

Logistics & Transportation Services – A Canadian Perspective



**Green Supply Chain Management
Logistics & Transportation Services –
A Canadian Perspective**

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**Gestion de la chaîne d'approvisionnement verte :
Perspective canadienne des services
de logistique et de transport**

Green Supply Chain Management

Logistics & Transportation Services –

A Canadian Perspective



Highlights

While competing in a highly commoditized service sector, Canadian logistics and transportation service providers are placing increasing importance on green supply chain management (GSCM). Even though the value of GSCM activities is rarely disputed, literature to-date has been sparse in providing tangible evidence regarding performance and business benefits. For this reason, Supply Chain and Logistics Association Canada (SCL) partnered with Industry Canada to review the important service business function of GSCM. This resulting report provides unique insights to help Canadian logistics and transportation services executives understand the current trends and to recognize the benefits of adopting GSCM practices.

Companies that have adopted GSCM practices in distribution activities have successfully improved their business and environmental performance on many levels.

Key findings

- Most Best-in-Class (BiC)* businesses are able to increase distribution efficiency and service differentiation while reducing distribution cost.
- The high cost of energy is the main driver for implementing GSCM practices in distribution activities.
- A large portion of BiC businesses increased their use of multi-modal transportation (e.g., decreasing air and truck transportation and increasing rail and marine transportation) to maximize environmental and business benefits.
- Most logistics and transportation service providers implementing GSCM practices see improvements in energy reduction, waste reduction, and reduced packaging in distribution activities.
- To be successful at GSCM, BiC logistics and transportation service providers are using many highly advanced processes and technologies – both at the corporate level and within their distribution centres (DCs) and transportation operations.

Approach and methodology

This report is based on a collaborative undertaking between SCL's research committee and Industry Canada's Service Industries and Consumer Products Branch. The SCL research committee defined industry needs, drivers, and metrics and offered valuable insights from an industry perspective. By using SCL's 2008 Green Supply Chain Survey (1,165 business entities which included 240 Canadian logistics & transportation organizations)¹, and applying unique economic models developed in-house, Industry Canada provided the overall analysis and brought together all the components needed to produce a Green Supply Chain Management report for Canada's logistics & transportation services sector.

This report is one of a series of three GSCM reports that include:

- *GSCM: Manufacturing – A Canadian Perspective;*
- *GSCM: Logistics & Transportation Services – A Canadian Perspective;* and
- *GSCM: Retail Chains & Consumer Product Goods – A Canadian Perspective.*

* Best-in-Class (BiC) businesses are defined as businesses that achieve positive environmental benefits in the two main sector-specific GSCM practices.

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Background

Canadian distribution service firms must continuously introduce new and innovative business processes to remain competitive. One way Canadian logistics and transportation service providers are differentiating themselves is by developing green supply chain management (GSCM) solutions within their organizations or through mandates[†] with their customers and suppliers.

GSCM integrates environmental thinking into supply chain management (SCM). For the purpose of this report, this includes introducing technical and innovative processes into materials sourcing and selection, delivery of the final product to consumers, and end-of-life product management. The intended result is to improve a business' environmental impact while increasing efficiency and growth within its own supply chain.

GSCM practices that are being implemented in distribution activities include:

- Energy efficiency;
- Reduction of greenhouse gas (GHG) emissions;
- Water conservation or processing;
- Waste reduction;
- Reduced packaging/increased use of biodegradable packaging;
- Product and packaging recycling/re-use; and
- Green procurement practices.

In general, investment in a new business process such as GSCM should be supported by a business plan that outlines a demonstrable return on investment. However, current literature is relatively sparse in citing GSCM's tangible benefits. For this reason, Supply Chain & Logistics Association Canada (SCL)² has partnered with Industry Canada to research GSCM practices and their business benefits.

Specific resulting business benefits can include greater service differentiation, successful compliance, increased sales, new access to foreign markets, better customer retention, decreased distribution cost, enhanced risk management, and improved distributional efficiency. This research report identifies industry perspectives,

issues, and drivers for GSCM practices and thus helps inform decision makers of current and future industry needs.

