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Final Copy of Case Study

LOCATION:
NY, NY, USA

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STATUS:
Laureate

CATEGORY:
Environment

ORGANIZATION:
McKesson

ORGANIZATION URL:
www.mckesson.com

PROJECT NAME:
Supply Chain Sustainability Management Solution

PROJECT OVERVIEW

According to the U.S. Environmental Protection Agency, transportation is the second largest contributor to the nation's CO2 emissions. McKesson Corporation, the largest distributor of prescription drugs in North America has undertaken an initiative aimed at minimizing its carbon emissions while trimming drug distribution costs. The technology that is enabling McKesson's work in this area is a Web-based analytics system developed in collaboration with IBM Global Business Services and IBM Research mathematicians. McKesson is the first IBM client to use the system, which is known as Supply Chain Sustainability Management Solution (SCSM). SCSM draws on McKesson's supply chain, sales and geographic data to analyze "what if" scenarios that help the company make better informed decisions concerning distribution network modeling, supply planning, inventory positioning, vehicle routing and sustainability management. Specifically, the system uses data on the operational and energy usage of warehouse equipment such as fork lifts, conveyor belts and HVAC systems as well as trucks and airplanes to calculate carbon emissions in all McKesson's supply chain operations that use energy and hence emit carbon. It then generates reports on energy use and carbon emissions by site, product group, vendor or customer. Since the analytics engines that make up the system are fully integrated, SCSM can also evaluate the impact of supply chain policy changes on energy use and carbon emissions by processing the outputs of other analytical engines. To understand the impact of decisions such as changing locations of warehouses, serving some customers from different locations, changing transportation routes, increasing sales in some regions for certain products or changing an energy source, the system can estimate how energy use and carbon emissions would change under such scenarios. For example, McKesson has used the system to determine the value of keeping pharmaceuticals that need to be kept cold, such as insulin and vaccines, in one central refrigeration facility. The engines in the tool calculate the

inventory cost and the potential reduction in carbon emissions against the option of keeping such products in all its warehouses. Based on such comparisons the system provides recommendations to allow for increased efficiency with minimal environmental impact. Similarly, SCSM can identify the best ways to bring pharmaceutical products into McKesson's distribution network and manage inventory and customer deliveries in a way that minimizes both McKesson's carbon emission and its costs. For instance, it can calculate the emissions implications and monetary cost of transporting a given product from the vendor directly to local warehouses or through a central warehouse and recommend the best action.

SOCIETAL BENEFITS

More than half of global carbon emissions can be attributed to supply chain activities, particularly in manufacturing and distribution. It is important for companies to get a better understanding of how their supply chain operations impact carbon emission and identify the most cost effective ways to manage their operations and reduce emissions.

PROJECT BENEFIT EXAMPLE

The ability to estimate the change in carbon emissions that would result from modifications in the supply chain has been helping McKesson's supply chain and logistics operations managers better understand how supply chain actions can impact the company's carbon emissions. This has been very useful in helping McKesson achieve its environmental stewardship goals. Sustainability management is no longer a silo operation in McKesson -- it is now considered in connection with all key supply chain operations that influence it. "With this initiative, we are advancing our ability to contain costs while contributing to the health of our environment. IBM has given us the tools we need to weigh the environmental and financial effects of actions we may take in our supply chain. This system will be valuable to any business seeking ways to achieve both their financial and carbon reduction goals." -- Don Walker, senior vice president distribution operations, McKesson Corporation "As a result of our collaboration with McKesson on this project, we have jointly created a solution which will enable us to make this technology available to other companies seeking to reduce their carbon emissions while improving service levels and reducing costs. In this way, we can reach a wider set of users which will have a greater impact on the drive to reduce carbon emissions while improving business efficiency." -- Bill Gilmour, general manager, consumer products industry, IBM

IS THIS PROJECT AN INNOVATION, BEST PRACTICE? Yes

PLEASE DESCRIBE

This system establishes a best practice for carbon management. It offers a unique ability to integrate typically separate functions for planning truck routes, supply networks, inventory policy, supply flow and sustainability management. SCSM gives McKesson the ability to model these functional areas using a single solution. The system's detailed method for calculating carbon emissions at the equipment level and its ability to aggregate these metrics by operation, site, and location and also allocate them to product groups, vendors, and customers is also an innovation. Finally, SCSM's ability to connect sustainability metrics to other supply chain metrics by quantifying the trade-offs has enabled McKesson to make sustainability management an integral part of supply chain management; this is a new "best practice" for the industry. As a result of McKesson's successful use of the technology, IBM is making it available as a new offering through IBM Global Business Services.

ADDITIONAL PROJECT INFORMATION

The biggest challenge McKesson faced in reducing carbon emissions was not just to calculate carbon emitted by its supply chain at a high level and report it, but to calculate it in such a way that it could determine which operations contribute to its carbon emissions, why and how much, so that McKesson could determine where to focus for improvement. This required a detailed carbon model that could use energy use data at the equipment level and relate this data to all stages in all operations including receiving, putting-away, storing, refrigeration, picking, packing, shipping and transporting. For instance, in order to calculate how much carbon is emitted during product refrigeration, McKesson needs to know the energy consumption of its refrigerators; a total electricity bill is not enough. Because this type of data was not readily available, McKesson had to put together a long list of equipment data and their characteristics. Another challenge McKesson faced was understanding how its carbon emissions would change if management wanted to take actions such as changing the warehouse locations, modes of transportation and supply lot sizes. Modeling how such changes will impact carbon emissions is not trivial. Supply chain metrics such as total weight and miles transported, total throughputs in warehouses and their energy sources, inventory levels, and replenishment lot sizes can all impact carbon emissions and these are metrics that can change as a result of supply chain policy actions. Therefore, McKesson needed a comprehensive model capable of calculating potential changes in these metrics first, and then calculating the change in carbon emissions. Even for a simple scenario in which demand goes up by some percentage in a particular region, McKesson has to carefully account for how much throughput would have to increase in warehouses that serve that region, how much that change would increase the operational hours of necessary equipment, and therefore, its energy use, and how many more weight-miles will be needed to serve the demand. See attached PowerPoint file, entitled “McKesson – Computerworld Award Graphics”: Figure 1 depicts the architecture of the SCSM solution. Figure 2 shows the methodology of the solution, in which any supply chain operation can be modeled using a generic building block. The building block enables calculation of water usage, solid or liquid waste, energy usage and GHG emissions. The figure also shows how carbon calculations are made based on equipment level data. Figure 3 shows carbon emissions are calculated based on equipment level data. Figure 4 shows how equipment level carbon calculations are associated with activities and operations in a supply chain. Figure 5 shows how sustainability metrics are calculated when there is a change in the supply chain due to policy actions or external conditions. Figure 6 has a screenshot of the menu of reports available to users. Figures 7 through 10 provide examples of report the system can generate.