



Final Critical Review Statement

A critical review of “*Comparative LCA of recycled fine papers made by Cascades with generic virgin and recycled North American papers*” has been carried out.

Chair of the panel:

Nathan Ayer
EarthShift

Contributing members of the panel:

Michael Bilodeau, University of Maine
Melissa Hamilton, EarthShift

Review Procedure

The panel critically reviewed this LCA study and supporting documents to determine if:

- The methods used to carry out the LCA are consistent with the international standards (ISO 14040, 14044);
- The methods used to carry out the LCA are scientifically and technically valid;
- The data used are appropriate and reasonable in relation to the goal of the study;
- The interpretations reflect the limitations identified and the goal and scope of the study; and
- The study report is transparent and consistent.

In addition, since the study is intended to be used to make public claims about the environmental impacts associated with competing product systems, the review panel also considered whether the LCA study is compliant with the specific requirements of ISO 14044 for studies intended to be used to support comparative assertions disclosed to the public, provided in Section 5.3 of ISO 14044.

The review has been carried out by a panel of three members. Mr. Bilodeau provided technical expertise in paper manufacturing, and Nathan Ayer and Melissa Hamilton provided expertise in LCA and the ISO 14040 and 14044 standards. Nathan Ayer acted as chair of the panel and coordinated the review process and communications with the study team.

The critical review panel’s comments and the study team’s responses have been appended to this statement and should appear in the main study report for reference. The steps involved in the critical review process are outlined below.

1. The study documents, including the main study report and all relevant appendices, were provided to the panel chair on July 7, 2011.
2. The supporting document “An assessment of the biogenic carbon net emissions from the Northeast American forest sector” was provided to the panel chair on July 7, 2011, in support of

the study team's assumptions for carbon emissions from forestry activities in the fine paper life cycle.

3. On July 27, 2011, the panel chair circulated the study documents to the review panel, including the main study report and appendices.
4. On August 29, 2011, the panel chair provided Sandra Bourret of Cascades with a summary of the panel's critical review comments.
5. On September 6, 2011, Sandra Bourret of Cascades provided a summary of the study team's responses to the critical review comments to the panel chair.
6. On September 7, 2011, the panel chair hosted a conference call to discuss the critical review comments and study team responses. Present on the call were Nathan Ayer (EarthShift), Michael Bilodeau (University of Maine), Sandra Bourret (Cascades), and Leon Marineau (Cascades).
7. On September 8, 2011, Sandra Bourret submitted a revised version of the main study report to the panel chair for review.
8. Upon review of the revised study report submitted on September 8, 2011, the critical review panel has written the final review statement below.

Final Review Statement

The review panel has concluded that the study is in compliance with the ISO 14040 and 14044 standards for LCA studies used to support comparative assertions to be disclosed to the public. There are no outstanding methodological or technical issues upon completion of this review, and the general findings of the review panel are summarized below. More detailed comments on the study methodology and technical assumptions, including the study team's responses, can be found in the attached review summary.

Are the methods used to carry out the LCA consistent with the international standards (ISO 14040, 14044)?

The review panel finds that the study is consistent with the ISO LCA standards, and in particular, the reporting requirements under Section 5.3 for studies used to support comparative assertions. The methodology is clearly described, and all modeling assumptions are documented and explained. Sensitivity analyses were conducted to verify key assumptions and few of the sensitivity analyses showed results that varied significantly from the primary results, generally supporting the study conclusions. A detailed data quality assessment was also conducted, and the study conclusions were supported by uncertainty analysis using Monte Carlo simulations in the SimaPro software program.

Are the methods used to carry out the LCA scientifically and technically valid?

The review panel finds that the methods used are scientifically and technically valid. The ReCiPe impact assessment method was used, which is an internationally-accepted environmental impact assessment method, and the environmental indicators reported are relevant to the production systems under study, including a mix of selected mid-point and end-point indicators. The limitations of the impact assessment method are carefully described and the chosen impact assessment method was tested by also generating results with the IMPACT 2002+ method for comparison. The technical accuracy of the system descriptions, assumptions, and modeling were verified by the panel and found to be representative of the production systems under study.

The issue of carbon balance in forestry operations is raised in the study report, and the study highlights the fact that great scientific uncertainty exists about the level of carbon emissions that should be attributed to forest extraction activities. Based on a background study previously conducted for

Cascades and based on their own professional judgment, the authors assumed that 20% of biogenic carbon emissions should be accounted for in the LCA and modified the ReCiPe impact assessment method accordingly. While the review panel questioned this assumption as being somewhat arbitrary, the study report clearly articulates the rationale for this assumption, and provides sensitivity analysis to show that the assumption does not have a significant effect on the study results and conclusions. As such, the review panel finds that this assumption is valid with respect to the study objectives.

Are the data used appropriate and reasonable in relation to the goal of the study?

The review panel finds that the data used are appropriate with respect to the study objectives. Primary data was used to characterize the Cascades paper products and represents the best available data to characterize these production systems. Published data drawn largely from two sources (Ecoinvent and the Environmental Defense Fund) were generally used to characterize the average North American production systems, and the sources of data and the rationale for the data used has been carefully documented in the study report. The review panel carefully reviewed these data and supporting assumptions and is confident that these represent the best available data to achieve the study objectives. The study report provides a great deal of discussion around data quality, and in instances where data quality was less than desirable, sensitivity analysis has been conducted to show that there is no impact on the overall study results.

Do the interpretations reflect the limitations identified and the goal and scope of the study?

The review panel finds that the interpretation of the results reflects the limitations identified and the sensitivity analyses and uncertainty analysis provided support the conclusions.

Is the study report transparent and consistent?

The review panel finds that the study report is transparent and consistent. A high-level of detail is provided in the description of the product systems, key assumptions, and data used.