



Painting the CPG Supply Chain GREEN

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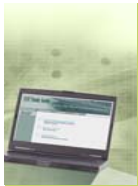
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Environmental sustainability in the 21st century continues to rage as a topic of major interest. For businesses, sustainability has become an issue of corporate image and responsibility towards the society from which they generate revenues. However, maintaining a balance between profitability and sustainability has been a difficult line for businesses to toe. This paper is an attempt to arrive at solutions which will aid organizations to realize sustainability ambitions efficiently. The ability of packaged implementations to extend their influence across the supply chain is a factor to be capitalized on to achieve significant headway in improving an organization's carbon footprint.



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Introduction

Environment and its sustainability in the future has been a topic of intense debate in the last decade. The Ozone Hole and global warming are topics which have garnered immense attention. The estimated economic damage stands at about US \$85¹ for each ton of carbon dioxide emission. Organizations have added sustainability in their corporate strategies. Although the current economic slowdown has applied breaks on some of the major initiatives companies had embarked upon, environmental sustainability will be an inevitable part of company strategy in the future.

Figure 1 gives us a glimpse of impact the Consumer Packaged Goods (CPG) companies have had on the environment.

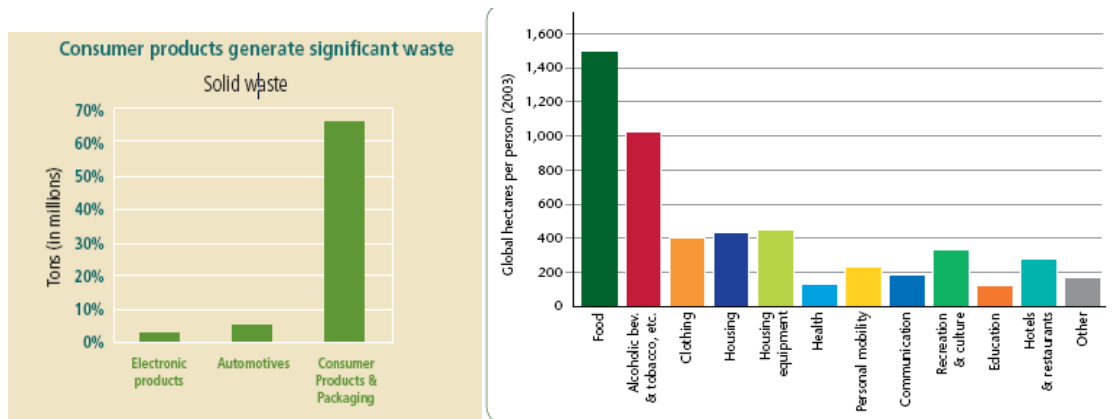


Figure 1: Waste Creation in Industries² Figure 2: Ecological footprint per US\$ 1 million spent by consumers³

Waste disposal forms just one component of the sustainability issue; others being green house gas emissions and usage of toxic materials in production. With the largest environmental footprint, use of more natural resources than other industries, and use of chemicals and energy, the CPG industry had to play a major role in curbing its impact on the environment.

Figure 2 displays the impact each of the listed industries have on the environment. The listed industries are from a household point of view and the portfolio of spends their budget entails.

Some CPG industry majors have come up with innovative initiatives to curb their negative impact on the environment. Increasing consumer knowledge and a consequent discretion in consumer behavior puts CPG majors in a tight position being an industry closest to consumers and their needs. A few efforts in this direction brook our attention:

Apparel and Footwear major Nike spends about \$800 mn on its waste management efforts every year. Nike maintains the green indices of its products. Each Nike shoe comes with a green index indicating the level of impact on the environment⁴.

Food and Beverages Company Nestle has embarked on ambitious efforts to maximize recycling plastic and reduce plastic content in the bottles from 12.4 grams/bottle to 9.8 grams which are used by Nestle Waters⁵.



