Assessing Terminal Operator Environmental Performance

Assessment Tool Pilot Results

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About This Report

This report was generously supported by the Rockefeller Brothers Fund as part of an initiative to improve sustainability performance and environmental health at ports in southern China. The authors would like to thank the pilot participants for their contributions; any errors that remain are those of the authors.

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ABOUT BSR
BSR works with its global network of nearly 300 member companies to build a just and sustainable world. From its offices in Asia, Europe, and North and South America, BSR develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. Visit www.bsr.org for more information about BSR's more than 20 years of leadership in sustainability.

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Introduction

A sustainable economy depends on the right infrastructure. Terminal operations are a key node in the logistics and transportation value chain—at the nexus where global supply chains meet communities—and the time has come for terminal operators to align with the environmental improvement approaches adopted by global shippers and carriers.

The movement of goods around the world, from field and factory to storefront, presents a complex challenge for reducing environmental impacts because of the sheer complexity and number of different actors. Each organization may have a limited scope of control, and cost pressures are intense. Increasingly, freight carriers and shippers are taking a close look at their environmental footprints and looking for ways to improve them, especially by reducing emissions. Now, they are also looking to their business partners at ports and terminals to support their supply chain efforts by providing environmentally friendly services.

Our previous report shared the findings of our stakeholder research to understand existing efforts related to port and terminal environmental performance and the business needs of the diverse entities in the logistics and transportation value chain. Based on this information, BSR developed a pilot tool for terminal operators to track and report diverse aspects of environmental performance, ranging from emissions management to community interaction. Three terminal operators completed the pilot tool for their own operations, and this report shares their results and feedback and our recommendations for implementation.

Tool Development

Tool Development Stakeholders

APL
APM Terminals
Cargotec
Civic Exchange
CMA CGM
COSCON
DP World
European Sea Ports Organization
Guangdong Maritime Safety Administration
Hanjin
Hong Kong Container Terminal Operator Association
Hong Kong Shipowners Association
International Council on Clean Transportation
International Association of Ports and Harbors
Maersk Line
Modern Terminals
OECD
OOCL
Port of Houston
Port of Seattle
Shenzhen Ports Association
World Ports Climate Initiative
World Shipping Council

The tool described in this report is the result of conversations with shippers, carriers, ports, terminals, and other interested stakeholders in 2011. The overlapping needs of these stakeholders, representing different nodes in the value chain, highlight the business case for increased management and transparency of environmental impact and activities. BSR developed the environmental assessment tool to help address business partners' and communities' needs for comparable data, informed decision-making, and transparency.

Purpose of the Tool

The environmental assessment tool was developed to provide multiple benefits:

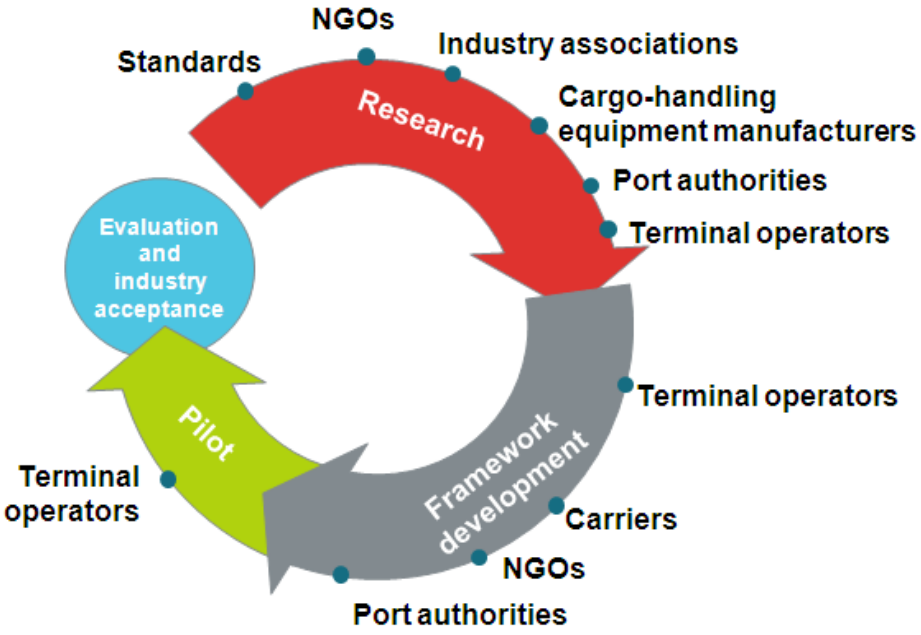
» **Performance benchmark:** A consistent and standardized framework will allow terminal operators to track their own environmental performance compare it with peers

» **Supply chain metrics:** Data requests for greenhouse gas (GHG) emissions, from ocean carriers up through consumer-facing companies and retailers, are increasingly common. This tool helps prepare terminal operators for an increase in data requests, which will improve efficiency, reduce duplication, and ultimately align with initiatives such as the Greenhouse Gas Protocol (GHG Protocol) and Carbon Disclosure Project (CDP).

