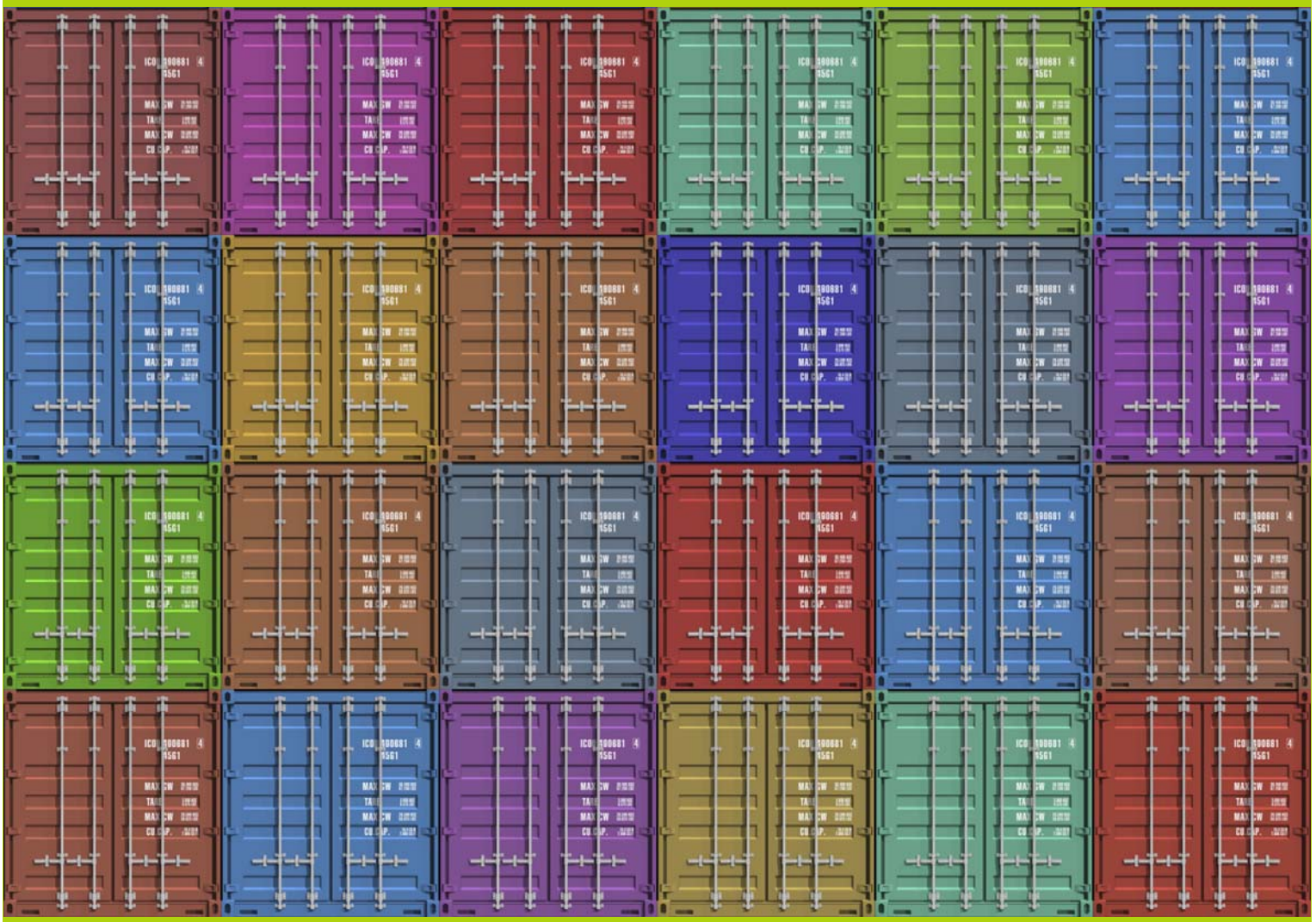
BSR

# Beyond the Factory Gates: How Brands Improve Supply Chain Sustainability Through Shipping and Logistics

## Clean Cargo Working Group Tools for Measuring and Reducing Environmental Impacts

March 2011



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# About This Report

The Clean Cargo Working Group (CCWG, www.bsr.org/cleancargo) is a business-to-business initiative that creates practical tools for measuring and reducing the environmental impacts of global goods transportation. The ocean carriers in the group are responsible for more than 60 percent of the market share of containers shipped worldwide. The global brands in CCWG represent an important voice for supply chain sustainability through their direct participation in partnership with the ocean carriers. CCWG fosters dialogue and collaboration between brands and transportation providers to develop tools and standards that manage environmental performance efficiently.

This report is a culmination of CCWG collaboration, which includes a significant amount of vessel-by-vessel data transparency from the participating ocean carriers, as well as implementation of CCWG tools by the global brands. The tools described in this report are already in use and contributing to more sustainable transportation and logistics.

Note the terminology used within CCWG and this report:

1) *Carriers* are transportation service providers, vessel owners, and vessel operators.
2) *Shippers* are global retailers, manufacturers, and cargo owners utilizing transportation services.

CCWG shares the information in this report to:

- ***Explain how CCWG tools work*** - Described in this report are the tools and processes that CCWG uses as a basis for its collaboration. Included is a description of the specific metrics and the data that is shared among group members.

- ***Contribute to industry-leading standards for measuring and reporting environmental performance*** - The standards and methodologies described in this report are based on CCWG's collaborative efforts to create a reasonable way to benchmark performance and inform shipper decisions.

- ***Foster transparency and open dialogue*** - CCWG shares this information in the spirit of continuous improvements through dialogue with stakeholders who are aligned with CCWG's mission of creating efficient, sustainable supply chains.

- ***Demonstrate the value of CCWG membership*** - Group members lead in the development of standards to assess environmental performance in the ocean container freight sector. This report highlights outputs that members use to benchmark performance, estimate emissions from intermodal shipping, and better understand the environmental challenges and opportunities in the sector.

