Environmental Supply Chain Management

by

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Outline of presentation

1. Definition
2. Rationale
3. Methodology
4. Some findings and strategies
5. Conclusions

Environmental Supply Chain Management

- "the organization of activities to address the environmental performance of material, components, goods and services that an organization buys and uses"
- "…at its most developed, ESCM involves identifying the most significant environmental improvement opportunities by considering the entire product system and working cooperatively with suppliers to reduce environmental impact."

Five Winds International, *Policy Framework for Environmental Sustainability Project*,

ESCM and Market demands

- "It is worth mentioning the increasing importance of market demands (basically from customers and especially business customers through subcontracting relationships) for adopting environmentally responsible solutions in general and environmental management systems in particular. Thus, *supply chain management is becoming a key environmental driving force since large enterprises are starting to look at and drive environmental improvements along their supply chains*, *whereas smaller firms are coming under increasing pressure to modify their environmental behaviour*."

Corporate examples

- Ikea
- Home Depot
- Times Warner
- Nike
- Times Warner
- WalMart

Carbon Disclosure Project

Investors with more than $20 trillion in funds send questionnaires to the Fortune 500 companies requesting information on:

- Existence of commercial risks attributed to climate change;
- Allocation of responsibility to executives or directors for climate change related issues;
- Availability of technologies to achieve GHG emission reductions;
- Existence of a strategy to take advantage of emission trading;
- Quantity of GHG emissions from operations;
- *Estimates of GHG emissions associated with supply chain and the use and disposal of products;*
- Existence of emission reduction programs;
- Measurement of emission intensity of production, sales or other output measures;
- Percentage of revenue represented by costs of fuel and electricity.

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Making business sense of climate change

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Some environmental costs associated with the supply chain of a firm

- Large inventory levels with associated storage costs;
- potential for product obsolescence and attendant disposal costs;
  - material paid for twice!
- purchase price for excess packaging and the costs of management and disposal of the packaging
- environmental management training costs;
- environmental permitting fees;
- hazardous materials tracking and reporting;
- sewer use and landfill tipping fees.

Some or all of the costs may not be explicitly linked to product lines or services as they are buried in the overhead costs of the facility or business.

Small Businesses and the Environment

Internal barriers

lack of information
limited technical and managerial skills
insufficient awareness of laws and regulations
lack of resources

Economic barriers

inability to achieve economies of scale
unacceptable pay-back periods
difficulty in entering value chains of national and global firms

Institutional barriers

Time-consuming regulatory requirements

Project framework

- Three manufacturers
  - All in Burnside Industrial Park
  - Medium sized
- Review of goals of the project
  - Reduction of solid waste and greenhouse gases
    - Reuse, remanufacturing, recycling
  - Quantification, if possible, of reductions, both individual and collective
  - Seeking opportunities that were financially viable
- Flexibility in time frames

