Working to Achieve Sustainable Freight Systems

A detailed look at emissions, regulations, technology, and environmental management approaches to manage the environmental concerns of trucks, ships, trains, planes, and their supporting infrastructure.
The global economy continues to expand, and with it, the worldwide movement of goods has accelerated. Ships, trains, planes, and trucks crisscross our planet in complex supply chains and logistics systems at a scale that is truly phenomenal.

Global trade has helped raise standards of living throughout the world, but along with these benefits come significant environmental costs. Our modes of freight transportation are powered almost entirely by fossil fuels; and the burning of fossil fuels is a leading contributor to anthropogenic emissions of greenhouse gases (GHGs), criteria pollutants, and hazardous air toxics. Additionally, the physical infrastructure built to facilitate goods movement and modal transfers—for example, ports and their vast array of cargo-handling equipment—represents major stationary and area sources of air and water pollution.

Nonetheless, solutions exist, and this issue of *EM* is directed at exploring the ways and means for achieving more sustainable freight systems. The first article, written by Suzanne Greene (MIT) and Alan Lewis (Smart Freight Centre), provides a uniform approach for calculating GHG emissions for supply chains through the Global Logistics Emissions Council. Standardizing methodologies for GHG accounting is critically important for successful GHG emissions management.

Focusing on the trucking sector, in the second article, John Koupal (ERG) writes about the health impacts of heavy-duty vehicles and the movement toward cleaner vehicles through technology and policy implementation. In particular, the use of after-treatment devices (stimulated by aggressive emissions standards), combined with efforts to retire older trucks, has been a successful model in the United States and one that can be replicated elsewhere.

Another option for cleaner trucks is the use of alternative fuels. In the third article, Erik Neandross (Gladstein, Neandross & Associates) discusses the role that natural gas can play as a fuel for heavy-duty vehicles. The use of low-nitrogen oxides natural gas internal combustion engines is argued as a viable solution for many of the environmental problems the sector faces, especially if the natural gas comes from renewable sources.

The fourth article, written by Cheryl Bynum, Chien Sze, and Matthew Payne (U.S. Environmental Protection Agency [EPA]), describes U.S. government efforts to encourage firms to embrace fuel efficiency and emissions improvements along the entire supply chain through the EPA’s “SmartWay” Program. This program includes more than 3,000 participants who have access to data exchanges and evaluation tools that help them achieve emissions reductions and identify other stakeholders willing to collaborate to achieve similar goals.

Moving onto global shipping, the fifth article, by James Winebrake (RIT), James Corbett (University of Delaware), and Dan
Yuska (U.S. Maritime Administration), explores the advantages and disadvantages of using natural gas as a marine fuel. Air pollution from shipping is currently responsible for tens of thousands of premature mortalities annually and efforts are underway to reduce these emissions through the use of natural gas fuels. However, the article demonstrates that natural gas fueling systems must be carefully implemented to reduce both local pollutants and GHGs.

Lastly, Michael Christensen (Port of Long Beach) describes efforts to curtail emissions at two of the busiest ports in the world: the Port of Long Beach and the Port of Los Angeles. These ports have implemented numerous programs to reduce their emissions profile, including requiring vessel speed reductions near port, providing vessel shore power from the grid, and mandating clean truck operations within the port area. These ports are an exemplar for ports worldwide.

Moving toward a sustainable freight system is one of our greatest challenges. Pressure to improve the environmental performance of goods movement will only increase as global trade continues to expand. This issue of EM provides a playbook of sorts on how different policies, technologies, and fuels can be used to reduce many of these emissions. What is now needed is the will from both the public and private sectors to implement these approaches into supply chains worldwide.

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In Next Month’s Issue…

Air Quality in the Western States

Air quality issues in the Western United States can differ from those in the rest of the nation, due to differences in population, energy sources, geography, climate, and other factors. Key issues in Western states include attainment of national ambient air quality standards (NAAQS), especially ozone (including considerations of exceptional events and international emissions), and visibility/regional haze. Interstate transport measures in state plans to meet tighter NAAQS are receiving greater attention. Fire management and wood burning are key issues for Western state air quality.