

Integrating LCIA and LCM: Evaluating environmental performances for supply chain management

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Manufacturing industries in the global marketplace are increasingly pressurised to incorporate economic, environmental and social performances in their policies, culture and decision-making processes. These performances objectives manifest in three operational focal points that are fundamental to the manufacturing industry: projects that drive internal operational changes, assets that are required in the manufacturing process, and products that determine the economic value of manufacturing operations. A holistic Life Cycle Management (LCM) approach would subsequently require an effective integration of these three life cycles within the manufacturing organisation. Sustainable product LCM, or product stewardship, implies the incorporation of the principles of supply chain management. The manufacturer of a product assumes responsibility for the economic, environmental and societal consequences of supplied components, materials and energy inputs. Automotive Original Equipment Manufacturers (OEMs) in South Africa have initiated the process to assess the environmental performances of their first-tier suppliers. However, the lack of process information to determine the precise environmental impacts of suppliers is a common problem in South Africa (as in other developing countries). OEMs have subsequently commenced to systematically obtain process information limited to: water usage, energy usage, and waste produced per manufactured item. These three process parameters do not, however, directly show the overall burden of a supplier on the environmental resources of South Africa. An Environmental Performance Resource Impact Indicator (EPRII), which is based on the LCIA framework of the UNEP/SETAC Life Cycle Initiative, has subsequently been introduced for environmental supply chain management purposes. The EPRII methodology calculates impact indicator values of the process parameters on four natural resource groups that have been separately addressed by the national government and the manufacturing sector: water, air, land and mined abiotic resources. The EPRII enables a company to evaluate and compare the environmental performances of suppliers, and to identify improvement possibilities.