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# Contents

# 1. Introduction

Clean Cargo Working Group (CCWG) is a business-to-business collaboration among leading shippers (retailers, manufacturers), ocean carriers, and logistics providers. The group works together through direct dialogue to create practical tools for measuring and reducing the environmental impacts of goods transportation worldwide.

Members include some of the world's largest multinational brands across a range of industries and leading ocean carriers, representing more than 60 percent of global container shipments (see Appendix for list of current members). While participating companies control and share their own information, the group is committed to collaboration and a rigorous process for environmental data collection.

Aggregated CCWG $CO_2$ emission rates across trade lanes in 2008 showed an 8-percent decrease on average compared to 2007, and a 17-percent decrease relative to 2006.

CCWG drives performance improvement by:

- Enabling fact-based dialogue between shippers and carriers
- Sharing best practices on operations and technology investments
- Developing a verification standard for environmental data to increase credibility in shipping industry data
- Increasing transparency in the industry by facilitating efficient exchange of information between shippers and carriers

## 2. CCWG Accomplishments

BSR established CCWG in 2003 in response to the growing complexity of global supply chains and increasing risks to business, such as regulation, reputation, and competitive pressure, particularly in terms of carbon emissions. Shippers (brands) needed reliable information about the environmental performance of transportation service providers, and carriers were receiving redundant, time-intensive demands for environmental data from brands. It became clear there was a need for a standardized, credible, and efficient approach for measuring and sharing environmental data with stakeholders.

Over the past eight years, CCWG has been gathering emissions data ($CO_2$, $SO_X$, $NO_X$) from at least 10 of the world's largest transportation carriers. The information collected has become one of the most comprehensive environmental data sets in the shipping industry. This rigorous process established baselines and enabled the creation of measurement tools that did not exist previously.

"Clean Cargo brings together large multinationals that compete with each other in the marketplace to take on environmental issues with remarkable results, helping us develop sustainable transportation strategies."

*- Thomas Bergmark*
***IKEA***
*March 2010*

As a result, CCWG has been successful in the following accomplishments:

- Developed the industry standard for assessing ocean carriers' environmental performance
- Created a carrier "Scorecard" to quantify performance and benchmark individual carriers against industry performance
- Distributing annual aggregated environmental performance data to members
- Realized an average 8-percent decrease in aggregated CCWG $CO_2$ emission rates across trade lanes from 2007 to 2008, and a 17-percent decrease compared to 2006

CCWG strives to continuously improve its tools and methodologies to reflect new and emerging standards. The group considers a variety of updates and changes to tools each year in order to improve calculation accuracy while encouraging consistency and usability of environmental performance data along the value chain.

**CCWG Member Profile: IKEA**

IKEA is committed to reducing its emissions, and shipping represents a key opportunity to make a positive impact on emissions and other environmental issues. By joining CCWG, IKEA learned from other members that simple practices, such as slowing the speed of ships, can have big impacts on the company's environmental footprint. Utilizing Clean Cargo's easy-to-use intermodal emissions calculator, IKEA can now measure its annual Scope 3 transportation emissions. In addition, the shared performance metrics on transportation impacts have enabled IKEA to make informed procurement decisions that align with its goal to improve environmental performance throughout its supply chain.

# 3. Average $CO_2$ Emissions by Trade Lane

The participating carriers use CCWG's $CO_2$ calculation methodology to submit vessel-by-vessel data, including $CO_2$ emissions for each global trade lane. The following table presents the average $CO_2$ emissions, by global trade lane, for both dry and refrigerated ("reefer") cargo containers of all CCWG carriers. The averages are used to benchmark performance on specific trade lanes and to calculate emissions per unit of cargo shipped on specific trade lanes. The averages are also used in CCWG's Intermodal Calculator Tool to estimate emissions from the ocean segment of intermodal shipments.

In 2010 CCWG approved a verification protocol, based on industry leading practices, which can be used individually by carriers to verify submitted data.

## 2010 CCWG Process (2009 Data)

CCWG average emissions per trade lane are based on:

Clean Cargo gathered environmental data on 1,206 container ships in 2009.

