

Case study summaries

For the project "Linking the UN SDGs to life cycle impact frameworks"



Fact-based sustainability

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1 Introduction

The project “Linking the UN Sustainable Development Goals to life cycle impact pathway frameworks” was initiated by the UN Life Cycle Initiative to create robust links between the SDGs and LCA and to develop a methodology for measuring and reporting on companies’ contributions to the SDGs. The project has been under administration of OnePlanet and is executed by 2.-0 LCA Consultants and PRé Sustainability. Two complementary approaches have been developed within the project: the life cycle SDG screening and the life cycle SDG assessment. Both approaches have been tested in case studies with industrial partners: Novozymes, Janus, Corbion and ArcelorMittal. This report summarizes the case studies that were executed in the course of 2021.



2 Overview of case studies

In the table below, an overview of the different case studies and their focus for the application of the method is shown.

Table 1 Overview of case studies

Company	Novozymes	Janus (JGC)	Corbion	ArcelorMittal
Type	SDG assessment	SDG screening	SDG screening	SDG screening
Product	Protein-enriched biscuit	Ammonia from plastic waste	Meat preservative	Passenger car component
LC scope	Full life cycle	Waste processing, ammonia production	Supply chain, manufacturing, use phase	Direct activities
SDG scope	all, but focus on dietary health	All SDGs	Subset (SDG 2, 3, 12)	Subset (SDG 3, 5, 6)
Collected data	Product ingredients and location-specific dietary information	Existing LCA results, publicly available s-LCA information	Identification of benchmark for LCA. Existing LCA and PSIA results	PSIA performance indicators for own activities

3 Case study summaries

3.1 Study on nutritious biscuit by Novozymes

Novozymes has joined a project funded by P4G (<https://p4gpartnerships.org/content/about-p4g#ac-p4g-what-is-p4g>) which is a forum for developing concrete public-private partnerships at scale to deliver on the SDGs and the Paris Climate Agreement. Novozymes has joined the Sustainable Food Partnership for Better Nutrition through Inclusive Value Chains in Ethiopia.

The purpose is to develop a more nutritious biscuit, which is affordable for low-income people and based on local raw materials to replace current conventional biscuit, which is less nutritious (see introduction to the project: <https://www.youtube.com/watch?v=-xzHjvrVOGo>). Novozymes role is to provide baking enzymes which enable baking with alternative flours and reduce added sugars.

Goal and scope

The goal of the assessment was to compare the new more nutritious biscuit with the conventional biscuit.

The new biscuit will include locally produced chickpea flour and whey protein to increase nutritional value which will replace part of the wheat in the conventional biscuit. In addition, by application of Novozymes' baking enzymes it is possible to reduce added sugar in the new biscuit.

The approach from the life cycle SDG Assessment methodology was applied. In practice, the Social footprint method (Weidema B.) was applied combined with a nutritional analysis. The social footprint can give an indication of where in the value chain the social impact is changing (across different sectors and countries).

Inventory analysis

Inventory analysis is based on the recipes for the two biscuits. No other data was collected.

Impact assessment

The preliminary results of the Social footprint method indicated that the main potential change in social impact in the value chain should be found in the change from wheat flour to chickpea flour production due to the different relative efficiencies in production of the two crops.

Interpretation

The potential changes in social impact were not studied further.

Most important learnings

The social footprint method may be useful to get an indication of where in the value chain the social impacts potentially change. However, as the method is today, all impacts are productivity related based on income. It could be interesting to repeat the assessment with the revised version of the social footprint method based on well-being which has been developed in this project, but this was not studied further within the timeframe of the project.

Assessment of potential social impacts and nutritional analysis may be useful in the scoping phase of future projects.

3.2 Comparison of ammonia product processes by Janus

JGC Holdings has been involved in the development of a new chemical process that enables to make a common chemical product, ammonia, from the use of plastic waste whereas ammonia is generally made from fossil resources (city gas).

At Japan NUS, which is a group company of JGC Holdings, as experts in the environment and energy fields, we identified the SDGs as a new tool to better support our clients to find new ideas and solutions for a more sustainable future.

Before joining the project, we had the will to deal with the SDGs but we had difficulties in incorporating and understanding the goals at companies' levels.

Goal and scope

The goal of the study was to make a preliminary assessment of the "Waste Plastic Gasification to Liquid Ammonia" project by comparing it to the production from city gas, from the SDGs perspective. We had already conducted a CO₂ footprint calculation for this project, but we were interested in how the project would be evaluated from the point of view of other environmental and social impacts.

