Social LCA at SP - Challenges and opportunities

Brenda Waldekker, Stefan Molnar
Social LCA at SP - Challenges and opportunities

Brenda Waldekker & Stefan Molnar
Abstract

Social LCA at SP - Challenges and opportunities

The aim of this study has been to explore the challenges and opportunities for SP, when it comes to working with Social Life Cycle Assessment (from here on Social LCA). The study is presented in the form of a Green Paper, meaning that it should be seen as a basis for further discussions within SP.

Concerning the study’s research design, a mixed methods approach has been used, combining a workshop and interviews with SP researchers with desktop studies. Furthermore, an analytical model, based on so called Qualitative Content Analysis, has been employed for analyzing the collected data. The relatively small amount of individuals that were part of the study limits its quality. However, the mixed methods approach, together with the fact that many of the themes that are raised by the involved SP employees are also raised in the academic literature on Social LCA, indicates that conclusions of the Green Paper is relevant for SP.

When it comes to SPs experiences of working with Social LCA, one can conclude that they seem to be limited. However, there are examples of projects within SP that has focused on social impact, but not from a life cycle perspective.

Concerning limitations and challenges with Social LCA, both for SP and for the wider research and innovation community, a number of such has been identified. They are as follows: 1) a lack of well-developed methodology; 2) difficulties in choosing the right social indicators and impact categories; 3) difficulties with data collection being time consuming and expensive; 4) ethical dilemmas that one is bound to meet when conducting a Social LCA; 5) decisions that one has to take when it comes to analyzing and interpreting the data; 6) the challenge of connecting the social dimension to the environmental and economic dimensions; 7) a lack of the necessary skills within SP and 8) difficulties in applying the LCA methodology to the very complex and context dependent problems that social scientists usually works with.

A number of opportunities for SP to come to terms with the challenges have been identified. The opportunities can be summarized as follows: 1) if SP was to complement its already expertise on LCA with knowledge on Social LCA – and the social sciences in general - the organization would have an opportunity to become an important player within the field internationally; 2) SP could in this way also contribute to the existing academic discussions around methodological issues, e.g. those concerning social indicators, data collection, data analysis and the development of database tools; 3) there already exists a number of research projects within SP that could be built upon by adding a social dimension.

With this having been said, two types of potential clients or partners for Social LCA projects have been identified in the report: 1) organizations that are already working with environmental LCA and can see the need of incorporating social aspects into their work,
and 2) organizations that are already working with social issues, but would like to get a lifecycle view on things.

However, if SP is to enter deeper into this field, the question is, in what way? Hopefully this Green Paper can provide a basis for a discussion within SP. The reader is invited to take part in the discussions by becoming involved in potential future activities or by commenting on the issues raised in this paper. The latter can be done by contacting:

Stefan Molnar, Sociologist
SP Energy Technology, Section for Systems Analysis
stefan.molnar@sp.se
+46 70 5385978

Key words: Social LCA, social impact assessment, lifecycle sustainability assessment

SP Sveriges Tekniska Forskningsinstitut
SP Technical Research Institute of Sweden

ISSN 0284-5172
Borås 2014
Contents

Abstract 3
Contents 5
Preface 6
1 What is Social LCA? 7
2 Why Social LCA? 7
3 Research Methodology 8
4 Experience of Social LCA within SP 8
5 Limitations & Challenges with Social LCA 11
6 Opportunities and Recommendations 17
7 What are the Next Steps? 21
8 List of references 23
Appendix A. Actors involved in the workshop 25
Preface

The aim of this study has been to explore the challenges and opportunities for SP, when it comes to including social aspects into its work on life cycle assessment. Focus is put on the method called Social Life Cycle Assessment (from here on called Social LCA). The background is that SP in recent times has been called upon to complement its work on Environmental LCA with an understanding of the impact that products and services have on socio-technical systems and the individuals, who are a part of them. This is an important task in a world characterized by increased connectivity between humans and their surroundings. This connectivity was already stressed by the Brundtland Commission in the year of 1987, when sustainability was described as being composed out of three dimensions: The social, economic and environmental dimensions. This development of trying to see the world in a holistic way is also something that SP is already involved in, however, there is potential of improvement in many areas.

This study does, however, not decide on whether SP should delve deeper into the field of Social LCA, and if so in what way. It is also not meant to be an overview of all the research within the field. Rather, the aim of the study has been to understand some of the main challenges and opportunities for SP, when it comes to work with Social LCA. This is why the study has been published in the form of a Green Paper, so that the issues raised within this study can provide the basis for further discussions within SP.

The study has been conducted by Brenda Waldekker, previously at SP Fire Research, and Stefan Molnar at SP Energy Technology – Section for Systems Analysis. It has been financed by SP Systems Analysis Platform.

The research questions that have guided the study are:

- What key challenges and opportunities with Social LCA can be found within the existing research literature?
- What challenges and opportunities are there for SP, when it comes to working with Social LCA?
1 What is Social LCA?

