



## *Automotive Materials Life Cycle Assessment Model Released for Use*

### ***Updated model evaluates the total vehicle life cycle impact of materials, powertrains, fuels and their sources, total energy consumed***

**Brussels, 4 August 2009** – WorldAutoSteel has released a 2<sup>nd</sup> iteration of the automotive materials parametric Life Cycle Assessment (LCA) model, which allows for broader evaluations of automotive materials, powertrains, fuels and vehicle total energy consumed. Automakers can now evaluate more comprehensively material selections decisions and their affect on green house gas emissions, with additional options for materials, emerging powertrains and fuel sources. The Phase 2 model was developed under the leadership of Dr. Roland Geyer of the University of California's Bren School for Environmental Science.

The LCA approach assists automakers in evaluating and reducing the total energy consumed and the lifetime GHG emissions of their products. Regulations that consider only the vehicle use phase, or tailpipe emissions, can encourage use of low-density, GHG-intensive materials that provide somewhat lighter weight components. However, this may have the unexpected result of increasing GHG emissions during the vehicle's total life cycle.

To investigate the aspects of material selection on automotive LCA GHG emissions, a study entitled *The Impact of Material Choice in Vehicle Design on Life Cycle Greenhouse Gas emissions - The Case of HSS and AHSS versus Aluminium for BIW applications* (see [www.worldautosteel.org](http://www.worldautosteel.org)) was conducted at the University of California, Santa Barbara (UCSB) Bren School of Environmental Science and a Phase 1 model for material comparisons was developed. The study's methodology was evaluated and approved by a peer review committee consisting of OEM scientists, University academicians, and a member of the Aluminum Institute

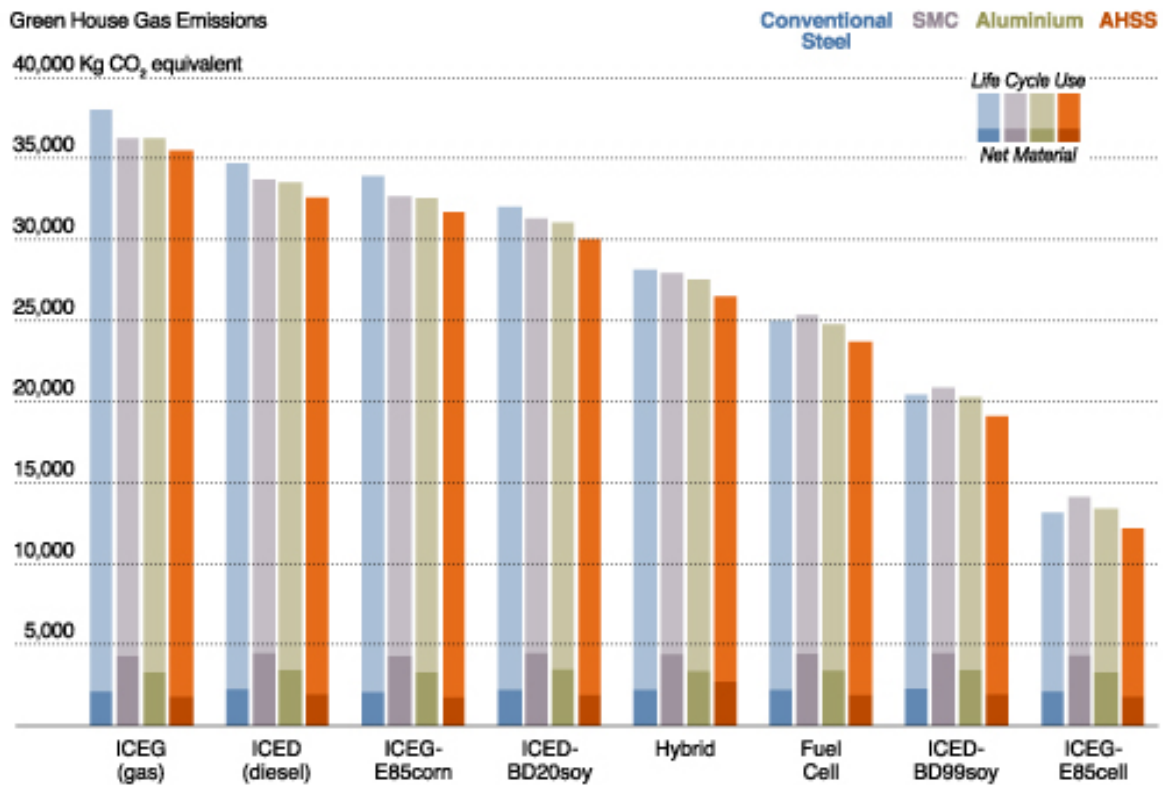
The Phase 2 LCA model is a successor to the Phase 1 model. Following the same methodology, the Phase 2 model has incorporated many new features and capabilities. Examples:

- 1) The original model allowed evaluation of three materials: conventional steel, Advanced High-Strength Steels (AHSS) and aluminium. The updated model adds magnesium and several composites to the materials that may now be evaluated for their emissions from manufacturing through use and end-of-life.
- 2) Advanced powertrains incorporated into the Phase 2 model are diesel and fuel cells.
- 3) It is now possible to evaluate the impact of bio-fuels and varying agricultural sources for the production of these fuels.
- 4) The model is now capable of producing an analysis of total energy consumed over a vehicle life cycle, to compliment the total green house gas emissions analysis.

An example of evaluations that can be conducted using the model are shown in Figure 1, which compares green house gas emissions for steel, aluminium and sheet moulding composite vehicle body structures incorporating these advanced technologies. As we move to the right with the comparison bars, total life cycle emissions decrease, which means that material production emissions contribute a greater percentage to the whole. Thus as these technologies are implemented in mainstream vehicle designs, the emissions from material production becomes relatively more important in the total life cycle. This places greater emphasis on the critical decisions required to

choose low GHG-intensive materials such as steel to ensure that total life cycle GHGs also are reduced.

**Figure 1: Life Cycle GHG's, Varying By Materials, Powertrains and Fuel Sources**



A key finding is that with reasonable assumptions and inputs for the specific application and manufacturing processes, the material production phase can be a significant percentage of the vehicle's total carbon footprint. In fact, it becomes even more important as the vehicle's footprint is diminished through advanced powertrains and fuel sources. This chart also clearly shows that significant improvements in reducing automotive GHG emissions will not be achieved by material substitution alone. Investment in new powertrains and fuels contribute to the greatest emissions reductions.

**Regardless of all reasonable inputs, the impact of material production and recycling on LCA GHG emissions are relatively small compared to total emissions**, and significant improvements in reducing automotive GHG emissions will not be made by material substitution alone.

The Phase 2 model is fully parameterized, and developed using a Microsoft Excel spreadsheet, making it very user-friendly. Users can download it free for use in conducting their own evaluations at the WorldAutoSteel website: <http://www.worldautosteel.org/Projects/LCA-Study/Phase-2-LCA-Model-available-for-download.aspx> Images shown here are also available at this web address.

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**About WorldAutoSteel**

WorldAutoSteel, the automotive group of the World Steel Association, is comprised of seventeen major global steel producers from around the world.

Our mission is to advance and communicate steel's unique ability to meet the automotive industry's needs and challenges in a sustainable and environmentally responsible way. We are committed to a low carbon future, the principles of which are embedded in our continuous research, manufacturing processes, and ultimately, in our advanced automotive steel products, for the benefit of society and future generations.

To learn more about WorldAutoSteel and its projects, visit [www.worldautosteel.org](http://www.worldautosteel.org)

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