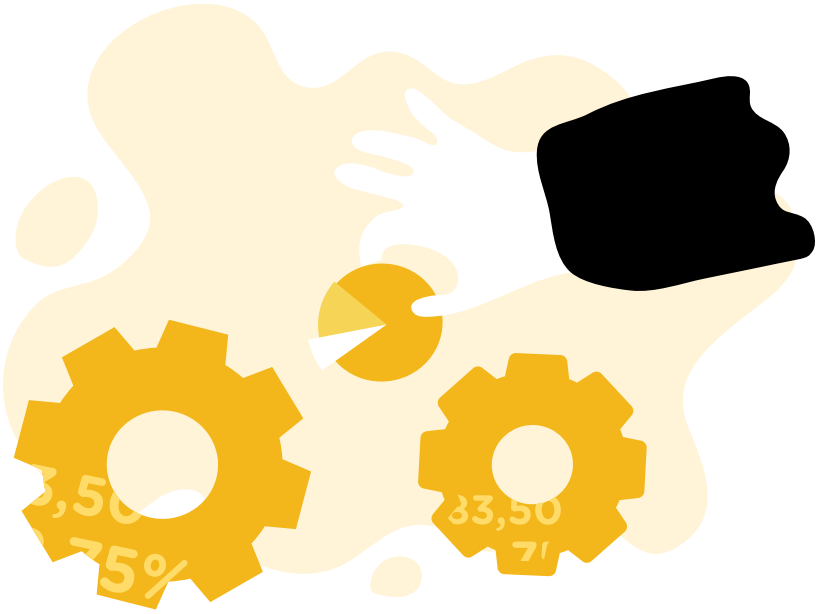
BM.3
Gather additional data on operational performance



Complex activity

The aim of this activity is to gather detailed and quantified data about key areas of the company's operational performance to support the business model innovation and evaluation activities.

INPUTS

- Operational strengths and weaknesses identified during the step Preliminary Assessment from the activity *ST.7 Do a SWOT analysis.*
- Data Gathering Checklist from the activity *BM.1 Update the data gathering strategy*

OUTPUTS

- Detailed and quantified data concerning key areas of the business model used throughout the rest of the *SET BUSINESS MODEL* phase.

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In this activity you will collect detailed and, where possible, quantified data about the operational performance of the company. You should already have captured some basic information about the company's operational performance during the Preliminary Assessment. This activity provides the data required to validate the hotspots previously identified and evaluate the potential benefits, costs and risks of business model ideas in a more quantified and rigorous manner.

Examples of the types of data or questions you need to answer concerning the operational performance of the company are provided below, using a simplified version of the *Life Cycle Thinking template*.

HOW TO GO ABOUT IT

1. Refer back to the *Data Gathering Update template* to remind yourself of which of the types of data mentioned in the templates you need to gather.
2. The simplified *Life Cycle Thinking template* provided here gives suggestions for the types of operational performance data that you might want to collect. Use this in combination with the Data Gathering Checklist to select the types of data you will collect.
3. Create a more detailed plan of how and when you will collect the different data types and review this with the Focal Point.
4. Once you have completed the data collection activities you should analyse the data and prepare the results of your analysis in a short report - integrating the results of the *BM.2 Gather additional data on the business model* activity. You can present this the report to the company as an intermediary deliverable to help maintain the interest and engagement as you get ready to start generating alternative business model concepts.