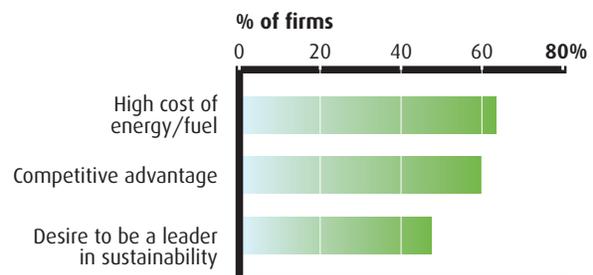
This report also provides insights on the:

- Internal and external pressures involved in adopting GSCM practices;
- Importance and use of GSCM practices by businesses;
- Specific GSCM practices that businesses use;
- Environmental benefits gained by implementing GSCM practices; and
- Business benefits gained by Best-in-Class (BiC) logistics and transportation service providers and the GSCM technologies and processes used to achieve them.

GSCM Practices: Drivers and Adoption

Canadian logistics and transportation service providers view high cost of energy as the main driver for implementing GSCM practices due to these firms' high reliance on energy in their operations (*Figure 1*) — energy costs can amount to 55% of air transportation costs and 29% of truck transportation costs.³ Other drivers that Canadian logistics and transportation service providers view as important include developing competitive advantages, becoming a leader in sustainability, and access to foreign markets.¹ To make GSCM initiatives successful in the logistics and transportation service industry, environmental benefits and positive Net Present Value (NPV) for the service provider must both be achieved at the same time.²

FIGURE 1
Main drivers for implementing GSCM practices in distribution activities¹



[†] Supply chain compliance mandates (SCCM) refers to systems or departments within corporations that ensure supply chain participants are aware of and take steps to comply with a clearly defined specification and/or standard.

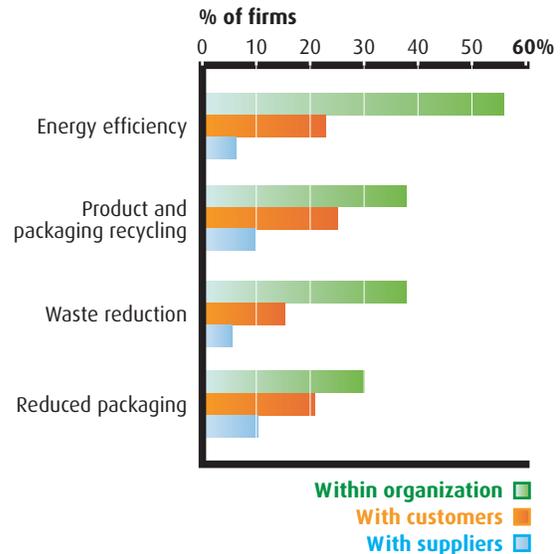
Most logistics and transportation service providers and their supply chain partners believe that GSCM practices are strategically important (Figure 2). Since logistics and transportation service providers own more transportation assets than manufacturing and retail businesses, they have additional options and opportunities to implement GSCM practices.² For this reason, a higher percentage (80%) of logistics and transportation service providers are implementing GSCM practices in distribution activities compared with manufacturing firms and retail chains.⁷

FIGURE 2
Perspectives on and use of GSCM practices in distribution activities¹



GSCM practices can be applied at different points in the supply chain, either within the organization or in collaboration with customers and suppliers. Canadian logistics and transportation service providers primarily engage in these practices within their organization. Specifically, energy efficient distribution activities constitute the most common GSCM practice, with 55% of businesses implementing them in-house, followed by product and packaging recycling and waste reduction (Figure 3). Fewer logistics and transportation service providers are engaging in GSCM practices with their supply chain partners — only 25% with customers (due in part to retail chain GSCM mandates) and less than 10% with suppliers.

