

ALIGNING GOVERNMENT AND INDUSTRY ACTION TOWARDS A GREENER FREIGHT SECTOR

PROCEEDINGS OF THE INTERNATIONAL GREEN FREIGHT WORKSHOP 2018



3 October 2018
San Diego, USA

Authors: Cristiano Façanha, Buddy Polovick, Suzanne Greene



ACKNOWLEDGMENTS

This workshop was supported by the United States Environmental Protection Agency, Natural Resources Canada, HP Inc., and the Smart Freight Centre.

For additional information:

International Council on Clean Transportation

1225 I Street NW Suite 900

Washington, DC 20005 USA

communications@theicct.org | www.theicct.org | [@TheICCT](https://twitter.com/TheICCT)

© 2018 International Council on Clean Transportation

TABLE OF CONTENTS

LIST OF ACRONYMS.....	ii
WORKSHOP SUMMARY	1
Why Green Freight?	1
The Global Green Freight Action Plan	1
Objectives.....	1
Highlights.....	1
Outlook for future collaboration and action.....	2
SESSION 1. OVERVIEW OF GREEN FREIGHT PROGRAMS AND INITIATIVES.....	3
Objective.....	3
Presenters.....	3
Importance of freight sector	3
How can green freight programs help companies?	3
What can companies do?	3
SESSION 2. HOW GOVERNMENT CAN SUPPORT BUSINESS.....	4
Objective.....	4
Presenters.....	4
Highlights.....	4
U.S. EPA—Building sustainable supply chains.....	4
NRCan—Greening freight transportation for Canadians.....	5
ICLEI—How local government can support business.....	6
CARB—Protecting communities from freight impacts.....	6
SEMARNAT—How government can support business.....	7
SESSION 3. PRACTICAL INSIGHTS FROM BUSINESS.....	9
Objective.....	9
Presenters.....	9
Highlights.....	9
HP—Logistics supply chain sustainability: from reporting to actions.....	10
DP-DHL—Disruptions in Logistics Transportation—the opportunity for Green technologies and solutions?.....	10
BSR—Business Collaboration: Future of Fuels and Clean Cargo Working Group	11
BNSF.....	11
SESSION 4. MOBILIZING IMPLEMENTATION OF CONCRETE ACTIONS.....	12
Objective.....	12
Moderators	12
The green supply chain.....	12
Group discussions	13
LIST OF PARTICIPANTS	17

LIST OF ACRONYMS

BNSF	Burlington Northern Santa Fe Railway
BSR	Business for Social Responsibility
CAD	Canadian dollar
CARB	California Air Resources Board
CCWG	Clean Cargo Working Group
CDP	Carbon Disclosure Project
CO₂	Carbon dioxide
DP-DHL	Deutsche Post DHL Group
GHG	Greenhouse gas
GLEC	Global Logistics Emissions Council
HP	Hewlett Packard Inc.
ICCT	International Council on Clean Transportation
ICLEI	International Council for Local Environmental Initiatives
IT	Information technology
MIT	Massachusetts Institute of Technology
NGO	Non-governmental organization
NO_x	Nitrogen oxides
NRCan	Natural Resources Canada
PM	Particulate matter
SCAG	Southern California Association of Governments
SFC	Smart Freight Centre
THD	The Home Depot
TMS	Transportation management systems
U.S. EPA	United States Environmental Protection Agency

WORKSHOP SUMMARY

The International Council on Clean Transportation (ICCT), the United States Environmental Protection Agency (U.S. EPA), Natural Resources Canada (NRCan), the Smart Freight Center (SFC), and Hewlett Packard (HP Inc.) brought together representatives from governments, corporations, and non-governmental organizations to discuss best practices and future opportunities to green the freight sector.

WHY GREEN FREIGHT?

Domestic and international freight activity will quadruple by 2050 if trends persist. Freight movement accounts for a disproportionate share of oil consumption, greenhouse gas (GHG) emissions, and air pollution, and thus represents an important target for emissions control. Decarbonizing freight is also more challenging than other sectors of the economy, and a systems approach will be needed—one that includes advanced vehicle technologies and measures to shift freight to the most energy-efficient modes and optimize supply chain activity.

THE GLOBAL GREEN FREIGHT ACTION PLAN

Green freight programs and initiatives exist around the world to support industry efforts to optimize energy efficiency, minimize costs, and reduce emissions of their logistics supply chains. The Global Green Freight Action Plan¹, a multi-stakeholder initiative bringing together over 50 organizations and countries, aims to develop and align green freight efforts worldwide, while incorporating the reduction of short-lived climate pollutants. The Action Plan is centered around effective stakeholder engagement and the development of science- and data-driven analyses to support green freight initiatives. Under the Action Plan, four regional green freight workshops (Africa, Asia, Europe, and Latin America) were conducted to gather stakeholder input and inform future program development. The International Green Freight Workshop brought all their lessons together to provide a platform for future green freight action.