Social LCA is a method that is used in order to assess the social impact of products and services over their life cycle – which can include phases, such as extraction and processing of raw materials, manufacturing, distribution, use, reuse, maintenance, recycling and disposal. As with Environmental LCA, a Social LCA study often follows the ISO 14040 and ISO 14044 standards for Life Cycle Assessment according to which a LCA-study involves the following stages: 1) definition of goal & scope, 2) inventory, 3) impact assessment, 4) interpretation. The researcher’s task is, amongst others, to define the system, the functional unit and relevant indicators, subcategories and impact categories, as well as to engage in data collection and analysis of hotspots. (Benoît et al. 2009)

However, in general Social LCA differs from Environmental LCA, since it often involves data to be collected on-site. The data is often also a combination of quantitative, semi-quantitative and qualitative character. Furthermore, Social LCA in general includes a higher grade of stakeholder involvement that Environmental LCA does. (Dreyer et al. 2006, Benoît, Mazijn et al. 2009)

2 Why Social LCA?

Why should a research institution engage itself with Social LCA? One obvious reason is that the method allows one to get a more holistic view of the social impact of a product or service by providing knowledge of its entire lifecycle. Similarly, the UNEP/SETAC Social Life Cycle Initiative (Benoît, Mazijn et al. 2009) say that: “Life cycle approaches avoid shifting problems between life cycle stages or between geographic distances.” In their overview of what different techniques, tools and methods for analysing social impact that exists, they say that: “SOCIAL LCA is quite exceptional, as it considers social and economic aspects within a product life cycle perspective”. The tools referred to by UNEP/SETAC, such as the reporting framework provided by Global Reporting Initiative (GRI), the research method Social Impact Assessment (SIA) and the certification standard Social Accountability 8000 (SA8000), can be complementary to Social LCA by providing other areas and levels of assessment than Social LCA focuses on. However, Social LCA still seems to be the only socially focused method that is built for studying the different stages of the lifecycle of a product or service.

Yet, there is another reason for why one should consider using Social LCA. From a sustainable development perspective, the social dimension is in reality not separate from, but tied together with, the ecological and economical dimensions, as was stated in the first mentioning of “sustainable development” by the Brundtland-commission in 1987. (Elias 2009) In a context where sustainable development is a core guiding principle for many organizations, Social LCA could be a way of helping organizations to get a more complete picture from a sustainability perspective, by combining the method with Environmental LCA and Lifecycle Costing. (Dreyer, Hauschild et al. 2006, Benoît et al. 2010)
Ciroth & Franze (Franze et al. 2011) state that from the viewpoint of a business or organization there are a number of other possible outcomes from using Social LCA, which has to do with risk assessment, cost reduction/sales increase, a positive sustainable image, marketing, reporting and labeling, strategic planning, support in decision situations, and development of public policies.

3 Research Methodology

When conducting this study, a mixed methods approach has been used, meaning that several different methods have complemented each other. (Marshall et al. 2006)

To begin with, a workshop was arranged in November 2013 which was attended by eight SP researchers (including the two authors of this paper). Here, the researchers were given an opportunity to discuss what competences and experiences that already exists within SP when it comes to LCA in general and social issues in particular. Furthermore, between November, 2013, and January, 2014, semi-structured interviews (Marshall and Rossman 2006) were conducted with four additional SP researchers.

On the top of this, seventeen research papers and reports that deal with the Social LCA field were reviewed. These have provided additional insight into the main challenges and opportunities with Social LCA that exists internationally and have had influence on the analytical model that has been used to structure the data. This model consists of three parts: 1) Limitations with Social LCA in general, 2) opportunities for SP, and 3) recommendations for SP. In this Green Paper the collected data has been sorted according to these categories and a number of subcategories, according to a method for analysis called “Qualitative Content Analysis”. (Krippendorff 2004)

Finally, what is the quality of the study? (Esaiasson et al. 2002) To what extent can it be said that this report answers the research questions? To begin with, the mixed methods approach that has been used means that the validity of the study is increased, compared to if only one type of data collection method was used. The fact that only a limited amount of individuals and research papers at a specific point in time were studied, gives the study some disadvantage, when it concerns possible biases and problems with reliability. However, since many of the themes that were raised during the workshop and interviews are also raised in the research articles, it can be stated that the themes that are presented in this Green Paper are both relevant for SP and reliable. However, we cannot say that the results from this study are the only important issues for SP to deal with in the future; there are probably many other areas of importance.

4 Experience of Social LCA within SP

Within the many different departments of SP there are already experiences from environmental LCA research. However, the experiences of working with Social LCA
specifically are limited. Below is an overview of the past and current experiences with Social LCA among the individuals that participated in the workshop that was arranged within this project. See Appendix A for an extended list.

**SP Wood Technology**

At SP Wood Technology some ongoing environmental LCA projects are related to building elements, raw material extraction, phases of coating and glue production, water and land use in textile fibers, and impact reduction of textiles in the fashion industry. There is some experience with social aspects in LCA projects, but not extensive. There is also experience with the use of the Social Hotspots Database\(^1\). A future in social sustainability work/Social LCA at SP Wood Technology is unsettled, partly due to uncertainty about methods and questions about usefulness with the people currently involved in such projects. Judging by previous projects, however, there seem to be opportunities for incorporating social elements in future LCA projects.

