

Environmental Report BMW 740Li

Abstract

Goal and scope:

The scope of the study is the life cycle assessment of the BMW 740Li, Model Year (MY) 2015. Its purpose is to assess the environmental impacts of the entire vehicle and its components according to the product responsibility strategy of the BMW Group. The comparison of the previous and the new model of BMW 7series clearly states the improvements in terms of environmental impact reduction. These results are important for the further development and optimization of the next BMW 7series generation as well as for the next set of targets.

System boundaries:

The system boundaries consist of all material and energy flows, input and output collected according to ISO 14040 with the following level of detail:

- From sourcing and production of raw materials to production, to use phase, to recycling (incl. transport logistic).
- Use phase: assumed mileage 250.000 km (new European driving cycle)
- Software and database GaBi 6©.
- Material data from material balance of the BMW 740Li.
- The impact assessment is based on the CML-method (November 2009) developed at Leiden University in the Netherlands (Guinée and Lindeijer 2002).
- A critical review of the environmental report is done by an external auditor.
- The compilation and assessment process was verified by TÜV SÜD assessing compliance with the internal process description as well as verifying data and environmental information used (validation attached).

The functional unit and the reference flow are defined as the BMW 740Li vehicle, at SOP (start of production) in 2015 and 2008, with a 6-cylinder gasoline motor as an ECE-basis version with a use phase of 250.000 km according to the new European driving cycle.

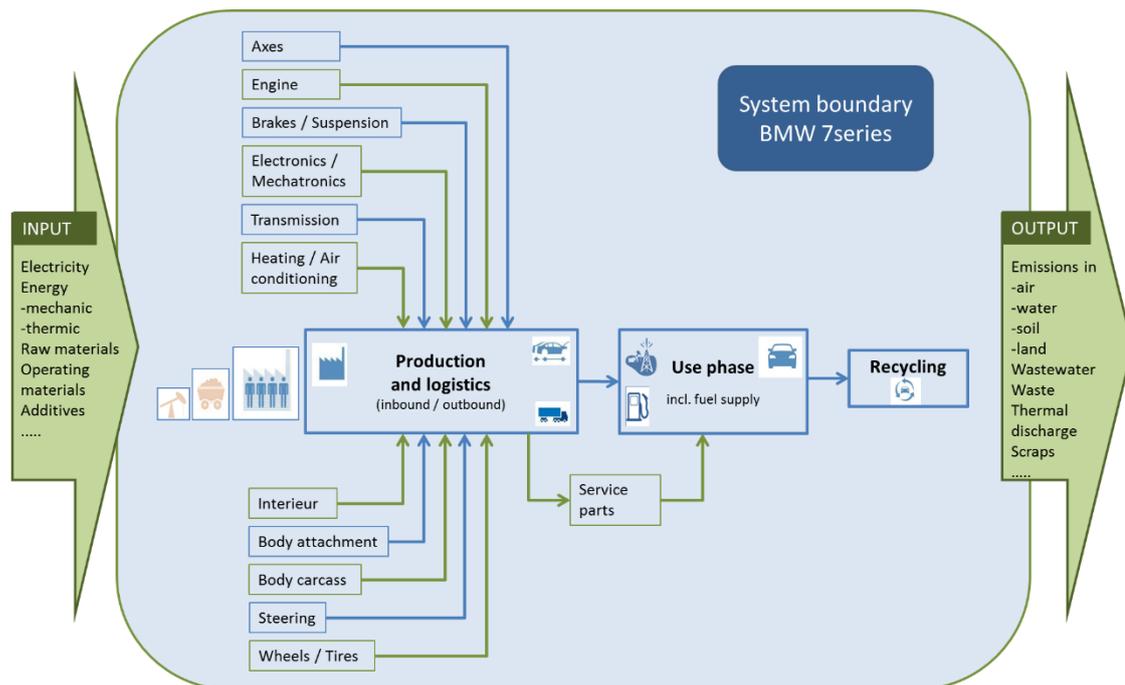


Fig. 1: Flowchart input / output data of the BMW 7series

The LCA according to ISO 14040/44 refers to environmental aspects and potential environmental impacts along the life cycle of a product from the raw material extraction to the manufacturing process, to the use phase, and to the recycling at the end of the vehicle's life.

Facts:

The life cycle assessment (LCA) of the BMW 740Li and its predecessor shows the following environmental impacts across the whole life cycle in terms of Global Warming Potential (GWP) (fig. 2). The environmental impacts determined by the LCA are measured in different units. The GWP, for example, is stated in kilogram CO₂-equivalents (kg CO₂e).

Sustainability targets have been already defined at the earliest strategic development phase and further monitored until the Start-of-Production of the vehicle throughout the LCA. Energy saving targets and renewable source for the electricity have been established in the BMW production plants.

Materials for the 7series are chosen by considering the sustainability targets, this is one of the reasons for having chosen as much as possible secondary aluminum and recycled thermoplastics. The production of carbon fiber is obtained by using electricity produced by hydropower.