OBJECTIVES

The International Green Freight Workshop aimed to:

- » Provide an overview of green freight programs and initiatives and examine what is needed to expand and harmonize these worldwide;
- » Understand existing efforts by leading companies and what steps are needed to take this to scale; and
- » Explore new opportunities for industry and government to work together in the sector-wide implementation of concrete actions.

HIGHLIGHTS

- » Growth in freight activity and emissions poses a critical challenge for decarbonization and sector sustainability. Decarbonizing the sector will need to rely on clean and efficient logistics, modes and equipment.

¹ For more information please refer to www.globalgreenfreight.org.

- » Tackling freight emissions requires a comprehensive portfolio of governmental regulations, market-based programs, fiscal instruments, and industry action. Green freight programs are an important part of the equation, often bridging the gap between government policies and industry action. These programs aim to reduce fuel consumption, costs and emissions; provide access to technical information on fuel-saving and emission reduction strategies; create brand recognition; and attract socially responsible investors. Green freight programs also act as a neutral third party for data collection, benchmarking and disclosure, providing sustainability guidance, providing information on clean and efficient technology and operational strategies, and evaluating ways that freight and emissions data can be used to improve supply chain performance.
- » The Global Green Freight Action Plan aims to develop, expand, and align green freight programs worldwide while incorporating both black carbon and GHG emissions. Harmonizing national green freight programs can facilitate industry adoption, especially for multinational firms with global operations. The GLEC framework is an important component of program harmonization.
- » National, regional and local government agencies share a common vision of a zero or low emission, safe, modern, integrated and resilient freight system. Industry aims to have integrated, efficient, streamlined, and cost-effective supply chains. Despite the contrasting language, both government and industry support aggressive emission reduction targets, and share a broad vision for sustainable supply chains, including support for local communities that bear most freight-related health impacts. Both government and industry agree that climate change is a strong incentive for sustainability, alongside community issues like human health, and local air quality. However, most companies still face challenges building internal buy-in for sustainability.
- » The rise of e-commerce is seen as both an opportunity to expand green freight and a potential source of increased emissions due to rapid, unsustainable growth. It is important to evaluate the last mile where most freight impacts are, and where technology and data integration can play a critical role to increase freight efficiency. It is also important to work together with local communities to address health impacts.
- » Electrification of trucks, locomotives and transshipment centers represent great promise for many companies and are being prioritized for near-term sustainability investments.
- » Data availability is a major challenge externally and internally within companies. Advanced data sources (e.g., telematics, GPS, OBD) can streamline data collection, and add more specificity where necessary (e.g., local impacts).

OUTLOOK FOR FUTURE COLLABORATION AND ACTION

This workshop confirmed the importance of bringing government and industry together to discuss a vision for sustainable freight, as well as policies and actions to green the freight sector. Green freight programs are well positioned to align government policies and industry action, and a follow-up symposium will leverage the momentum built by this workshop.

SESSION 1. OVERVIEW OF GREEN FREIGHT PROGRAMS AND INITIATIVES

OBJECTIVE

Introduce the workshop objectives, and present existing programs and initiatives to help companies improve their logistics and supply chain efficiency and reduce emissions.

PRESENTERS

Name	Role	Organization
Cristiano Façanha	Program Lead	ICCT
Eszter Toth-Weedon	Industry Relations Manager	SFC

IMPORTANCE OF FREIGHT SECTOR

- » Freight energy and GHG emissions are forecasted to grow four-fold through 2050.
- » Freight equipment contributes disproportionately to emissions, thus being an effective target for emissions control. However, decarbonizing freight will be challenging, and will need to rely on clean and efficient logistics, modes and equipment.
- » The Global Green Freight Action Plan aims to develop, expand, and align green freight programs worldwide while incorporating black carbon reductions alongside GHG emissions. The Action Plan is supported by a network of partners who have invested in capacity building, outreach, technical documentation and support for program development.

HOW CAN GREEN FREIGHT PROGRAMS HELP COMPANIES?

There are ample green freight programs and initiatives that can help companies:

- » Reduce fuel consumption and costs;
- » Improve relations with industry partners (carriers, shippers);
- » Create incentives for drivers;
- » Provide access to fuel-saving and emission reduction strategies;
- » Create branding recognition, and attract socially responsible investors; and
- » Measure, report and improve their environmental footprint.

WHAT CAN COMPANIES DO?

