Tools for Carriers to Measure and Benchmark Environmental Performance

Tool	Description	Cost	Reference
EPA, Freight Carrier FLEET Model	Spreadsheet-based model used to estimate emissions reductions and to generate the SmartWay score. Covers rail and truck sources in the US. Evaluates vehicle technologies and operational strategies. See SmartWay 2.0 Model for more information. This model has bee been replaced by the 2.0 version described below.	Free	Available for download at: http://www.epa.gov/smartway/transport/partner-resources/resources-complete.htm#tools
EPA SmartWay 2.0 Truck Model	Extends beyond trucking to encompass entire supply chain. The SmartWay 2.0 Truck Model is part of Since carbon is produced from fuel combustion, SmartWay's goal of reducing carbon emissions complements industry's goal of lowering fuel costs and fuel consumption.	Free	Download User Guide: http://www.epa.gov/smartway/transport/documents/fleet-models/truckingmodel-userguide-recent.pdf

EPA, SmartWay 2.0 Models for Other Modes (forthcoming)	A suite of SmartWay models that collect carbon inventory and efficiency information from all freight transportation modes. SmartWay created the new SmartWay 2.0 system models in 2009.
	
	Marine:
	• Data for ocean vessels available from Lloyds
	• Emission factors by type and general size
	• Companies can provide additional information to improve their score
	• Inland Sea (barge): working with barge companies; anticipated company-level data
	
	Air:
	• Domestic Companies:
	  ○ Data available from FAA
	  ○ Emission factors by company
	  ○ Companies can provide additional information to improve their score
	• International:
	  ○ No data available
	  ○ Default values will be used if airlines do not supply the data
		Free	http://www.epa.gov/smartwaylogistics/transport/documents/webinars/smartway-for-carriers-101-webinar.pdf

	Rail: • Class 1 Data available from FRA, public sources • Model developed for refined class 1 and class 2 and 3 data		
EPA SmartWay DrayFLEET Model	EPA, in collaboration with FHWA, developed the DrayFLEET model to assess truck emissions, and various technical and management options for reducing emissions and fuel consumption from truck drayage activity. Options that can be assessed by the model include expanded gate hours, appointment systems, chassis pools, virtual container yards, on-dock or near dock rail, and truck scrappage programs. In addition, the user will also be able to assess technological options targeted to drayage trucks including diesel oxidation catalysts, particulate filters, and idle reduction technologies.	Free	http://www.epa.gov/smartway/transport/partner-resources/resources-drayage.htm
EPA, Diesel Emissions Quantifier	The Diesel Emissions Quantifier (Quantifier) is an interactive tool to help state/local governments, fleet owners/operators, school districts, municipalities, contractors, port authorities, and others to estimate emission reductions and cost effectiveness for clean diesel projects. Estimates are made using specific information about a fleet. If you are applying to EPA, or some other Federal or state/local funding assistance program, this site will help you to prepare and submit your diesel emissions data to EPA. EPA has built the Quantifier based on existing EPA tools and guidance and it can be used by potential grantees, state and local governments, metropolitan planning organizations, and fleet owners and operators, among others. The Quantifier uses emission factors and other information from EPA's National Mobile Inventory Model (NMIM). NMIM includes the MOBILE 6.2 and NONROAD2005 models.	Free	Tool resources: http://cfpub.epa.gov/quantifier/view/index.cfm More basic information: http://cfpub.epa.gov/quantifier/view/info.cfm
Environmental Defense Fund, Greenhouse Gas Emissions Calculator	This tool helps a carrier measure its GHG emissions using fuel consumption data. A carrier can enter aggregate fuel-use data for its entire fleet or specific data for different types of fuels and vehicles.	Free	http://innovation.edf.org/page.cfm?tagid=37020
BSR Environmental Performance Survey for Ocean Carriers	The Clean Cargo Working Group of Business for Social Responsibility conducts an annual survey of the environmental performance of ocean carriers. Carriers submit metrics data and survey annually. The survey also gathers qualitative information on carriers' environmental management and performance. The survey relies on a standardized set of performance metrics regarding	Unknown fee associated	http://www.bsr.org/consulting/working-groups/CCWG_Overview_2010.pdf

