GREEN MANUFACTURING: AN ANALYSIS OF SUSTAINABILITY OPERATIONS AT BMW COMPANY AND AN INDUSTRY COMPARISON

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ABSTRACT

This paper describes how BMW has tackled the environmental issues in its operations. Environmentally friendly initiatives have led to significant reductions in carbon, adoption of new technologies, and creation of innovative processes. Other automobile manufacturers are also investing significantly in time and money in the development and incorporation of environmentally conscious practices.

INTRODUCTION

Environmental concerns have led to increased political, social and legislative concerns toward the products manufactured and distributed by the automobile industry. As a result, environmental regulations have significantly increased the operating costs and the capital investments in the automotive industry. Meeting the new regulations has resulted in new processes, aptly named "Green Manufacturing." Green manufacturing is a method that seeks to minimize waste and pollution while meeting the environmental demands of the new regulations. It utilizes a process called sustainable product development, i.e., the ability to achieve economic prosperity while protecting the natural resources[1]. Green manufacturing considers the material costs of descendant products as an opportunity cost for current ventures, with the underlying challenge of mitigating the cost of environmental compliance.

Automakers view sustainable development as discrete tasks. The first task is environmental management, which sets goals, prepares and executes a strategy for achieving them and records clearly defined performance metrics. In the automobile industry, an example of a sustainable goal would be to reduce emissions by 2% over the next design cycle. The metric would be a pass fail criteria on the 2% reduction and would be reported in a highly visible sustainability report on an annual basis. The second task is factoring sustainable approaches into the development and design of products. In the automotive industry, pre-design consideration of sustainability has the greatest environmental impact, much more so than discrete factory improvements[2]. Examples of such are designs with the intent to use alternative fuels, biodegradable material selection, reusable materials and hybrid technologies. The third task is to apply a sustainable approach toward the continuous improvement of production and logistic processes. These types of improvements include upgrades to energy saving equipment, water treatment capabilities and solvent use considerations. They often require substantial capital investment toward green manufacturing, a metric used to determine a firm's compliance with the environmental regulations. The firm views sustainable approaches to green manufacturing as required investments with cash flow potential (i.e., lower energy costs, low risk of regulatory fines, etc.), will likely be on the right path toward compliance.

Many firms invest in the green approach by selecting materials that are recyclable or are planned for refurbishment. However, few firms successfully and efficiently follow through and implement the processes necessary to execute the reclamations. Reclamation processes require discipline and add complexity to corporate processes. They require a substantial communications network to support an IT infrastructure and cross-functional participation by and between corporate, engineering, field service, procurement and suppliers with those present at the end of the product life cycle.[3]

Bavarian Motor Works (BMW), headquartered at Olympic Park in Munich, Germany, has over 103,000 full-time employees in over 150 countries. Moreover, it has a financial services organization that arranges financing and leasing options for its customers as well as its competitors.[4] BMW's 2005/2006 Sustainable Value Report, the firm's principle motivation for implementing ecologically friendly practices is social consciousness; but the more likely drivers seem to be compliance, risk mitigation, and competitiveness. At the international level, BMW is compliant with the ISO 14001 standard, which is a voluntary standard defining an environmental management system for use within a firm. Requirements in the standard include an environmental policy statement, continuous improvement in environmental performance, and compliance with all applicable laws and regulations. In May 2001, the European Union published its Strategy for Sustainable Development, which among other things looks to satisfy the requirements of the United Nations Kyoto Protocol. The Kyoto Protocol stipulated that industrialized countries should reduce their greenhouse gas emissions by an average of 5% below their 1990 levels by 2008-2012[5]. Although the United States does not have any legislation governing end-of-life vehicles, more than 95% of all vehicles in the United States go through a market-driven recycling infrastructure.

BMW has been using its green manufacturing practices as a source of competitive advantage. The inclusion of an environmental component in its advertisements has helped it to differentiate the brand as progressive and environmentally conscious. The company has been the recipient of a large number of awards related to environmental responsibility such as the European Environmental Press Award in Gold for the firm's VALVETRONIC technology.

PRODUCTION AND LOGISTICS

BMW has developed many environmentally friendly initiatives in its manufacturing processes. These initiatives include waste water reduction, water consumption reduction, energy consumption and CO_2 emission reduction. BMW currently uses an innovative paint application process in which the top layer of paint is a powder application. The paint powder is electro-statically charged to enable the powder particles to adhere to the vehicle body. Powder-based paint offers significant advantages in protecting the environment as it does not require any solvents and does not require any water to retain overspray. There has also been progress with logistics and suppliers. BMW is reviewing their transportation methods and the potential to shift from shipping by truck to rail. They are also in the process of working with their suppliers to share best "green" practices. BMW is the first auto maker with facilities dedicated to dismantling end of life vehicles. Controlled return of the vehicle is the first step in the recycling process as vehicles are delivered to a dismantling facility where a certificate of destruction is issued and is required for the final vehicle deregistration.

PERFORMANCE MEASURE

The Pacific Sustainability Index (PSI)[6] is a measure of environmental and social factors taken from company websites and from two systematic questionnaires completed by companies on their quality of sustainability reporting. BMW has high scores in environmental and social intent due to corporate

policy, moderate scores in environmental and social reporting due to non-periodic reporting, and weak scores in environmental and social performance due to sub-standard performance in 2006. General Motors (GM) leads the group with an A+ PSI grade. Despite recent financial and competitive challenges, GM has made substantial investment in preparing for and complying with regulations. They have reduced greenhouse gas emissions by 12.5% since 2000.

CONCLUSION

At the time when environmental issues are moving to the top of the European Union's agenda, BMW showed itself to be an early adopter of green manufacturing techniques. Environmentally friendly initiatives have led to significant reductions in carbon dioxide and volatile organic compound emissions, adoption of new technologies such as hydrogen fuel cells for energy generation, and creation of innovative processes such as the new powder paint application process. Product designs were already oriented toward recycling prior to the enactment of end-of-life vehicle recycling legislation. However, after taking these initial steps, the results of the Pacific Sustainability Index (PSI) evaluation seem to indicate that BMW has lost some of its momentum, and that other automobile manufacturers are investing more time and money in the development and incorporation of environmentally conscious practices.

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