In order to support the greening of the freight sector, companies can:

- » Join green freight programs and initiatives to reduce emissions;
- » Calculate and report logistics emissions using the GLEC Framework;
- » Support the further development of green freight programs and ensure global alignment; and
- » Influence the role that governments and civil society can play in sustainable freight.

SESSION 2. HOW GOVERNMENT CAN SUPPORT BUSINESS

OBJECTIVE

Highlight government actions to support green freight efforts based on these overarching questions:

1. What is the *role of government* (national, state or local) in supporting businesses' freight sustainability efforts?
2. What are the *biggest barriers or gaps* policy makers face as we work to address these challenges?
3. What is your *vision* for a sustainable freight sector in 20-30 years? How should government support this vision?

PRESENTERS

Name	Role	Organization
Buddy Polovick (moderator)	Environmental Protection Specialist	U.S. EPA SmartWay
Cheryl Bynum	National Program Manager	U.S. EPA SmartWay
Luke Bond	Strategic Policy Advisor	NRCan
Pam O'Connor	Council Member	ICLEI
Doug Ito	Assistant Division Chief, Transportation and Toxics	CARB
Judith Trujillo	Subdirectora del Sector Transporte	SEMARNAT

HIGHLIGHTS

- » All agencies share a vision of a zero (or low) emission, safe, modern, integrated and resilient freight system.
- » It is key to have an integrated policy portfolio including regulations, market-based programs and fiscal mechanisms. Green freight programs in particular attempt to work more collaboratively with industry.
- » Importance of Demonstration projects are important to prove the effectiveness and feasibility of new technologies and operational strategies such as driver training.
- » From a regional and local perspective, it is essential to address the local health impacts of the freight industry and work together with local communities.
- » It is important to evaluate the last mile where most impacts are, and where technology and data integration can play a critical role.

U.S. EPA—BUILDING SUSTAINABLE SUPPLY CHAINS

- » U.S. EPA aims to create a policy environment that fosters innovation and provides businesses with regulatory certainty and a level-playing field.
- » U.S. EPA sets policies (e.g., national standards for new vehicles and fuels), provides incentives to leverage private investment in clean technology, and offers cross-cutting complementary programs such as SmartWay. There are synergies between regulations and the complementary programs, which can share technology testing data (with the exception of confidential proprietary information).

- » SmartWay supports industry benchmarking by giving companies assessment tools to measure and share performance data.
- » Government is well-positioned to lead SmartWay as a neutral and unbiased information broker because it does not profit from information technology systems or technology devices.
- » One challenge is that many owner-operators are skeptical of government and have limited ability to do much beyond daily operations. They also tend to deploy older, less efficient fleets, and thus would benefit the most from SmartWay technologies. To address this, U.S. EPA is currently working on a small carrier application to streamline data collection and program information.
- » There are new solutions for data collection including telematics to monitor driver behavior, optimize operations, manage vehicle performance, cut down vehicle downtime, and support vehicle technology specification for maximized efficiency. Despite large amounts of freight data generated by these new tools, IT systems are not well integrated to leverage data. This integration of data sources will require resources such as machine learning, artificial intelligence, and scalable and secure integrated platforms.
- » We need to rethink urban transportation and the “last mile”, which carries the highest price tag along the supply chain. A combination of drones alongside electric trucks could double the current delivery capacity.

NRCAN—GREENING FREIGHT TRANSPORTATION FOR CANADIANS

- » NRCan is not responsible for regulations or vehicle testing, but instead is tasked with influencing and changing behavior. NRCan leads SmartWay in Canada to support this goal.
- » There are 430 Canadian partners accounting for over 44,000 trucks registered in SmartWay Canada, or 28% of Canada’s for-hire on-road freight movement. In 2017/18 Canadian SmartWay Truck carriers saved 160 million liters of fuel, equivalent to \$4,400 in fuel saved per class 8 truck.
- » NRCan is currently establishing partnerships with provincial governments and associations to further the reach of SmartWay and increase number of partners.
- » NRCan is upgrading tools, including the Small Carrier App, a simplified version of the truck tool to ease entry for small and medium enterprises. They are also researching the next generation of data collection and how it can be used to help partners.
- » For 20 years, NRCan has been educating fleets on the benefits of energy-efficient commercial equipment purchases, alternative fuel choices, and business best practices. The driver training program helps truckers and trucking companies reduce fuel use, cut costs, increase profits and improve competitiveness, and helps Canada meet its climate change goals.
- » NRCan’s Green Freight Assessment Program, launched in the spring 2018, provides up to CAD10,000 for Canadian fleets to take a deep dive into their fleet and operations, and make informed decisions to reduce fuel costs and GHG emissions. The assessment determines the company’s performance baseline and builds scenarios to test strategies to identify solutions to improve efficiency of their fleet and operations.