	air emissions, water effluents, waste management, chemical use, EMSs, vessel recycling, and transparency.		
Energy and Environmental Accounting and Reporting System (EMISTRA) (Finland)	EMISTRA is a useful and affordable tool for energy consumption and emissions monitoring and reporting. It is intended to help Finnish carriers calculate their energy consumption and vehicle emissions. Carriers can also compare the results of their own activities to the average results obtained from the tool's statistical database system.	Free for transport companies in Finland	http://www.emistra.fi/index_emistra.asp
ConsoComparateur (France)	Funded by the French Environment and Energy Management Agency (ADEME), this online benchmarking tool allows carriers to calculate the fuel efficiency of individual driver-truck pairs and compare them to reference values for similar vehicles in similar operating conditions.	Unknown fee associated	http://www.energeco.org/index.php?page=projet&p=5_1_0_0
CO_2 Ruler (Netherlands)	This is a CO_2 yardstick for transport and logistics service providers. It calculates CO_2 emissions and compares performance to that of "co-transporters."	Unknown fee associated	http://www.duurzamelogistiek.nl/toolbox/berekenen-van-emissies/co2-meetlat/
Fleet Performance Management Tool (U.K.)	This tool allows carriers to monitor their performance for any number of vehicles over any number of years. In addition to traditional operational performance metrics, it calculates CO_2 emissions and will show CO_2 emission per kilometer or per unit carried per kilometer (e.g., per ton-km). The tool provides a mechanism for a fleet manager to manager to accurately measure Key Performance Indicators within their own fleet, or to internally benchmark.	Free	http://www.freightbestpractice.org.uk/performance-management
On Line Benchmarking Tool (OLB) (U.K.)	Offered by the U.K.'s Freight Best Practices Program, this tool allows truck carriers to benchmark their operations externally and anonymously. This tool includes a Key Performance Indicators (KPIs) related to fuel use and CO_2 emissions. OLB is a useful performance management tool that allows an operator to compare their operational performance across a range of 13 Key Performance Indicators (KPIs), covering aspects such as fuel, safety, vehicle utilization, and customer satisfaction. Benchmarking reports can be run on a continuous basis and instant updates on a carrier's performance are available as further data is added to the system.	Free	http://www.freightbestpractice.org.uk/benchmarking http://www.onlinebenchmarking.org.uk/
Association of American Railroads (AAR), Train Energy Model (TEM)	The Train Energy Model (TEM) developed under the AAR's Energy Program is a train performance simulator used to predict fuel consumption for any train on any route.	Free (?)	http://findarticles.com/p/articles/mi_m1215/is_n12_v193/ai_13262066/?tag=content;col1 AAR Website: http://www.aar.org/Homepage.a

			spx
University of Delaware, Total Energy & Emissions Analysis for Marine Systems (TEAMS) Model	The Total Energy & Emissions Analysis for Marine Systems Model (TEAMS) is the first-ever model able to calculate total fuel-cycle emissions and energy use for marine vessels. TEAMS captures "well-to-hull" energy use and emissions - that is, energy and emissions along the entire fuel pathway (extraction -> processing -> distribution -> use in vessels). TEAMS conducts analyses for six fuel pathways: (1) petroleum to residual oil; (2) petroleum to conventional diesel; (3) petroleum to low-sulfur diesel; (4) natural gas to compressed natural gas; (5) natural gas to Fischer-Tropsch diesel; and, (6) soybeans to Biodiesel. TEAMS calculates total fuel-cycle emissions of three greenhouse gases (carbon dioxide [CO_2], nitrous oxide [N_2O], and methane [CH_4]) and five criteria pollutants (volatile organic compounds [VOCs], carbon monoxide [CO], nitrogen oxides [NO_x], particulate matter with aerodynamic diameters of 10 micrometers or less [PM10], and sulfur oxides [SO_x]). TEAMS also calculates total energy consumption, fossil fuel consumption, and petroleum consumption associated with each of its six fuel cycles. TEAMS can be used to study emissions from a variety of user-defined vessels, including cargo ships, passenger ferries, and container ships.	Free	http://www.rit.edu/cla/teams/

Tools for Shippers to Measure and Benchmark Environmental Performance

Tool	Description	Cost	Reference
Shipper/Logistics FLEET Model	Covers information related to shippers. Evaluates operational strategies outside of carrier fleets. The Shipper/Logistics (S/LM) model is the measurement tool that EPA uses to demonstrate the beneficial actions that companies are taking to save fuel and reduce emissions. The Shipper/Logistics model is a *required* part of a Shipper/Logistics Partner's participation in the SmartWay Transport Partnership. In addition, it can help you calculate the emissions from: ▪ the trucking companies you hire. ▪ the rail services you use. ▪ the equipment at your facilities. ▪ the trucks idling at your facilities.	Free	Available for download at: http://www.epa.gov/smartway/transport/partner-resources/resources-complete.htm#tools Download User Guide: http://www.epa.gov/smartway/documents/shipper-logistics-model-user-guide-2008.pdf

EPA SmartWay 2.0 Shipper/ Logistics FLEET Model (forthcoming)	• Will be able to calculate carbon footprint of freight operations
	• Will determine the freight efficiency of the shipper: overall, by mode, and within mode.
	• Will incorporate additional shipper efficiencies
	  ○ Optimization
	  ○ Packaging
	  ○ Reduced miles
	• Will include a performance score similar to carriers
		Free	http://www.epa.gov/smartwaylogistics/transport/documents/webinars/smartway-for-carriers-101-webinar.pdf

YRC Logistics Enhanced SmartWay Shipper Fleet Performance Model	YRC Logistics expanded the EPA Shipper Fleet Performance Model to include ocean and rail transportation emissions, and has the tools to model emissions associated with fuel usage for commercial cargo and passenger aircrafts; heavy-duty diesel engines on the road, rail and sea; facility equipment (e.g., forklifts); and idling vehicles on a facility lot.	Unknown fee associated	https://www.yrcw.com/green/green_alliances.html
AAR Carbon Calculator	AAR's carbon calculator estimates the amount of CO_2 emissions that can be prevented by using freight rail instead of trucks. It will also tell the user how many seedlings would need to be planted to have the same effect.	Free	http://www.aar.org/Home/AAR2/Environment/EconomicCalculator.aspx
Walmart Supplier Sustainability Index and Assessment	The index will be a "simple, convenient, easy to understand" way of conveying the sustainability of any particular product sold by Walmart. How that information is delivered to consumers is still undetermined. Walmart is providing its more than 100,000 global suppliers with a brief survey to evaluate their own companies' sustainability. The questions will focus on four areas: energy and climate; material efficiency; natural resources; and people and community. Emissions from transport will likely only be a small portion of the environmental impacts of any particular suppliers or product.	Cost of Index is undetermined at this point	http://walmartstores.com/Sustainability/9292.aspx http://walmartstores.com/download/3879.pdf
BSR Intermodal CO_2 Calculator	The Clean Cargo Working Group of the Business for Social Responsibility offers to its members a "customized" Intermodal CO_2 Calculator for calculating and comparing the carbon footprint of multiple modes of transportation: • Calculates the absolute carbon emissions associated with moving goods from place to place • Uses the best available emissions factors, including primary data from Clean Cargo carriers • Is consistent with WRI's GHG Protocol methodology	Unknown fee associated	http://www.bsr.org/consulting/working-groups/CCWG_Overview_2010.pdf

