

Critical Review of the study

LIFE CYCLE ASSESSMENT OF NICKEL PRODUCTS - REFERENCE YEAR 2017

Commissioned by: Nickel Institute, Toronto, Canada

Reviewer: Prof. Dr. Matthias Finkbeiner, Berlin, Germany

Reference ISO 14040 (2006): Environmental Management - Life Cycle Assessment - Principles and Framework
ISO 14044 (2006): Environmental Management - Life Cycle Assessment – Requirements and Guidelines
ISO/TS 14071 (2014): Environmental management -Life cycle assessment - Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006

The Scope of the Critical Review

The reviewer 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 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.

Because it is not the intention of the commissioner to use the study in comparative assertions intended to be disclosed to the public, the review was performed by an external expert according to paragraph 6.2 of ISO 14044.

This review statement is only valid for this specific report version 1.8 dated 25.05.2020.

The analysis or verification of individual datasets and the LCA software models used to calculate the results were outside the scope of this review.

The review process

The review process was coordinated between the Nickel Institute, Sphera Solutions (Sphera, LCA practitioner for the Nickel Institute) and the reviewer.

The review process started with the provision of the first draft of the goal and scope report on 24th September 2018. The reviewer evaluated the draft and provided 29 comments of general, technical and editorial nature by 30th September 2018. Sphera and the Nickel Institute revised the goal and scope report accordingly.

The first complete draft of the final report was delivered on 23rd March 2020. The assessment of the reviewer resulted in 45 comments of general, technical and editorial nature. They were delivered to Sphera and the Nickel Institute on 4th April 2020. Sphera provided responses to the review comments and an updated version of the final report on 2nd May 2020. A final set of three editorial comments was provided by the reviewer. The remaining actions and modifications to the study report were completed by 25th May 2020. This final report served as the basis for this review statement.

Overall, the feedback provided by the reviewer was adopted very constructively in the finalisation of the study. All critical issues and most of the recommendations of the reviewer were addressed in a proper manner. The reviewer acknowledges the open and constructive dialogue during the critical review process.

General evaluation

The first set of LCA data on Nickel products provided by the Nickel Institute dates back to 2003. The previous update referred to data from 2010/11. The study presented here provides another update by the Nickel Institute of industry average cradle-to-gate life cycle data for two types of nickel products, i.e. class 1 nickel metal and ferronickel. In addition, due to the increasing relevance of the product, LCA data for nickel sulphate are provided for the first time.

The outstanding feature of this study is the large and even increased amount of primary data collected to reach representative results for global nickel production. They represent 52% of the global nickel metal production, 47% of the global ferronickel production and 15% of the global production of nickel sulphate. All

relevant pyro- and hydrometallurgical production routes were considered in the investigation. All major nickel producing regions except for China were covered.

The defined and achieved scope for this study was found to be appropriate to achieve the stated goals. Being the third version of the study, the methodology and procedures reached a high level of maturity. Several assumptions were addressed and backed by sensitivity analyses of critical data and methodological choices.

This study covers nickel produced from e.g. PGM, cobalt and copper bearing ores, for which other, specific datasets exist. Achieving consistency between these datasets is beyond the control of this study as they were commissioned by different industry associations, may have had different goals and may include data from different time periods, processes and databases. As a consequence, data users have to check and assess the consistency between these different data sources within the context of their particular goal and scope.

Conclusion

The study has been carried out in conformity with ISO 14040 and ISO 14044. The reviewer found the overall quality of the methodology and its execution to be very adequate for the purposes of the study. The study is reported in a comprehensive manner including a transparent documentation of its limitations in data and scope.



Matthias Finkbeiner
26 May 2020