- » The Pilot Implementation Program provides funding for companies to test solutions identified during their green freight assessment.
- » Launching Spring 2019, NRCan's Supply Chain Modernization program will provide up to CAD100,000 to support research and green freight modernization.
- » NRCan has focused their international efforts on supporting the adoption of driver training programs in other countries, including a partnership in Brazil and possibly in other countries in Latin America.

ICLEI—HOW LOCAL GOVERNMENT CAN SUPPORT BUSINESS

- » Southern California has an extensive freight network, including the two largest U.S. container ports (Long Beach/Los Angeles and Port of Hueneme), an extensive network of freeways and highways, two Class I rail-roads, and three international border crossings.
- » Much of Southern California is a non-attainment area for two criteria pollutants driven by freight, which is responsible for nearly 50% of NO_x emissions from all sources.
- » Nationally, heavy-duty vehicles were only 4% of registered vehicles in 2010 but accounted for approximately 25% of on-road fuel use and GHG in the transportation sector.
- » The 2016-2040 SCAG Goods Movement environment strategy was developed to address community health concerns, federal attainment requirements and climate change issues, while contributing to the region's economic and energy security goals. It focuses on the long-term goal of a zero-emission goods-movement system where technically feasible and economically viable.
- » Regionally-significant goods movement initiatives include: the Los Angeles County Zero-Emission Trucks Collaborative, Los Angeles Clean Tech Incubator 2028 Zero Emissions Roadmap, and ARB Sustainable Freight Initiatives.

CARB—PROTECTING COMMUNITIES FROM FREIGHT IMPACTS

- » Air pollution from freight harms human health, leading to premature death, increased cancer risk, cardiac and respiratory diseases, hospitalizations, and lost work/school days.
- » CARB has had decades of leadership in environmental stewardship, including combatting criteria pollutants since the 1960s, toxics exposure since 1980s, climate change since 2000s and more recently community exposure to pollutants.
- » CARB's has a vision for a Sustainable Freight Transport System is to: "Utilize a partnership of federal, State, regional, local, community, and industry stakeholders to move freight in California on a modern, safe, integrated, and resilient system that continues to support California's economy, jobs, and healthy, livable communities. Transporting freight reliably and efficiently by zero emission equipment everywhere feasible, and near-zero emission equipment powered by clean, low- carbon renewable fuels everywhere else."
- » To fulfill this vision, CARB finalized its California Sustainable Freight Action Plan in July 2016, which aims to improve freight efficiency, transition to zero emission operations, and increase economic competitiveness.

- » CARB's main freight-related goal is to protect communities near freight facilities. This depends on four actions: tighten CARB rules and add facility infrastructure and compliance, support district facility-based measures & port initiatives, pursue stricter federal and international standards, and coordinate and expand incentives for freight transition to zero emission operations. CARB will identify 10 communities impacted by freight (and other sources) and develop action plans.
- » Reaching CARB's goals will require a lot more integration and industry input to the development of policies. Some industry players are very willing to be involved in the Sustainable Freight Action Plan.

SEMARNAT—HOW GOVERNMENT CAN SUPPORT BUSINESS

- » Air pollution has a vast impact on public health: In Latin America, more than 150 million people live in urban areas where the air quality guidelines of the World Health Organization are exceeded. In Mexico, it is estimated that 20,500 deaths have been related to exposure to air pollutants in 2010.
- » Diesel vehicles contribute to a large share of on-road emissions, including 25% of NO_x, 42% of PM₁₀, 52% of PM_{2.5}, 63% of black carbon, and 26% of CO₂.
- » Public policies aimed at reducing emissions from freight transport include:
 - » State and local: inspection and maintenance programs, self-regulation (preventive maintenance & emissions reduction devices), ecozones or low emission zones, promotion of efficient and low emission vehicles (natural gas, hybrids, electric), night deliveries;
 - » National: national vehicle emission standards (NOM-044), fleet scrappage schemes, financing (NAFIN), green freight program (Transporte Limpio).
- » Transporte Limpio is a voluntary program, designed by SEMARNAT with the support of SCT and U.S. EPA SmartWay.
 - » The objective of the program is to make freight transportation more efficient, competitive, and environmentally-friendly.
 - » Project partners include carriers, who adopt measures to save fuel and emissions, and shippers, who hire efficient carriers. This creates complementary incentives between carriers and shippers.
 - » Measures promoted by the program include operational measures (eco-driving, speed limits, idling reduction, vehicle specification, maintenance) and technologies (aerodynamic devices, low-resistance tires, automatic tire inflation systems, advanced lubricants, and emission control equipment).
 - » The program currently has 418 partners with over 69,000 trucks evaluated in 2018 and 8.7 million cumulative tons of CO₂ avoided since 2008.
 - » The main barriers to program success are the high number of very small carriers, differing regulatory frameworks due to the co-existence of US and EU-based regulations, fuel quality, and poor highway infrastructure and security.