**SP Fire Research**

At SP Fire Research there have been several environmental LCA projects in the past, where important work has been done to develop guidelines on how to perform a LCA; several projects regarding costs and benefits of flame retardants and risks of fire fighter exposure to hazardous materials from fires. At the moment in time when the workshop was conducted two projects existed with the aim of identifying new fire safe and environmentally friendly materials. At the moment there is limited work at SP Fire Research when it comes to incorporating social impact categories in fire research, however there is a potential to offer this as an extension of previous work to the clients in the flame retardants industry. SP Fire Research is also very active with product stewardship, but it is unclear whether this has any direct relationship to social and ethical issues. There is a need to get a clearer idea of what Social LCA offers to determine whether to open this dialogue with the industry or not.

**SIK**

Currently SIK, the Swedish Institute for Food and Biotechnology, works with environmental LCA of, among others, primary production systems, process lines and supply chains for new food preservation technologies, novel food processing technologies, food packaging and developing standard key environmental performance indicators (KEPI) and a harmonized methodology for environmental impact assessment. In this context there is a big opportunity to integrate social and ethical issues to obtain a set of sustainability performance indicators.

Although not currently incorporating social aspects in projects and as of yet little experience with using Social LCA methodology, researchers at SIK are aiming at

---

\(^1\) The Social Hotspot Data Base (SHDB) project was launched in 2009. It is a project of New Earth, a 501 c3 non-profit organization located in the Greater Boston area in the U.S. A first user portal was developed in 2010. It partners up with some large companies and organizations and aims ‘to foster greater collaboration in improving social conditions worldwide by providing the data and tools necessary for improved visibility of social hotspots in product supply chains’. A lot of the common names in Social LCA are members of the advisory board. [Http://socialhotspot.org](http://socialhotspot.org)
applying Social LCA in an upcoming project. Overall, they are interested in finding more ways to incorporate Social LCA, but they feel that they do not have the sufficient experience in the department to be able to offer this to clients.

SP Energy Technology
At SP Energy Technology about 10 individuals work with Environmental LCA and LCC. Through the section for Systems Analysis, SP Energy Technology has the main responsibility for business development and for coordinating the research on LCA within SP. This means that SP Energy Technology cooperates with other parts of SP, such as SP Fire Technology, CBI, JTI, SIK and SP Wood Technology. In this way the research on LCA within SP Energy Technology deals with different fields, such as buildings, food, transports, textiles and so on.

There is only one existing example of work on Social LCA within SP Energy Technology and that is the project Renobuild which deals with decision support tools for renovation. There are also some other examples of work on social impact within SP Energy Technology. One example is a project on the social impact that a potential future lack of fossil fuels would have on Swedish society. The project was conducted together with JTI and SIK. Another project called WISE, deals with climate change and changes of lifestyle among citizens of Gothenburg. Within an upcoming project together with amongst others SP Wood Technology, called MobileFlip, SP Energy Technology is responsible for conducting Social LCA research on portable biorefineries in different parts of Europe.

SP Energy Technology has as its aim to become a leading swedish actor when it comes to Social LCA research. Another ambition is to integrate Social LCA with LCC and Environmental LCA so that all three dimensions of sustainability can be analyzed all at once.

JTI
JTI, the Swedish Institute of Agricultural and Environmental Engineering, works with Environmental LCA of organic waste management, including management of waste water, sewage sludge, energy- material flow and economy analysis of different agro-energy production systems, as well as environmental system analysis of different manure management systems. So far, researchers as JTI have not applied Social LCA in any projects, but they do recognize the need of including social aspects more in systems analyses. In a recently submitted paper together with social scientists, options for bioenergy from farmland were analyzed and discussed, both in terms of their environmental performance in a life cycle perspective and their impact on rural development, collaboration and local economic diversification. Another ongoing project identifies environmental impacts using LCA and effects on social and rural development, when farmers collaborate in existing farm-based biogas production. In the future JTI would like to develop Social LCA in connection to Rural Development Policy and in projects evaluating the roles of different actors and how cooperation, motives and drivers affect the environmental outcome.
Social LCA is in its infancy. Not that many LCA studies have considered the social dimension. Those studies that have been conducted so far are limited in scope and goal. As with all new research fields, it takes some time to fine tune the methods and perfect the tools. Although LCA studies have been around since the 1960’s, it has taken until fairly recently to agree on somewhat of a common ground and methods to guide researchers, however, the research community will never reach 100% agreement. Below some of the most commonly voiced limitations and challenges of thorough Social LCA research are discussed. Some of these were voiced during the workshop and others are raised in research papers. The analysis of limitations and challenges also form the basis for the analysis of opportunities of Social LCA for SP that will be discussed in Chapter 6.

**Lack of Well-developed Methodology**

Although UNEP/SETAC (Benoit, Mazijn et al. 2009) has constructed a guiding document on Social LCA methodology, there still is much debate on a proper methodology. Among the twelve research articles studied for this paper, methodology is a commonly discussed subject. Ciroth & Franze (2011), for example, argue that there is a strong need for a methodological background, ‘a comprehensive method, which is able to consider and assess social effects of products along their whole life cycle’. Similarly, methodology was also a prominent issue during the workshop.