	• Accommodates all modes (ocean, rail, air, road)		

Non-Environmental Benchmarking Tools for Carriers and Shippers

Tool	Description	Cost	Reference
Wayne State University's Trucking Industry Benchmarking Program	The Trucking Industry Benchmarking Program provides performance measurements that are useful for motor carrier management. This online system allows for efficient data entry and rapid turnaround of benchmark output. This system is being used by the California Trucking Association to benchmark carrier safety performance and by OOIDA to benchmark owner-operator cost of operations. The program is also offering a benchmarking service for LTL carriers. None of these offerings collect data regarding fuel economy or environmental impacts.	The Sloan Foundation has underwritten the program's development cost, but it is intended to become self-supporting.	http://www.ilir.umich.edu/TIBP/index.cfm
APQC Logistics Benchmarking	By participating in APQC's benchmarking survey, logistics professionals can discover new opportunities for: defining a logistics strategy, planning inbound material flow, overseeing warehousing, managing outbound transportation, and managing returns. By comparing your organization's performance to the top performers, you will be able to identify areas that may require attention and resources to keep up with or stay ahead of your competitors.	Unknown fee associated	http://www.apqc.org/portal/apqc/site?path=/research/bmm/osbc/sc/logistics/index.html Summary of Logistics Performance Measures: http://www.apqc.org/portal/apqc/ksn/sc_logistics_20070713.pdf?paf_gear_id=contentgearhome&paf_dm=full&pageselect=contentitem&docid=135352

Widescale, Public-Sector Tools (e.g., national, state)

Tool	Description	Cost	Reference
EPA, MOBILE6	MOBILE is an EPA model for estimating pollution from highway vehicles. MOBILE calculates emissions of hydrocarbons (HC), nitrogen oxides (NO_x), and carbon monoxide (CO) from passenger cars, motorcycles, light- and heavy-duty trucks. The model accounts for the	Free	Download Tool: http://www.epa.gov/otaq/m6.htm

	emission impacts of factors such as changes in vehicle emission standards, changes in vehicle populations and activity, and variation in local conditions such as temperature, humidity and fuel quality. MOBILE is used to calculate current and future emission inventories of these emissions at the national and local level. These inventories are used to make decisions about air pollution policy at the local, state and national level. Inventories based on MOBILE are also used to meet the federal Clean Air Act's State Implementation Plan (SIP) and transportation conformity requirements, and are sometimes used to meet requirements of the National Environmental Protection Act (NEPA).		
EPA, MOVES2010	MOVES2010 is the state-of-the-art upgrade to EPA's modeling tools for estimating emissions from highway vehicles, based on analysis of millions of emission test results and considerable advances in the Agency's understanding of vehicle emissions. MOVES2010 replaces the previous model for estimating on-road mobile source emissions, MOBILE6.2.	Free	http://www.epa.gov/otaq/models/moves/index.htm
National Mobile Inventory Model (NMIM)	EPA's National Mobile Inventory Model (NMIM) is a free, desktop computer application that can develop estimates of current and future emission inventories for on-road motor vehicles and nonroad equipment. NMIM uses current versions of MOBILE6 and NONROAD to calculate emission inventories, based on multiple input scenarios that the user enters into the system. NMIM can calculate national, individual state, or county inventories.	Free	http://www.epa.gov/OMS/nmim.htm
EPA, NONROAD 2008 a Model	NONROAD2008 is major update of the NONROAD model and it supersedes all previous versions of this model, most recently NONROAD2005. It calculates past, present, and future emission inventories (i.e., tons of pollutant) for all nonroad equipment categories except commercial marine, locomotives, and aircraft. Fuel types included in the model are: gasoline, diesel, compressed natural gas, and liquefied petroleum gas. The model estimates exhaust and evaporative hydrocarbons (HC), carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter (PM), sulfur dioxide (SO_2), and carbon dioxide (CO_2). The user may select a specific geographic area (e.g., national, state, or county) and time period (e.g., annual, monthly, seasonal, or daily) for analysis. Relevant freight related non-road equipment covered includes equipment used at ports & distribution centers such as forklifts and cranes, among other sources.	Free	FAQ Document: http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2008/420f09021.pdf Download Tool: http://www.epa.gov/otaq/nonrdmdl.htm
California Air Resources	Emission factors that represent the vehicle fleet, speeds, and environmental conditions associated with a project are needed to perform	Free	http://www.dot.ca.gov/hq/env/air/pages/emfac.htm