Template of Life Cycle Thinking

	Environmental impacts	Social Impacts	Economic impacts
Materials			
Production			
Transportation			
Use			
End of life			

Life cycle thinking

Project _____ Date _____ Version _____

					Environmental impacts		Social Impacts			Economic impacts
Phase	**Activity**	**Inputs**	**Product outputs**	**Emissions**	**Resource use**	**Ecosystem quality**	**On workers**	**On consumers**	**On stakeholders**	**Profitability**

Used during activities

PR.4, ST.6, BM.3 and BM.15

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LEARNING CASE STUDY OF LIFE CYCLE THINKING

	Environmental impacts	Social Impacts	Economic impacts
Materials	• *Inventory of materials purchased including quantities* • *Data on energy consumption for production and delivery of materials.*	*Do materials suppliers have:* • *Health & Safety management system in operation?* • *Chemical management system in operation?* • *Policy on child labour?* • *Policy on equal opportunities and discrimination?* • *Policy on working hours?* • *Can suppliers demonstrate compliance with relevant health, safety and chemical regulations or standards?* • *Are jobs in the supply chain permanent, full-time and secure?* • *What are the prospects for job creation?*	• *Cost of materials purchased.*
Production	• *Inventory of material waste in production including quantities.* • *Water consumption data.* • *Production energy consumption with breakdown by process.* • *Energy consumption in heating/cooling and lighting of production facilities and offices.* • *Emissions governed by permits or regulations?*	*Does company have:* • *Health & Safety management system in operation?* • *Chemical management system in operation?* • *Policy on child labour?* • *Policy on gender awareness, gender equality and discrimination?* • *Policy on working hours?* • *Staff development and training?*	• *Cost of waste and emissions.* • *Cost of energy use in production.* • *Cost of social impacts.*

	Environmental impacts	Social Impacts	Economic impacts
Production		• *Is company compliant with relevant health, safety and chemical regulations or standards?* • *Any complaints from local community regarding noise and pollution from production operations?* • *Are jobs in the company permanent, full-time and secure?* • *What are the prospects for job creation?* • *What barriers exist for women or men who want to work for the company?*	
Transportation	• *Inventory of packaging materials including quantities.* • *Inventory of product waste during transportation including quantities.* • *Data on energy consumed in warehouse (lighting, refrigeration)* • *Data on fuel consumption for product transportation.*	• *Guidance for workers on safe handling of product.* • *Complaints from local community regarding noise and pollution from transportation operations?* • *Are jobs in the logistics provider permanent, full-time and secure?* • *What are the prospects for job creation?*	• *Cost of warehouse operation.* • *Cost of transportation operations.* • *Product sales revenues including breakdown by product line.*
Use	• *Data on energy consumed retail location (lighting, refrigeration).* • *Data on energy consumption of product during use phase.* • *Availability of guidance for user on energy-efficient use of product?*	• *Guidance for user on safe use of product.* • *Evidence of social benefits of use of product? E.g. job creation, improved health etc.*	• *Revenues from maintenance services or consumables.* • *What are the prospects for job creation in maintenance, support and service?*
End of life	• *Data on typical end of life fate for product.* • *Data on energy consumption of product during end of life phase.*	• *Guidance for user/workers on safe product disposal practices.* • *Risk of hazardous waste emissions from end of life product?* • *Complaints from local community regarding pollution from end of life disposal?* • *What are the prospects for job creation in recycling and reverse logistics?*	• *Cost of end of life processing.* • *Revenues from end of life processing.*

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BACKGROUND INFORMATION

To measure life cycle environmental impacts in a rigorous and scientific manner generally requires tools such as 'Life Cycle Assessment' (LCA) and 'Social Life Cycle Assessment' (SLCA). LCA and SLCA are both major topics in their own right and is not the aim of this manual to provide a comprehensive introduction to this field. Further information on UN Environment activities to support the application of LCA can be found at the Life Cycle Initiative website – see the references below for further details. Similarly, for details of SLCA approaches see the UN Environment publication 'Guidelines for Social Life Cycle Assessment of Products'. One issue to keep in mind is that conducting a detailed LCA conforming to international standards such as ISO 14040:2006 generally requires a significant investment of time and money (upwards of US$10,000 and 6 person-months). Also, eco-innovation ideas can be very difficult to evaluate using conventional LCA or SLCA approaches as the necessary input data is often very imprecise or simply not available. For these reasons, you may decide to use simplified approaches to understanding the life cycle sustainability impacts of a product, such as the 'hotspot analysis' introduced in the activity 'PR.4 Identify sustainability hotspots across the value chain'.