At the moment the guidelines by UNEP/SETAC (Benoit, Mazijn et al. 2009) give a very broad, general outline of how a Social LCA could be conducted. Therefore it’s very much up to the individual researcher how to conduct a study on Social LCA. Some researchers, amongst other some of the participants at the workshop, voice criticism over the fact that no impact assessment method is defined or recommended by UNEP/SETAC, that the impacts of determined subcategories are not described and that there exist no clear default sets of subcategories and indicators.

There are also methodological issues, when it comes to studying the use-phase. Many Social LCA researchers agree that the use phase is extremely difficult to address, but extremely important, as it is the primary reason for the existence of a product or service. (Paragahawewa et al. 2009) The UNEP/SETAC (2009) Life Cycle Initiative state that “Assessing the use phase represents a major challenge. The accent in method development so far was placed on production, distribution and end-of-life aspects; therefore, use stage aspects require further development”. They also suggest that the usability and satisfaction of the users may be better assessed through other tools or become a future field of research for Social LCA.

---

2 This was an opinion that was voiced during the workshop. One indication that this is the case might be the fact that there are only 56 papers and reports with the sentence ‘Social Life Cycle Assessment’ in the title on Google Scholar, compared to 466 that feature ‘Environmental Life Cycle Assessment’. Furthermore, there are 619 papers that feature ‘Social Life Cycle Assessment’ somewhere in the text and 5860 that feature ‘Environmental Life Cycle Assessment’ which gives an indication on how commonly discussed both subjects are. If one searches Google Scholar for papers and reports that feature “Life Cycle Assessment” somewhere in the text (which is what Environmental Life Cycle Assessment is often called) one finds almost 100,000 papers and reports.
A challenge not only for the research community in general but also for SP, therefore, seems to be to develop knowledge on and solutions to the methodological problems described above.

**Social Indicators and Impact Categories**

Choosing the right social indicators and assessing the subsequent forthcoming data is one of the biggest challenges in Social LCA research. It is difficult to determine the appropriate indicators to measure the status of a specific theme and there is no accepted social impact assessment method at present, and very few methods that are able to deal with life cycle information exist at all. However, as Macombe et al (2013) state: “Social LCA can never deal with all the social effects of changes within product life cycles”. This is why it is important to decide what impacts to study and how to describe them theoretically. UNEP, as well as most of the other research reports studied for this Green Paper, choose to talk about ‘indicators’ and ‘impact categories’, but they have different ways of defining these. Macombe et al (2013), for example, in their study of biodiesel production, refer to two main ways of conceptualizing social impacts – on one hand a product’s impact on human health, and on the other hand its effects related to work environment. UNEP/SETAC (2009), however, choose the following impact categories: human rights, working conditions, health and safety, cultural heritage, socio-economic governance and repercussions. Furthermore, Hauschild et al (2008) talk about human health, human dignity and wellbeing as important categories, and Lehmann et al (2013), when studying the sustainability of technologies for water and fuel production, propose the need to use additional indicators – for example those that focus on trust - if you are to study “technology as a product type in developing countries”.

The fact that there are no general, all encompassing, definitions of impact categories and indicators within the Social LCA literature, may be viewed as a limitation, even if this is hardly a surprise, since this is a reality for a lot of, or perhaps all, research. Either way, building the theoretical foundation by knowing what indicators are relevant in a specific situation, is a major challenge that SP would also have to deal with, if doing research on Social LCA.

Furthermore, the formulation of social indicators is always a context dependent and culturally colored process. Hauschild et al (2008) argue that when choosing social impact categories and indicators, the researchers must develop them to “the actual context by considering impacts which are specific to the product or sector of industry and to the company itself”. According to them, the researcher also has to be able to decide what the most important effects at short- and mid-term are, since this is where the focus needs to be placed. This highlights the challenge and need for SP, not only to have the theoretical knowledge of how impact categories and indicators can be defined, but also to know how to research and understand the local cultural, social, economic and political circumstances that are specific for the social system being studied.

Finally, as was discussed during the workshop, the fact that the definition of social indicators is so context dependent perhaps means that there might be some downsides,
when it comes to using Social LCA in order to compare different products that exist in different cultural contexts (as often done in Environmental LCA studies). Rather, Social LCA is probably most adequately used, when analyzing which product or service that has the best social impact within a certain system, for example: What value chain should a company choose for a certain product? For SP this is something worth thinking about more thoroughly, since the answer to the question could give us a direction on where focus should be when doing Social LCA studies.

**Limitations with Data Collection & Databases**

There are problems with data collection and database use that need some further discussion and explanation.