CUMULATIVE - weighted average $gCO_2/TEU\text{-}km$

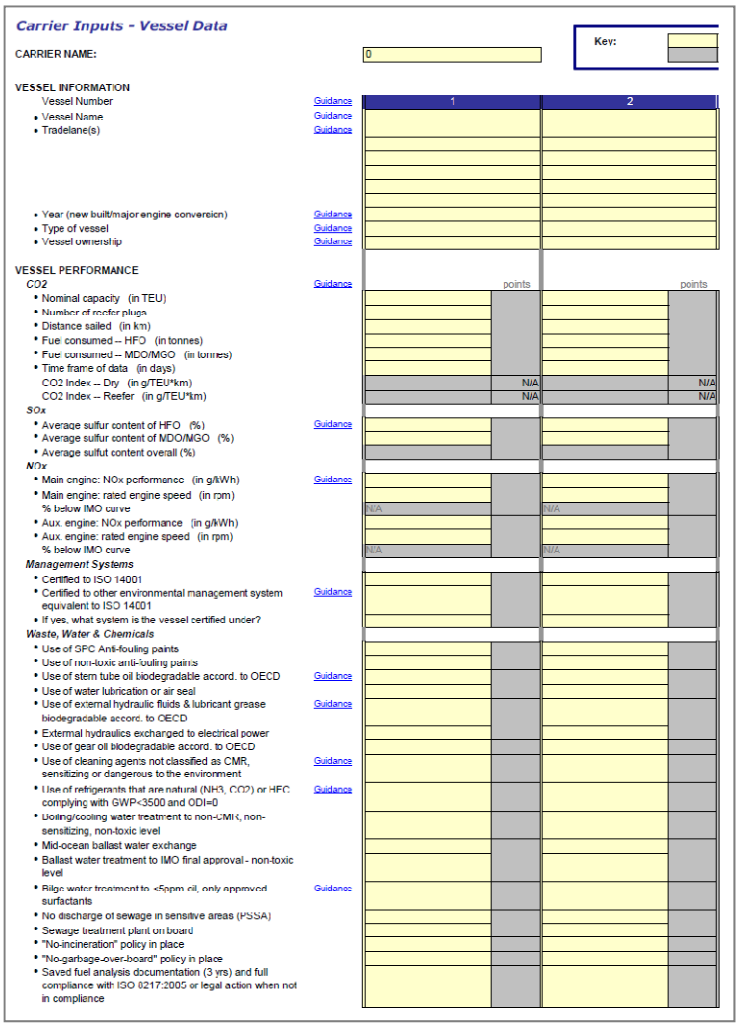
| | Dry | Reefer |
|---|---|---|
| Intra-Americas (Caribbean) | 102.28 | 133.41 |
| Europe (North & Med)--Oceania (via Suez / via Panama) | 101.52 | 128.62 |
| North America--Oceania | 100.48 | 126.87 |
| North America--Africa | 97.37 | 139.65 |
| Asia--Oceania | 92.80 | 120.34 |
| Europe (North & Med)--Africa | 88.67 | 122.65 |
| Europe (North & Med)--Latin America/South America | 87.33 | 114.91 |
| North Europe--North America EC (incl. Gulf) | 85.41 | 112.46 |
| North America--South America (EC/WC) | 84.96 | 112.84 |
| Asia--Africa | 84.87 | 110.51 |
| North America EC--Middle East/India | 84.20 | 108.59 |
| Asia--South America (EC/WC) | 80.57 | 104.40 |
| Mediterranean--North America EC (incl. Gulf) | 80.03 | 108.83 |
| North Europe--North America WC | 79.81 | 104.64 |
| Other | 78.55 | 108.51 |
| Asia--North America EC | 78.15 | 97.44 |
| South America (EC/WC)--Africa | 77.81 | 97.79 |
| Europe (North & Med)--Middle East/India | 76.19 | 106.10 |
| Intra-Asia | 76.14 | 100.67 |
| Asia--North America WC | 74.20 | 97.13 |
| Asia--Middle East/India | 73.72 | 103.50 |
| Intra-Europe | 72.75 | 102.59 |
| Asia--Mediterranean | 67.52 | 96.71 |
| Asia--North Europe | 67.26 | 93.91 |
| Mediterranean--North America WC | 59.69 | 89.93 |

# 4. CCWG Tools

CCWG developed and uses three primary tools to promote improvements in the logistics and transportation sector.

1) **The Performance Metrics Tool** is an Excel-based, vessel-by-vessel data collection method that assesses environmental performance for carriers in six categories: $CO_2$, $SO_X$, $NO_X$, Waste/Water/Chemicals Management, Environmental Management Systems, and Transparency. All CCWG carriers are required to submit annual vessel-level data for each of the performance categories. In 2008 the group moved from a qualitative survey of environmental performance to one that is focused on quantitative and comparable metrics. Metrics have been initially developed to suit a variety of needs, including: availability of data, shipper and customer needs, and alignment with leading external standards.

   The group is currently finalizing a protocol to verify annually submitted performance data. CCWG plans to have the process launched in time to offer verification for 2010 performance data that is submitted in 2011.



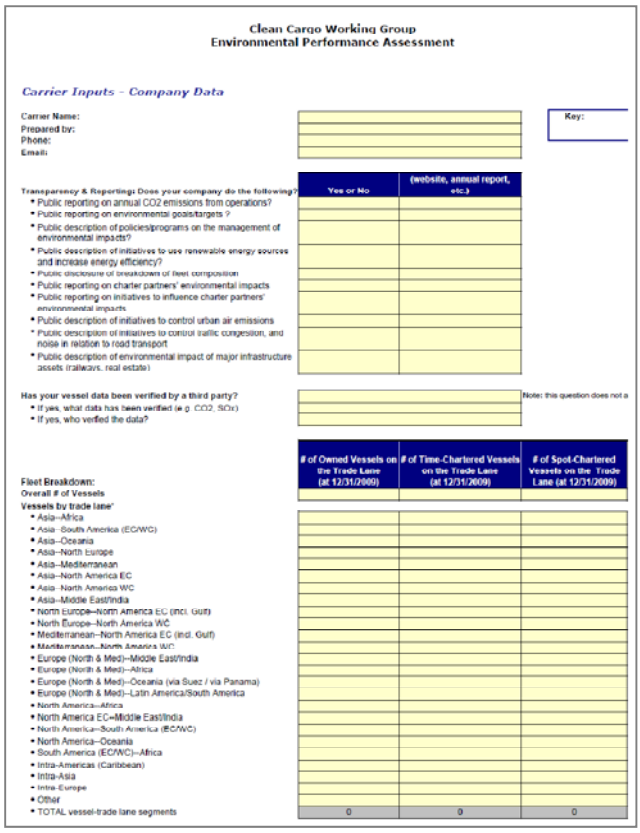
**Carrier Inputs - Vessel Data**

CARRIER NAME: 0

Key:

| | | 1 | 2 |
|---|---|---|---|
| **VESSEL INFORMATION** | | | |
| Vessel Number | Guidance | | |
| • Vessel Name | Guidance | | |
| • Tradelane(s) | Guidance | | |
| • Year (new built/major engine conversion) | Guidance | | |
| • Type of vessel | Guidance | | |
| • Vessel ownership | Guidance | | |
| **VESSEL PERFORMANCE** | | | |
| *CO2* | Guidance | points | points |
| • Nominal capacity (in TEU) | | | |
| • Number of reefer plugs | | | |
| • Distance sailed (in km) | | | |
| • Fuel consumed -- HFO (in tonnes) | | | |
| • Fuel consumed -- MDO/MGO (in tonnes) | | | |
| • Time frame of data (in days) | | | |
| CO2 Index -- Dry (in g/TEU*km) | | N/A | N/A |
| CO2 Index -- Reefer (in g/TEU*km) | | N/A | N/A |
| *SOx* | | | |
| • Average sulfur content of HFO (%) | Guidance | | |
| • Average sulfur content of MDO/MGO (%) | | | |
| • Average sulfut content overall (%) | | | |
| *NOx* | | | |
| • Main engine: NOx performance (in g/kWh) | Guidance | | |
| • Main engine: rated engine speed (in rpm) | | | |
| % below IMO curve | | N/A | N/A |
| • Aux. engine: NOx performance (in g/kWh) | | | |
| • Aux. engine: rated engine speed (in rpm) | | | |
| % below IMO curve | | N/A | N/A |
| ***Management Systems*** | | | |
| • Certified to ISO 14001 | | | |
| • Certified to other environmental management system equivalent to ISO 14001 | Guidance | | |
| • If yes, what system is the vessel certified under? | | | |
| ***Waste, Water & Chemicals*** | | | |
| • Use of SPC Anti-fouling paints | | | |
| • Use of non-toxic anti-fouling paints | | | |
| • Use of stern tube oil biodegradable accord. to OECD | Guidance | | |
| • Use of water lubrication or air seal | | | |
| • Use of external hydraulic fluids & lubricant grease biodegracable accord. to OECD | Guidance | | |
| • External hydraulics exchanged to electrical power | | | |
| • Use of gear oil biodegradable accord. to OECD | | | |
| • Use of cleaning agents not classified as CMR, sensitizing or dangerous to the environment | Guidance | | |
| • Use of refrigerants that are natural (NH3, CO2) or HFC complying with GWP<3500 and ODI=0 | Guidance | | |
| • Boiling/cooling water treatment to non-CMR, non-sensitizing, non-toxic level | | | |
| • Mid-ocean ballast water exchange | | | |
| • Ballast water treatment to IMO final approval - non-toxic level | | | |
| • Bilge water treatment to <5ppm oil, only approved surfactants | Guidance | | |
| • No discharge of sewage in sensitive areas (PSSA) | | | |
| • Sewage treatment plant on board | | | |
| • "No-incineration" policy in place | | | |
| • "No-garbage-over-board" policy in place | | | |
| • Saved fuel analysis documentation (3 yrs) and full compliance with ISO 8217:2005 or legal action when not in compliance | | | |

CCWG Performance Metrics Sample Input Sheet



Clean Cargo Working Group
Environmental Performance Assessment

*Carrier Inputs - Company Data*

Carrier Name:
Prepared by:
Phone:
Email:

Key:

| Transparency & Reporting: Does your company do the following? | Yes or No | (website, annual report, etc.) |
|---|---|---|
| • Public reporting on annual CO2 emissions from operations? | | |
| • Public reporting on environmental goals/targets ? | | |
| • Public description of policies/programs on the management of environmental impacts? | | |
| • Public description of initiatives to use renewable energy sources and increase energy efficiency? | | |
| • Public disclosure of breakdown of fleet composition | | |
| • Public reporting on charter partners' environmental impacts | | |
| • Public reporting on initiatives to influence charter partners' environmental impacts | | |
| • Public description of initiatives to control urban air emissions | | |
| • Public description of initiatives to control traffic congestion, and noise in relation to road transport | | |
| • Public description of environmental impact of major infrastructure assets (railways, real estate) | | |

Has your vessel data been verified by a third party?
• If yes, what data has been verified (e.g. CO2, SOx)
• If yes, who verified the data?

Note: this question does not a

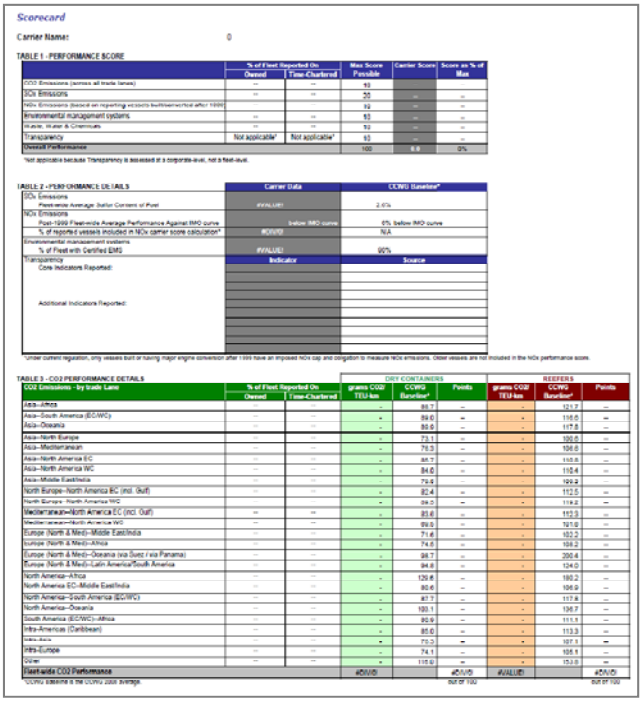
| Fleet Breakdown: | # of Owned Vessels on the Trade Lane (at 12/31/2009) | # of Time-Chartered Vessels on the Trade Lane (at 12/31/2009) | # of Spot-Chartered Vessels on the Trade Lane (at 12/31/2009) |
|---|---|---|---|
| Overall # of Vessels | | | |
| Vessels by trade lane* | | | |
| • Asia--Africa | | | |
| • Asia--South America (EC/WC) | | | |
| • Asia--Oceania | | | |
| • Asia--North Europe | | | |
| • Asia--Mediterranean | | | |
| • Asia--North America EC | | | |
| • Asia--North America WC | | | |
| • Asia--Middle East/India | | | |
| • North Europe--North America EC (incl. Gulf) | | | |
| • North Europe--North America WC | | | |
| • Mediterranean--North America EC (incl. Gulf) | | | |
| • Mediterranean--North America WC | | | |
| • Europe (North & Med)--Middle East/India | | | |
| • Europe (North & Med)--Africa | | | |
| • Europe (North & Med)--Oceania (via Suez / via Panama) | | | |
| • Europe (North & Med)--Latin America/South America | | | |
| • North America--Africa | | | |
| • North America EC--Middle East/India | | | |
| • North America--South America (EC/WC) | | | |
| • North America--Oceania | | | |
| • South America (EC/WC)--Africa | | | |
| • Intra-Americas (Caribbean) | | | |
| • Intra-Asia | | | |
| • Intra-Europe | | | |
| • Other | | | |
| • TOTAL vessel-trade lane segments | 0 | 0 | 0 |

CCWG Performance Metrics Sample Input Sheet

Carriers enter data into standardized spreadsheets that calculate environmental performance based on CCWG methodology. Additionally, each of the six performance categories are scored based on CCWG performance thresholds. Total scores are populated into the output scorecard. For $CO_2$ performance, a score is provided for each trade lane and compared to performance from an indexed CCWG average.

