A Synthesis of Carbon Accounting Tools with Applicability to the Trucking Industry

The Problem

In late 2009, the U.S. Environmental Protection Agency acknowledged that documentation requirements for greenhouse gas emissions could be better implemented by fuel suppliers than by motor carriers and, consequently, did not require carriers to report their emissions. Despite this decision, quantifying greenhouse gas emissions, i.e. carbon accounting, continues to be an emerging issue for trucking fleets; particularly as shippers seek to identify the greenhouse gas emissions generated by their supply chains. In response, trucking companies are being asked to quantify greenhouse gas emissions.

Research Goal

This research reviewed and analyzed a range of greenhouse gas reporting tools and emissions models to assess their consistency and applicability to the trucking industry. Based on this research, current carbon models with application to the trucking industry have been identified as well as issues needing further guidance. Motor carriers may use this research to quantify potential sources of greenhouse gases within their operations.

Methodology

In addition to a comprehensive literature review, ATRI's research methodology involved the collection and analysis of carbon models and formulas, and interviews with environmental assessment and reporting organizations. ATRI also collaborated with a European research organization with expertise in the development of freight-related greenhouse gas quantification methodologies. Given the global interest in emissions reporting, there is a growing need for data and model standardization. This research also identifies where inconsistencies in the quantification tools and models exist.

Findings

For many motor carriers, the U.S. EPA SmartWay Partnership Truck Model is the most widely recognized tool for quantifying greenhouse gas emissions. This model calculates emissions generated from a company's on-road vehicle fleet. However, an individual company's carbon footprint encompasses more than just its on-road vehicle fleet.

Greenhouse gas emissions are generally divided into three distinct classifications or scopes. Scope 1 includes direct emissions from the combustion of fuel as well as evaporative fluorocarbon emissions associated with the use of refrigerants. Potential Scope 1 emission sources include:
— Trucks and ancillary equipment used to transport freight, such as those accounted for in the SmartWay model;
— Mobile equipment used at company facilities, such as yard tractors and forklifts;
— Stationary equipment used at company facilities, such as furnaces, generators and other on-site fuel-burning equipment; and
— Air conditioning and/or refrigeration systems used in trucks and trailers as well as at company facilities.

Emission factors for the various types of fuels and refrigerants used in this equipment are generally available; however, subtle differences exist among the various accounting tools. For instance, emission factors for biodiesel were not consistent and leakage rates among refrigerants varied by a factor of five. Refinements to these methodologies could improve their applicability to the trucking industry.

The next classification, known as Scope 2, includes the indirect emissions associated with the purchase and use of electricity. While direct emissions associated with producing electricity occur at the electrical power plant, each trucking facility adds these as indirect emissions to the trucking companies total greenhouse gas emissions.

Although emission factors for the purchase of electricity are available for locations throughout the United States, the greenhouse gas emissions generated from electricity purchased in one part of the country can be twice as high as the same amount of electricity purchased in another part of the country.

Finally, Scope 3 is an optional reporting classification that includes the upstream and downstream emissions associated with various business-related activities. These activities can include business travel, employee commuting, the transportation of products using non-company owned vehicles and other related activities. This classification encompasses what are considered the “life-cycle” emissions associated with the principal business activity. Given the optional nature of this classification as well as its complexity, limited guidance and consensus exists as to how to account for these emissions. Efforts to develop additional Scope 3 guidance are underway.

The issue of carbon accounting is both technical and complex. There are a number of areas where further guidance is needed to better quantify the greenhouse gas emissions generated by motor carriers. However, it should be recognized that precision may be sacrificed when data reporting is done at the energy consumer level, e.g. a motor carrier, as opposed to the energy producer level.

Nonetheless, for carriers looking to quantify their greenhouse gas emissions, a number of reporting entities and tools exist in the U.S. and internationally which have been identified in this report. Several organizations are currently working to refine the methods used to estimate greenhouse gas emissions, especially among the supply chain. Companies are also developing their own carbon calculators to help customers estimate the carbon impacts of the services they use. While the reporting tools are generally similar, there are differences between accounting methods which can impact the reported level of emissions. For companies developing a carbon accounting framework, the consistency of the accounting method and the appropriateness of the assumptions used to quantify emissions are two important areas of focus.

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