To begin with, due to a lack of database tools and data, carrying out a Social LCA on a complete life cycle can be very expensive and time consuming. However, how resource heavy a study becomes, depends on how detailed you want the data to be. In general, it is more costly for a researcher to collect her/his own information than to use information that is already in a database. Although databases, such as the earlier mentioned Social Hotspot Database, make data collection a lot easier, databases like the mentioned one are still very limited and need to grow significantly. Furthermore, whichever databases are available, they have to be viewed critically, because it can be difficult to assess how biased the data actually is. For example, if a database has been constructed by an European organization, will this mean that values and perspectives that exists in other parts of the world will not be represented? This is a subject that was also discussed during the workshop. It should also be kept in mind that, as a thoroughly conducted Social LCA should incorporate a blend of qualitative, semi-qualitative and quantitative data, some data does not fit the mold of any database and will have to be gathered by other, more labour intensive means. (Benoît, Mazijn et al. 2009)

The need to involve stakeholders, which is emphasized in the UNEP/SETAC (Benoît, Mazijn et al. 2009) guidelines and the general need for having a bottom-up approach, which Paragahawewa et al (2009) focus on, also create extra costs compared to Environmental LCA studies. It should also be kept in mind that this could introduce an element of bias, as stakeholders are often not impartial parties.

To sum up this section so far, there is a limitation to Social LCA in the fact that it takes time and money to gather the data needed. Therefore, a challenge for SP would be to access the resources needed to collect the empirical information.

Except a lack of resources, there are other important aspects when deciding what data collection methods to use within a Social LCA research project. The UNEP/SETAC (Benoît, Mazijn et al. 2009) guidelines feature a general analysis of different kinds of tools for data collection, as well as thoughts about their quality. According to this data is collected in order to 1) prioritize what areas to study, 2) assess social hotspots, 3) do site specific evaluations, and 4) assess impact. Data can be collected through desktop screening by conducting literature reviews and web search. However, looking into databases and other forms of secondary information is not enough. Site specific data
Collection should also be carried out through social audit, which may involve evaluating documentation from enterprises, authorities and NGOs, using participant methodologies, conducting directed and semi-directed interviews and carrying out focus group interviews, questionnaires and surveys. Data triangulation is needed, which means that different forms of data collection are to be combined with a focus on different stakeholder groups, areas and stages in the product chain.

However, since all stages of the lifecycle and parts of the system cannot be studied, prioritization is an important challenge. A cost-efficient and promising system of research would, according to the UNEP/SETAC guidelines (Benoit, Mazijn et al. 2009), join together hotspot assessment, desktop screening and a limited number of on-the-spot visits. Another important challenge, especially when conducting Social LCA studies in areas, which are remote both culturally- and language-wise, is to have the necessary language skills and cultural knowledge. Ideally, the data collection on sight should be done by experienced persons, familiar with the local language(s) and cultural aspects. (Benoit, Mazijn et al. 2009)

Even though the UNEP/SETAC (Benoit, Mazijn et al. 2009) guidelines acknowledge the importance of having a thorough understanding of the data collection process, we argue that there is still much to be asked for in their analysis regarding detailed explanations and a critical review of how the different tools can be used, such as interviews, surveys, participant observation and databases. This lack of analysis is evident in most of the research papers studied for this Green Paper. Only two of them (Hauschild, Dreyer et al. 2008, Paragahawewa, Blackett et al. 2009) even mention the need for collecting on sight specific data through interviews, surveys and so on. The rest of the articles put focus on statistical data collected through databases and they don’t feature any methodological discussions whatsoever. This might be seen as an indication of a deep lack of thought about data collection within Social LCA research so far. And this is a challenge for the research community, as well as for SP. However, there is by no means a need to start from anew. There already exist an extensive catalogue of books and articles on data collection within the Social Sciences that could be applied within Social LCA research.

**Ethics**

During the workshop the issue of how SP should deal with issues of ‘right and wrong’ was heavily discussed, which has to do with the fact that social indicators are always context dependent and culturally colored. For instance, the question of whether child labor is always wrong was mentioned as a dilemma that one might meet when conducting a Social LCA.

To some ethical questions, SP should quite easily be able to find an answer by looking into major policy documents. Hauschild et al. (2008) mention the Declaration of Human Rights, the global workers’ rights by the International Labour Organisation and the Tripartite Declaration of Principles Concerning Multinational Enterprises and Social Policy as important policy documents for Social LCA research. Other policy documents that we think should be mentioned on the top of these are Global Compact, ISO 26000 as well as national and European laws.
There are, however, other ethical questions, which sooner or later will arise when conducting a Social LCA, to which the answers are not always as straightforward as perhaps would be desired. Questions, such as: Are the jobs that the farming of sugar cane intended to be used for bio energy positive for the local community, even if it might lead to the local economy being increasingly dependent on world market prices on sugar cane? Shall the creation of new jobs in the farming industry be seen as good or bad, if they at the same time lead to the “death” of traditional means of existence? What should be prioritized: The potential positive democratic effects that smart phone technology might brings to young adults in a certain region, or the negative effects connected to increased stress that this might also lead to? These questions are difficult to address with a general approach, since they will not have any general answers in any for SP binding policy documents, instead they require a discussion together with project partners and stakeholders. Therefore, SP also need to have the necessary understanding of certain problem areas and analytical tools in order to be able to discuss moral issues in different cultural contexts.