Home and Personal Care leader Procter and Gamble Co. reduced its water and energy consumption by 6% to 8% bringing the total reduction since 2002 to about 20%⁵. By 2012, P&G plans to sell \$20 bn worth sustainable products. The company sold \$2.05 bn worth sustainable products which includes⁶:

- Concentrated liquid laundry detergent
- Concentrated powdered detergent in Europe
- Crest Whitestrips (Uses lesser material)

Where should CPG firms turn their attention to?

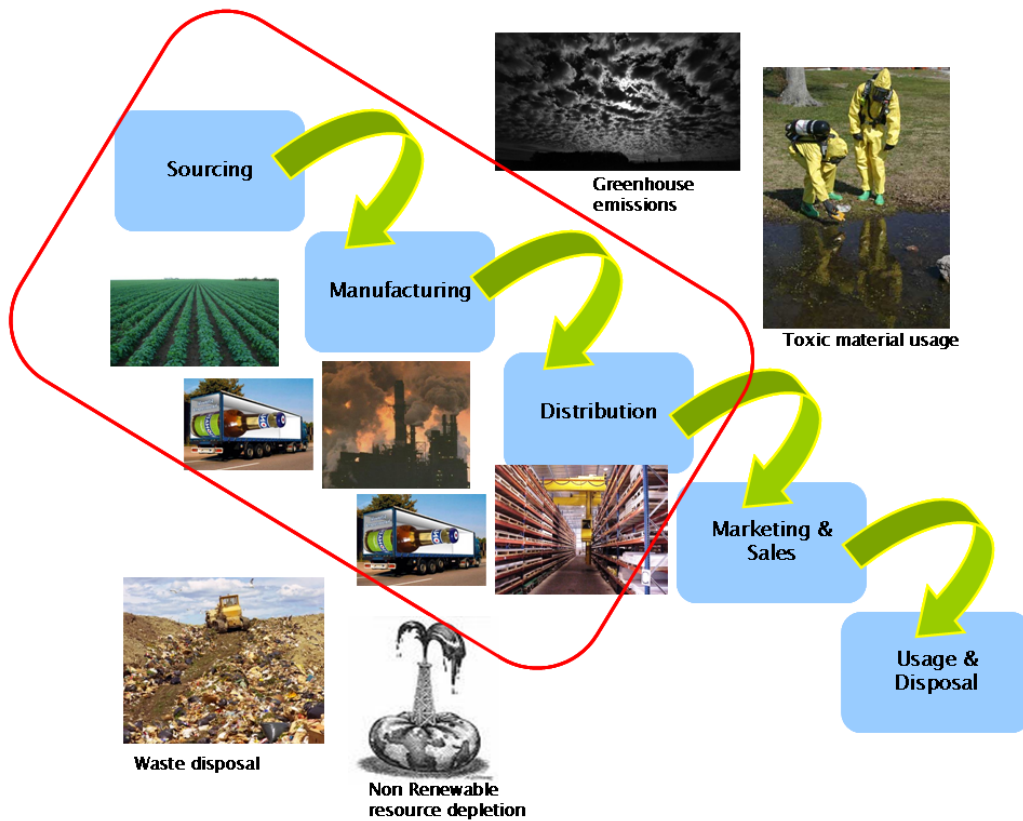


Figure 3: CPG value chain and environmental impact

While manufacturing may be able to come up with significant savings in energy consumption, logistics and transportation more than make up for that due to their fuel consumption. Similarly other functions across the supply chain pursue activities in silos which negate the significant results achieved from one stage of the supply chain. Green efforts often provide cost efficiency, continuous improvement and profitability⁷ which is another reason for companies to pursue Green Initiatives. What has been observed is that while individual efforts by the manufacturer/brand owner may result in significant reduction in carbon footprint, but achieving same success in the extended supply chain is still a major challenge.

The first step in arriving at solution addressing these challenges will be to determine the impact of each stage in the supply chain on environment and sustainability where the CPG manufacturer has control over. The following chart summarizes the modes of impact on environment and the how do each stage of supply chain contribute to this.