DISCUSSION OF EXPANSION AND ALIGNMENT OF GREEN FREIGHT PROGRAMS AND INITIATIVES

The moderator briefly reflected on key themes and takeaways from government presentations including: numerous workstreams at global, national, local levels; a patchwork of programs, methodologies, initiatives and standards; new programs and pilots currently in development and on the horizon; and rapidly growing interest to align and harmonize efforts with key goal of making freight programs adaptable and valuable for business to participate, report and reduce emissions. With these observations, the moderator:

- » Asked panelists what their governments are doing to help expand, align and harmonize green freight efforts and initiatives;
- » Asked the audience to share concerns or challenges faced by business to help policy makers to better understand marketplace needs and how government can better help them on their sustainability journey;
- » Asked the audience and panelists what “harmonization” means to them and what it looks like (e.g., does it include key principles, framework or standard methodologies? Does it mean government plays a central role?); and
- » Asked the audience what they envision a green freight future to look like and what are biggest barriers in helping them to get there.

Highlights of the panel discussion included the following observations:

- » The world is shifting rapidly—trade agreements are being renegotiated, Brexit is affecting the future of the European Union—with important consequences for global goods movement. Even in an environment of political instability, businesses are investing tremendous resources to make supply chains cleaner, more efficient, and more profitable.
- » It makes sense to harmonize national green freight programs. In the case of North America, freight systems are already integrated across the 3 countries, and many SmartWay shipper partners have cross-border supply chains. This was the key rationale for the SmartWay harmonization across U.S., Canada and Mexico.
- » Green freight program harmonization and streamlining can lead to more industry support. Companies struggle to justify joining different programs if they are not harmonized and requirements are different. Programs need common indicators compatible with Global Logistics Emissions Council (GLEC) framework. It would be ideal if green freight program reporting requirements were integrated with internal transportation management systems (TMS) to facilitate data collection.
- » Health impacts from freight occur at the regional and local levels. It is helpful to have information on industry-led emission reduction strategies that could be communicated to local communities. However, it is difficult to collect route-based data using current SmartWay tools, which could be improved by leveraging new advanced data collection methods (e.g., telematics, GPS, OBD). Canada has a SmartCities program and SmartWay has also enacted collaborations with New York and college communities to address local freight impacts.
- » Because many freight impacts are concentrated around ports, it is best to include local communities in port planning. U.S. EPA’s Ports program is developing tools to help communicate SmartWay benefits to local communities.

SESSION 3. PRACTICAL INSIGHTS FROM BUSINESS

OBJECTIVE

This session included insights from business leaders and industry experts on strategies to make sustainable logistics work in the real world and explored how green freight programs can further enable this progress. This session also aimed to directly or indirectly answer or speak to the three following overarching questions:

- » What is the role of green freight programs in supporting businesses' freight sustainability efforts?
- » What are the biggest barriers or gaps business faces as we work to address challenges?
- » What is your vision for a sustainable freight sector in 20-30 years? How should industry support this vision?

PRESENTERS

Name	Role	Organization
Suzanne Greene (moderator)	Sustainable Supply Chains Manager Technical Advisor	MIT / SFC
Blair Chikasuye	Global Logistics Environment Manager	HP
Emily Davis	GoGreen Lead North America	DP-DHL
Eric Olson	Senior Vice President	BSR
Nathan Loftice	Director, Planning Permitting & Sustainability	BNSF

HIGHLIGHTS

- » Climate change is a strong incentive for promoting sustainability, alongside community issues like human health, and local air quality.
- » Companies are prioritizing the reduction of emissions from transportation, but efforts can be stymied by lack of data from suppliers, the increase in cost of more sustainable services, and business decisions that preclude the use of more sustainable solutions (e.g., tight production deadlines or high value products that require the security afforded by air transport).
- » Data availability seems to be a major challenge not only externally (i.e., getting data from suppliers) but even internally via data sharing across silos within an organization. Data quality and assurance/validation is also a concern.
- » Electrification of trucks, locomotives and transshipment centers represent great promise for many companies and are being prioritized for near-term sustainability investments.
- » Ambitious climate targets can help push innovation within companies and suppliers.
- » There is a tendency to oversimplify sustainability in sales and procurement. For example, some companies perceive that membership in a green freight program is

a reasonable indication of sustainability, however it does not necessarily mean it is a more efficient carrier.