These simpler approaches allow you to evaluate sustainability impacts such as resource consumption and waste without performing a full LCA. You will have identified sustainability hotspots using the *Life Cycle Thinking template* as part of the Preliminary Assessment. At this stage you should begin to gather data to quantify these hotspots by interviewing key mid-level managers. For example, the procurement manager should know the amount of raw materials, water, electricity and fuel consumed per year and per production line. The sales and marketing manager will have data on the volume of product sales. The production manager will know about production losses (scrap and waste). With these data it is possible to generate a reasonable, quantified estimate of the scale of a sustainability hotspot without performing an LCA. Tracking improvements in sustainability performance will also be easier if quantified data can be obtained.

References and resources

Life Cycle Assessment:

- Joint UN Environment-SETAC Life Cycle Initiative. Available from: http://www.life cycleinitiative.org/
- UN Environment, (2009). Guidelines for Social Life Cycle Assessment of Products. UN Environment, Paris. Available from: http://www.unep.fr/shared/publications/pdf/DTIx1164xPA-guidelines_sLCA.pdf

→ Further information in the Agri-food, Chemicals and Metals Supplements

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Eco—i Agri-foods

TIPS & TRICKS

USE DOCUMENTATION AVAILABLE ON SITE TO GATHER DATA ON OPERATIONAL PERFORMANCE

Most of the data needed to quantify the operational performance can be gathered on site. Some of the questions that you should ask the production management in order to obtain the necessary data are:

- Do any accounts records exist for raw material purchases?
- Do any production records exist? Use these to find out how much raw material is actually used, rather than how much is ordered and delivered. Try quantifying each raw material used separately.
- Do any waste transfer notes or waste disposal invoices exist? This can be used to find out how much solid waste has left the site.
- Do any records exist about packaging purchases and properties?
- Is information on energy and water usage available?

If you do not have all the data available to assess the operational performance, approach the accounting department. The accountants may have records that provide details of materials and services bought, product sold and waste disposal costs. Additionally you can contact the suppliers of raw materials, packaging, and waste disposal companies in order to acquire the required data. As a last resort you can also use the data available at the company (invoices, bills, reports, records) in order to make an estimation of a KPI if direct information does not exists.

USE SOURCES OF DATA ALREADY AVAILABLE

Life Cycle Assessment (LCA) is used for gathering data and making quantitative assessment on environmental performance of a value chain. However conducting a LCA is a research and data intensive process. Conducting desk research on completed LCA studies for specific food products or categories might give you a sufficient understanding on life cycle impacts of your targeted company. If more detail is required there are several sources of data and guidelines that can be useful. Below you will find sources of information about LCA, environmental KPIs, environmental management and best available techniques for minimizing environmental impact in the food industry.

- Eco-Management and Audit Scheme - EMAS is an environmental management tool developed based on ISO 14001:1996, international standard on environmental management. The tool is currently used by approximately 4,500 organizations at over 8,000 sites for environmental assessment and improvement of environmental performance. Sector specific guidelines can be found at the EMAS website: http://ec.europa.eu/environment/emas/index_en.htm
- Best Available Techniques References Documents on Food, Drink and Milk Industries – provide detailed information about environmental KPIs used in the food industry sorted by each processing operation used in the processing of food. Benchmarks on many KPIs are also provided, which are periodically updated. Available at: http://eippcb.jrc.ec.europa.eu/reference/
- Product Environmental Footprint Guide – the PEF Guide provides guidance and methodology for conducting a LCA and is based on ISO 14040/44:2006. The PEF Guide is supplemented by documents specific to product and organisational groups. Available at: http://www.pef-world-forum.org/
- ENVIFOOD – this protocol provides guidance on LCA specific to the