At the beginning, we started evaluating all the SDGs and their 169 targets but soon realized that most of them were not completely relevant for the project. Therefore, we spent some time in the selection of the relevant SDGs targets, and came to conclusion that the following aspects would be most relevant:

- Reuse of (plastic) waste: SDG 12.2, 12.4 and 12.5
- Efficiency of the new process in terms of water and energy use efficiency: SDG 7.3, SDG 9.4
- Impacts on climate change: SDG 13.2
- Impacts on human health: SDG 3.9
- Impacts on marine and terrestrial ecosystems: SDG 14.1, 14.3, 15.1
- Development of advanced technologies: SDG 9.4

We started with the SDG Screening approach, as we already had conducted an LCA for this project.

Inventory analysis

Regarding the environmental aspects, we collected inventory data for the project scenario and baseline scenario, based on current project's input and output flow. We set the functional unit as production of 1kg of liquid ammonia and we listed the resources and energy needed for the ammonia production process such as Waste Plastic Gasification/city gas, electricity, steam, oxygen, etc. Primary data was provided from the technical team, but regarding the secondary data, we used a Japanese LCA database called IDEA (v 2.3).

Regarding the social aspects, we could not directly contact the project developer, so the analysis was based on publicly available information.

Impact assessment

The results showed positive impacts of the project for SDGs related to efficient resource management, climate change, energy efficiency, and life below water, which was an expected outcome.

On the other hand, we found some surprising results regarding the impacts on waste management, life on land, industry and human health, as the new process turned out to need more steam and nitrogen resources than the baseline project, which had negative impacts on some environmental impact categories even though this project has high recycling advantages.

Interpretation

One of the technical conclusions from the case study is that the establishment of new processes enabling a circular economy may need more resources or steps to make the same final product, making the process less efficient in some aspect, even if it has positive impacts on the CO₂ or waste reduction point of view. We may see many similar trade-off situation for new technologies and for that, we are aware that we need to consider the countermeasure carefully. This kind of findings could be shared with the technical team to optimize the process scheme in the future and we how to assess these trade-offs from the SDGs perspective. In addition, we think that score weighting/compensation for each SDGs target would also be needed to be considered.

In our study, we have been limited by the access to information and data regarding the social aspects.

Another limitation was that the screening approach is based on LCA methods commonly used in the EU. The characterization models available in the software we used in Japan could be different from the ones required by the screening methodology, therefore our results are not directly comparable with other studies that are following the screening methodology.

We think that the uniformization of the characterization models/LCA software is a challenge.

Most important learnings

When we started the SDGs journey, we thought that we would develop a sort of straightforward tool that would enable to give a direct SDG impacts scoring after entering some data. We realized that such tool could not be made, because the SDGs are goals that are to be empowered, and for that they are to be well understood. At the end of the day, we spent a lot of time trying to understand and interpret the goals and targets, and how they could be applied at company level, that enabled us to have a deeper knowledge of what the SDGs are.

3.3 Study on a meat preservative by Corbion

For the SDG project, Corbion analyzed a subset of SDG's (2, 3, and 12) for a meat preservative. The supply chain, manufacturing and use phase were in scope. The business value that was seen was the application of a standardized approach to calculate SDG impact, that can help to improve the credibility of claims.

The goal was to test the applicability of the SDG Screening method to linking LCA methodologies with SDGs, and to evaluate whether the approach would bring new insights with relation to the SDGs.

The test in the first round showed that the nature of the SDG Screening did not allow for trade-offs within LCA results, which resulted in a barrier for the applicability of the method. This is changed in the updated version of the SDG Screening methodology.

Furthermore, the choice of the reference product for the environmental part of the screening remains a critical methodological choice.

Overall, it was found that the methodology is easy to apply with existing PSIA and comparative environmental LCA results.

3.4 Analysis of direct activities for a B-pillar by ArcelorMittal

In the SDG project, Arcelor Mittal analyzed a subset of SDG's (3, 5 and 6) for a B-pillar of passenger car. The goal was to test the applicability of the SDG Screening method to linking LCA methodologies with SDGs, and to evaluate if the proposed approach could be used for internal and external communication purposes regarding Arcelor Mittal's contribution to the SDGs.

Due to lack of available data about their supply chain, it was chosen to focus only on their direct activities. The lack of availability of social data about the supply chain can be a barrier for the applicability of the method.

During the analysis, they found that not all links are always relevant. Hence, the context of the product life cycle should be considered, which means that the links are not always applicable (circumstantial), and not all SDG targets are relevant

The methodology is relatively easy to apply with existing LCA results and can be used to underpin communication about SDG contribution. With regards to the uptake of the methodology, in the course of the project the meaning of the SDGs within the companies shifted, as they turned out to be not the driver of the sustainability strategy of ArcelorMittal. Therefore, the SDGs now have a different position, and reporting on the SDGs on product level is less relevant.