- » The rise of e-commerce is seen as both an opportunity to expand green freight programs and a potential source of increased emissions due to rapid, unsustainable growth in the shipping sector.
- » Green freight programs can help by:
 - » Acting as a neutral platform for data collection and sharing, particularly for streamlining and harmonizing reporting to ensure calculations are done consistently;
 - » Providing simple sustainability guidance, such as language for procurement documents;
 - » Ranking carriers by their efficiency is a helpful mechanism, particularly if tied to programs like Science-Based Targets or Carbon Disclosure Project (CDP);
 - » Finding mechanisms to incentivize/subsidize sustainability upgrades from small businesses to support the greening the logistics sector as a whole, who often share the same carriers yet have little influence on their sustainability investments;
 - » Informing business strategies for expanding logistics activities while increasing efficiency; and
 - » Evaluating ways that freight and emissions data can be used to improve supply chain performance, while providing more guidance through best practices as well as incentives to continuously improve.

HP—LOGISTICS SUPPLY CHAIN SUSTAINABILITY: FROM REPORTING TO ACTIONS

- » HP’s logistics sustainability strategy includes both environmental and social aspects, which has landed them various accolades for their proactive and progressive vision.
- » On the environmental front, HP has targets for GHG emissions, GHG intensity, water consumption, renewable electricity, recycling, and deforestation. They also assist their suppliers with similar goals.
- » With respect to social aspects, HP requires its truck carriers to comply with Truckers Against Trafficking practices. As an example of creating positive local impact, HP repurposed a 53’ trailer to be available for families seeking to connect with loved ones during disasters.
- » HP has set targets to reduce supply chain emissions intensity, using SmartWay and the GLEC Framework as tools for supplier engagement and emissions accuracy improvement. HP is also on Gartner’s Supply Chain Top 25 list.

DP-DHL—DISRUPTIONS IN LOGISTICS TRANSPORTATION—THE OPPORTUNITY FOR GREEN TECHNOLOGIES AND SOLUTIONS?

- » DP DHL has set a number of climate targets, aiming towards zero emissions by 2050. The goals are both global, such as increasing overall logistics efficiency by 50% by 2050, and local, such as low-carbon last-mile delivery.

- » Reaching emissions targets will require innovation, which DP DHL has addressed head-on through the development of their own brand of electric package cars (StreetScooters).
- » Meeting supply chain targets requires global collaboration—an effort furthered through participation in SmartWay, GLEC, Green Freight Asia, and other green freight initiatives.

BSR—BUSINESS COLLABORATION: FUTURE OF FUELS AND CLEAN CARGO WORKING GROUP

- » BSR spearheads the Clean Cargo Working Group (CCWG), an industry group that has spurred engagement and data sharing between container shipping companies and their customers.
- » The Sustainable Air Freight Initiative is a new program of BSR, looking to move the aviation sector forward in a similar way as the CCWG.
- » The Future of Fuels program at BSR provides a platform for sharing best practices and encouraging collaboration around low-carbon fuels for road transport.

BNSF

- » Numerous disruptive technologies are entering the marketplace that have the potential to advance sustainability, such as blockchain, 3D printing, and autonomous vehicles.
- » The rise of e-commerce is transforming the logistics sector, leading companies to develop a broader network of distribution centers in order to meet one- or two-day delivery requirements.
- » The rail industry is the lowest emissions intensity mode of transport, and BNSF maintains the greenest fleet in the U.S. Electrification is a growing trend for rail, not only for locomotives, but also for rail terminals and associated equipment.

SESSION 4. MOBILIZING IMPLEMENTATION OF CONCRETE ACTIONS

OBJECTIVE

The final session reviewed concrete green freight actions and explored how industry and government can work together on their sector-wide implementation.

MODERATORS

Name	Role	Organization
Cristiano Façanha	Program Lead	ICCT
Suzanne Greene	Sustainable Supply Chains Manager Technical Advisor	MIT / SFC

THE GREEN SUPPLY CHAIN

ICCT presented preliminary results of the Green Supply Chain study, a collaborative effort with U.S. EPA and The Home Depot (THD). The objective of study is to identify and showcase effective technologies and strategies to enhance the energy and environmental performance of a real-world global supply chain, including:

- » Model existing strategies based on THD's real-world operations;
- » Benchmark emission and energy savings adopted by a leading SmartWay partner;
- » Assess potential strategies for future implementation, including measuring the expected benefits and identify priority areas for further improvement; and
- » Highlight key stakeholders and potential collaborations to facilitate the implementation of additional strategies.