Causes of Adverse Impact On Environment

		Waste		Greenhouse gas (GHG)		Non Renewable resource usage		Toxic materials	
		Mode of Impact	Instances of Impact	Modes of Impact	Instances of Impact	Modes of Impact	Instances of Impact	Modes of Impact	Instances of Impact
Consumer Packaged goods Supply Chain	Sourcing	Improper disposal of waste created during production and transportation from suppliers	Plastic packaging materials used for transporting apparel from Asian countries. Non Bio degradability of Plastic is a major challenge	Sourcing from suppliers distributed across geographies	Apparel Companies rely on suppliers from Asia for their products. Food and agriculture based companies have to rely on agri intensive areas for sourcing inputs. The emissions increase with the distance of the supplier.			The chemicals and other materials which are used for Production	Pesticides and chemicals used in grain production, the blue dust during Jeans production is heavy lungs irritant
				Environmentally unsustainable Supplier production processes	Cotton used extensively in Apparel industry is extremely dependent on Water and Pesticides	Inefficient transportation methods	Sub optimal usage of trucks, air/land transportation leading to multiple trips which increases fuel usage, Shrinkage losses during transportation and storage. The energy source is petroleum based and inefficiency in processes leads to excessive fuel usage and GHG emissions		
Mfg		Improper Disposal of waste created during Production and Management of product returns	Plastic water bottles take upto 1000 years to decompose in Landfills. The recycle rate of Plastic bottles in US is only 14%	The emissions from production facilities	Emissions from Meat industry accounts for 18% of total green house gas emissions	Use of petroleum based fuels for energy generation	Renewable sources of energy (Ethanol, water, solar and wind) account for about 6% of energy sources.		
		Waste creation due to Inefficiency of operations	Usage of additional PET material in cola bottle production.	Proliferation of SKUs and accompanying impacts on design, production and packaging	CPG companies with 50 or 100 different SKUs pay more for packaging because suppliers are forced to perform shorter production runs of myriad package types	Inefficient Production processes	18% of US corn production is sourced for Ethanol production accounting for 1% of energy source	Production processes	Use of PET bottles in beverages industry, Use of heavy metals and carcinogenic dyes in apparel production, Use of Lead based materials in cosmetics like Lipsticks

Causes of Adverse Impact On Environment								
Mode of Impact	Waste		Greenhouse gas (GHG)		Non Renewable resource usage		Toxic materials	
	Instances of Impact	Modes of Impact	Instances of Impact	Modes of Impact	Instances of Impact	Modes of Impact	Instances of Impact	
Distribution	Waste disposal	Packaging waste makes up 30 percent of the solid waste in the U.S.	Inefficiency in Distribution of goods to customers at diverse locations	Networking and routing techniques which are based on insufficient collaboration among Supply Chain partners results in greater energy usage than optimal requirements. Use of heavier packages results in increase in truckloads resulting greater fuel usage and GHG emissions	Energy for Warehouse and distribution centers, transportation of finished goods	Lighting consumes 50- 60% of energy while the rest is distributed among electric vehicles, hot water services, general power and air conditioning facilities		
	Waste creation due to Inefficiency of operations	the pallets and cardboard boxes used in CPG warehouses are discarded after minor breakage/defects. Usage of reusable packaging made of durable materials can result in \$2 million savings per company	Inefficient Transport processes	Sub optimal usage of trucks, air/land transportation leading to multiple trips for demand replenishment				

Table 1: Modes of Impact Vs. Supply Chain Stages



The above table paints the picture of impact of three stages of supply chain. An example to illustrate the distribution of impact from supply chain stages is in the soft drink manufacturing⁸. The distribution of emissions across the supply chain is

- Sourcing/raw materials : 15-20%
- Manufacturing: 20-25%
- Distribution: 10-15%

This sums up to about 50% - 60% of emissions in the supply chain. Other factors like toxic material usage, waste management, and use of non renewable sources of energy further add to the total environmental impact of the CPG supply chain.

The authors believe that technology can play a role in enhancing adoption and implementation of Green Initiatives. In the context of CPG Industry, Enterprise Resource Planning (ERP) systems are prevalent and in the following sections, we look at the possibility of configuring business rules for a Green Supply Chain in ERP.