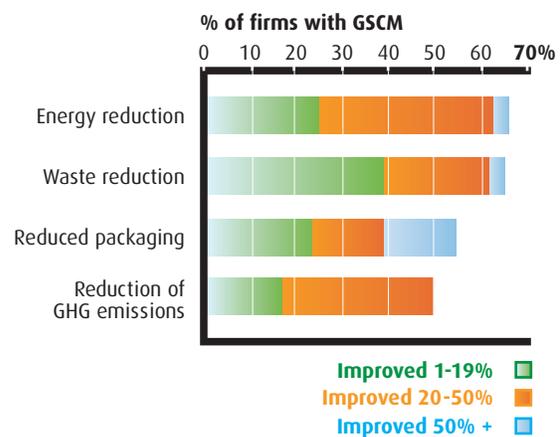
FIGURE 3
Main GSCM practices implemented in distribution activities¹



Environmental Benefits of GSCM Practices

Most logistics and transportation service providers that implement GSCM practices see improvements in both energy and waste reduction as well as decreased packaging within distribution activities (Figure 4).

FIGURE 4
Environmental improvements stemming from GSCM practices in distribution activities¹



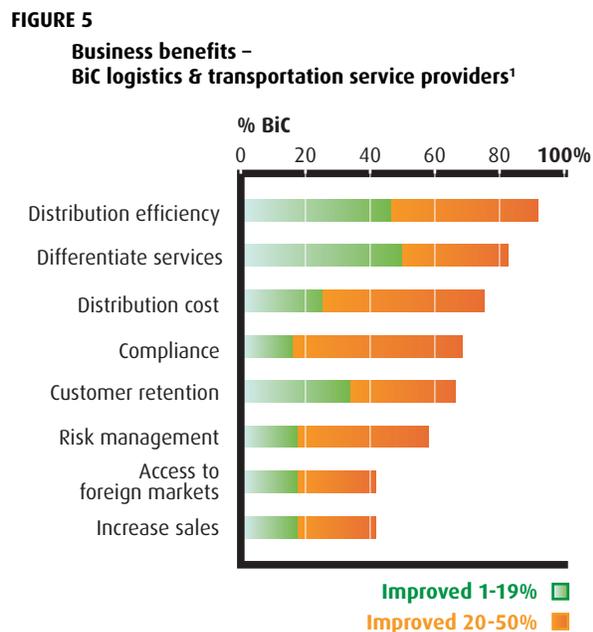
For example, energy reduction can be achieved by employing anti-idling technology and introducing electric hybrid vehicles in distribution activities. Improved oil and toxic material recycling programs benefit the environment by reducing excess waste and water

contamination. Additionally, using reusable crate material can decrease the amount of packaging and delivery material waste. All such changes have proven to reduce a business' carbon footprint and save considerably on distribution costs.²

Business Benefits of GSCM Practices

In addition to the environmental benefits that GSCM practices generate for logistics and transportation service providers, various business benefits can result as well. Businesses that have gained environmental benefits in the two main GSCM practices specific to logistics and transportation service providers — energy and waste reduction in distribution activities — are defined as Best-in-Class (BiC).

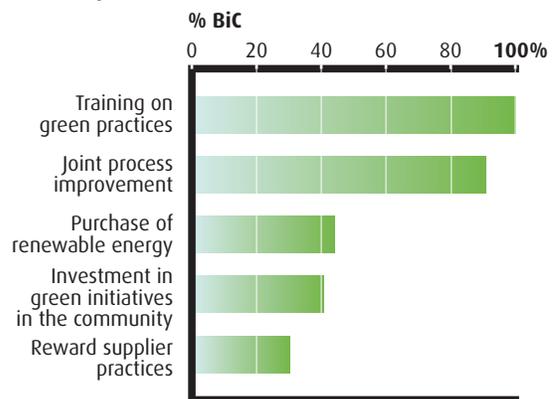
BiC logistics and transportation service providers report improved distribution efficiency and services differentiation as the most common business benefits, both of which are important determinants of competitiveness in such a highly commoditized service sector market (Figure 5). Other business benefits include reduced distribution cost, enhanced compliance processes to regulations and supply chain partners' mandates, and increased customer retention.