The analysis considers three strategy types—clean and efficient logistics, modes, and equipment—along a supply chain from China to United States (Figure 1), involving three scenarios:

- » Conventional: basic supply chain without strategies considered in the green scenario
- » Green: actual supply chain considering improvements already adopted
- » Green Plus: future supply chain with additional improvements to those already implemented in the Green scenario

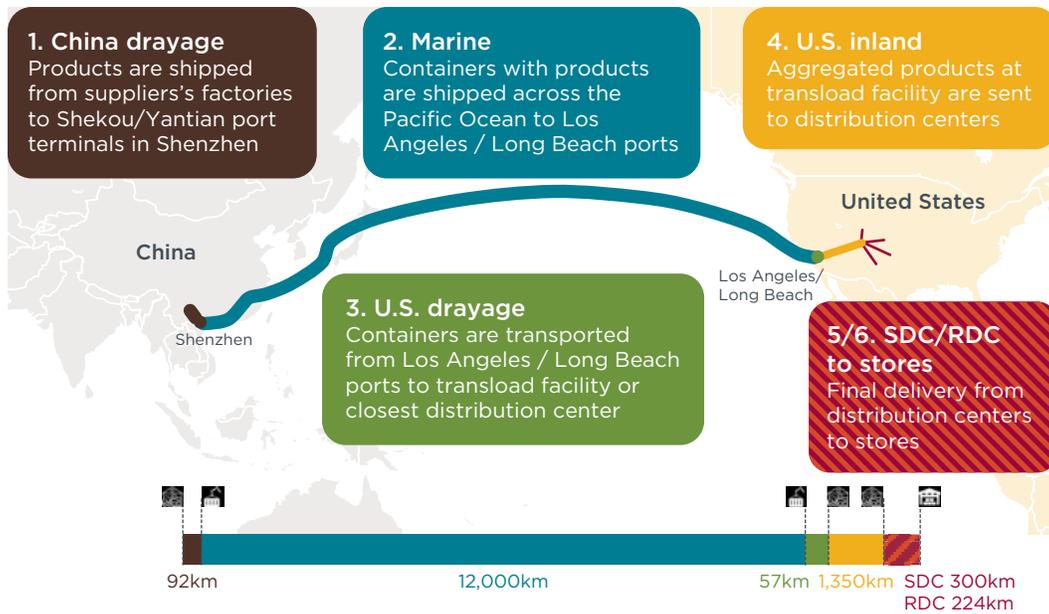


Figure 1. Green supply chain study

Key highlights of the presentation included:

- » Based on preliminary results, current available technologies and strategies reduced CO₂ emissions by 25% with respect to the conventional supply chain. Adopting advanced strategies can further reduce CO₂ by 36%. These improvements included a combination of technology and operational strategies.
- » Technology plays an important role in the reduction of local air pollutants. The marine sector accounts for the majority of local air pollutant emissions, and cleaner residual fuels and advanced aftertreatment vessel technologies will significantly reduce emissions. For land-based links, moving towards soot-free trucks and cleaner locomotives will virtually eliminate emissions of local air pollutants.

GROUP DISCUSSIONS

Following the framework established by the Green Supply Chain presentation, participants were divided in groups to discuss three strategy types: clean & efficient logistics, modes, and equipment (Figure 2). Topics and questions posed to participants included:

- » Please discuss strategies around these three themes, including the roles of green freight programs/initiatives, industry and government, expected benefits, barriers and feasibility, and opportunities for collaboration between industry and government.
- » Are green freight programs and initiatives doing a sufficiently good job in promoting these strategies? How can they be leveraged or adapted to mobilize the implementation of these strategies?
- » Are there particular strategies that you believe result in substantial benefits and where collaboration between industry and government can help overcome barriers?



Figure 2. Strategy evaluation framework

CLEAN AND EFFICIENT LOGISTICS

This group discussed multiple elements supporting the implementation of clean and efficient logistics practices, including market drivers, data sharing, education, and planning. This summary focuses on data sharing (Table 1), a key element to support more efficient logistics because of the potential for better routing and vehicle utilization, either within a company or via external partnerships.