CCWG tools and methods are informed by:

- WRI GHG Protocol
- Global Reporting Initiative (GRI)
- World Economic Forum (WEF)
- International Maritime Organization (IMO)
- World Shipping Council (WSC)
- U.S. EPA SmartWay
- Clean Shipping



*Scorecard*

Carrier Name: 0

TABLE 1 - PERFORMANCE SCORE

| | % of Fleet Reported On: Owned | % of Fleet Reported On: Time-Chartered | Max Score Possible | Carrier Score | Score as % of Max |
|---|---|---|---|---|---|
| CO2 Emissions (across all trade lanes) | -- | -- | 10 | | |
| NOx Emissions | -- | -- | 10 | -- | -- |
| NOx Emissions (based on reporting vessels built/converted after 1999) | | | 10 | -- | -- |
| Environmental management systems | -- | -- | 10 | -- | -- |
| Waste, Water & Chemicals | -- | -- | 10 | -- | -- |
| Transparency | Not applicable* | Not applicable* | 10 | -- | -- |
| Overall Performance | | | 100 | 0.0 | 0% |

*Not applicable because Transparency is assessed at a corporate-level, not a fleet-level.

TABLE 2 - PERFORMANCE DETAILS

| | Carrier Data | CCWG Baseline* |
|---|---|---|
| SOx Emissions | | |
| Fleet-wide Average Sulfur Content of Fuel | #VALUE! | 2.4% |
| NOx Emissions | | |
| Post-1999 Fleet-wide Average Performance Against IMO curve | below IMO curve | 6% below IMO curve |
| % of reported vessels included in NOx carrier score calculation* | #DIV/0! | N/A |
| Environmental management systems | | |
| % of Fleet with Certified EMS | #VALUE! | 90% |
| Transparency | Indicator | Source |
| Core Indicators Reported: | | |
| Additional Indicators Reported: | | |

*Under current regulation, only vessels built or having major engine conversion after 1999 have an imposed NOx cap and obligation to measure NOx emissions. Older vessels are not included in the NOx performance score.

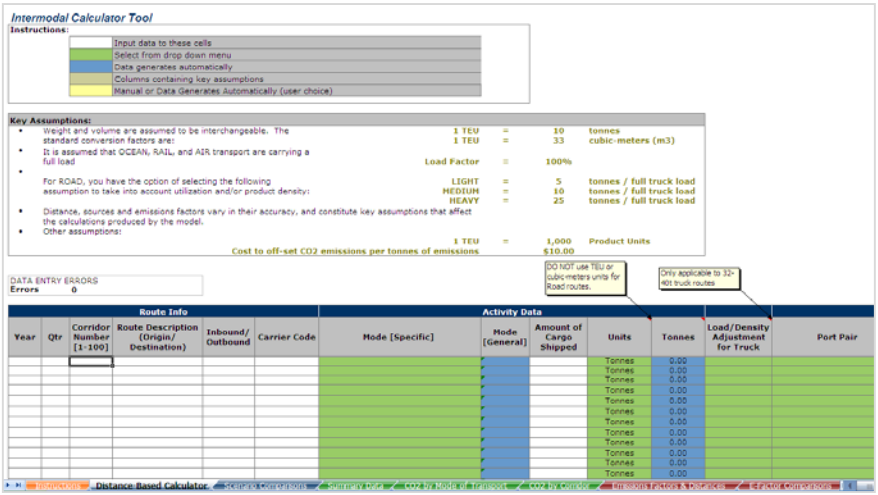
TABLE 3 - CO2 PERFORMANCE DETAILS

| CO2 Emissions - by trade lane | % of Fleet Reported On: Owned | % of Fleet Reported On: Time-Chartered | DRY CONTAINERS: grams CO2/ TEU-km | DRY CONTAINERS: CCWG Baseline* | DRY CONTAINERS: Points | REEFERS: grams CO2/ TEU-km | REEFERS: CCWG Baseline* | REEFERS: Points |
|---|---|---|---|---|---|---|---|---|
| Asia--Africa | -- | -- | - | 89.7 | -- | - | 151.7 | -- |
| Asia--South America (EC/WC) | -- | -- | - | 89.6 | -- | - | 116.6 | -- |
| Asia--Oceania | -- | -- | - | 89.6 | -- | - | 117.8 | -- |
| Asia--North Europe | -- | -- | - | 73.1 | -- | - | 100.6 | -- |
| Asia--Mediterranean | -- | -- | - | 76.3 | -- | - | 106.6 | -- |
| Asia--North America EC | -- | -- | - | 86.7 | -- | - | 116.6 | -- |
| Asia--North America WC | -- | -- | - | 84.0 | -- | - | 116.4 | -- |
| Asia--Middle East/India | -- | -- | - | 79.6 | -- | - | 109.2 | -- |
| North Europe--North America EC (incl. Gulf) | -- | -- | - | 82.4 | -- | - | 112.5 | -- |
| North Europe--North America WC | -- | -- | - | 84.0 | -- | - | 114.2 | -- |
| Mediterranean--North America EC (incl. Gulf) | -- | -- | - | 85.6 | -- | - | 112.9 | -- |
| Mediterranean--North America WC | -- | -- | - | 89.6 | -- | - | 121.6 | -- |
| Europe (North & Med)--Middle East/India | -- | -- | - | 71.4 | -- | - | 102.2 | -- |
| Europe (North & Med)--Africa | -- | -- | - | 74.6 | -- | - | 104.2 | -- |
| Europe (North & Med)--Oceania (via Suez / via Panama) | -- | -- | - | 98.7 | -- | - | 206.4 | -- |
| Europe (North & Med)--Latin America/South America | -- | -- | - | 94.8 | -- | - | 124.0 | -- |
| North America--Africa | -- | -- | - | 126.6 | -- | - | 180.2 | -- |
| North America EC--Middle East/India | -- | -- | - | 80.6 | -- | - | 106.9 | -- |
| North America--South America (EC/WC) | -- | -- | - | 87.7 | -- | - | 117.8 | -- |
| North America--Oceania | -- | -- | - | 100.1 | -- | - | 136.7 | -- |
| South America (EC/WC)--Africa | -- | -- | - | 90.9 | -- | - | 111.1 | -- |
| Intra-Americas (Caribbean) | -- | -- | - | 85.0 | -- | - | 113.3 | -- |
| Intra-Asia | -- | -- | - | 79.3 | -- | - | 107.1 | -- |
| Intra-Europe | -- | -- | - | 74.1 | -- | - | 105.1 | -- |
| Other | -- | -- | - | 115.9 | -- | - | 153.9 | -- |
| Fleet-wide CO2 Performance | | | #DIV/0! | | #DIV/0! | #VALUE! | | #DIV/0! |
| | | | | | out of 100 | | | out of 100 |

