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A COMPREHENSIVE APPROACH OF SUSTAINABILITY ASSESSMENT OF PRODUCT IN THE AUTOMOBILE SECTOR: CHALLENGES AND BENEFITS

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ABSTRACT

Environmental and social sustainability along the entire value chain, product responsibility in all areas as well as a clear commitment to resource efficiency are an integral part of the BMW Group's strategy. Already in the strategic & planning stage, sustainability performance of BMW Group's vehicles is assessed by life cycle assessment approach (ISO14040/44). The results are used to support decision-making process and to define improvements in the life cycle of each designed vehicle. However, there is a rising requirement to also consider social and economic criteria in addition the environmental ones within the framework of sustainability assessment. The sustainability assessment approach for vehicles produced by the BMW Group is presented here with strengths and challenges of the theoretical and practical approach.

INTRODUCTION

The importance of sustainability is frequently underlined by scientist, governments and enterprises. A key issue of the European plan on Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan (European Commission, 2008), is the challenge to improve the overall environmental performance of products throughout their life-cycle. BMW Group's sustainability strategy, adopted in 2009, aligns BMW Group's sustainable operations along the entire value chain and in all fundamental processes, thus creating added value for the company, the environment and society (BMW 2012). Our commitment to sustainability is widely recognized. In 2012, the BMW Group was named industry leader in the Dow Jones Sustainability Index for the eighth consecutive year in succession. The sustainability strategy of BMW Group is also implemented on product stewardship level. The aim of this paper is to outline the current approach used by the BMW Group to develop sustainable products. Furthermore, the challenge of creating transparency along the entire supply chain is addressed.

MATERIALS AND/OR METHODS (WHICHEVER APPLICABLE)

UNEP/SETAC (2011) sees a rising requirement to also consider social and economic criteria in addition to the environmental ones within the framework of product sustainability assessment. Life cycle assessment (LCA) is recognized as a valid supporting tool for



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assessing environmental performances of vehicles, as it is shown by the various publications (Koffler and Rohde-Bradenburger 2010) and environmental certificates developed in the automotive sector. According to this life cycle thinking approach, new concepts and new models have been developed in BMW Group by addressing environmental and social performances.

Environmental LCA

The environmental LCA has been implemented to support the development and design process of several vehicles of BMW Groups, according to the ISO 14040/44 (2006). The environmental impacts which can be generated by a vehicle life cycle are already assessed at the concept design phase by considering the material compositions and the production processes of components and entire vehicle. The software used to measure them is GaBi[®] software from PE International. The results obtained are used for defining improvements on the environmental performances of the entire vehicle. The vehicle is consequently designed according to the targets and, in the entire development phase until the production, the relative indicators are monitored and checked (ISO 14062, 2002) towards environmental enhancements.

As reported from several studies the necessity to use light materials for conventional vehicle has been led to the necessity to improve the fuel consumption and environmental performances of the use phase (e.g. efficient dynamics), which produces for example about 80% of the greenhouse gas emissions, measured in global warming potential (GWP), of the entire life cycle of conventional car. The impact measured by GWP is definitively transferred to production phase if we move from a conventional engine vehicle to hybrid and electrical ones. It moves the focus of BMW Group on the environmental performances of supply chain and manufacturing of materials and components, for further improvements of its products.

Social Assessment

The BMW Group manages its business in accordance with principles of responsible corporate governance. As example, since 2001 it has confirmed its commitment to these principles in its own Corporate Governance code (BMW Group, 2010; OECD, 2004). The social strategy of the company has been implemented by considering several stakeholder groups, such as workers, customers and local communities, in accordance with the social life cycle assessment guidelines (UNEP SETAC, 2009). Until now, the social factors have been mainly considered at corporate level by including suppliers, but it is clear that to implement social assessment at product level, the impact generated along the entire life cycle should be considered. The difference would not be so much if when we assess the social aspects at corporate level we include the entire supply chain and assess it by considering all sites which are involved in the product life cycle.

