

Communication of LCA in the Automotive Sector: Environmental Commendations

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Abstract. Volkswagen uses Environmental Commendations to inform customers, shareholders and other stakeholders within and outside the company how vehicles, components and production processes are made more environmentally compatible and what have been achieved in this respect. Environmental commendations for new vehicle models and technologies highlight ecological progress compared with predecessor models and previous technologies. The information in the Environmental Commendation is based on a Life Cycle Assessment (LCA) according to ISO 14040 which has been independently verified and certified by the technical inspection organization TÜV NORD. Based on a customer-oriented strategy for communication the requirements of different target groups are considered.

1 Introduction

For many years, the only measure of a car's environmental impact was what came out of the exhaust pipe. But sustainable mobility demands a much broader approach, as environmental impacts are not just produced while driving. Long before a vehicle ever hits the road, raw materials must first be extracted, and components must be manufactured. Thus, the development of targeted innovations has to consider the entire life cycle of the vehicle.

Volkswagen has many years of experience with Life Cycle Assessments (LCA) for product and process optimization. Today, LCA has become an integral part of the company's environmental principles that will ensure we reach the goals set out in Volkswagen's Environmental Policy. The Environmental Objectives of the Technical Development department help set Volkswagen apart from the competition to the benefit of its customers. For a long time now, Volkswagen has assigned absolute priority to the environmental impacts of its vehicles. With this in mind, we have defined goals designed to ensure the sustainable development and production of our models. These form part of the environmental strategy of

the Volkswagen brand and serve as guidelines for all regions, worldwide. The Environmental Objectives concern three focus areas:

- 1) Climate protection
- 2) Resource conservation
- 3) Healthcare

Volkswagen's objective is to develop each model in such a way that, in its entirety, it presents better environmental properties than a comparable predecessor. The ongoing improvement of our vehicle fleet in terms of environmental impacts and resource conservation forms part of Volkswagen's corporate policy, reflecting our awareness of our responsibility towards customers, society and the environment. To make at least part of these efforts visible for customers, shareholders and other stakeholders inside and outside the company we publish what we call Environmental Commendations.

2 LCA of complete vehicles

Volkswagen has many years of experience with Life Cycle Assessments for product and process optimization. We have even assumed a leading role in implementing and publishing life cycle inventories of complete vehicles. For instance, in 1996 we were the first car manufacturer in the world to prepare a Life Cycle Inventory study and publish it [1], followed by several other studies [2,3].

Volkswagen is also making long-term investments in further developing and optimizing Life Cycle Assessment methods. Today, we have succeeded in considerably reducing the workload involved in preparing Life Cycle Inventories. Our research resulted in the development of the VW slimLCI interface system [4]: this interface not only significantly cuts the workload involved in preparing Life Cycle Assessments of complete vehicles by automating the process, but also further improves the consistency and quality of the LCA models produced.

This represents substantial progress, since preparing a complete LCA for a vehicle involves registering thousands of components, together with any related upstream supply chains and processes. The complexity of the modeling process results from the fact that all the parts and components of a vehicle themselves consist of a variety of materials and are manufactured by many different processes – processes that in turn consume energy, consumables and fabricated materials. In addition, the correct assignment of manufacturing processes to materials calls for considerable expert knowledge, a large database and detailed information on production and processing steps. The VW slimLCI interface system allows these details to be modeled very precisely and sufficiently completely in Life Cycle

Assessment models – even for complete vehicles. A Life Cycle Assessment or product model is based on the vehicle parts lists drawn up by the Technical Development department, as well as on material data drawn from the Volkswagen AG Material Information System (MISS). The VW slimLCI interface system primarily consists of two interfaces that transfer the vehicle data from these systems to the GaBi Software using a defined operating sequence (algorithm) (see Fig 1).

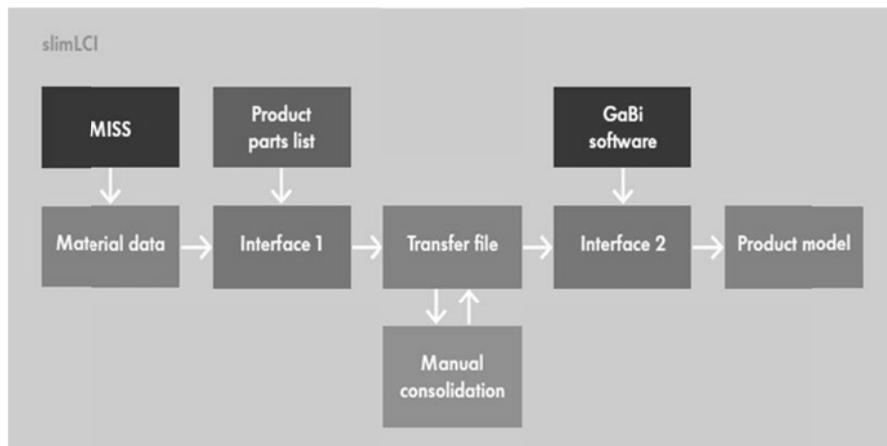


Fig 1: slim LCI interface system

3 Environmental Commendations

When a Life Cycle Assessment confirms that the vehicle analyzed has met the defined environmental goals, then they qualify for an Environmental Commendation. Since 2007, Volkswagen has been using environmental commendations to document ecological progress in a vehicle or technology compared to its predecessor. [5-7].

