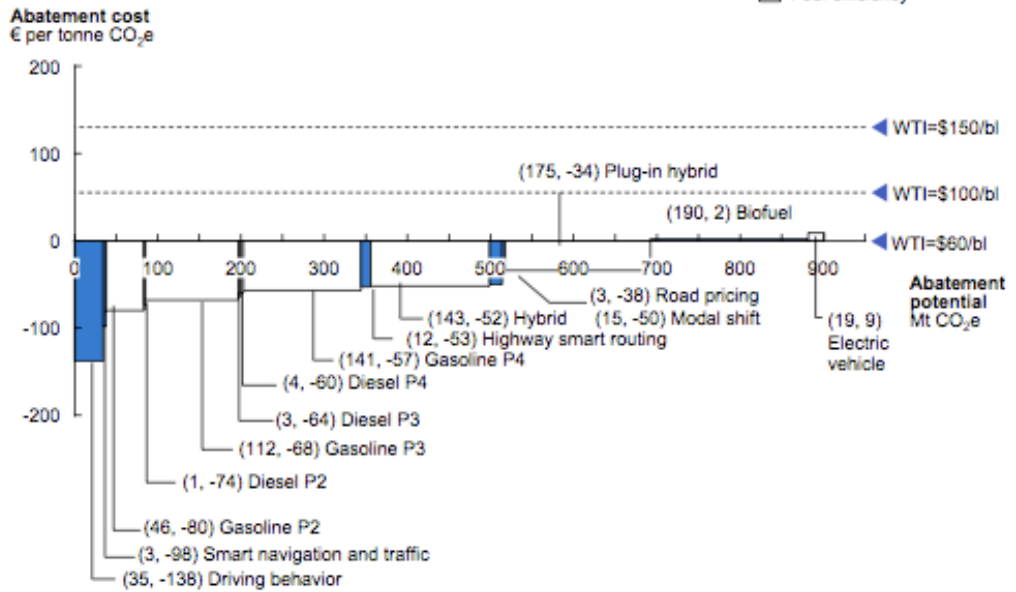
- **Energy consumption – Independent Operation:** When configured for cellular data backhaul powered by a battery, required energy is refreshed by a solar panel. The panel is certified to produce sufficient charging capacity across all latitudes in the United States, in temperatures ranging from – 30°C to 60°C (approximately -22°F to 140°F). As such, BlueTOAD consumes zero carbon-based fuels for operations.
- **BlueTOAD Battery** – Lead-acid batteries are considered an environmental success story. More than 80% of lead produced in the United States is used in lead-acid batteries and 98% of all battery lead and plastic is recycled.
- **Energy Consumption – Integrated Operation:** When configured to operate with a local power source and wired data connection, BlueTOAD is designed to typically draw 80 mA of electricity, far less than comparable sensors. When communicating data through an existing data channel, BlueTOAD can even operate through highly efficient Power Over Ethernet (POE).
- **Installation** – BlueTOAD can adapt to a variety of installation scenarios; it is a rare circumstance when any new infrastructure is required. With its compact size and weight, and optional independent operation, BlueTOAD can be affixed to round light poles, I-beam sign supports, oblong overpass pilings, or just about any existing roadside structure. In integrated operations, BlueTOAD is again using existing infrastructure such as signal cabinets. As a result, the environmental impact of BlueTOAD installation is negligible.
- **Maintenance** – BlueTOAD software enables automated systems monitoring, Over the Air (OTA) diagnostics and device reboot. Barring catastrophic events (e.g. physical assault, vehicular crashes, direct lightning strikes), it is highly unlikely that any on-site maintenance of BlueTOAD units will be required following installation.
- **About TrafficCast** - *TrafficCast is the leader in travel time forecasting and traffic information, developing technology, applications and content for the interactive, mobile, enterprise and public sector markets. TrafficCast analyzes real-time data from expressways and major arterials as well as information from secondary and tertiary roadways, weather conditions, roadway incidents and events, construction, and historical traffic patterns. The company is based in Madison, Wisconsin, with offices in Los Angeles, Philadelphia, Atlanta and Shanghai. <http://trafficcast.com/>*

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Exhibit B-1

CO₂ abatement curve for passenger vehicles in North America: Mixed-technology scenario – 2030



Source: McKinsey analysis

“Exhibit B-1”: Chart illustrating relative value of various approaches to mitigating carbon emissions due to transportation from *Roads Toward a Low Carbon Future: Reducing CO₂ emissions from passenger vehicles in the global road transportation system*, McKinsey & Co., May, 2009