Creating Supply Chain Carbon Harmony

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The reduction of CO_2 and other greenhouse gas (GHG) emissions is a global issue. The Kyoto agreement, EU and national regulations have been implemented in order to reduce the level of CO_2.

Countries that have ratified the Kyoto protocol need to have mechanisms in place to be able to meet their GHG emission reduction obligations in the various sectors of their economy (commercial, residential and transport). Schemes such as European Union Emission Trading Scheme (EU-ETS) require monitoring and reporting, verification of emission reports, and there are monetary fines and potential negative publicity for companies that do not comply.

Regulations are currently based on “in country” use, but “exporting the CO_2” via production in other countries will soon be discouraged by use of strategies including CO_2 import taxes. This is likely to have an impact on supply chain carbon management requirements.

Consumers, particularly in developed countries, are starting to demand that retailers and manufacturers provide information so that they can make informed buying decisions. The consumer pressure is felt most acutely at the retailer level, who in turn demand CO_2 information and compliance from their suppliers.

Both the consumer and the authorities demand that the CO_2 is measured and reported according to certain standards and that this information is verified.

There are many different mechanisms that can result in reduction of GHG levels. Optimal results in reduction can occur through the introduction of governance schemes which support supply chain strategies while meeting customer needs for products and credible information about what they are buying. Such governance schemes can either come from regulatory bodies or through executive governance from the key players in the supply chain system.

Global value chains

A company’s first step towards effective carbon management is to focus on reducing its direct emissions. This includes implementing cost effective energy efficient measures, training, alternative energy sources as well as addressing business risks and opportunities associated with climate change.

The in-house savings, however, are often only a fraction of the impact of the total product supply chain. For example, Wal-Mart’s carbon footprint is approximately 20 million metric tons. But when estimating the carbon footprint of Wal-Mart’s entire supply chain, it totals at about 200 million metric tons. Zoom out a step further to Wal-Mart’s 13 million daily customers and even the supply chain number seems paltry. At current prices for CO_2, Wal-Mart then is directly responsible for EUR 500 million of CO_2 emission and indirectly responsible for another EUR 5,000 million in serving their customer base. Wal-Marts gross profit in 2007 was EUR 50 893 million[1].

Global value chains are hallmarked by a complex, globally dispersed and dynamic supply network relationship in which manufacturing, distribution and logistics are increasingly outsourced. As such, competition not only arises with regard to the end product produced, but among actors who compete for their relative position within the value chain. The direct

[1] http://moneycentral.msn.com: Gross Profit in USD 80,840.0 million

and indirect pressures to manage the carbon profile of the supply chain increase the complexity of this challenge.

Supply chain management

Evaluation of suppliers includes a number of factors in supply chain management, where the level of produced GHG is one, relatively new, evaluation criterion. Quality, dependability of delivery, price and other factors will remain important in determining which companies are preferred suppliers.

Given that one supplier may have several customers that are in direct competition, and suppliers may have to compete with companies that have less regulation or better opportunities to mitigate investment costs, it is unlikely that there will be one simple mechanism to promote GHG reduction.

Implementing GHG mitigation strategies can both reduce the carbon exposure and result in real monetary savings, e.g. due to increased energy efficiency or less exposure for CO_2 related taxations The challenge lies in finding mechanisms to compensate investment costs early in the supply chain that benefits stakeholders later in the supply chain.

The supply chains are often costly and difficult to control. Various scandals, such as Melamine in pet foodsand and lead paints in toys have shown that lack of control of the "suppliers to the suppliers" is still a challenge. Retailers and brand owners allocate considerable resources to reduce risk at all stages of a supply chain through various control mechanisms.

The management systems used by retailers and brand owners can be used for reporting and specification of requirements of carbon management throughout the supply chain resulting in some carbon reduction. Reducing the carbon levels and the risks beyond these levels will require new configurations of supply chain management, including methods for competitor collaboration and traceability management. Use of certification and validation should be integrated into systems to ensure and document the basis for CO_2 reporting and be used in similar areas of interest, such as ethical and environmental reporting.

Consumer and end user pressure

Consumers want information on the sustainability of the products that they buy, including information on the carbon footprint. Consumers indicate that there is a willingness to pay more for products with a CO_2 label, but whether this will translate into actual and significant changes in buying patterns is not yet clear. As a result of these pressures, there is increased attention paid to the way businesses promote their carbon performance. Companies use public information channels, such as GRI and the Dow Jones Index for sustainability reporting to ensure that they are credible both to investors and the general public.

It is good business to ensure that investments in carbon reduction really have a positive impact and that this can be communicated to the end user. The consumer wants *credible* information, such as validated CO_2 emission reduction numbers

One method to provide consumers with information about product sustainability is to add the actual carbon footprint on the final product. All stages of the production must be evaluated in a lifecycle perspective, which is often a complex exercise. This complexity is felt most acutely by brand owners and retailers that need to calculate and validate a large number of value chains, particularly those where suppliers change throughout the year, for example seasonal food products. Other methods of providing consumers with information, perhaps at a brand level, may be an alternative in meeting consumer needs.