Board, EMissions FACtor 2007 Software (EMFAC)	project-level air quality modeling. In California, the EMFAC model issued by the California Air Resources Board is used for this process. Calculates emission inventories for motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways, and local roads in California. In the EMFAC model, the emission rates are multiplied with vehicle activity data provided by the regional transportation agencies to calculate the statewide or regional emission inventories.		
UC Riverside, Comprehensive Modal Emissions Model (CMEM)	CMEM was initially developed in the late 1990's with sponsorship from the National Cooperative Highway Research Program (NCHRP) and U.S. EPA to fulfill the need for microscopic emissions modeling. This type of model is necessary for evaluating emissions benefits of project-level or corridor-specific transportation control measures (e.g. HOV lanes), intelligent transportation systems (ITS) implementations (e.g. electronic toll collection), and traffic flow improvements (e.g. traffic signal coordination). CMEM is microscopic in the sense that it predicts second-by-second tailpipe emissions and fuel consumption based on different modal operations from in-use vehicle fleet. One of the most important features of CMEM is that it uses a physical, power-demand approach based on a parameterized analytical representation of fuel consumption and emissions production. In this type of model, the entire fuel consumption and emissions process is broken down into components that correspond to physical phenomena associated with vehicle operation and emissions production. Each component is modeled as an analytical representation consisting of various parameters that are characteristic of the process. These parameters vary according to the vehicle type, engine, emission technology, and level of deterioration. One distinct advantage of this physical approach is that it is possible to adjust many of these physical parameters to predict energy consumption and emissions of future vehicle models and applications of new technology (e.g., after-treatment devices).	Free	General Information: http://www.cert.ucr.edu/cmem/ Download Model: http://www.cert.ucr.edu/cmem/model.html
System for Assessing Aviation's Global Emissions (SAGE)	SAGE was a high fidelity computer model used to predict aircraft fuel burn and emissions for all commercial (civil) flights globally. The model was used to analyze scenarios from a single flight to airport, country, regional, and global levels. In addition, SAGE dynamically modeled aircraft performance, fuel burn and emissions. The United States Federal Aviation Administration (FAA) Office of	Free	http://www.faa.gov/about/office_org/headquarters_offices/aep/models/sage/

	Environment and Energy (AEE) developed SAGE with support from the Volpe National Transportation Systems Center (Volpe), the Massachusetts Institute of Technology (MIT) and the Logistics Management Institute (LMI). Its purpose was to provide FAA, and indirectly the international aviation community, with a tool to evaluate the effects of various policy, technology, and operational scenarios on aircraft fuel use and emissions. Concluded at Version 1.5, SAGE was not developed for use on a stand-alone personal computer; it was an FAA government research tool. Results from the model were made available to the international aviation community.		
Aviation Environmental Design Tool (AEDT)	AEDT is a software system that dynamically models aircraft performance in space and time to produce fuel burn, emissions and noise. Full flight gate-to-gate analyses are possible for study sizes ranging from a single flight at an airport to scenarios at the regional, national, and global levels. AEDT is currently used by the U.S. government to consider the interdependencies between aircraft-related fuel burn, noise and emissions. AEDT is also being developed for public release, and will become the next generation aviation environmental consequence tool, replacing the current public-use aviation air quality and noise analysis tools such as the Integrated Noise Model (INM – single airport noise analysis), the Emissions and Dispersion Modeling System (EDMS – single airport emissions analysis), and the Noise Integrated Routing System (NIRS – regional noise analysis).	Free	http://www.faa.gov/about/office_org/headquarters_offices/aep/models/aedt/
Federal Aviation Administration (FAA), Emissions and Dispersion Modeling System (EDMS)	Developed by FAA to specifically address the impacts of airport emission sources, including ground level sources and associated support activity. FAA requires the use of the model in performing air quality analyses for aviation sources. The model can separate aircraft by mode (cargo) but cannot separate aircraft which carry both cargo and freight. The Emissions and Dispersion Modeling System (EDMS) is designed to assess the air quality impacts of airport emission sources, particularly aviation sources, which consist of: • Aircraft • Auxiliary power units • Ground support equipment • Ground access vehicles • Stationary sources	Free	http://www.faa.gov/about/office_org/headquarters_offices/aep/models/edms_model/

	EDMS is one of the few air quality assessment tools specifically engineered for the aviation community. It includes: • Emissions and dispersion calculations • The latest aircraft engine emission factors from the International Civil Aviation Organization (ICAO) Engine Exhaust Emissions Data Bank • Vehicle emission factors from the latest version of the Environmental Protection Agency's (EPA) MOBILE6 model • EPA-validated dispersion algorithms • Emissions data for criteria pollutants and speciated organic gas emissions OGs (45 HAPs and 349 non-toxic compounds).		
Argonne National Laboratory, GREET Model	To fully evaluate energy and emission impacts of advanced vehicle technologies and new transportation fuels, the fuel cycle from wells to wheels and the vehicle cycle through material recovery and vehicle disposal need to be considered. Sponsored by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), Argonne has developed a full life-cycle model called GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation). It allows researchers and analysts to evaluate various vehicle and fuel combinations on a full fuel-cycle/vehicle-cycle basis. For a given vehicle and fuel system, GREET separately calculates the following: • Consumption of total energy (energy in non-renewable and renewable sources), fossil fuels (petroleum, natural gas, and coal together), petroleum, coal and natural gas. • Emissions of CO2-equivalent greenhouse gases - primarily carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). • Emissions of six criteria pollutants: volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxide (NOx), particulate matter with size smaller than 10 micron (PM10), particulate matter with size smaller than 2.5 micron (PM2.5),and sulfur oxides (SOx). GREET includes more than 100 fuel production pathways and more than 70 vehicle/fuel systems.	Free	http://www.transportation.anl.gov/modeling_simulation/GREET/