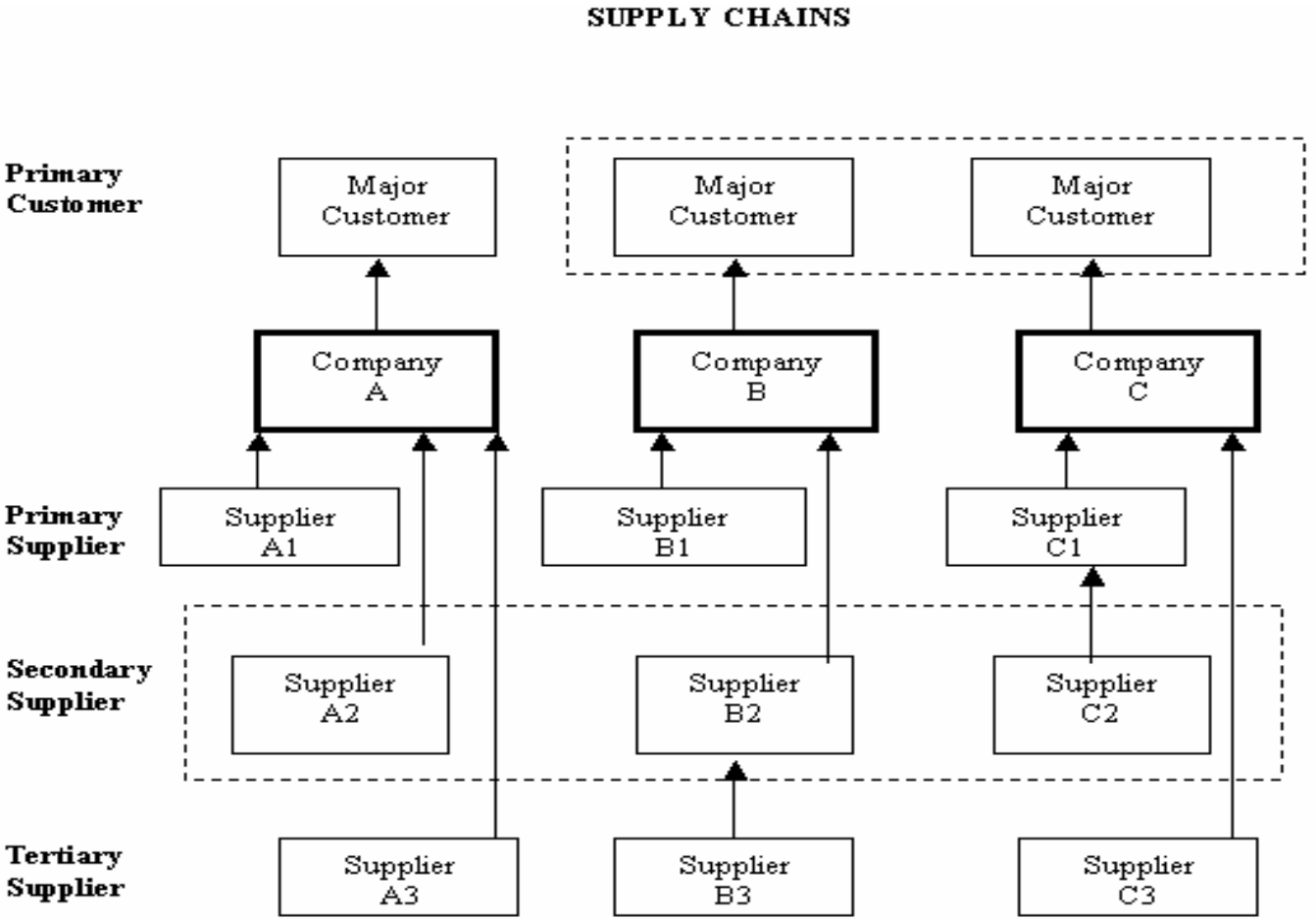


Figure 1. Scope of the supply chains of companies A, B and C.

Product design: Light weighting of product

- Re-engineering
  - Reduces resources needed for production and waste materials- One company halved the weight of their product!
  - Reduces shipping weight

Recommendation

Manufacturing Companies: Determine the underlying "purpose" for the product and assess if there is a way to achieve this same objective with less material.

Recognizing “waste” materials and by-products

- Turning “waste” into “resource”
  - Reuse internally
  - Listing on exchange
  - New use or new revenue stream

Recommendation

General: Consider the waste streams produced by the organization and track them. Even if the use is not apparent now, there may be a use for them in the future.

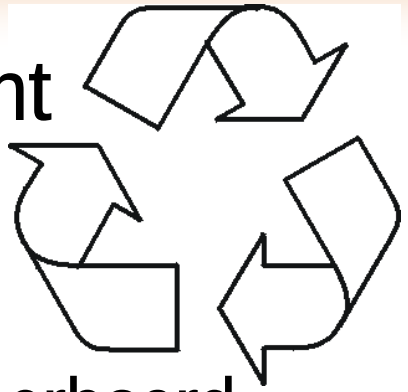
Packaging reviews

- Customer reviews of packaging needs to determine areas for reductions
- One company was able to achieve an average increase of 10% of packaging efficiency

Recommendation

General: If you or your suppliers have not utilized packaging optimization software or undertaken a packaging review, you may have the opportunity to do so and improve your shipping efficiency.

Waste Resource Management



- Waste is returned to suppliers –take-back
- Off cuts recycled and reused in future paperboard materials
  - 10 tonnes of virgin CC: 9.28 MTCO2 eq / lifecycle
  - 10 tonnes of 82% OCC: -25.1 MTCO2 eq / lifecycle
- Plastic regrind reused
  - 10 tonnes of virgin HDPE plastic: 21.85 MTCO2 eq /lifecycle
  - 10 tonnes of 40% HDPE regrind: 12.66 MTCO2 eq / lifecycle
- Sale of waste to other companies

Pallet Management

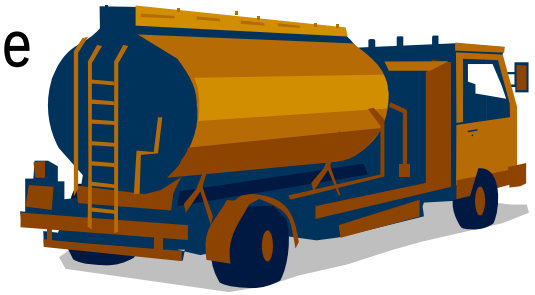
- Major Issue: Approx 20% of all lumber becomes pallets
- Return to shippers not always an economically sound option
  - Paper tracking –balancing inputs and outputs
  - Rental agreements
- Pallet cascading – European pallets
- NS Materials Exchange Program