» **Holistic environmental performance data:** While data for carbon emissions may be the priority for supply chain partners, the relative contribution of carbon emissions by terminals is typically not as great as local impacts on air pollution and public health. Terminals may also need to track and report on impacts related to management of water, waste, chemicals, and noise. This tool allows terminal operators to evaluate a portfolio of indicators, with a view to both immediate economic and environmental priorities and long-term planning for investments in port infrastructure and equipment.

Challenges in Development

BSR interviewed a variety of stakeholders to understand the most critical needs and considerations for developing a common assessment tool.



» **Identification of clear and comparable metrics:** Finding comparable metrics for environmental assessment and improvement, across a variety of terminal operations, proves to be challenging since terminals vary in size and scope. While absolute measurements of environmental impacts may be available, the path to improvement may vary significantly across terminals. Many stakeholders argued that terminals are so diverse that quantitative metrics cannot capture their relative environmental performance.

» **Feasibility in metric collection:** A key factor in the tool's adoption is how easy it will be for terminal operators to operate it. The current tool uses series of yes-or-no questions to assess the general maturity of environmental management, while a smaller number of quantitative metrics assess the availability of data. An effective tool must focus on data that is readily available or must offer benefits (e.g., regulatory reporting, customer interest, or community need) that outweigh the costs of implementation.

» **Simple versus comprehensive:** Terminal operators value the ability to share high-level information and best practices for environmental management. However, they must supply detailed data for all critical issues (which vary by operation or region) to carriers, shippers, and other stakeholders to enable the latter to understand supply chain performance or assess the efficiency of the shipping life cycle.

» **Real business benefits:** Improved, consistent transparency reduces overlapping requests from port authorities, ocean carriers, and investors which in turn provides business value and fosters stronger business, government, and community relations. A well-designed tool also allows

terminal operators to track their own performance and identify opportunities for improvement.

» **Continuous improvement:** A useful tool should include both basic and challenging performance issues to capture current activities and allow room for improvement. Operators should also revisit the tool periodically to ensure that it is relevant to data needs and current industry best practice.