Reporting Frameworks for Greenhouse Gas Emissions and Sustainability

Framework	Description	Cost	Reference
Global Reporting Initiative	The Sustainability Reporting Framework - of which the Sustainability Reporting Guidelines are the cornerstone - provides guidance for organizations to disclose their sustainability performance. It is applicable to organizations of any size or type, and from any sector or geographic region, and has been used by thousands of organizations worldwide as the basis for their sustainability reporting. It facilitates transparency and accountability by organizations and provides stakeholders a universally-applicable, comparable framework from which to understand disclosed information. The Framework is developed through a process of systematic, consensus-seeking dialogue with a large network of individuals from over 60 countries, representing stakeholder groups including business, civil society, academia, labor, and other professional institutions. The process is open, inclusive and takes a global perspective on the growing understanding of good reporting on key sustainability issues. The Framework is continuously improved and expanded as knowledge of sustainability issues evolves and the needs of report makers and users change.	N/A	http://www.globalreporting.org/ReportingFramework/G3Online/ http://www.globalreporting.org/ReportingFramework/ReportingFrameworkOverview/
Carbon Disclosure Project Supply Chain	CDP Supply Chain provides a tried and tested, standardized methodology to support effective collaboration with your suppliers and peers around climate change and greenhouse gas (GHG) emissions. The process helps you to measure and understand your climate change risk in a significant part of your business—the supply chain—in order to drive awareness and action. Performance Benchmarking. CDP's methodology will translate suppliers' responses into Key Performance Indicators and metrics to enable evaluation of supplier performance and promotion of better reporting.	Licensing fee required	https://www.cdproject.net/en-US/Programmes/Documents/CDPSupplyChain_2010_Brochure_US.pdf
GHG Protocol: Calculation tool for GHG emissions from	The Greenhouse Gas Protocol (GHG Protocol) is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. A decade-long partnership between the World Resources Institute (WRI) and the	N/A	http://www.ghgprotocol.org/downloads/calcs/co2-mobile.pdf http://www.ghgprotocol.org/downloa

transport or mobile sources	World Business Council for Sustainable Development (WBCSD), the GHG Protocol is working with businesses, governments, and environmental groups around the world to build a new generation of credible and effective programs for tackling climate change. It serves as the foundation for nearly every GHG standard and program in the world - from the International Standards Organization to The Climate Registry - as well as hundreds of GHG inventories prepared by individual companies.		ds/calcs/WRI_Transport_Tool.xls [Registration required to use these links]
ISO 14001	Environmental management systems—Requirements with guidance for use	N/A	
ISO 14004	Environmental management systems—General guidelines on principles, systems and support technique	N/A	
ISO 14031	ISO 14031 is an international standard that describes a process for designing and using environmental performance evaluation, and for identifying and selecting environmental performance indicators, for use by all organizations, regardless of type, size, location and complexity. It is not a standard for certification, as is ISO 14001. However, it fits into the ISO 14000 series of standards, and is intended to help organizations obtain ISO 14001 certification.	N/A	
ISO 14064	ISO 14064-1:2006 specifies principles and requirements at the organization level for quantification and reporting of greenhouse gas (GHG) emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organization's GHG inventory.	N/A	http://www.epa.gov/ttn/chief/conference/ei16/session13/wintergreen.pdf

Commercial Software for Measuring, Managing, and Reporting Environmental Impacts

Tool	Description	Cost	Reference
Acco$_2$untenterprise, Greenstone Carbon Management	Provides organizations with robust carbon management and accounting solutions. Enables organizations to measure, manage, plan, store, and report emission data, track performance of their carbon footprint at multiple organizational levels, and accurately model key reduction strategies. Key benefits include reducing the costs of data capture, auditable data	Unknown fee associated	http://www.greenstonecarbon.com/software.php

	integrity checking, ROI comparisons for reductions projects, simple implementation and no capital expenditure requirements, outsourced tracking and maintenance of compliance/reporting standards, save on carbon audit consultancy fees, generation of all required carbon related reports, and it's compatible with ISO 14064 and ISO 14001 requirements.		
Carbon Hub, Carbon Hub Ltd.	The Carbon Hub platform offers an array of functionalities that enable users to accurately measure and visualise their carbon footprint, simulate the impact of reduction actions both in terms of costs and carbon savings, set reduction targets, define and implement personalised action plans, while accessing and sharing best practices through the use of web 2.0 functionality. • Supply chain initiatives: Our collaborative capabilities can be used to facilitate carbon measurement activities across multi-tiered supply chain networks and to coordinate supply chain carbon reduction project. • Commercial initiatives: large businesses can also fully configure the solution – to engage their own customer base on measuring and reducing their carbon footprint.	Annual subscription to access and use carbon reduction service	Overview: http://www.carbon-hub.com/sections/solutions-overview More information: http://www.carbon-hub.com/sections/businesses
e-Bench, NZ Energy SolutioNZ	e-Bench™ is a world leading Internet based computer tool for measuring energy and environmental efficiency. Energy and CO2 is measured per facility or process and compared to benchmarks established from other facilities or processes around the country. In addition to benchmarking e-Bench™ can provide invoice reconciliation, targeting and monitoring, and also simulation. e-Bench™ has an impressive range of public and private sector clients who utilize e-Bench to highlight opportunities for efficiency improvements and to indicate potential savings. The benchmark figures are drawn from the organizations using e-Bench. This means that instead of using some theoretical figures, the benchmarks are based on actual processes or buildings. By adopting this approach we are mirroring what is really happening in the market. Hence we expect to see continually improving benchmark indicators as new technology, materials and practice are steadily introduced over time.	Annual subscription fee	Tool information: http://www.e-bench.com/what.html Benchmarking Database: http://www.e-bench.com/energy.html
Sustainability Solution, IHS	IHS's Sustainability Solution is an enterprise software solution to help manage the large body of disparate data associated with a company's Corporate Social Responsibility (CSR) report with increased efficiency, accuracy and transparency. The software helps companies manage	Unknown fee associated	Tool Information: http://www.esp-net.com/Solutions/SustainabilitySolution.aspx