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food industry. Important KPIs are listed and methodology for data acquisition is thoroughly covered. Available at: http://www.food-scp.eu/

- SENSE-tool – Easy-to-use online tool to calculate food product environmental impact. A 14-day, free licence is available at: http://www.senseproject.eu/
- Sustainability Consortium –offers data and reports on environmental KPIs across major industry sectors covering the whole value chain. The services and products of the Sustainability Consortium can be accessed through a yearly membership fee or licensing agreement. Available at: http://www.sustainability-consortium.org/

PRIORITIZE DATA GATHERING FOR PRODUCTS WITH HIGH THROUGHPUT

Generally food companies manufacture several different products on one or multiple product lines. You can maximize the cost-to-benefit of the data gathering activities by focusing on the product that has the highest throughput. The results can often be extrapolated to cover other lines and products.

BACKGROUND INFORMATION

Operational KPIs

Some commonly used KPIs in the food and drink industry are listed in Table 6. The nature of the food and drink processing markets makes it difficult to provide a set of indicators that fits the whole industry. The suggested KPIs will give you a useful starting point, from which you can develop indicators suited to the company.

Environmental KPIs

Environmental KPIs are used to quantify the environmental impact of a company or a value chain. KPIs that are applicable for the food industry generally include parameters to quantify: air emissions, waste water, solid waste, energy, utilities and other specific operational materials.

Social sustainability KPIs

Social performance indicators can be categorized according to the value chain stakeholders affected by a company's operations. The categories include: Employees, Local community, Society, Consumers, and Other value chain actors (UN Environment/SETAC, 2009). Important stakeholder and social impacts in the agri-food value chain are shown in Fiigure 10. The indicators were developed by Agresearch, New Zealand (2009), using methodological approaches presented by UN Environment (UN Environment/SETAC, 2009), Labuschagne and Brent (2006) and Klosch et.al. (2008).

Benchmarking

Apart from tracking the progress towards the strategic goals, KPIs can also be used for benchmarking. Benchmarking was introduced earlier in this supplement as a tool for identifying opportunities for eco-innovation. It is also an excellent way to assess where the

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KPI	Unit	Description	Reflects on	Desired result
Water consumption	m_3/tonne of product	Total water use on site, excluding cooling water and extracted and returned to source	Total volume of water consumed in any given time period (week, month, year	Low levels
Process water	m_3/tonne of product	Water used in processing operations, including that used as raw material (ingredient)	Volume of water used in any given time period to produce a normalised unit of production	Dependent on the particular product
Product rework	% (by number of items)	Percentage of finished goods (number of items) that have to be reprocessed in some way (if applicable) one or more times	Level of rework – related to inefficiency or very high quality standards	Low levels – high levels are generally bad
Total product yield	% (by weight)	100% x tonnage of saleable goods divided by total tonnage of all goods produced	Overall effectiveness in making saleable product	High levels
Process energy (specific activities)	kWh/tonne of product	Amount of energy used in separate specific manufacturing processes (eg bottling lines, ovens, mixing vessels) per unit of production	Process energy use by different activities (allow this to be tracked independently) requires high levels of process control and monitoring equipment	Low levels
Total raw material use	Tonnes/ tonne of product	Relative quantity of raw material consumed in a given time period, including all packaging but excluding fuel and water (unless water is also a main ingredient/raw material)	Allows raw material consumption to be tracked over time, regardless of the level of production output	Low levels are generally good, but varies according to product

Table 6. Commonly used operational KPIs in the food industry (WRAP, 2013)

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company stands compared to other businesses in the sector. It is used to find specific areas for improvement such as high energy use, low processing yields or extensive use of water. Unfortunately benchmarking data is not readily available and is often quickly outdated. Table 7 gives an example of benchmarking data in the European market for total product yield, a very important KPI. Where possible, you should always try to seek out local, up to date benchmark data.

