Critical Review of the study

Life Cycle Assessment of Container Glass

Commissioned by:	FEVE - the European Container Glass Federation, Bruxelles
Critical Review Panel:	Prof. Dr. Matthias Finkbeiner, Germany (Chair) Prof. Dr. Ruud Beerkens, Netherlands Prof. Dr. Arpad Horvath, USA Phil Ross, USA
Reference	ISO 14040 (2006): Environmental Management - Life Cycle Assessment - Principles and Framework ISO 14044 (2006): Environmental Management - Life Cycle Assessment – Requirements and Guidelines

The Scope of the Critical Review

The review panel had the task to assess whether

- the methods used to carry out the LCA are consistent with the international standards ISO 14040 and ISO 14044
- the methods used to carry out the LCA are scientifically and technically valid,
- the technological coverage of the glass container industry in the prevalent LCA study is representative of the current practice,
- the data used are appropriate and reasonable in relation to the goal of the study,
- the interpretations reflect the limitations identified and the goal of the study, and
- the study report is transparent and consistent.

The review was performed according to ISO 14040 and ISO 14044 in their strictest sense as the data provided by the study are intended to be used for comparative assertions intended to be disclosed to the public. The analysis of individual datasets is outside the scope of this review.

The members of the critical review panel were chosen to ensure both LCA competence (mainly represented by Horvath and Finkbeiner) and technological (glass technology & production) competence for the studied technologies (mainly represented by Beerkens and Ross). The choice of reviewers also reflects the intended regional representation of North America and Europe.

The review process

The review process was coordinated between PE International as consultant performing the LCA for FEVE and the chair of the critical review panel. Initially, the members of the critical review team were selected in a phone meeting on November 18th, 2008. The kick-off-meeting of the critical review panel for agreeing on the scope and format of the review process was held by phone conference on January, 9th 2009. The draft goal and scope definition document was sent to the

critical review panel on January 30th, 2009 followed by a web meeting on on February 9th, 2009. At this stage, feedback with regard to modelling and data issues – both from an LCA as well as a technological perspective - was provided and adopted in the finalisation of the study. Preliminary LCI and LCIA results were presented and discussed in a further web meeting on March 9th, 2009. The request by the critical review team to get detailed insights in the data collection procedure was satisfied by the contractor. Data collection instruction manuals as well as data collection sheets were also provided by the contractor.

After further adjustments to the model, the draft report was delivered to the critical review team on March 11th. Based on the draft report, each member of the critical review panel provided individual review comments. These comments were compiled and implemented in the 2nd draft version of the report. This version of the report was the input to the face-to-face meeting of the critical review panel with the commissioners at PE International´s office in Stuttgart on March 24th, 2009 to resolve remaining open issues and to make technical adjustments to the report. All critical issues and the majority of recommendations of the critical review panel were addressed in a proper manner.

The final report was submitted to the panel on 27.05.2009. The critical review panel checked the implementation of the comments and agreed to the final report.

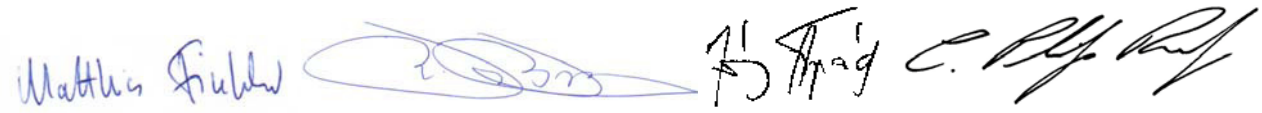
General evaluation

The defined scope for this LCA study was found to be appropriate to achieve the defined goals. The LCI model was applicable for the purpose of the study and had the capacity to support the goal of the study. Primary data were collected at more than 200 furnaces representing more than 72% of the production volume (mass of container glass production). Data quality is found to be high. As a result, the report is deemed to be representative and complete. The study was reported in a transparent manner. Various assumptions were addressed and backed by sensitivity analyses of critical data and methodological choices.

The critical review panel acknowledges the unrestricted access to all requested information as well as the open and constructive dialogue during the critical review process.

Conclusion

The study has been carried out in compliance with ISO 14040 and ISO 14044. The critical review panel found the overall quality of the methodology and its execution to be excellent for the purposes of the study.



Matthias Finkbeiner	Ruud Beerkens	Arpad Horvath	Phil Ross

Junel 15, 2009

Addendum, May 2010

Based on recent data delivered by the producer Solvay in January 2010, the specific Life Cycle Inventory (LCI) of soda ash (European production mix) from brine resources was set up.

The discussion with Solvay was initiated with reference to the fact that synthetic soda ash is the main contributor from batch materials for all environmental impact categories – as identified in the sensitivity analysis of the FEVE LCA on container glass.

Outcome of the discussion was that the generic background data describing the average soda ash production in Europe does not represent the application specific and integrated soda ash production (e.g. concerning salt sources and process water treatment) as consumed in the container glass production. The results reflect lower environmental interventions.

Correspondingly an update of the FEVE container glass LCA was carried out and the updated LCI results presented to the review panel. Besides the changes in the soda ash LCI, there are no changes in the goal & scope of the FEVE LCA study and for that reason the critical review statement valid as set up in June 15, 2009.



Matthias Finkbeiner also in behalf of;

Ruud Beerkens
Arpad Horvath
Phil Ross