The cost of CO_2 abatement and technology

The initial focus on CO_2 reduction has been on power and manufacturing industries. These industries are an important focus area but account for less than 50% of the total potential of low cost abatement.

The other lower-cost abatement opportunities are fragmented across sectors and regions and will require an effective global supply chain oriented system. The technology to reduce supply chain emissions is available, and around 70% of possible low-cost abatement alternatives use known technologies.

When analysing the positive marginal cost[2] of implementing these technologies, it appears to be only a matter of rolling these measures out. A number of companies are taking advantage of these opportunities but a large number are not, even though there are clear benefits.

This lag of implementation may be explained by internal factors within the organisation. To put it simply, in many organisations the people paying the energy bills aren't making capital decisions, and the people making capital decisions aren't paying energy bills. If the investments are taken in one department but the returns are seen elsewhere, one important improvement driver for investment intensive improvements is missing. This problem becomes amplified when applied to the supply chain, where the barriers to implementation are much higher, having to cross both companies and geographies.

The implementation of new technologies to reduce GHG comes at a cost that is usually carried by a single entity or step in the supply chain. In order to effectively utilise the lower-cost alternatives for CO_2 abatement, the focus should be on the best methods to *promote* effective implementation of technological solutions coupled to the opportunities for CO_2 improvement throughout the entire supply chain.

Countries should establish strategies, institutions, policies, regulations and carbon markets that can provide all economies with incentives to apply innovative practices and technologies that can reduce GHGs across a supply chain. Locking into carbon intensive investments must be avoided.

[2] Vattenfalls Climate map 2030

Towards Carbon Chain Harmony

The most effective way to achieve low-carbon development is to utilise supply chain mechanisms in harmony with regulatory mechanisms. The buyer can tighten energy and fuel performance standards and requirements for products while the regulatory mechanisms promote technological use and development across global supply chains.

Consumers, governments and stakeholders in value chains all play a part in developing optimal CO_2 reduction mechanisms. The authorities need to align regulations to meet international supply chain GHG reductions, looking beyond national and regional boundaries. The retailers and manufacturers need to ensure that their supply chain CO_2 performance is visible and trustworthy to consumers.

Standards that can be utilised worldwide need to be developed, following the known mechanisms of ISO, Codex and other international standardisation organisations. The data provided by the actors in the supply chain needs to be validated by independent parties to ensure compliance and credibility.

An international system where investments can be credited to where reduction occurs will stimulate technological adoption and development, possibly by enabling CO_2 "trading scheme" mechanimsms within the supply chain. Technological development coupled with consumer and industrial incentives are essential if efforts to reduce supply chain CO_2 levels are to succeed.

Carbon & Sustainability related trends and drivers in the supply chain:

Impacts to business value

- In CIES *Top of Mind* 2008 Survey, Sustainability ranked n°1 among Food & Beverage CEO's priorities.
- Environmental issues, including Climate Change, poses the greatest impact to the shareholder value according to CEO's surveyed by McKinsey (Nov. 2007)
- GHG represents an increasingly important part of overall sustainability
- Ratings used for investment information

Consumers	Retailer	Brand	Logistics	OEM	Raw materials
• Public Awareness • Demand For Sustainable Products Is Growing • Want To Be Informed And Want To Contribute To Decreased CO_2	• Product selection, e.g. purchasing policy / product design • Labelling: FSC: MSC: GM-free • Local communities: Good neighbours? • Waste management: packaging/waste/carrier bags	• Brands at risk • Product brands towards consumers • Corporate brands to customers	• Food miles • Congestion • Pollution	• Product Design / Life Cycle Analysis • Packaging • Product And Shipment • Processing Waste Management	• Emissions • Efficiency • Soil And Water Contamination • Biodiversity • Waste Management

Increased policy measures

- Regulations, caps
- Taxes on emissions and energy consumption
- Subsidies for new technologies

Key technologies enabling supply chain carbon management:

	Mature	Emerging
CO2 reducing technologies	• Energy efficient building materials (windows, insulation) • Heat pumps/ waster heat usage • Control systems • 1st generation bio fuels • Effective engines • Efficient appliances • Low GWP refrigerants • Some alternative energy sources • Fuel cells	• Hydrogen fuel cells • 2nd generation bio fuels • Carbon storage • Efficient batteries (car) • Carbon storage • Alternative energy sources
SC monitoring technologies	• Electronic information systems • Labelling/ Tracking systems (RFID) • Energy use monitors • Temperature sensors	• Integrated environmental monitoring sensors • Position and quality tracking