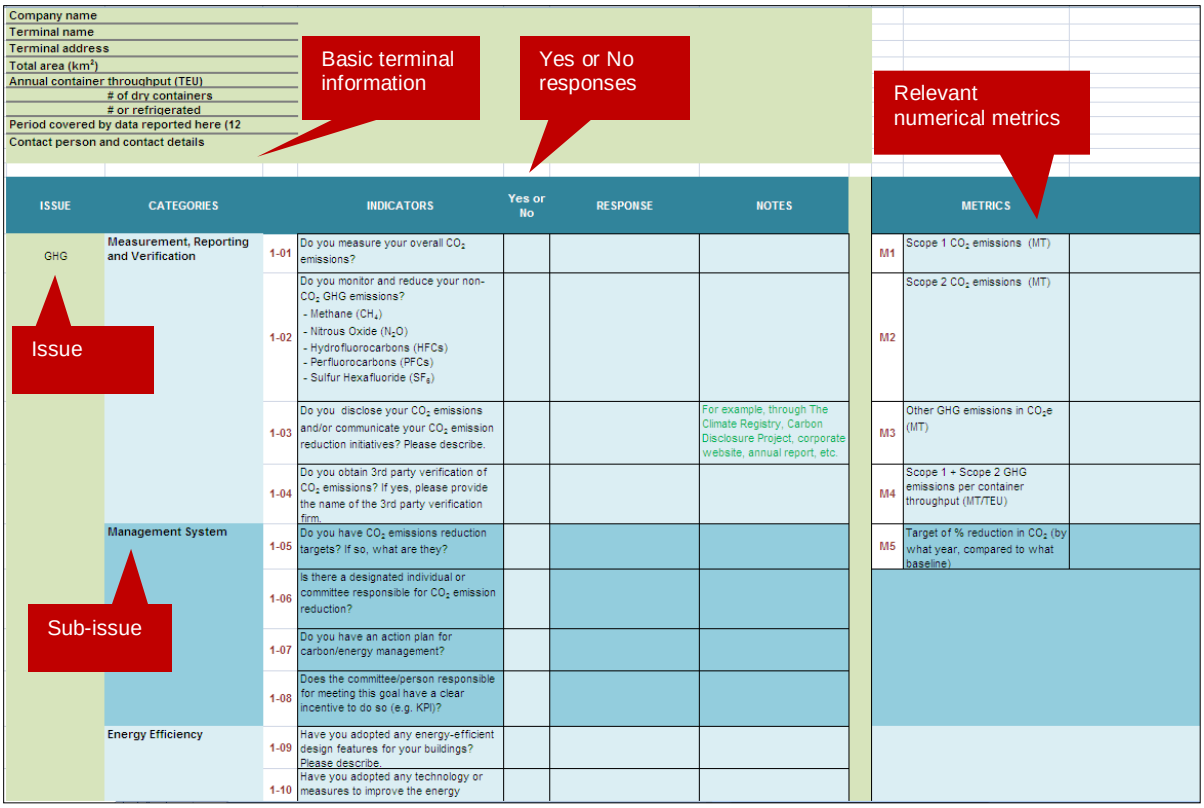
Environmental Assessment Tool

The simple Excel-based environmental assessment tool collects information about the management of key environmental issues relevant to terminal operations. The response areas are divided into two distinct categories for ease of use and analysis:

» **Indicators:** A series of yes-or-no questions to understand the extent to which terminal operators are managing specific issues.

» **Metrics:** Specific quantitative questions based on commonly accepted standards or easily derived calculations. Metrics are only included in areas where terminal operators in the initial draft phase of the tool deemed quantification feasible.

Tool Snapshot



The primary purpose of the current tool is to understand the state of environmental issues management rather than compare respondents based on a standardized scoring system. At this stage it is clear that terminals have widely varying environmental impacts and opportunities based on regional and operating characteristics. However, later versions of the tool could include a scoring system to allow carriers to compare terminals and terminals to compare their performance against other terminals.

Pilot Results

GHG and Energy

	North America West Coast	Southern EU	Asia
Measurement of CO_2 emissions	Yes	Yes	Yes
Monitoring and reduction of non-CO_2 GHG emissions	Yes	No	Yes
Disclosure of CO_2 emissions and/or reduction initiatives	Yes	Yes	Yes
Third-party verification of CO_2 emissions	Yes	No	No
CO_2 reduction targets	Yes	No	Yes
Who is the individual/committee responsible for emission reduction?	Environmental manager	QA-HSE manager	Environmental committee
CO_2/energy management plan	Yes	Yes	Yes
Does the committee/person have a clear incentive for reduction?	Yes Regulatory compliance	No	Yes Included in annual personal targets
Building energy-efficient design features	Yes New building will use LEED	Yes Use of solar	Yes Lighting, solar, green roof, and sensor switches for lighting and water
Technology or measures for reefer energy efficiency	No	No	No
Technology to improve truck and cargo-handling equipment efficiency	Yes New terminals	Yes	Yes
Renewable energy sources	No	Yes (Solar, 0.67%)	No
Shore-side power available for ships	No (Yes, for new terminals)	No	No (Small scale for barges)
Measures to minimize waiting times	Yes Truck turn times and gate, vessel, rail, and yard operations to reduce fuel	Yes Berthing plans optimized continuously	Yes In-port appointment systems
Policies or incentives for carriers to reduce emissions	Yes Incentive program for reduced speed	No	No
What is the modal split for onward transfer of freight?	51% local 49% intermodal	5% road	N/A

Summary and highlighted practices:

- **CO_2:** Carbon emissions from owned operations are measured and can be calculated; however, not all operators are setting targets and developing reduction plans.
- **Reefers:** Operators said that management of reefers is challenging given that the terminal operators do not own the containers. However, one terminal has carried out a study on the application of remote reefer monitoring for better energy management.
- **Cargo-handling efficiency:** Operators highlighted the following activities:
  - Investment in efficient greener rubber tire gantry cranes (RTGs) (up to 60 percent less fuel consumption) to replace old RTGs
  - Better operational efficiency (prime route, remote twistlock stations, and less idle time during all aspects of operations)

- More efficient and greener tugmasters
- Empty handlers with power management system
- Program to reduce speeds of tugmasters from 40 kilometers per hour to 30 kilometers per hour, thus reducing emissions
- Euro III or better standard of equipment adopted when replacing old equipment
- Inter-terminal transfer platform established to better utilize the tractor pool among other terminal operators
- 100 percent of TEU moved by hybrid-RTG or E-RTG

» **Waiting times:** All of the operators highlighted programs to minimize waiting times, thus reducing fuel consumption and related emissions, and increasing overall resource efficiency.