	corporate EHS and sustainability data by leveraging existing intranet and messaging platforms for enterprise-wide data collection and reporting. The software helps track most any metric at any frequency, with rollup capabilities that streamline annual report preparation by allowing the report to be generated from a single, centralized database. From energy usage to emissions data to injury reporting and more, the software puts the information companies need at their fingertips and delivers the data with minimal time spent. The software can also be used to create benchmarking reports. The system facilitates comparison between facilities and operating units, allowing companies to call out best practices to drive performance improvement.		Customer List: http://www.esp-net.com/Customers/CustomerList.aspx
Enablon Responsible Supply Chain, Enablon	Enablon Responsible Supply Chain (RSC) is a web-based sustainable supply chain management solution which helps companies: ▪ Inform suppliers on corporate policies and requirements ▪ Evaluate suppliers' performance and compliance: > International standards : SA 8000, ISO 26000, ILO Convention, etc. > Internal guidelines: codes of conduct, ethical charters, sustainable procurement policies, etc. ▪ Plan, perform and document suppliers' audits ▪ Communicate audit reports and auditors recommendations ▪ Propose action plans and monitor the closing of non-conformities ▪ Benchmark suppliers according to their environmental, social and economical performance. The Enablon GHG management software addresses companies' needs in terms of collection, monitoring, analysis and overall management of greenhouse gas emissions. It provides a set of tools allowing companies to comply with legal requirements (national regulations, quota directives) and to deliver on voluntary initiatives. Enablon GHG-MS allows you to benchmark and improve your performance: ▪ Set your corporate emission reduction targets ▪ Identify the emissions reduction opportunities ▪ Manage abatement measures portfolio ▪ Capture emission allowances ▪ Track company progress toward achieving compliance obligations ▪ Audit and track data accuracy and integrity	Unknown fee associated	RSC Tool: http://enablon.com/products/corporate-responsibility-ehs-management/responsible-supply-chain.aspx GHG Emissions Management Tool: http://enablon.com/products/corporate-responsibility-ehs-management/GHG-emissions-management.aspx

	▪ Communicate / Publish your performance		
Environmental Sustainability Dashboard for Microsoft Dynamics AX	The Environmental Sustainability Dashboard is a cost-effective solution designed to help Microsoft Dynamics AX customers collect and assess data about their energy use and carbon footprint. The data from the dashboard can help businesses become aware—often for the first time—of their impact on the environment so that they can choose to implement environmentally sustainable business policies and practices. After these policies and practices are in place, businesses can use the Environmental Sustainability Dashboard to track and display their effects. The Environmental Sustainability Dashboard will enable companies to track and report on four primary environmental performance indicators. These values measure: direct energy consumption, indirect energy consumption, greenhouse gas emissions from the total energy consumption, green house gas emissions from standard business practices such as transportation, commuting, and business travel. The Environmental Sustainability Dashboard uses indicators based on the G3 guidelines from the Global Reporting Initiative, an internationally recognized organization formed to facilitate sustainability reports.	Unknown fee associated	http://www.microsoft.com/environment/business_solutions/articles/dynamics_ax.aspx
Enterprise Sustainability Management Platform from CSRWare	CSRware products give an organization a way to accurately measure and monitor environmental impacts across internal operations, and the supply chain. This powerful carbon and sustainability software allows organizations to consolidate data to create a GHG inventory, set and meet reduction goals cost-effectively, and ensure compliance with regulations for reporting or auditing purposes. With CSRware Energy & Sustainability Software, your firm will can easily track, measure and report to key stakeholders. Carbon management and sustainability are all part of the same activity, by leveraging the integrated library of key performance indicators, best practices and role-based dashboards your company can better manage your global operation from a single location.	Unknown fee associated	http://csrware.com/solutions.htm#sustainability-aas
Foundation Footprint from Revolution ID	FoundationFootprint™ is a web based, real time carbon footprint and resource management system built to meet the GHG Protocol Corporate Standard and ISO 14064. FoundationFootprint™ integrates seamlessly	Subscription based pricing model—fee	Main Website: http://www.rev-id.com