*CCWG baseline is the CCWG 2008 average.

Performance Metrics Scorecard

2) **Intermodal Calculator Tool** is an Excel-based, $CO_2$ calculation and footprinting tool for intermodal shipments. Annually updated ocean emissions factors are based on actual data collected through CCWG's performance metrics process. Emissions factors for all other modes (road, rail, air, other ocean) are based on best available public data (e.g. WRI, DEFRA, EPA).




3) **Environmental Performance Survey (EPS)** is a qualitative survey to complement the quantitative performance metrics. The EPS collects descriptive best practices in areas where quantitative metrics are less suitable at this time (e.g. pilot projects).

"Clean Cargo inspires conversation and collaboration that wouldn't otherwise happen. By engaging closely with shippers, we increase our shared understanding of the difficulties before us and can work together to tackle important issues."

*- John Grenville-Goble*
***"K" Line***
*March 2010*

### CCWG Member Profile: "K" Line

Environmental responsibility is a core part of "K" Line's business ethic. CCWG is an opportunity to extend that ethic to influence industry practices and learn from peers. "K" Line values the collaborative spirit of CCWG. Hearing shippers' views on environmental issues has enabled the carrier to develop stronger relationships with its customers. "K" Line also benefits from influencing industry tools and standards, working with peers to create a level playing field that inspires performance improvement. The carrier is using CCWG's Performance Metrics Tool to communicate with its customers about environmental impacts. "K" Line also uses the Intermodal Emissions Calculator to report to customers the carbon emissions associated with their shipments.

## 5. CCWG Performance Metrics Methodology

The performance metrics methodology is the basis for the performance metrics data collection process and analysis. Divided into six categories (see below), the metrics represent material environmental issues for the sector, as well as issues that cargo owners in the group view as important to assess their own supply chain sustainability.

| Category | Metric |
|---|---|
| **$CO_2$ Emissions** | Grams $CO_2$/nominal TEU-km, by trade lane |
| **$SO_X$ Emissions** | Sulfur content of bunker fuel |
| **$NO_X$ Emissions** | Main engine performance percentage below IMO curve<br>Auxiliary engine performance percentage below IMO curve |
| **Environmental Management Systems (EMS)** | Percentage of owned vessels with ISO 14001 certification or other comparable third-party certified EMS (other qualifying EMS to be assessed and confirmed by BSR and CCWG members) |
| **Waste, Water, and Chemicals** | ▪ Use of SPC Anti-fouling paints OR use of non-toxic anti-fouling paints<br>▪ Use of stern tube oil biodegradable (according to OECD) OR use of water lubrication or air seal<br>▪ Use of external hydraulic fluids and lubricant grease biodegradable (according to OECD) OR external hydraulics exchanged to electrical power<br>▪ Use of gear oil biodegradable (according to OECD)<br>▪ Use of cleaning agents not classified as CMR, sensitizing, or dangerous to the environment<br>▪ Use of refrigerants that are natural ($NH_3$, $CO_2$) OR HFC complying with GWP<3500 and ODI=0<br>▪ Boiling/cooling water treatment to non-CMR, non-sensitizing, non-toxic level<br>▪ Mid-ocean ballast water exchange OR ballast water treatment to IMO final approval—non-toxic level<br>▪ Bilge water treatment to <5ppm oil, only approved surfactants<br>▪ No discharge of sewage in sensitive areas (PSSA) OR sewage treatment plant on board<br>▪ "No incineration" policy in place<br>▪ "No garbage overboard" policy in place<br>▪ Saved fuel analysis documentation (three years) and full compliance with ISO 8217:2005, or legal action when not in compliance |
| **Transparency** | For corporate-level public reporting: Meeting “Core” and “Additional” Indicators |

# 6. $CO_2$ Calculation Methodology

## CCWG has developed a standardized $CO_2$ calculation methodology to enable $CO_2$ benchmarking, drive improvements, and improve data quality over time.

The methodology is used exclusively by CCWG member carriers to calculate vessel emissions as part of the CCWG Performance Metrics disclosure. Following is a description of how $CO_2$ emissions factors (in $gCO_2$/TEU-km) are calculated for the purposes of the CCWG Performance Metrics.