Packaged Implementations - Key to Green

ERP and other packaged implementations used in the CPG industry cover the length of a CPG company's supply chain right from sourcing the raw materials to manufacturing/production of finished goods to distribution. These packages can contribute immensely in achieving significant sustainability goals due to their reach across the supply chain.

Green Configurations/Business Rules

Packaged Implementations are customized to the business needs through industry/company specific rules which are configured in the packages.

Green configurations would be business rules that can be configured during a package implementation. These rules will act as constraints while arriving at decisions during interactions with supply chain partners, like supplier decisions, work centre scheduling, distribution network decisions et al.

Sourcing

Supplier Decisions - Based on the detailed listing of the modes of environmental impact across various stages of the supply chain, a set of parameters are suggested here which would drive the green configurations while making sourcing decisions.

Sourcing	Waste Management	Waste created (supplier wise) (Tonnes)
		% of Non Bio degradable waste
		% of Waste recycled
		%Reduction in plastics achieved YoY
		%Reduction in packaging material achieved YoY
	Emissions	Emissions from transportation (multi modal) (Metric Tonnes)
		% Reduction in no. of truck loads YoY
		Proximity of sourcing locations (Global/local suppliers)
		% of Suppliers using efficient routing algorithms in transportation
	Energy Usage	Annual Energy Usage in storage, production (Kwh)
		% Reduction in energy usage
		% of Energy generated from Renewable energy sources
	Hazardous Materials	% Levels of Toxic materials used
		Toxicity levels of ingredients used

Table 2: Green configuration metrics for sourcing



The green configuration configured in the sourcing module can be used to evaluate the production processes used by the supplier, supplier's geographical locations and hence the transportation modes, the chemicals used in production. These factors will be used to arrive at a Green Rating for the supplier. This in turn would be evaluated against the contracts with the supplier and the price lists to arrive at the most sustainable supplier.

Manufacturing/Production

The parameters which would aid in manufacturing decisions are:

Manufacturing	Waste Management	Annual waste created (Tonnes)
		% of Non Bio degradable waste
		% of Waste recycled
		%Reduction in plastics achieved YoY
		%Reduction in packaging material achieved YoY
	Emissions	Total Emissions from production facilities (Metric tonnes)
		% of Production equipment meeting Sustainability standards
		Emissions distribution based on Product/brand/SKU (tonnes/unit)
		% Reduction achieved in number of SKUs
	Energy Usage	Annual energy usage in storage, production (KwH)
		% of Renewable energy sources
		Machine uptime statistics (total hours)
		Rejection/defect rates at machines
	Hazardous Materials	% of Organic products
		Annual water consumption (cubic meters)

Table 3: Green configuration metrics for manufacturing

The aforementioned parameters would fit in the green configurations and will have a twofold impact on improving the footprint of manufacturing in supply chain. This would be at:

- a) Operational level which would include the machine maintenance levels and energy usage statistics. The Green Configuration can be used to configure business rules in the packages governing the manufacturing modules. This would determine the energy usage statistics and the share of sustainable energy sources in the same. These combined with the maintenance schedule of the machines and the usage history can be used to arrive at the Green Ratings for machines which in turn will translate to stakeholders like supervisors, sustainability managers to improve the Green Ratings. The business rules configured in the package can hence, help in determining the



most efficient machine and the levels to which renewable energy sources can be used to operate the machine.

- b) Manufacturing This would include the parameters like the usage of toxic/non biodegradable materials in the production of finished products. Taking the example of PET bottles for soft drink packaging, Manufacturing Execution systems can play a major role in regulating the PET content in the bottles. Green Configurations added with MES can play a significant role in decreasing the toxicity of the CPG products.

An important source of waste creation is due to the demand supply gap. Lack of accuracy in replenishment of goods and resulting inventory buildups result in loss of products. A solution which is gaining acceptance in this respect is improving the demand visibility across the supply chain. Having better tabs on the demand at customer's end will help in coming with accurate Manufacturing schedules and better material and inventory management practices.