**Problems with Data Assessment and Data Analysis**

Of concern is also the issue of how to evaluate and interpret the data, once it has been acquired. The research articles that are the basis of this Green Paper discuss different models of analyses and assessment. Ciroth & Franze (2011), for example, in recognizing the challenge of analysis, suggest that one should deal with this by looking at just one indicator at a time or perhaps combine data available from different statistical sources. However, this raises concern about how to choose the right indicators and how to account for this choice, as has been discussed previously in the paper.

Environmental LCA typically focuses on quantification of data. Social LCA studies also studies issues that are difficult to quantify and in many circumstances becomes useless if quantified. Although the UNEP/SETAC guidelines (Benoît, Mazijn et al. 2009) look into this matter, questions about how to integrate this data into analytical models have not yet been fully explored, according to our literature review.

As for data storage and assessment tools, there are at the moment no appropriate software tools for Social LCA available. This makes data storage and assessment more difficult. To sum up, there are limitations and challenges when analyzing, assessing and storing collected data. For SP this challenge needs to be dealt with, since the importance of having knowledge of different models of data analysis as well as understanding how and when to use them is crucial.

**The Challenge of Studying all Three Dimensions at once**

As has been mentioned previously in this paper, Social LCA is strongly related to Environmental LCA and LCC. The basic approach is often the same; however the types

---

of impact that are studied vary and, therefore, also the methods for data collection and analysis. Lately a discussion has emerged around the question of how these methods could be combined. One attempt of achieving this is the development of the tool called Lifecycle Sustainability Assessment (from here on LCSA). The UNEP/SETAC Lifecycle Initiative have since the creation of the Social LCA guidelines (Benoît, Mazijn et al. 2009) also conducted work on what they call a ‘first inventory’ of LCSA. (Valdivia et al. 2013) In this report the authors show the reader “how to use and combine stand-alone life cycle assessment techniques already in use to start an overall life cycle sustainability assessment (L-CSA)”. The report argues that LCSA is a necessary step on the way to find an instrument that tries to account for the three pillars of sustainability by, amongst others, organizing "complex environmental, economic and social information and data in a structured form”, as well as by clarifying the “trade-offs between the three sustainability pillars, life cycle stages and impacts, products and generations”. In another report on this issue, Life Cycle Assessment: Past, Present, and Future (Guinée et al. 2011), which, amongst others, features researchers from the Swedish Environmental Research Institute, IVL, it is argued that “LCSA does not make present day product oriented LCA and LCC superfluous”. It rather builds on these already existing methods in order to answer more complex issues of impact on sustainability.

The UNEP/SETAC (Valdivia et al. 2011) report goes further in trying to develop LCSA than the report by Guinée et al (2011) does, but it still only gives “general indications and recommendations on how to conduct a Life Cycle Sustainability Assessment (LCSA)”. Areas that need extra attention in the future according to UNEP/SETAC are 1) How LCSA systems can be conceptualized, since Social LCA, Environmental LCA and LCC typically use different boundaries and components when analyzing systems, 2) the selection of impact categories associated with all three pillars of sustainability, 3) how allocations should be accounted for in the cases, where burdens have the potential to be statistically allocated to different outputs, 4) and how to combine the collection of environmental, economic and social data simultaneously. Similarly, a combined framework for both 5) impact assessment, and 6) interpretation of data is needed. Here, UNEP/SETAC has some general suggestions on how this could look like.

Both UNEP/SETAC (Valdivia, Matthias et al. 2011) and Guinée et al (2011) argue that more research is needed regarding testing and developing the models. This is also a challenge for SP, if it is to combine its already existing experience of LCC and Environmental LCA with the development of Social LCA as a method.

**Acquiring the Necessary Skills**

Practitioners of Social LCA require general LCA skills as well as knowledge on social scientific research, corporate social responsibility and social impact assessment. (Benoît, Mazijn et al. 2009) This need is also something that was agreed upon during the workshop.

So far, we have identified only one person at SP, who has experience of Social LCA. Although some people have done projects, where social indicators and social impact were
taken into account, they have not used specific Social LCA methodology. However, we have no real overview of what exact knowledge we have at all the different departments.

Because of the knowledge gap that seems to exist, it is difficult for many LCA practitioners to assess the value of Social LCA. However, it was clear for the workshop attendees that there probably are opportunities and benefits with Social LCA for SP.

**Social Science and LCA**

While many, but not all, social scientists analyze the world as a system of contextually dependent components, traditional LCA often wishes to be context independent, which means that generic data from databases put into a model would give context independent results. These different ways of thinking are often contradictory to one another, which might be problematic, when a LCA practitioner is not educated in a way to take the context into consideration. The question that came forth in the workshop was: how do we bring together things, which are quantifiable and those that are not? Could we use tools from other fields, e.g. social anthropology? And if so, are we going to educate LCA practitioners to a full extent, or are we better off employing a social scientist that can guide traditional LCA practitioners within the organization? Regarding LCA it is obvious that there is a need of including social aspects, but one question is: Are social scientists interested in working with LCA? Can we define a common arena? These are questions that remain open for the moment, but will be further discussed in Chapter 6.