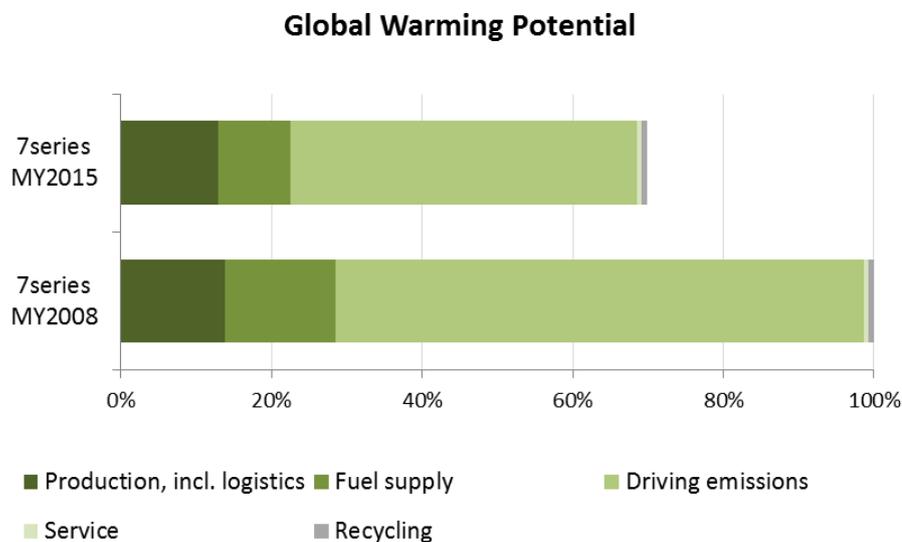


Fig. 2: Distribution of global warming potential over life cycle of BMW 7series

Sensitivity analysis:

A sensitivity analysis of different scenarios was carried out for estimating the effect of the choices made regarding methods and data on the results of the study.

Examples of the scenarios considered in the sensitivity analysis are:

- Influence of the data robustness on the life cycle assessment results.
- Influence of the different consumption scenarios during use phase.

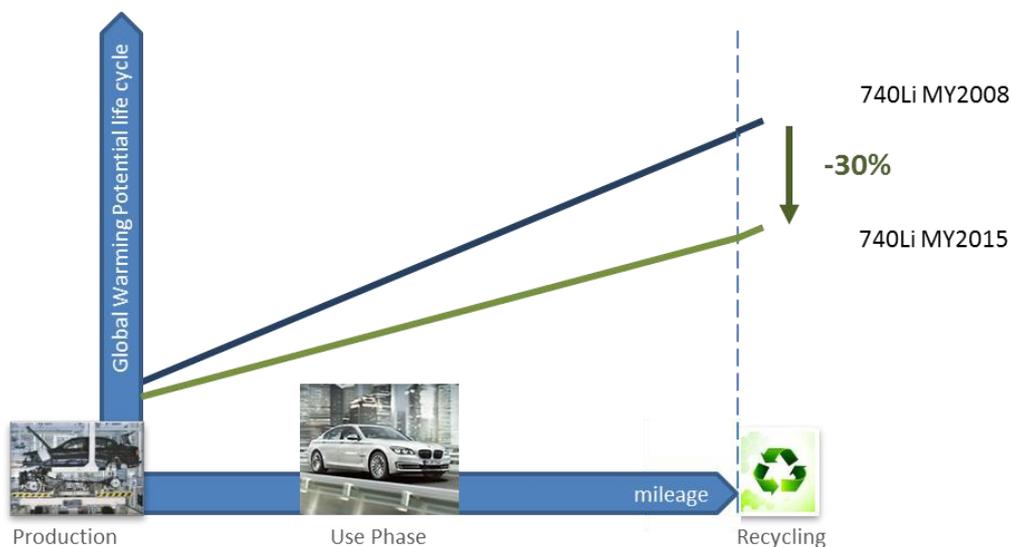


Fig. 3: Global warming potential of BMW 740Li along the life cycle

We succeeded to produce the new BMW 740Li with Global Warming Potential around 30% less than its previous model (MY 2008) by establishing sustainability measures and actions in the entire supply chain (fig. 3).



Management Service

Validation

TÜV SÜD Management Service GmbH has verified the Life Cycle Assessment (LCA) study for the following passenger vehicle type

BMW 740Li
model year 2015

of

BMW AG
Petuelring 130
80788 München

and herewith, **declares it valid.**

Basis of verification:

- **The standards ISO 14040:2006 / ISO 14044:2006** for the statements to LCA study in the version no. 4 of 2015-08-11 (principles and general requirements, definition of goal and scope as well as inventory analysis, life cycle impact assessment, interpretation, critical review)
- **Requirements of the TÜV SÜD MS-methodology for the evaluation of the quality of (process and product) modelling and data for inventory analysis and impact assessment as parts of a life cycle assessment according to ISO 14040:2006/ISO 14044:2006**

Scope of verification:

- **External critical review of LCA study regarding compliance with requirements of ISO 14040/14044**
- **Review of compliance of the specific LCA process with the related BMW process instruction**
- **Verification of LCA input data and other relevant environmental information**

Results of verification in detail:

- **This LCA study meets the requirements of above mentioned standards. The applied methodology is consistent with the scientific state of technology.**
- **The LCA study was prepared in line with the related BMW process instruction. Key statements were traced on sample base and confirmed to primary measuring results or data. (TMS-Report no: 707032379 from 2015-08-12)**

TÜV SÜD Management Service GmbH

Munich, 2015-08-19

Michael Brunk
Environmental Verifier

Dipl.-Ing. Ulrich Wegner
Head of certification body

Independence and objectivity of verifier:

TÜV SÜD Group has not advised product-related environmental aspects with BMW Group neither in the past nor at present. TÜV SÜD Management Service GmbH is not economically dependent or otherwise involved in any way with BMW AG.

Responsibilities:

BMW AG has full responsibility for the content of the LCA study. TÜV SÜD Management Service GmbH had been assigned to review the fulfilment of the methodical requirements regarding LCA realisation as well as to verify and validate the available information for correctness and credibility.