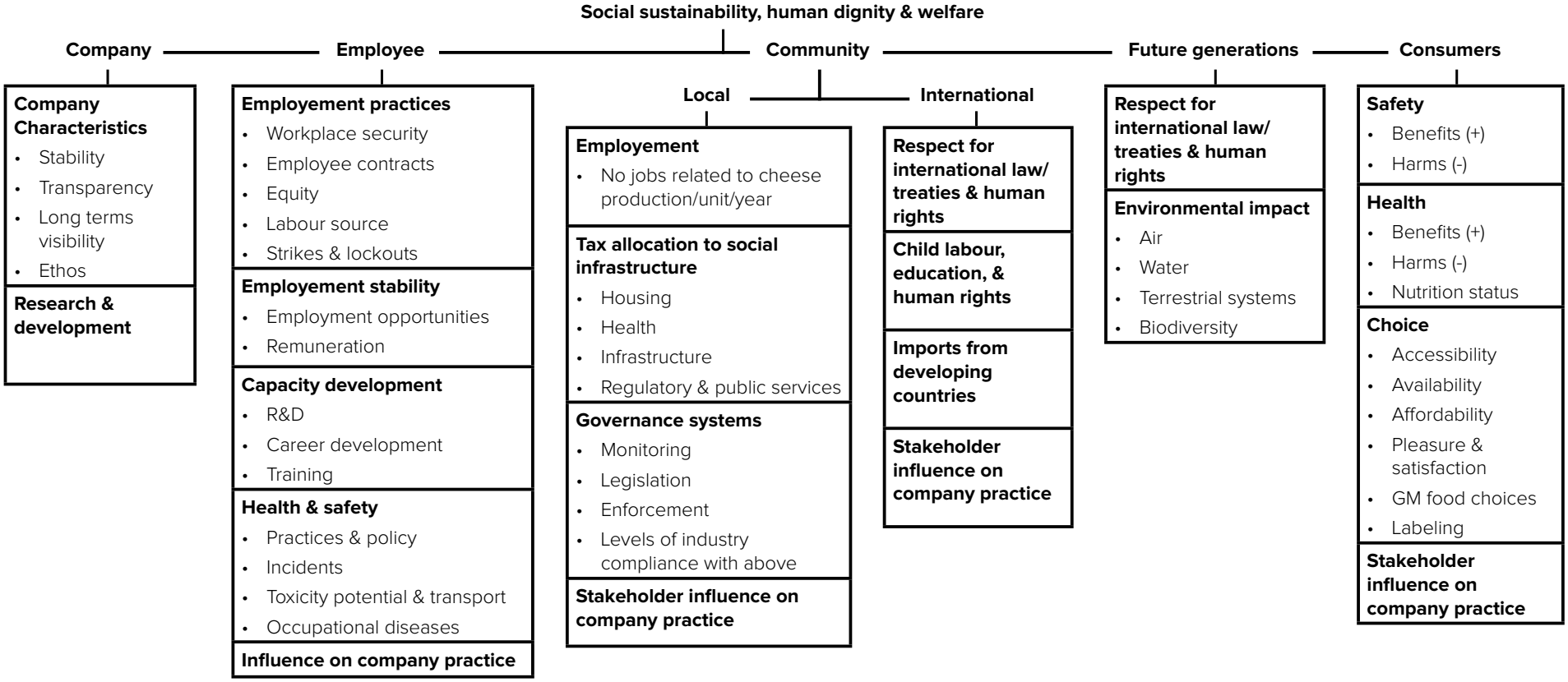

Figure 10. Example of social indicators in the agri-food value chain (Agresearch, 2009)