### 6 Opportunities and Recommendations

Although the list of limitations mentioned in the previous chapters may seem long, the general consensus from the workshop was that there is not necessarily a bigger problem with Social LCA than with other research tools, as long as we are open and aware about its limitations. Being aware of the limitations of a particular research approach is sometimes looked upon as a criteria of soundness. (Marshall and Rossman 2006)

Furthermore, with each challenges also comes an opportunity. In the following chapter we will identify some opportunities for SP, built on the challenges that have been identified previously in the paper.

**Building on Expertise**

As we have seen in the previous analysis, working with Social LCA requires methodological and theoretical knowledge, derived from the social and behavioral sciences, as well as insights into, amongst others, the issues of Corporate Social Responsibility and human rights. However, the apparent lack of such skills seems to be a limitation and a challenge, if SP is to focus on the subject.
There is, however, an opportunity for SP to come to terms with this problem, by conducting an inventory of employees with expertise in related areas and educate them in the foundations of Social LCA. Another opportunity would be to hire social and behavioral scientists with the necessary skills as key persons in the process; alternatively to have an expert on Social LCA with several PhD students, which is a model that SP already uses within other areas. These different alternatives were suggested during the workshop. All in all, the workshop participants seemed to agree upon the fact that there is a need of both using social scientists and educating engineers.

As we have seen in the previous analysis, another challenge related to expertise that SP is expected to have to deal with in the near future is the issue of how to integrate Social LCA with environmental LCA and LCC within the method called Lifecycle Sustainability Assessment. However, with its vast experience of environmental LCA, SP has a real opportunity to start working with Lifecycle Sustainability Assessment by developing projects that combine this experience with expertise of Social LCA. Two examples of projects that are already trying to do this are 1) a PhD project on wood based textiles within SP Wood Technology, 2) the project Renobuild which works with the social, ecological and economical dimensions of renovation of buildings.

**Recommendations:**
- That SP conducts an inventory of employees with expertise in areas, which are related to Social LCA and educates them in the method.
- That SP hires additional social and behavioral scientists in order to fill in some of the knowledge gaps that exist within the organization.
- That SP starts cooperating with other research institutes and departments around the issue of Social LCA.
- That SP develops expertise in Lifecycle Sustainability Assessment by combining its vast experience of environmental LCA with Social LCA and LCC.

**Develop Existing Research on Social LCA**

From our previous analysis of limitations we have seen that any research organization that wants to venture into the world of Social LCA will meet a challenge concerning research methodology. For SP this challenge could also be seen as an opportunity to become an important actor, when it comes to contributing to the development of Social LCA methodology.

One area, where research is lacking and where there is an opportunity to contribute, is when it comes to generating a better understanding of the previous research on social indicators, and to develop methods for assessing what social indicators should be used in what cultural contexts, organizations, or sectors. Another such area is to contribute to the lack of data and databases on social issues. Yet another area, where there are limitations and therefore opportunities for SP, is to develop knowledge on how to analyze data, especially concerning the use phase and on integrating qualitative, semi-quantitative and quantitative data. Finally, software and tools for storing data are also needed.

**Recommendations:**
• That SP sets as its goal to contribute to the international discussion on research methodology around Social LCA.
• That SP contributes to research on social indicators, data collection, data analysis and the development of database tools.

Develop an Ethical Compass
Previously in the paper the challenge of Social LCA being value based was discussed. The question of how to handle issues of right and wrong surely will be a challenge for SP. This fact, however, is not something that would have to cause problems for SP, as long as the organization is prepared for how to handle these issues. One possibility would be by involving individuals that have a thorough understanding of how policy documents on issues, such as human rights and workers’ rights on local, national and international levels in different countries, may be interpreted. SP also needs to develop an understanding of different models for analyzing moral issues in different cultural contexts. Furthermore, it is important to develop knowledge of how to facilitate dialogue processes with different stakeholders, with whom a common understanding of certain issues needs to be developed. This could be done together with actors within SP, who already work with stakeholder involvement, such as Samverkansprojekt Hållbara Städer, Renobuild and SP Service Labs.

Recommendations:
• That individuals who have a thorough understanding of different kinds of policy documents on human rights and workers’ rights are involved.
• That SP develops an understanding of different models for analyzing, and facilitating discussions on, moral issues in different cultural contexts.

Develop Existing LCA Research within SP
In the previous section, we have analyzed some of the opportunities that SP has in working with Social LCA. However, we have not so far discussed what concrete projects that SP has as an opportunity to work with in the future. Within which areas could it be possible to build on previous research and get funding for future projects? This question will be discussed in the following section by relating the analysis to some of the research papers that have been studied for this Green Paper.

The Social Impact of Food Production
In the research report ‘Social Life Cycle Analysis (SOCIAL LCA): Some Methodological Issues and Potential Application to Cheese Production in New Zealand’ written by the state owned research organization AG Research (Paragahawewa, Blackett et al. 2009) a tentative Social LCA case study on New Zealand cheese production is presented. This initial tentative study resulted in a more general study and the development of a framework suitable for Social LCA studies. According to this report no other Social LCA studies of food production processes had been done up to that point and no clear methodology was present at the time. This is definitely an interesting starting point for
SIK, since it looks into the food industry and answers some of the methodology questions that they might have when/if they want to start working with Social LCA.