BiC GSCM Processes and Technologies

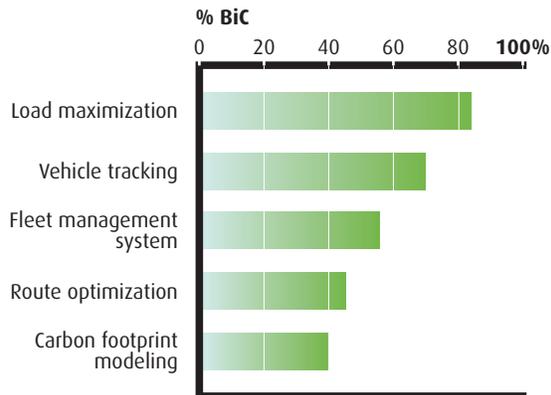
To be successful at GSCM, BiC logistics and transportation service providers are using many highly advanced processes and technologies — both at the corporate level and within their distribution centres (DCs) and transportation operations (see Annex 1 for detailed BiC activities). The most common activity used by logistics and transportation service providers is training on green processes (Figure 6). Focusing on green benefits, implementation, and integration, this training is intended for all levels of employees within an organization from corporate to technology and operations departments. The next most common activity is joint process improvement, a strategy that involves the collaboration of supply chain partners in the implementation of GSCM processes. One example is the use of a sustainability supply chain scorecard, which outlines the criteria that a business and its partners must follow in order to achieve their GSCM goals.

FIGURE 6
Processes for implementing GSCM practices in distribution activities – BiC logistics & transportation service providers¹



Many BiC logistics and transportation service providers use advanced transportation operation processes to monitor and reduce GHG emissions and optimize efficient delivery. Load maximization and vehicle tracking are the most common BiC GSCM processes (Figure 7). Load maximization involves optimizing freight carrying capacity by, for example, changing the shape of delivery containers. Vehicle tracking can involve monitoring a vehicle's position as well as its internal and external condition. Applying several GSCM processes in multiple areas can further benefit businesses and their supply chain partners.⁴

FIGURE 7
Transportation processes – BiC logistics & transportation service providers¹

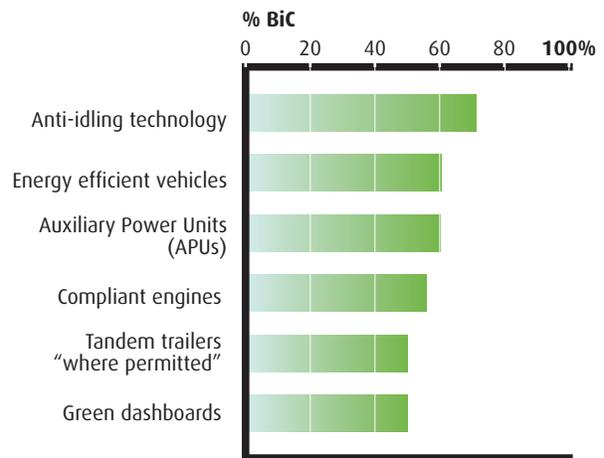


The most commonly used GSCM transportation processes are low-risk and require minimal capital investment. Such processes can be easily applied across a logistics business' delivery operations and provide short-term return-on-investment (ROI) periods.² On the other hand, technologies that require larger investments, such as introducing hybrid vehicles and aerodynamic trailers, have longer ROI periods due to the numerous modifications that must be carried out on businesses' transportation fleets.

Adopting new technologies and modifying transportation management is common for Canadian BiC logistics and transportation service providers. Implementing anti-idling technology and energy efficient vehicles are the main GSCM technologies used (Figure 8). Other GSCM technologies include introducing auxiliary power

units (APUs), which use an external power source to help start engines or power internal systems, and green dashboards, which consist of computer units that monitor the GHG emissions of a vehicle.¹ The goal of these technologies is to improve the fuel/energy efficiency of a vehicle by reducing its overall energy consumption, fuel consumption, and GHG emissions.

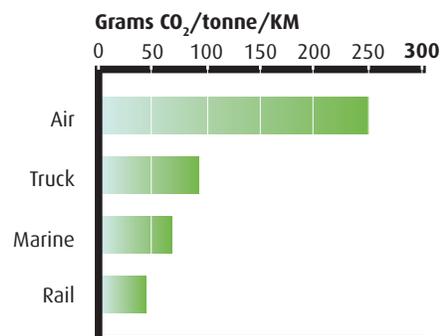
FIGURE 8
Transportation technologies – BiC logistics & transportation service providers¹



In addition to adopting transportation technologies and processes, Canadian logistics and transportation service providers are changing their mix of transportation modes to maximize environmental and business benefits.