Demand planning solution for fresh foods industry (iSDPS) is a composite solution developed by Wipro Technologies that aims to provide a consistent and simplified solution for managing the short-term production planning process in fresh food companies. Wipro Technologies worked closely with SAP AG as a member of the Industry Value Network group for consumer products to develop this solution. The solution recently helped the second most valuable consumer grocery brand in the U.K. in addressing need for an effective sub-daily production planning and scheduling system. The solution is geared towards cutting down waste created in the manufacturing process and help achieve significant savings through reduction in transportation costs.

With its proven end to end service capabilities, Wipro can provide its clients with solutions to achieve significant results on green initiatives. Wipro was recently rated among top 5 global green brands in the world by Greenpeace.



Distribution

The set of Green configuration parameters for distribution strategy would be

Distribution	Waste Management	Annual waste created (Tonnes)
		% of non bio degradable waste
		%Reduction in plastics achieved YoY
		Quantity of Packaging material used (Tonnes)
		%Reduction in packaging material achieved YoY
	Emissions	Emissions from transportation (multi modal) (Metric tonnes)
	Energy Usage	Total energy usage in warehousing, loading/unloading (KWh)
		% Energy generated using renewable energy sources

Table 4: Green configuration metrics for distribution

On the distribution side, the purpose of Green Configurations would be to arrive at Green Ratings by the amount of waste created in packaging and distribution, the inventory wastage statistics, and the energy usage history. This can be combined with the shipment contracts and distributor centre location data to arrive at the appropriate distribution strategy.

In this context, in addition to the mode of transportation and the routing decisions, distribution strategy can also be configured during the package implementation. One example could be the use of direct store delivery (DSD). Instead of the conventional 4 step supply chain where wholesalers/distributors play a major role, DSD could offer significant results in greening the supply chain. Green Configurations can determine the distribution strategy among the various options available and arrive at appropriate sustainable action plan.

Advantages of Green Configurations

Green configurations can help organizations in:

- Achieve significant results in shorter timeframes: CPG firms are increasingly adopting packaged implementations to improve their efficiency in operations and rationalize their cost structure. Green configuration as business rules would add on to these implementations and hence, would have a say on the company's activities across supply chain resulting in significant results in improving their carbon footprint.



- Cost efficiencies: As the configurations add on to the existing or ongoing implementation process, technology costs would be minimal.

The solution suggested in this whitepaper can form a foundation for a greater and all encompassing initiative to leverage the complete IT organization across the supply chain to achieve sustainability goals. This could be in terms of how energy and resources can be routed and shared across business partners of the supply chain, how business partners can utilize waste created in different stages and how products developed are more ecologically viable.

Green initiatives are perceived to consume huge amounts of resources with much lesser benefits to business. While, this view is disputed often, the bottom-line is that approach towards implementation of green initiatives will make a huge difference. A long term view is definitely imperative in evaluation of returns of green initiatives but, continuous monitoring, evaluation and assessment of the progress made is indispensable for any business not to lose track of the long term goals.

- P&G is Cisco's largest installation of tele-presence rooms. Global travel budgets have been reduced by 15%, Information & Decision Solutions (IDS) P&G's IT division reduced travel by 40% and used a portion of the travel savings to fund video conferencing..⁸
- Nestle's packaging material savings between 1991 and 2006--part of an ongoing, company-wide sustainability program--resulted in \$510 million of savings, worldwide, according to Nestle's corporate Web site. ⁹
- Heineken aims to reduce fuel and electricity costs by 15 percent for the period between 2002 and 2010. As of a 2006 sustainability report, Heineken had achieved a savings of 6 percent--even after the acquisition of new breweries. ⁹
- Nike Environmental Action Team (N.E.A.T) has inspired initiatives such as the "Reuse-A-Shoe" program that reclaims worn and defective footwear and grinds them into granulated rubber used for sports surfaces and carpet padding, and so far has kept 7.5 million shoes out of landfills. The company has saved \$4.5 million dollars and 1.3 million gallons of solvent by substituting water-based adhesives for petroleum-based solvents in nine out of ten of its shoe designs.

CPG Companies need to look at both Process and technical dimensions of going 'Green' and this paper is an attempt to look at both dimensions of this key environmental challenge faced by every industry today.



Appendix

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