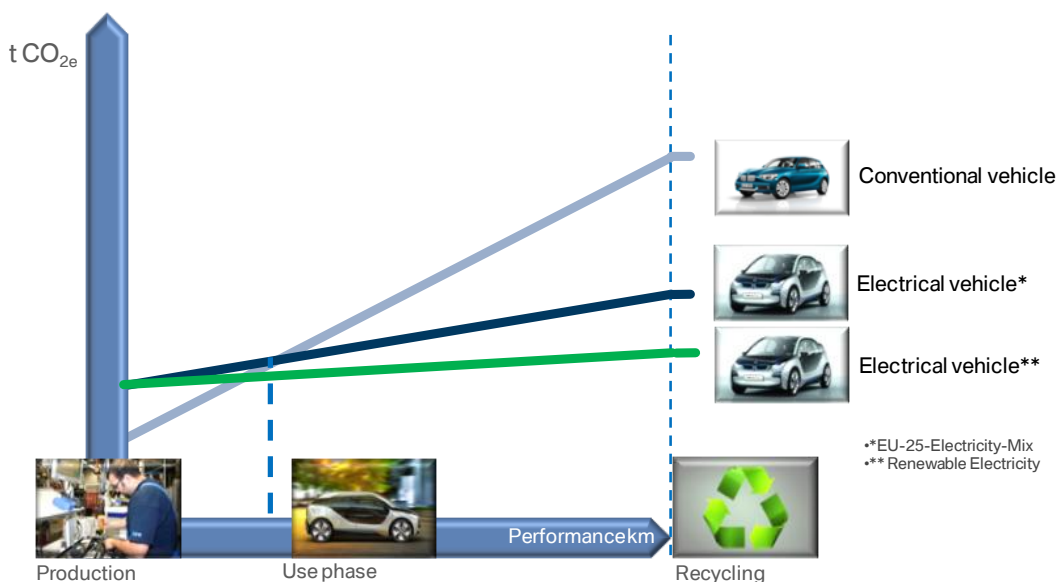
On one hand, the main difficulty in the implementation of social assessment to the entire supply chain, lays on the lack of primary social data. A company has often not bilateral agreement with all suppliers until n-tier; consequently it has not rights into asking detailed information to the n-tier. On the other hand, to reach a more sustainable production, it is definitively important identifying at least the social hotspots (ILO conventions on human and labour rights) along the entire supply chain. The social hotspot aspects are mainly related to the workers stakeholder group (UNEP SETAC, 2009). BMW Group and all plants of its, are definitively compliant to ILO standards (human and labour rights). Further social aspects,

such as working hours, pair opportunities and healthy and safety, social security are assessed and monitored among BMW Group’s employees that leads to move the attention for the social assessment to our supply chain where a further attention is probably necessary. To identify sustainability risks and to mitigate the risk of suppliers not meeting BMW Group’s sustainability standards, a BMW Group specific risk filter was developed. The sustainability risk filter evaluates our suppliers and sub-suppliers according to their commodity and the country where the sites are located against environmental, social and governance criteria. The risk filter is the first step to identify which are the sustainability risks in BMW Group’s supplier network and carry on with a further auditing process with questionnaire and /or on-site audits. The social and governance topics used in the risk filter are the same identified by human and labour rights; relative social risk data has been collected at country level by using several databases such as: World Bank, Maplecroft, and Unicef.

RESULTS

In 2011 we presented the BMWi sub-brand embodying our belief that premium cars are increasingly defined by their sustainability. Our design approach by life cycle assessment was already implemented in the respective concept electrical car, BMW i3 Concept, unveiled in 2011. Due to respective targets set from the earliest strategic and planning stages on, it was achieved that the GWP of BMW i3, assuming a European electricity mix (EU 25), is at least a third lower than for a highly efficient conventional combustion engine vehicle in the same segment. If the vehicle is powered by renewable electricity, the improvement increases to well over 50 per cent. In addition to GWP, other environmental impact categories have been taken into account as well. This is reflected in a large number of innovative measures relating to the development, production and recycling stage.

Figure 1. GWP of BMW electrical vehicle compare to the conventional one



For the social assessment, the risk filter is normally used as first step of the assessment. The social risk filter is necessary to identify the main risks at commodity and country level, and to move on with a further assessment of the supplier by questionnaire and site audits. The countries and commodities are ranked according to their potential risk by ranking score and



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colour scale. Because the non compliance with topics related to ILO standard (e.g. child labour, forced labour) are considered high social risk also according to BMW social strategy, several knot out criteria have been inserted. The further assessment has to be conducted at site level and at the usual social questionnaire some specific questions according to the risk filter results have been added.

DISCUSSION AND CONCLUSIONS

The BMW Group assumes responsibility for all of its products and processes. This is reflected in our long-standing Life Cycle Assessment (ISO 14040/14044), enabling us to ensure from the architecture phase onwards that our products and processes conform to our environmental sustainability standards.

A complementary social assessment is carried to assess new materials, components and technologies more environmental friendly are produced by improving the social conditions of workers, customers and local communities involved in the product life cycle. In the implementation of social assessment a lot of difficulties have been faced up in the definition of the indicators and in the data collection. The gap of a database sector specific and the use of a hotspots analyses often leads to an evident results where the developing and emerging countries resulted having higher social impact compared to developed ones. These results are mainly due to a lack of database related to company and/or commodity that could trace social benefits as well as impacts. A first step in this direction has been made from BMW Group with the implementation of risk filter that even if no so many data at commodity level are still available creates the framework for future systematic implementations of social assessment with quantitative indicators.

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