	with both a company's internal systems and their utilities and suppliers IT systems to track emissions and resources in your operations and supply chain. FoundationFootprint™ is a robust compliance reporting system and a platform for cost savings, more efficient use of resources and real time decision making. With FoundationFootprint™ □rganizations can take an active monthly approach to carbon and resource management. It is ideal for companies who need to comply with internal and external energy, emissions, water and waste programs simultaneously such as with customer and regulatory mandates. FoundationFootprint™ has three components: 1) Real-time enterprise carbon reporting and compliance 2) Active resource management and reduction 3) Automated supply chain and product emissions reporting	changes monthly	General Information: http://www.rev-id.com/FoundationFootprint.aspx
ghgTrack by Enverity	*ghgTrack*™ is the affordable, Internet-based software solution that can help you with your entity's greenhouse gas (GHG) emissions data collection, management and reporting needs today, with the flexibility that your entity may need to meet the GHG business and regulatory challenges into the future. Whether your organization is small, medium or large, ghgTrack is easy to use, yet robust enough to handle your GHG data-management and reporting needs. You can manage GHG emissions for any number of facilities, assign and track data-collection tasks, edit GHG emissions baselines, emission sources, emission factors, etc., prepare third-party verification packages and automatically produce reports for internal use, voluntary programs and/or regulatory regimes. Features include: Manage Your GHG Emissions Data ▪ Set up and edit your GHG Inventory ▪ Coordinate GHG data-collection tasks ▪ Automatically calculate GHG emissions (including CO2 Equivalents) Easily Produce all Necessary Reports	Unknown fee associated	http://ghgtrack.com/gt/index.html

	▪ Create ad-hoc reports for internal analysis ▪ Multiple formats to support the package for 3rd-party verification ▪ Generate reports to support regulatory and voluntary program requirements		
e3 Solutions: Carbon Accounting Tool, Enterprise Carbon Management, Environmental Management Information Systems	e3 Solutions delivers industry-leading Governance, Risk, and Compliance (GRC) software systems in the areas of enterprise carbon management (ECM), and environmental management information systems (EMIS). E3CAT is an affordable, internet-based software solution that can help your organization with your carbon accounting requirements including greenhouse gas emissions data collection, management and reporting. E3CAT was built for small to medium sized entities that do not require a large enterprise management system. E3's Enterprise Carbon Management (ECM) software delivers the comprehensive greenhouse gas monitoring, management and reporting capabilities today's organizations need. ECM simplifies the process of maintaining an accurate, defensible and verifiable GHG inventory, enabling successful implementation of your carbon reduction strategies, support marketing claims, meet investment or shareholder requirements, fulfill regulatory obligations, and assume a leadership role on climate change. E3 EMIS, Enterprise Edition, provides the tools companies need to predict, plan for, monitor, and report on your organization's EH&S performance metrics. EMIS can be readily deployed at a single facility or across multiple sites. There are six modules: air, water, waste, hazardous materials, compliance, and health & safety.	Unknown fee associated	http://www.e3solutionsinc.com/home
Enviance Environmental Enterprise Resource Planning (ERP) Software	Enviance Environmental ERP system to measure, manage and report environmental data and performance. The Enviance System helps you manage a large body of disparate EHS data – air (including greenhouse gases), water, waste, health, safety and more – so your annual Corporate Social Responsibility (CSR) and Sustainability reports are completed	Unknown fee associated	http://www.enviance.com/solutions/environmental-erp-software.aspx
SoFi Software, PE International	Consistent, valid data as well as sensible environmental Key Performance Indicator systems (KPIs) are the premise. The results must be processed promptly and communicated appropriately inwards (e.g. benchmarks to those in charge of the branches or a complete progress report to the	Unknown cost associated	SoFi Software: http://www.sofi-software.com/sofi/environmental-management/

	management) as well as outwards (e.g. environmental report). SoFi Software offers: • Consistent and efficient data collection, supported by interfaces to legacy systems such as ERP Central data base system with powerful report functionality designed to meet your requirements and provides the source for all company-wide sustainability information and indicators • Highly flexible incorporates your specific requirements • Ideal tool supporting performance management and achieving goals • Cost reduction opportunities identified within system (e.g. energy and transport costs)		
Product Lifecycle Management, Parametric Technology Corporation (PTC)	Well suited for the rapid iteration and innovation necessary for successful product development. Supports the many interdependent processes required to bring winning products to market, including: management, sales and marketing, engineering, sourcing, manufacturing, and customer service. The PTC Value Roadmap helps senior executives make their corporate strategies operational by linking them to improvements in product development processes with a simplicity and clarity that did not previously exist in the industry. It also helps functional owners do a better job of internally selling technology funding and process improvement initiatives.	Unknown fee associated	http://www.ptc.com/solutions/product-development-system/index.htm Main brochure: http://www.ptc.com/WCMS/files/56912/en/2759_PDS_bro_ViewONLY.pdf
SAP for Transportation and Logistics, SAP Global	SAP for Transportation and Logistics—railway asset management • Technical-asset management – Obtain a consolidated view of your assets to better document, configure, and store technical assets. Manage the induction, maintenance, and retirement of assets throughout the life cycle. Perform maintenance planning for rolling stock and infrastructure, and conduct reliability analyses to improve the maintenance and performance of assets. • Maintenance operations – Plan, execute, and monitor rolling stock and maintain your infrastructure. Improve planning, execution, and monitoring of workshop maintenance. • Service parts and tools management – Manage the complete	Unknown fee associated	Transportation and Logistics Information: http://www.sap.com/industries/transportationandlogistics/index.epx

	service supply chain, from order management and fulfillment to transportation execution and analysis. Optimize and rebalance stock by working with repair depots and channel partners.		
SAP Sustainability Performance Management, SAP Global	The SAP BusinessObjects Sustainability Performance Management application helps your organization to track and communicate sustainability performance, set goals and objectives, manage risks, and monitor activities – all while helping to reduce the time and cost spent collecting data and compiling disclosures. The application features a library of key sustainability performance indicators and is the first solution to be certified by the Global Reporting Initiative (GRI) Certified Software and Tools Program.	Unknown fee associated	http://www.sap.com/usa/solutions/executiveview/sustainability/sustainability-performance/index.epx Sustainability eBook: http://www.sap.com/community/ebook/2010_Sustainability_eBook/en/index.html
Hara Environmental and Energy Management Software	Hara Environmental and Energy Management (Hara EEM) gives organizations auditable transparency and control of the resources they consume and expend, including energy, water, waste, carbon, and other natural resources. Hara EEM enables organizations to comprehensively and securely manage their environmental record and leverage best practices. Users include News Corporation, Coca Cola, Intuit, and Safeway.	Unknown fee associated	http://www.hara.com/index.html