SOx

	North America West Coast	Southern EU	Asia
Use of low-sulfur fuel in equipment	No	Yes 6 mg/kg	Yes, ultra-low-sulfur diesel (ULSD)

Summary and highlighted practices:

» Use of low-sulfur fuel is driven by local regulation and voluntary schemes.

NOx

	North America West Coast	Southern EU	Asia
Emissions control technology or measures	Yes Annual programs	No Euro III for tugmasters, RTGs	Yes Retrofitted RTGs, Tier III
Engine replacement policy or plan	Yes	Yes	Yes

Summary and highlighted practices:

» NOx control is driven by local engine replacement programs and the feasibility of retrofitting other cargo-handling equipment.

Waste

	North America West Coast	Southern EU	Asia
Waste reduction targets	No	No	Yes
Waste management policy	Yes	Yes	Yes
Periodic measurement against targets	No	Yes	Yes
Public disclosure of performance	No	Yes	No
Facilities for ship waste disposal	Yes	N/A	Not provided

Summary and highlighted practices:

» While waste management policies are in place, periodic measurement and reduction targets are not common.

Water

	North America West Coast	Southern EU	Asia
Policies to manage wastewater	Yes Does not include water supplied to ships	Yes Oil and water separator	Yes Sensors to manage use
Policy on storm water management	Yes	No	Yes
Approach to managing toxic spills	Yes	Yes	Yes
Water consumption reduction targets	No	No	No
Water conservation technologies	Yes Controls in restrooms	Yes Water-saving taps in restrooms	Yes Sensors
Periodic measurement of wastewater management and water conservation	No	Yes	Yes Quarterly audits
Public disclosure of performance	No	Yes	No

Summary and highlighted practices:

- Water management is not consistent among operators. Best practice includes sensors and other technologies to measure and manage freshwater use.
- Public disclosure: Water impacts are not commonly shared publicly.

Chemicals

	North America West Coast	Southern EU	Asia
Chemicals management plan	No	No	Yes
Chemical use reduction targets	No	No	Yes
Employee training on handling, disposal and emergencies	Yes	Yes	Yes

Summary and highlighted practices:

- Chemicals management is not consistent among operators, however operators train employees to handle chemicals safely and to understand the risks involved.

Environmental Management Systems

	North America West Coast	Southern EU	Asia
Environmental policies	No	Yes	Yes
Process for identifying top issues	Yes	Yes	Yes
Top five issues	1. Human health impact 2. Air pollution 3. Impact on water resources 4. Pressure to the biological integrity of the port	1. Noise pollution 2. Air pollution 3. Light pollution 4. Hydrocarbon pollution 5. Conflicts of use with neighboring community	1. Consumption of fossil fuel 2. Electricity consumption 3. Air emissions from container-handling equipment 4. Handling of chemical waste 5. Emergency handling of chemical spillage

Environmental targets	Yes	Yes • Air: Continuous improvement • Noise: To be determined during a noise study next year • Light: Continuous improvement • Hydrocarbon pollution: Fewer than 5 ppm of hydrocarbons in water outflow from washing areas	Yes • Develop guidelines to minimize environmental impacts throughout the whole life cycle of terminal development, construction, and operation. • Increase waste paper recycling rate by 2%. • Reduce energy consumption by 9%.
Responsible committee or designated individual	Yes	Yes	Yes
Internal training	Yes	Yes	Yes
ISO 14001	No	No	Yes
Third-party verification of environmental impacts	Yes	No	No
Green procurement policies	No	No	Yes

Summary and highlighted practices:

- **Process for identifying top issues:** Each of the responding operators said that they had a process for identifying their most significant environmental issues, and each listed their top issues.
- **Committee:** Each respondent employs a committee or defined individual to manage environmental impacts.
- **Targets:** All respondents employ some reduction targets for some environmental impacts, though the targets are inconsistent.
- **ISO 14001:** Not all operators are ISO 14001 certified; however, this certification also correlated with more robust environmental management systems for the issues assessed in this tool.

Biodiversity

	North America West Coast	Southern EU	Asia
Process to manage and track impacts	Yes Local invasive species program	No	Yes Guidelines to minimize environmental impacts throughout the whole life cycle of terminal development, construction, and operation
Policies or measures to minimize impacts	No	No	Yes

Summary and highlighted practices:

- Driven by a combination of local requirements and voluntary action, operators employ some limited efforts to manage biodiversity impacts.
- One terminal respondent employs a life cycle assessment guideline for terminal development, construction, and operation that includes biodiversity impacts.