### Calculation of Vessel $CO_2$ Emissions

CCWG carriers report on the following data for each vessel through the annual CCWG Performance Metrics data collection process:

- Nominal capacity in 20-foot equivalent container units (TEUs)
- Number of reefer plugs
- Distance sailed
- Fuel consumed (HFO and MDO/MGO reported separately)
- Timeframe of data

The CCWG Performance Metrics Tool uses this information to calculate vessel $CO_2$ emissions. A general formula for this calculation is:

*Total kg fuel consumed for containers, multiplied by 3114.4 $gCO_2$/kg fuel, divided by the product of [maximum nominal TEU capacity * total distance sailed]*

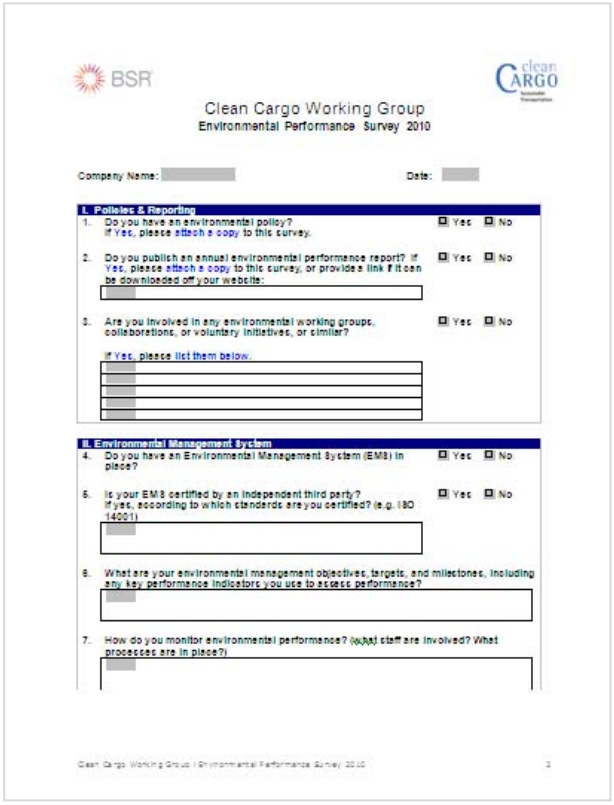
The calculation methodology for dry containers is based on International Maritime Organization (IMO) guidance for emissions and carbon contents of fuels. CCWG will continue to align with IMO standards as they improve over time.

CCWG members receive full access to the calculation methodologies and the ability to work with the group to shape future standards. The group continuously improves the methodology to increase the accuracy of data. Improvements are based on factors such as: changes to IMO protocols, new GHG standards, availability of better emissions factors, availability of more accurate data, utilization adjustments, and stakeholder expectations.

# 7. 2010 Environmental Performance Survey (EPS)

The EPS is a short questionnaire for CCWG carriers to supplement the detailed Performance Metrics submission. The EPS questions seek a combination of yes/no and descriptive responses in emerging issue areas, or areas in which clear performance metrics for the group do not exist.

Each CCWG carrier submits an EPS annually. CCWG has historically made the EPS questionnaire available to the public.



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Environmental Performance Survey 2010

Company Name: Date:

**I. Policies & Reporting**

1. Do you have an environmental policy? ☐ Yes ☐ No
   If Yes, please attach a copy to this survey.
2. Do you publish an annual environmental performance report? If ☐ Yes ☐ No
   Yes, please attach a copy to this survey, or provide a link if it can be downloaded off your website:
3. Are you involved in any environmental working groups, collaborations, or voluntary initiatives, or similar? ☐ Yes ☐ No
   If Yes, please list them below.

**II. Environmental Management System**

4. Do you have an Environmental Management System (EMS) in place? ☐ Yes ☐ No
5. Is your EMS certified by an independent third party? ☐ Yes ☐ No
   If yes, according to which standards are you certified? (e.g. ISO 14001)
6. What are your environmental management objectives, targets, and milestones, including any key performance indicators you use to assess performance?
7. How do you monitor environmental performance? (What staff are involved? What processes are in place?)

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## 8. Conclusion

CCWG's evolving tools will continue to improve as the group assesses ongoing expectations driven by regulation, stakeholders, and business needs. The group's success in achieving significant progress in supply chain sustainability is due to its inimitable focus on business-to-business relationships and collaborative decision-making. CCWG continues to focus on data accuracy and comparability, balanced in equal measure with what is feasible and actionable.

Newcomers to CCWG will find standardized data and tools that are proven to simplify measurement, increase transparency, and reduce emissions in supply chain logistics and transportation. Global brands, retailers, and manufacturers that are looking to their supply chains for increased sustainability are encouraged to participate in CCWG and adopt CCWG's tools and methodology for the ocean transportation portion of their shipments.

For more information on CCWG, please contact Raj Sapru at +1 415 984 3209 or rsapru@bsr.org.

# 9. Appendix

## CCWG Members

American Eagle Outfitters, Inc.

APL

CMA CGM

The Coca-Cola Company

COSCON

CSAV

DAMCO

DHL Deutsche Post

Electrolux

Hamburg Sud

Hanjin Shipping

Hapag Lloyd

Heineken N.V.

Hyundai Merchant Marine

IKEA

Johnson & Johnson

John Wiley & Sons, Inc.

K Line

Kuehne + Nagel Inc.

Li & Fung Limited

Maersk

Nike, Inc.

Nordstrom, Inc.

NYK Line

OOCL

Phillips-Van Heusen Corporation

Polo Ralph Lauren Corporation

Starbucks Coffee Company

Wal-Mart Stores, Inc.

Yang Ming Marine Transport Corp.