Other Miscellaneous Resources

Deloitte, Touche, Tohmatsu, Sustainability Reporting Scorecard	Allows evaluation of the value and quality of Sustainability Reports for the reporting organization and for its stakeholders. Both a benchmarking and learning tool for continual improvement. Can assist report providers to better design their reports, and report users to evaluate and compare reports with current best practice in sustainability reporting. There are 30 criteria evaluated by the Scorecard, which are grouped into six parts: (1) Communicate effectively; (2) Show relevance; (3) Demonstrate commitment and management quality; (4) Address the sustainable development agenda; (5) Quantify performance; and (6) Achieve credibility.	Unknown cost associated	Company website: http://www.deloitte.com/sustainability PDF with more information: https://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/DTT_EnseRiskManagement_SustainabilityReportingScardBrief.pdf Case study of scorecard in practice: http://www.epd.gov.hk/epd/english/how_help_epr/files/benchmark_about.pdf and http://www.epd.gov.hk/epd/english/how_help_epr/epr_benchmark.html

In-fleet Trials of Fuel Saving Interventions	This Guide shows how to establish the potential performance of fuel saving devices in your fleet.	Free	http://www.freightbestpractice.org.uk/perform management
Fuel Ready Reckoner	New Freight Best Practice tool which allows you to quickly estimate how much fuel and money you could save for various different fuel saving interventions. 5 simple steps allow you to research and see how much money and fuel you could save with different fuel saving methods, find the best ways to become more fuel efficient and see how to implement your fuel saving changes.	Must register, then free	http://www.fuelreadyreckoner.org.uk/ (Examp tool in PDF, "Fuel Ready Reckoner Tool"
Environmental Defense Fund, Five-Step Green Fleet Framework	A road map to lower costs and cleaner corporate fleets: Learn about our five-step framework for reducing your fleet's greenhouse gas emissions, or download the PDF (http://edf.org/documents/8697_GreenFleet_edf.pdf). 1. Measure emissions and set goals 2. Improve vehicle selection 3. Improve vehicle use 4. Consider carbon offsets 5. Report progress	Free	http://innovation.edf.org/page.cfm?tagID=306 edirect=greenfleet http://blogs.edf.org/innovation/2010/03/09/a-n tool-for-the-fleet-manager%e2%80%99s-arsen reduce-costs-and-emissions-from-medium-dut trucks/?utm_source=feedburner&utm_mediun ail&utm_campaign=Feed%3A+edfinnovation EDFix%3A+Innovation+Exchange%29
Environmental Defense Fund, Fuel-Smart Training	This guide is part of the fleet greenhouse gas management initiative of Environmental Defense Fund. This comprehensive initiative helps organizations improve vehicle fleet efficiency, reduce operating costs and cut greenhouse gas emissions. Fleet benefits include: • Better fuel economy; • Improvements in driving safety; • Lower maintenance costs from less vehicle wear and tear; and • Reduced greenhouse gas emissions.	Free	Handbook Download: http://www.edf.org/documents/10406_EDF_F Smart-Driving-Handbook.pdf Training: http://blogs.edf.org/innovation/files/edc_full_s /ED_Shell_SCORM.swf
Carnegie Mellon Green Design Institute, Economic Input-Output	The Economic Input-Output Life Cycle Assessment (EIO-LCA) method estimates the materials and energy resources required for, and the environmental emissions resulting from, activities in our economy. Results from using the EIO-LCA online tool provide guidance on the relative impacts of different types of products, materials, services, or	Free	General Information: http://www.eiolca.net/ Tool: http://www.eiolca.net/cgi-bin/dft/use.pl

Life Cycle Assessment (EIO-LCA) Model	industries with respect to resource use and emissions throughout the supply chain. Thus, the effect of producing an automobile would include not only the impacts at the final assembly facility, but also the impact from mining metal ores, making electronic parts, forming windows, etc. that are needed for parts to build the car.		
EPA, U.S. Inventory of Greenhouse Gas Sources and Sinks	Calculates emissions through a fuel-based analysis. Allocates emissions to each transportation mode, and to sub-categories within each mode according to fuel consumption and fuel type. While the GHG inventory does not disaggregate freight and non-freight emissions, it lists modal categories in sufficient detail to make such disaggregation possible, albeit while introducing uncertainties into the calculations. Fuel used in international cargo movements by both marine and aircraft is not counted and the resulting emissions are generally not allocated to any nation.	Free	http://www.epa.gov/climatechange/emissions/entoryreport.html
EPA, National Emissions Inventory (NEI)	Compared to the GHG Inventory, the NEI methodology is more complex. Because the emissions of criteria air pollutants and air toxics depend on vehicle type, age, and activity, the NEI relies on separate methodologies for each transportation mode. In addition, the NEI has much more geographic detail than the GHG Inventory. While the GHG Inventory only presents emissions at the national level, the NEI allocates emissions to the state and county levels.	Free	http://www.epa.gov/ttnchie1/trends/