3.1 Life Cycle Assessment

Each Environmental Commendation is based on a Life Cycle Assessment. The 'functional unit' for the assessment is usually defined as the transportation of up to five people plus luggage over a total distance of 150,000 kilometers in the New European Driving Cycle (NEDC) with comparable utilization characteristics (e.g. driving performance). In the Life Cycle Inventory, data is collected for all

processes within the scope of the assessment (see Figure 2). The vehicle manufacturing phase is modeled using the slimLCI methodology (see above).

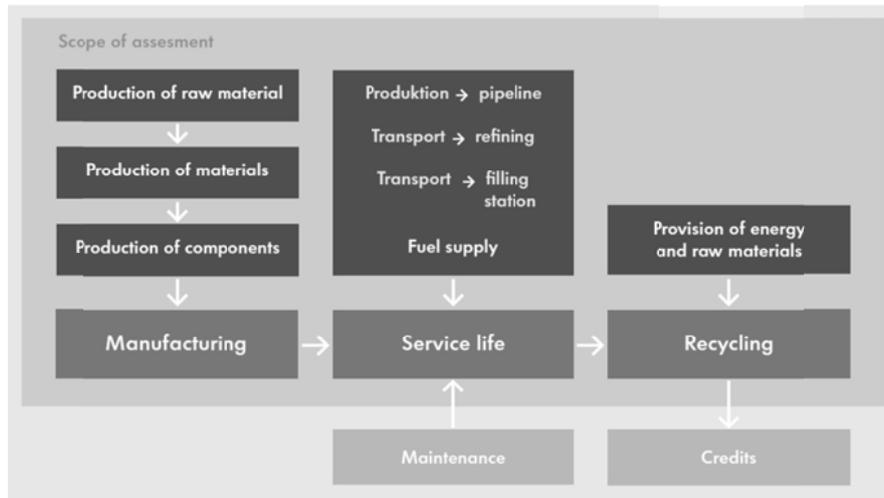


Fig 2: Scope of assessment for complete vehicle LCAs

Regarding the vehicle's service life, the model includes all relevant processes from fuel production and delivery through to driving. All consumption figures and emissions were determined on the basis of actual directives and regulations for type approval and correspond with the values presented to the German Federal Motor Transport Authority (Kraftfahrtbundesamt) for type approval. Finally, the recycling phase is modeled in accordance with the VW SiCon process [8]. The Impact Assessment is based on CML methodology.

3.2 Critical Review

Naturally enough, Volkswagen considers it important that the results achieved in the LCA should not only meet the environmental goals but should also be verified and confirmed by independent experts. Because in addition to being transparent, readily comparable and verifiable, the findings and evaluations in the LCAs have to match up to internationally recognized quality standards. Procedures for a critical review of comparative LCAs are laid down in the ISO 14040 standard [9]. This involves commissioning external experts who need to be familiar with the requirements of an LCA and must command the appropriate scientific and technical competence. They are tasked with determining whether or not the LCA meets the requirements in terms of methodology, data collection, evaluation and reporting, and complies with the prescribed principles. As a rule, the Life Cycle

Assessments of all Volkswagen vehicles are verified by external experts from the German technical inspectorate TÜV NORD, an organization that stands for independent critical reviews, competence and respectability, as well as enjoying broad-based acceptance in the fields of politics and business, and in society at large.

3.3 Communication

The purpose of the Environmental Commendations is to provide customers, shareholders and other stakeholders inside and outside the company with information about how Volkswagen is making vehicles, components and processes more environmentally compatible and what have been achieved in this respect. However, the challenge is to communicate the results of these studies in such a way that satisfies the individual requirements of different target groups. While some 'experts' might want to comprehend all details of the LCA, the presentation of all figures is often simply too extensive for 'non-scientists'. Therefore, the communication - and distribution respectively - of the Environmental Commendations is realized in two different ways:

- 1) **Brochure**
comprises a clear, sharp and understandable presentation of selected LCA-results on six pages. A copy of the printed leaflet can be obtained directly from Volkswagen dealers.
- 2) **Background report**
contains a comprehensive and transparent description of methodological aspects (goal & scope, system boundaries, etc.), LCI results and all investigated environmental impacts in a pdf.

Furthermore, supportive to the brochures another publication is available [10] that contains detailed information about the idea behind the environmental commendations, e.g. Volkswagen's environmental policy or the implementation of LCA and its usage as a tool for Design for Environment (DfE).

All actual brochures and background reports - as well as the environmental commendations of prior models - can be downloaded from environmental commendation's web-site at www.environmental-commendation.com.

4 Summary

This paper presents Volkswagen's environmental commendations as an outstanding concept for pointing out ecological improvements in automobile manufacturing by comparison of new vehicle models with predecessor models considering the environmental performance over the entire life cycle. To ensure reliability and consistency the LCA are verified and certified according to ISO 14040 by independent experts. As the scientific outcome of the LCA need to be communicated in customer-oriented way, the clear and understandable brochure is accompanied by the comprehensive and transparent background report.

5 References

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