Recommendation

Manufacturers: If extra pallets are available or pallets are required, check a materials exchange program to see who might be able to help: www.nsmaterials.com

Bulk Deliveries

- Large deliveries to mid-terminals to service smaller local orders
  - Reduced transportation costs and GHG emissions
    - 40,000 kms reduction: 10,700 liters of diesel: 28.8 MTCO2 eq
  - Reduced disposal waste in the form of containers
- LTL vs FTL
  - FTL is generally cheaper
  - Consolidate shipments when ever possible



Recommendation

General: The more FTL shipments you can handle, the less expensive shipping is going to be. Less transport trips must be taken, less fuel surcharges paid, and less GHG emissions.

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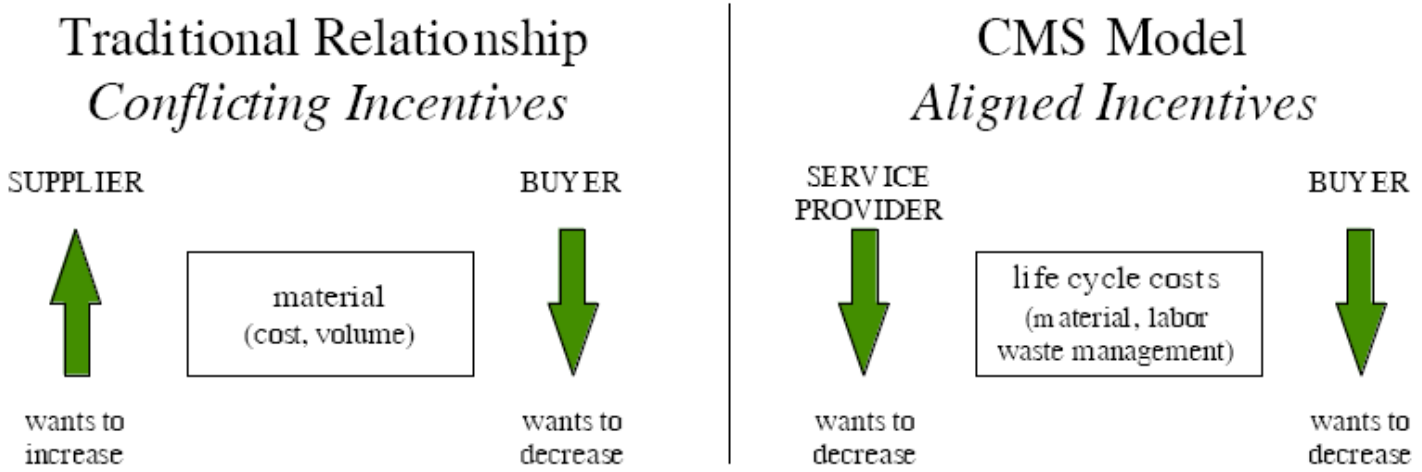
Service vs product

- Suppliers providing service rather than product



- Ford and GM with Dupont (paints) and Dow (solvents)
- Sun Chemical and Maritime Paper Products

Reusable containers

- Liners
  - Liner discarded but
  - container remains
    - Reuse
      - It is still a useful product that requires minimal cleaning
    - Return to supplier
    - Alternative use
    - Sale
- Reusable packaging
  - Plastic/corrugate comparison
  - 5 times for corrugate
  - 250 times for plastic

Recommendation

General: The material your reusable containers are made out of matter. Consider environmental impacts without losing efficiency.