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Production process	% of raw material in final product
Fish canning	35-70
Fish filleting, curing, salting and smoking	25-50
Crustacean processing	40-50
Mollusc processing	50-80
Milk, butter and cream production	99
Yoghurt production	94-98
Fresh, soft and cooked cheese production	10-15
White wine production	70-80
Red wine production	70-80
Fruit and vegetable juice production	50-70
Fruit and vegetable processing and preservation	70-95
Vegetable oils and fats production, i.e. crude vegetable oil, protein rich meal, lecithin and fatty acids from oilseeds	30-60
Maize starch production	62.5
Maize starch production (including animal feed)	99
Potato starch production	20
Maize starch production (including animal feed)	30-35
Wheat starch production	50
Maize starch production (including animal feed)	99
Food and animal feed production from sugar beet	25-50

Table 7. Percentage of raw materials (by weight), which end up in the final product in selected processes (European Commission, 2006)

References

WRAP (2013). Business Resource Efficiency Guide: Self-assessment Review for Food and Drink Manufacturers. Available from: http://www.wrap.org.uk/sites/files/wrap/WRAP_Food_Drink_Manufacturers.pdf

UN Environment/SETAC (2009). Guidelines for Social Life Cycle Assessment of Products. Available from: http://www.unep.fr/shared/publications/pdf/dtix1164xpa-guidelines_slca.pdf

Labuschagne C., Brent, A.C. (2006). Social indicators for sustainable project and technology life cycle management in the process industry. Int. J. LCA, 11(1), 3-15.

Kolsch, D., et al. (2008). How to measure social impacts? A socio-eco-efficiency analysis by the SEEBALANCE® method. International Journal of Sustainable Development, 11(1), 1-23. Agresearch (2009). Social Life Cycle Analysis (S-LCA): Some Methodological Issues and Potential Application to Cheese Production in New Zealand

European Commission (2006). Integrated Pollution Prevention and Control: Reference Document on Best Available Techniques in the Food, Drink and Milk Industries

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Eco—i Chemicals

TIPS & TRICKS

PRIORITIZE FLAGSHIP PRODUCTS FOR LCA STUDY

Since chemical sector companies typically offer multiple products and product lines, such as different types of architectural paints, you can maximize the cost-to-benefit by performing a LCA on a "flagship" product because the results can often be applied to other product lines as well. Furthermore, a LCA of a "flagship" product will serve as a platform for communicating the company's sustainability approach to stakeholders.

USE CHEMICAL FOOTPRINTING TO QUANTIFY AND MONITOR USE OF CHEMICALS OF CONCERN IN YOUR PRODUCTS' VALUE CHAIN

Chemical footprinting is an emerging trend in the chemical industry. According to the Clean Production Action (Clean Production Action, 2016): "Chemical footprinting is the process of evaluating progress away from chemicals of high concern to human health or the environment to chemicals that have a lower hazard profile than the ones they replace". You may consider calculating the chemical footprint of products and using it as a KPI to measure your sustainability performance.

RE-EVALUATE AND UPDATE KPIs PRIORITIZED IN ACTIVITY 10

An overview of different KPIs was provided in Activity 10, which could be used to characterize sustainability hotspots. It is a good idea to revisit the selected KPIs and evaluate if new ones should be included or any existing ones are no longer important. At this point, it is helpful to ensure the underlying data is accurate and reliable. Refer to the '*Background Information*' in Activity 1 for examples and ranges of environmental performance indicators for selected chemical subsectors.

BACKGROUND INFORMATION

References and resources:

- Clean Production Action. (2016). Improve Your Chemical Footprint. [ONLINE] Available at: http://www.cleanproduction.org/programs/chemical-footprint [Accessed 4 July 2016]

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Eco—i Metals

TIPS & TRICKS

SELECT A FLAGSHIP PRODUCT FOR PERFORMING AN LCA

When you decide to perform an LCA to understand in more detail the sustainability impacts of a company's products, then make sure to select one of the company's flagship product since metals sector companies typically offer multiple products and product lines. This helps to maximise the cost-to-benefit of performing the LCA. The results can often be applied to other product lines as well. Furthermore, a LCA of a "flagship" product will serve as a platform for communicating the company's sustainability approach to stakeholders.