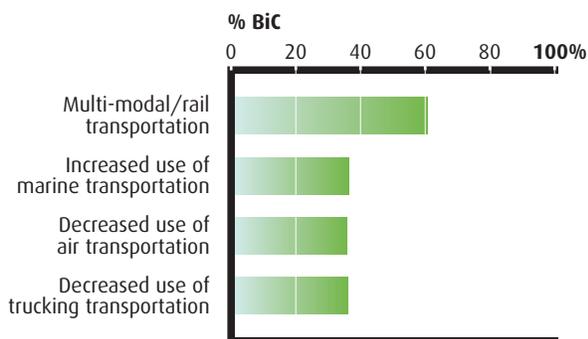
GHG emissions differ widely by transportation mode. Air and truck transportation are the most agile but emit the highest amount of carbon dioxide per ton of goods moved per kilometre (Figure 9).⁵

FIGURE 9
Emissions by transportation mode⁵



To minimize GHG emissions, most BiC logistics and transportation service providers use multi-modal transportation[‡], incorporating the use of rail among other transportation modes. They are also decreasing truck transportation, increasing marine transportation, and reducing air transportation (*Figure 10*). These transportation mode shifts allow BiC firms to reduce costs and GHG emissions while maintaining — or even improving — service levels.

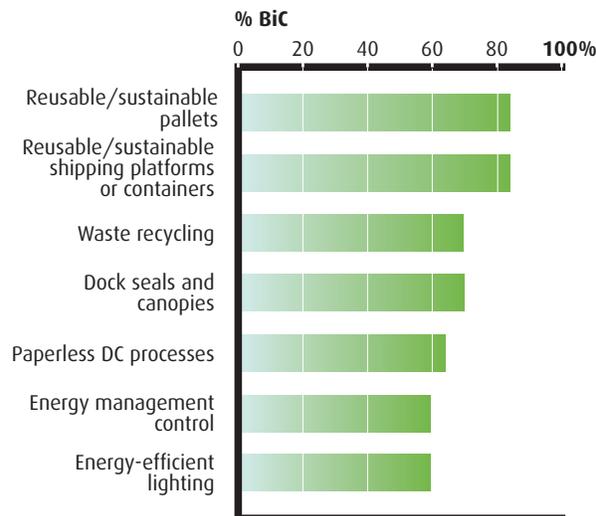
FIGURE 10
Transportation mode processes – BiC logistics & transportation service providers¹



When truck transportation is required, however, converting truck generators to function on electric power drastically reduces GHG emissions produced by idling and driving at slow speeds. This measure alone can significantly reduce annual distribution cost.

BiC logistics and transportation service providers also implement GSCM processes within their DCs. The use of reusable/sustainable pallets, shipping platforms and containers are the most common DC processes (*Figure 11*). Although reusable/sustainable pallets are often made from recyclable materials, they are durable enough for multiple uses within the distribution process. Logistics service providers also can provide recycling, repair, and other pallet-related services to help clients streamline their supply chain management processes and emphasize green practices.

FIGURE 11
Distribution centre processes – BiC logistics & transportation service providers¹



Of BiC logistics and transportation service providers, 70% implement waste recycling processes and use dock seals and canopies¹ (a way to maintain a consistent temperature in DCs during loading). Other environmentally friendly DC practices include pick optimization and the use of paperless processes. Pick optimization involves placing items in an ideal location to minimize inefficient movement and reduce excessive inventory. It should be noted that restructuring the DC itself (which may include introducing or modifying wind and solar energy sources and alternative cooling systems²) is not a common practice. Cost, availability, and ROI all come into play when logistics & transportation service providers consider altering the structure and function of a DC.

[‡] Multi-modal transportation refers to multiple means of transporting goods under a single contract.

Final Remarks

GSCM is a valuable activity for Canadian logistics and transportation service providers. Firms that have adopted GSCM practices have successfully improved their business and environmental performance on many levels.