## $CO_2$ Formula

**CO2 Formula**

(Note: the input sheet is designed to automatically calculate grams CO2/TEU-km based on carrier inputs)

*CO2 formula for dry containers:*

$$i_{Dry} = \frac{\left(\sum_{a,k} c \cdot m_{fuel,a,k}\right) - m_{RC} \cdot c}{V_{total} \cdot d}$$

*CO2 formula that integrates reefer containers:*

$$i_{Reefer} = \frac{\left(\sum_{ak} c \cdot m_{fuel,k}\right) - m_{RC} \cdot c}{V_{total} d} + \frac{m_{RC} \cdot c}{V_{Reefer} \cdot d}$$

With these definitions of variables:

$$\sum_{a,k} c \cdot m_{fuel,a,k} = c \cdot m_{fuel,HFO,ME} + c \cdot m_{fuel,HFO,AE} + c \cdot m_{fuel,HFO,Boiler} + \ldots$$

$$\ldots c \cdot m_{fuel,MDO,ME} + c \cdot m_{fuel,MDO,AE} + c \cdot m_{fuel,MDO,Boiler}$$

| | |
|---|---|
| a | Different Aggregates running on fuel (ME, AE, Boiler, Incinerator) |
| k | Different fuel types used on board (HFO, MDO) |
| $[m_{fuel}] = kg$ | Mass of fuel consumed during specified period (incl. Time at berth, river and sea) by all consumers (ME, AE, Boiler, Incinerator) |
| $[m_{RC} = 1.9\,TEU \cdot w_{fuel} \cdot x_{Plugs} \cdot z_{time}] = kg$ | Mass of fuel used for operating reefers |
| $[w_{fuel}] = \frac{kg}{TEU}$ | Mass of fuel consumed by one reefer TEU within one year |
| $[V_{cargo}] = TEU$ | loaded onto a specific ship while at STATUTORY summer draft, and complying with the SOLAS safe visibility regulation (Chapter V "Safety of navigation", Regulation 22 |
| $V_{Reefer} = 1.9TEU \cdot x_{Plugs}$ | |
| $[x_{Plugs}]$ | Number of reefer plugs on the vessel |
| 1.9 TEU | Number of TEU per plug. (We have several sizes of reefers e.g. 20', 40' and 45'. 1.9 is the average number of 20'reefer per reefer plug.) |
| $[d] = km$ | Total distance sailed during specified period (Incl. River, ports and sea distance) |
| $[z_{time}]$ | Percentage of one year calculation is provided for ( if one year $z_{time}$) |

And these constants.

| | |
|---|---|
| $w_{fuel} = \bar{P}_{Reefer} \cdot t \cdot y_{utility}$ | = 3.8kW * .23kg/kWh * 365 days * 24hours/day * 25% = 1914 kg/reefer-year |
| $\bar{P}_{Reefer}$ | Clean Cargo WG average power consumption of reefers = 3.8 kw |
| $[y_{Utility}] = 91d = 25\%$ | Reefer plugs utilization per year (based on Maersk and Hamburg Süd data) |
| $c = 3114\,\frac{g}{kg}$ | IMO-approved emissions factor, as of 2005 |

## CCWG Trade Lane Definitions

| Trade Regions | Countries in the Region | Sample Ports in Region |
|---|---|---|
| Africa | Angola, Cameroon, Kenya, Namibia, Nigeria, Somalia, Senegal, South Africa, Tanzania, Mauritania, The Gambia, Guinea-Bissau, Cape Verde, Guinea, Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo, Benin, Gabon, São Tomé & Príncipe, Equatorial Guinea, Congo, Democratic Republic of the Congo, Mozambique, Madagascar, Seychelles, Comoros, Mauritius | Luanda, Douala, Mombasa, Tripoli, Cape Town, Durban, Dakar, Walvis Bay, Port Elizabeth, Dar es Salaam, Mogadishu |
| Asia | Japan, Korea, China, Taiwan, Philippines, Vietnam, Malaysia, Cambodia, Thailand, Indonesia, Singapore, Burma, Brunei, East Timor, Philippines, Russia (Pacific) | Singapore, Shanghai, Yantian, Dalian, Busan, Hong Kong, Shekou, Surabaya, Kobe, Port Klang, Manila, Kaohsiung, Laem Chabang, Ho Chi Minh |
| Mediterranean / Black Sea | Italy, Spain, Portugal, France (Mediterranean), Greece, Turkey, Russia, Ukraine, Libya, Slovenia, Croatia, Montenegro, Albania, Bulgaria, Romania, Russia (Black Sea), Georgia, Cyprus, Syria, Lebanon, Israel, Tunisia, Algeria, Morocco, Malta, Gibraltar | Gioia Tauro, Algeciras, Lisbon, Odessa, Istanbul, Novorossiysk, Genoa, Barcelona |
| Middle East / India | Pakistan, Sri Lanka, Bangladesh, India, United Arab Emirates, Oman, Saudi Arabia, Bahrain, Qatar, Kuwait, Iraq, Egypt, Jordon, Djibouti, Sudan, Yemen, Eritrea, Iran, Maldives | Port Qasim, Nhava Sheva, Jeddah, Jebel Ali, Salalah, Colombo, Mina Sulman, Chittagong, Port Said, Chennai, Bandar Abbas, Aqaba, Shuwaikh, Suakin, Latakia, Abu Dhabi, Hodeidah |
| North America East Coast / Gulf | Canada (East Coast), United States (East Coast and Gulf Coast), Mexico (East/Gulf Coast), Cuba, Haiti, Dominican Republic, Bahamas, Caribbean Island nations | Miami, Savannah, Charleston, Houston, Newark, Montreal, Toronto, Veracruz |
| North America West Coast | Canada (West Coast), United States (West Coast), Mexico (West/Pacific Coast) | Los Angeles/Long Beach, Oakland, Tacoma, Vancouver, Lázaro Cárdenas |
| North Europe | Sweden, Norway, Denmark, Netherlands, Belgium, United Kingdom, France (Atlantic), Russia (North European), Finland, Estonia, Latvia, Lithuania, Poland, Germany, Ireland | Rotterdam, Bremerhaven, Antwerp, Felixstowe, Gothenburg, Copenhagen, Le Havre, Oslo, Vyborg, Hamburg, Southampton |
| South America (incl. Central America) | Guatemala, Honduras, Belize, Costa Rica, Nicaragua, El Salvador, Panama, Columbia, Venezuela, Brazil, Uruguay, Argentina, Chile, Peru, Ecuador, Guyana, French Guiana, Suriname | Itaguaí, Itajaí, Santos, Rio Grande, Paranaguá, Buenos Aires, Buenaventura, Iquique, Antofagasta, Callao, Guayaquil, Valparaíso |
| Oceania | Australia, New Zealand, Papua New Guinea, Pacific Island nations | Auckland, Melbourne, Sydney, Adelaide, Brisbane, Fremantle |