Community

	North America West Coast	Southern EU	Asia
Track and manage noise	No	No	Yes
Technology or measures to reduce noise pollution	No	Yes	Yes
Track and manage light	No	No	Yes
Technology or measures to reduce light pollution	No	Yes	Yes
Proactively engage with local community	Yes	Yes	Yes
Top community issues	1. Human health impact 2. Air pollution 3. Impact on water resources 4. Pressure to the biological integrity of the Port	1. Air pollution 2. Noise pollution 3. Vessel activities	1. Noise issues 2. Air emission 3. Carbon footprint

Summary and highlighted practices:

» **Noise:** While not all respondents track and manage noise, some have adopted practices to mitigate current noise impacts. These include:
- Fine-tuned gantry alarms
- New trailers equipped with suspension, brakes, double axles, and better guides
- Continuous maintenance of terminal paving
- Three-dimensional markers to position tugmasters correctly on the first attempt
- Noise reducers for RTG sirens
- Periodic noise measurements conducted within terminals

» **Light:** Practices to mitigate light impacts include:
- Full cut-out light fittings installed on terminal lighting
- Timer controls, motion sensors, and light zoning adopted to reduce light nuisance

Recommendations for Implementation

For Terminals

Terminal operators can continue to use the tool to track progress and assess environmental performance across different operations. Additionally, the tool provides a concise platform for terminal operators to communicate environmental impacts and performance to interested stakeholders including port authorities, carriers, and local communities. Increased participation and transparency within the sector will help identify best practices, areas of common challenge, and a more refined understanding of the impacts and how to manage them (e.g., through direct action, influence, partnership, or another method).

SELF-ASSESSMENT
The current version of the tool is available for download on the BSR website. Terminal operators can use the tool in order to:

- Understand their performance on environmental issues.
- Assess the maturity of data quality, systems, processes, and calculation methodologies against the standard set of issues and metrics in the tool.
- Communicate environmental performance (e.g., impacts and initiatives) to ocean carriers, port authorities, communities, and other business partners and stakeholders.
- Begin to coalesce as an industry around a standard set of metrics.

ENGAGEMENT WITH OCEAN CARRIERS AND OTHER STAKEHOLDERS
Engaging with carriers will enable terminal operators to highlight existing practices that improve carrier performance, understand expectations for environmental data and performance, and collaborate on shaping those expectations.

Additionally, formal engagement with a broad set of stakeholders (local communities, port authorities, and significant cargo owners) on environmental issues will help terminal operators prioritize the most relevant set of issues. This prioritization is critical to understanding where to invest resources on environmental management that will drive business value. This value may come from understanding trends and expectations before they become costly implementation projects or building trust with communities that have a stake in terminals' license to operate.

The tool provides a platform for engagement, communication, and a more structured and bounded discussion about environmental performance.

SUPPLY CHAIN REPORTING
Global brands and cargo owners have already begun efforts to increase visibility into supply chain carbon emissions. Terminal operators that have not completed basic carbon accounting for Scope 1 and Scope 2 (direct and indirect) GHG emissions should consider applying Section 1 of the Terminal Operator Environmental Assessment Tool as an initial step. Globally accepted voluntary standards such as the CDP are also a useful platform that will prepare terminal operators for adequate carbon transparency.

For Ocean Carriers and Other Business Partners

Ocean carriers have already incorporated environmental expectations of cargo owners and brands, for example, by reporting data via the Clean Cargo Working Group. Carriers looking to fulfill the assurance of strong end-to-end

environmental performance for shipped goods—offering “green shipping” options, for instance—will need to understand and manage environmental risks and opportunities at terminal operations to form a more complete picture of the transportation chain.

While carriers have focused almost exclusively on CO2 emissions, driven by fuel costs and demands from global consumer products companies, the sharpened focus on supply chain sustainability will bring other environmental impacts to the forefront. Increased engagement between carriers and terminal operators on the issue of environmental impacts will provide insights needed to continue the development of a standardized and efficient assessment tool.

Additionally, the terminal operators that participated in the pilot all have an approach to identifying the most significant environmental issues affecting them. This understanding can prove to be a valuable tool for carriers and other interested stakeholders since the most material issues may vary between terminals.

What the Future Holds

This tool is an initial step toward a common set of metrics and improved environmental performance at terminal operations. At BSR we know that sectors can shape their own destiny by actively shaping industry sustainability standards—rather than waiting for regulation—through collaboration, engaging with a wide set of stakeholders, and understanding clear supply chain and customer expectations before they result in divergent, duplicative, and costly exercises. A wide variety of terminal operators, including relevant joint initiatives, should continue to road test the tool so that it remains relevant to business and is refined into an accepted common standard for environmental performance.