To maximize benefits from productive GSCM practices, individual logistics and transportation service providers should develop their own business case tailored to their specific context. Canadian service providers should not only make the business benefits of GSCM clear to their supply chain partners, shareholders, employees and senior management, but should also make the environmental benefits of GSCM clear by developing metrics that are universally understood — for example, expressing carbon emission reductions as equivalent to “x” number of cars taken off the road or “y” number of trees saved. Each business case should include recommendations and a roadmap for implementing the proposed GSCM action plan. The roadmap exercise consists of documenting the long-term vision and classifying its components into specific actions linked to deliverables, performance indicators, objectives, return on investment, and the project time frame.

For some businesses, an initial roadmap action item could be to internally evaluate distribution activities and potential environmental improvements by participating in associations and networks. For others, the first step might be to implement a pilot project with a customer and a supplier (e.g., implementing a green energy and carbon emission reduction mandate, a recycling process, or a GSCM scorecard system). In all cases, a well-documented roadmap allows businesses to gain the support and involvement of all stakeholders for the implementation of their GSCM action plan.

For policy makers, the findings presented in this report draw important linkages between the drivers for adopting GSCM practices, firm activities and resulting business benefits. These connections can help inform a continued dialogue across government and with stakeholders. This report also sets the stage for those interested in GSCM trends to pursue new research opportunities and projects.



References

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2. Supply Chain & Logistics Association Canada Research Committee, 2009
3. Industry Canada, State of Logistics: The Canadian Report 2008, 2008
4. The McKinsey Quarterly, Time to rethink offshoring?, 2008
5. Colls, Jeremy. Air Pollution. New York: Spon Press, 2002

Annex I[‡]

Best-in-Class Logistics & Transportation Service Providers Analysis — % of BiC

Methods for Implementing GSCM Practices — BiC Logistics & Transportation Service Providers

Training on green processes	100%
Joint process improvement	90%
Purchase of renewable energy	45%
Investment in green initiatives in the community	40%
Rewarding of supplier practices	30%
Adoption of an internationally recognized performance reporting framework on green parameters	30%
Requirement of third-party certification for major suppliers	15%

Transportation Practices — BiC Logistics & Transportation Service Providers

Load maximization	85%
Vehicle tracking	70%
Anti-idling technology	70%
Energy-efficient vehicles	60%
Auxiliary power units (APUs)	60%
Multi-modal transportation	60%
Fleet management systems	55%
Compliant engines	55%
Environmentally responsible transportation/logistics partners	55%
Tandem trailers (where permitted)	50%
Green dashboards	50%
Carbon tracking	55%
Route optimization	45%
Advanced lubricants	45%
Truck stop electrification	40%
Speed governors	40%
Carbon footprint modeling	40%
Decreased use of air transportation	40%
Single-tire drive axles	35%
Aerodynamic trailers	35%
Increased use of marine transportation	35%
Decreased use of trucking transportation	35%
Diesel/hybrid vehicles	30%

[‡] Supply Chain & Logistics Association Canada, Green Supply Chain 2008 Survey, 2008

Alternative fuels	30%
“Responsible” transport system certification	25%
Electric/hybrid vehicles	20%

DC Practices — BiC Logistics & Transportation Service Providers

Reusable/sustainable pallets	85%
Reusable/sustainable shipping platforms or containers	85%
Waste recycling	70%
Dock seals and canopies	70%
Paperless DC processes	65%
Energy management control	60%
Energy-efficient lighting	60%
Optimized use of space through slotting	60%
DC pick optimization	55%
Energy-efficient cooling	55%
Water recycling	55%
High-density storage	50%
Conveyer belt speed controls	45%
Reduced packaging	45%
Reverse logistics responsibility (disposal or recycling at product end of life)	40%
Cartonization (pallet configuration optimization)	40%
Low-volt conveyers	35%
Motion detector lights	30%
Optimized use of natural light	30%
Energy credits	30%
Alternative/efficient assets	30%
VOC-free materials/coatings	30%
Alternative cooling systems	25%
Wind power	25%
Hydrogen fuel cell technology	20%
LEED-certified facilities	20%
Solar power	15%