The SmartCrate™

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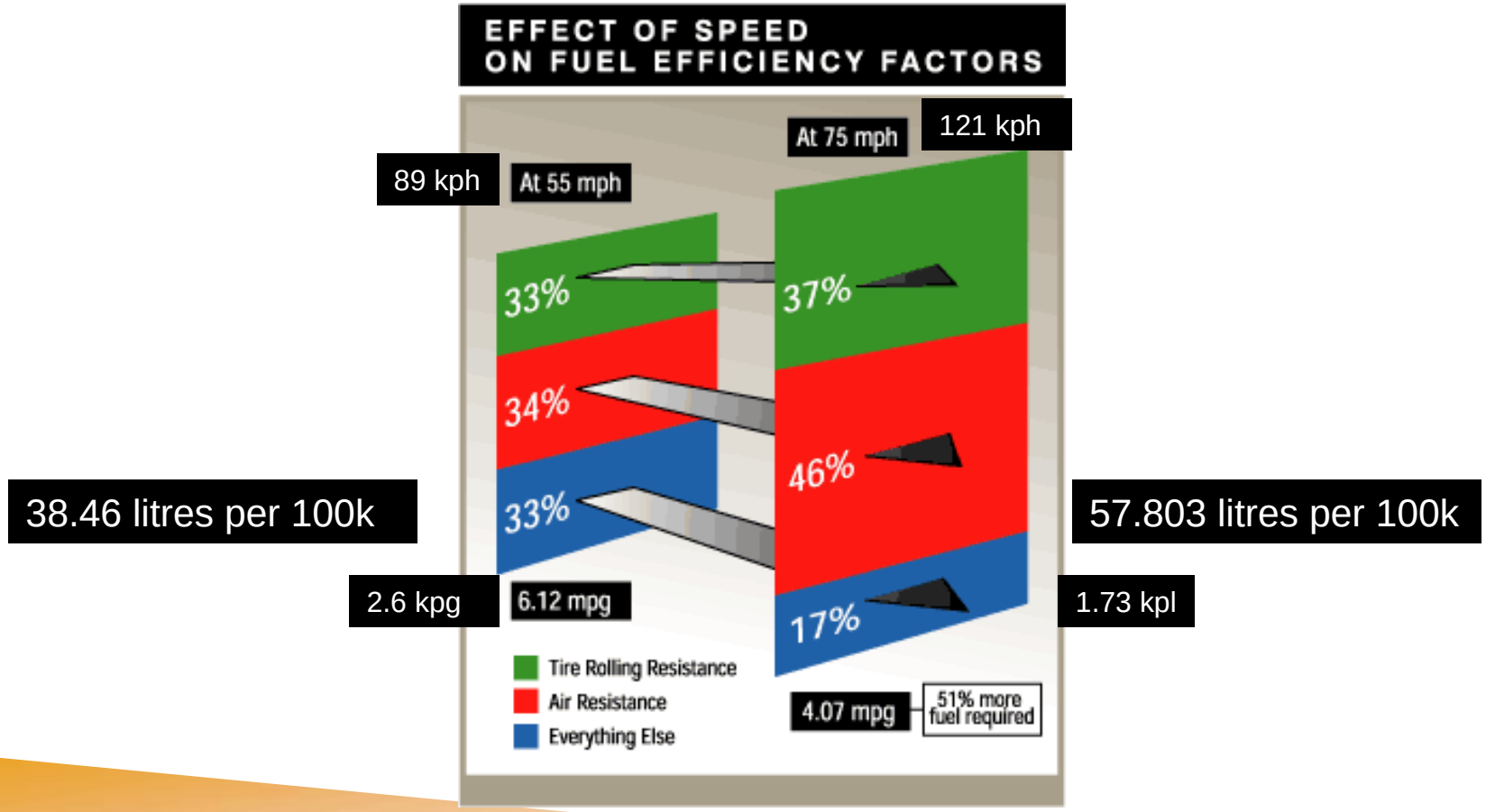
Managing trucking speeds

- **“In general, for every one mph increase in speed over 55 mph (88kph), miles per gallon will be reduced about 2%”**
- **Trade-off with customer satisfaction**



http://www.trucktires.com

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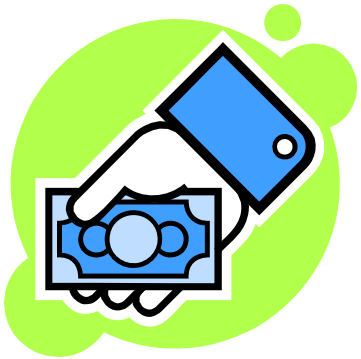
Driver Incentives

- Using tracking ability to set baselines
- Motivating drivers to reduce fuel consumption
  - What is a reduction of .5 litres per 100km worth?
    - $280,000 for Bison Transport
- Fair period of time as window for evaluation

Recommendation

Shippers: Get drivers motivated and involved in increasing fuel efficiency. Be careful incentives do not encourage the wrong behavior.



Two generic issues

- Communications
  - Communications between suppliers and customers
    - A particularly Canadian problem!
  - Communications across functions in an organization
    - Purchasing, operations, warehousing, logistics, waste management
- Time
  - Managers don't have the time to devote to analyze the problem and take advantage of opportunities.

Conclusions

- Opportunities exist to reduce greenhouse gas emissions and solid waste.
  - Within: pallet and containers reuse, chemical management partnership.
  - Across: pallet and container sharing, logistics coordination.
  - General: Increased use of recycled content.
- Time and, to a lesser degree, financial resources to address solid waste and energy issues are the greatest limiting factors.
  - The “attention economy” of SMEs is a particularly important issue.
- Waste and energy are not seen as related directly to the core functions of companies.
- Environmental costs are not yet sending the appropriate signals.
- Suppliers of manufacturers need to be involved in building long term relationships rather than selling product.
  - The chemical services partnership model should be explored further as it appears to have merit for SMEs.