Table 1. Clean and efficient equipment logistics

Strategy	Role of government	Role of industry	Role of GF programs	Expected benefits	Barriers and feasibility	Opportunities for collaboration
Data sharing	Subsidize data collection efforts	Scope 1 + 2 data IT solutions Sensor deployment	Data collection + aggregation Establish protocols	Improved TMS systems, planning and capacity utilization Supply chain collaboration Infrastructure planning	Distrust of government Privacy/security Competition Perceived risk	Align/ authenticate data sharing Supply chain collaboration Align methods and terminology Promote circular economies Crowd shipping

CLEAN AND EFFICIENT MODES

This group focused the discussion on clean and efficient modes (Table 2). Mode shifting is not a certain or feasible option unless infrastructure and costs are considered. Some industries or sectors may not lend themselves to mode shifting. The roles of key stakeholders are clear and complementary, with government responsible for regulations and infrastructure, while industry needs to invest in equipment or logistics improvements subject to feasibility as described above. Green freight programs are needed for education and to facilitate communication. Mode shifting can certainly lead to cost savings and emissions reductions in scenarios where markets and infrastructure allow. Pilot projects have shown a range of success and more research is needed.

Table 2. Clean and efficient equipment modes

Strategy	Role of government	Role of industry	Role of GF programs	Expected benefits	Barriers and feasibility	Opportunities for collaboration
Mode shifting, including: short sea shipping; truck to barge and rail; air to marine, etc.	Infrastructure improvements Regulatory reform	Equipment or logistics improvements and investments Market forecasting to adjust supply chain capacity	Communication and education	Emissions reductions, cost savings	Empty backhauls Equipment and labor costs Market demand for rapid freight Poor infrastructure Border and security delays	Co-load and share backhauls Engage with industry lobby for regulatory reform and infrastructure improvements

CLEAN AND EFFICIENT EQUIPMENT

This group focused the discussion on the electrification of urban delivery vehicles (Table 3). The roles of key stakeholders are also clear and complementary, with government responsible for regulations (e.g., efficiency/GHG standards, tariff structures, demand charges), industry responsible for energy demand and operations planning, and green freight programs responsible for sharing best practices and adequately accounting for emission benefits of electric trucks. Vehicle electrification can lead to clean, efficient and quiet transport in urban centers, and result in less need for enforcement since electric delivery vehicles do not have tailpipe emissions. There are important barriers to overcome (e.g., range, operational constraints, fueling time, initial investment), but there are also plenty of opportunities for collaboration. These include pilot projects and the adequate accounting of emission and economic benefits of electric urban delivery vehicles.

Table 3. Clean and efficient equipment strategies

Strategy	Role of government	Role of industry	Role of GF programs	Expected benefits	Barriers and feasibility	Opportunities for collaboration
Electrification of urban delivery vehicles	<p>Efficiency/GHG regulations (including super credits)</p> <p>Regulation of tariff structure and demand charges</p> <p>Preferential access (HOV lanes)</p>	<p>Energy demand planning</p> <p>Operational planning (when and where to charge)</p>	<p>Best practice sharing</p> <p>Demonstrate benefits through average emission factors</p>	<p>Clean, efficient and quiet transport</p> <p>Less need for emissions enforcement because of lack of tailpipe emissions</p>	<p>Limited range and impact on operations</p> <p>Charging time</p> <p>Shippers currently don't benefit from hiring "e-carriers"</p> <p>Initial investment for vehicles and charging infrastructure</p> <p>Charging infrastructure constraints</p>	<p>Incorporate life-cycle emissions to fully account for impacts</p> <p>Redesign green freight program parameters to fully account for "e-trucks" emissions and benefits</p> <p>Implement pilot projects</p> <p>Develop total cost of ownership analyses to accurately evaluate technology options</p>

LIST OF PARTICIPANTS

Name		Company
Alan	Lewis	Smart Freight Centre
Bernardo	Andrade	Dr. Bronner's Magic Soaps
Blair	Chikasuye	Hewlett Packard Inc.
Buddy	Polovick	U.S. EPA SmartWay
Cheryl	Bynum	U.S. EPA SmartWay
Christophe	Esayian	OIA Global
Claire	Boland	PepsiCo
Colleen	Milster	Dow Chemical
Cristiano	Façanha	International Council on Clean Transportation
Daniel	Kim	RCS Logistics, Inc.
Emily	Davis	Deutsche Post DHL
Eric	Olson	BSR
Erik	Maroney	FedEx Express
Eszter	Toth-Weedon	Smart Freight Centre
Eugene	Brown	Hewlett Packard Enterprise
Jennifer	Wheeler	Walmart
Jessica	Balsam	APL Logistics
Jessie	Lund	North American Council for Freight Efficiency
John	Koupal	Eastern Research Group
Laura	Aung	Dr. Bronner's Magic Soaps
Luke	Bond	Natural Resources Canada
Marlena	Blonsky	Expeditors International of Washington
Michael	Blake	Scope 3
Nathan	Loftice	BNSF Railway
Richard	Head	Trafigura
Rick	Baker	Eastern Research Group
Suzanne	Greene	MIT Center for Transportation and Logistics