**Sustainable technology management**

In “Measuring Corporate Social and Environmental Performance: The Extended Life-Cycle Assessment” (2005) Gauthier mentions a case study on the ‘Souris verte’, a manual charger for mobile phone batteries, which is commercialized in high-end and consumer versions. During the design phase, its inventor integrated the notions of sustainable development before the manufacturing stage of the product and unveiled three dimensions in the users' needs: ecology, sociology and safety. According to Gauthier, the Social LCA methodology is thus allowing the inventor to assess the current situation without overlooking any sustainable criteria. In the conclusion Gauthier states: ‘This paper aims to contribute to the emerging fields of corporate social responsibility and corporate environmental management’. It seems that this paper could be of interest to initiatives within SP – such as Inclusive Business Sweden – that works with sustainable technology management.

**Social Impact in Manufacturing**

In the paper “Understanding life cycle social impacts in manufacturing: A processed-based approach” Hutchins et al (Hutchins et al. 2013) use the example case of welding to identify key characteristics of social impacts associated with manufacturing. They suggest that: ‘With an understanding of the value chain and an awareness of social impacts of interest, one can generally identify impacts that are associated with value chain actors throughout the life cycle and scope of production activity. Databases, such as those provided by the ILO, UN, and Earthster, can provide information related to risk of social impacts [10,39,40]’. This might be an interesting case for all LCA practitioners at SP, as it shows how to choose and assign impact categories in manufacturing processes.

**Comparative Analyses of Alternative Technology Options**

In the paper “Social aspects for sustainability assessment of technologies — challenges for Social LCA (SLCA)” Lehmann et al (2013) focus on the contribution of technologies to sustainable development. They assert that ‘technologies can contribute to sustainable development (e.g. improve living conditions) and at the same time cause sustainability problems (e.g. emissions). Decisions on alternative technologies should thus ideally be based on the principle to minimize the latter. An analysis of the environmental, economic, and social aspects related to different technologies could potentially support decisions by identifying the “more sustainable technology”. For their study the authors used two ongoing research projects: 1) The analysis of alternative technologies for water supply and wastewater treatment in an Indonesian rural region (which could be of interest to JTI), and 2) Alternative design options for a new technology for fuel production (micro reactor) (which could be of interest to SP Energy Technology).

**Social Impacts of Biofuels**

In the paper “Social LCA of biodiesel production at three levels: a literature review and development needs” Macombe et al (2013) investigate Social LCA of biodiesel production. They review the field of Social LCA in general and take a closer look into the empirical case of biodiesel production, which ‘is a timely topic globally in view of the
climate change mitigation objectives’. The analysis was carried out at three levels: Company, region and state. Their preliminary conclusion is that ‘in many cases it is not yet possible to carry out a comprehensive Social LCA’ and they outline lines of research that would further improve the methodological and empirical basis of Social LCA at various levels of decision-making. This study is well connected to certain research that is currently being done at SP Energy Technology.

**The Social Impact of ICT Related Services**
Moberg et al (2009) have written the pre-study “Using a life-cycle perspective to assess potential social impacts of ICT services – a pre-study”, in which they use a life-cycle perspective to assess potential social impacts of ICT services. Their aim was to ‘consider the use of Social LCA for information and communication technology (ICT) services to learn more about the product and facilitate consideration of social impact in different decision-making situations’. As opposed to looking at a specific product, here services were considered for Social LCA. This approach of looking into the social impacts of services could potentially be of interest for SP Service Labs.

**The Social Impact of Electricity and Heat**
Welling (2013), in his Master’s Thesis, developed a set of indicators in order ‘to assess the social performance of Vattenfall’s products (electricity & heat)’. This set of indicators has been adapted to the requirements of the International EPD® system. The aim was to create a set of indicators that can be applied to all processes within the life cycle. The indicators are supposed to make a best possible statement of the social performance of the product of a company, including the most relevant issues and topics within the pillar of social sustainability. Welling has used the Delphi method to develop the indicators; which is something that many parts of SP could learn from as a way of investigating which indicators that are relevant to which type of products and systems. This is also something that has already been done by researchers at SP in the paper ‘Integrating Sustainability Considerations into Product Development’. (Sandin et al. 2011)

7 **What are the Next Steps?**

The main goal of this Green Paper has been to analyze some of the challenges and opportunities for SP when it comes to work with Social LCA, in order to provide a basis for a deepened discussion on the subject within the organization. A general conclusion is that there are indeed many opportunities for SP to contribute to and to help developing the research on Social LCA. With its already existing experience of working with environmental LCA as well as social networks within the area, there are also opportunities for SP to contribute to the application of Social LCA within private companies as well as governmental and non-governmental organizations.

However, in order for this to become reality, economy is an important pre-requisite. And since no market analysis has been conducted, we cannot say anything about how big the economic opportunity is for the organization. On the one hand, Social LCA is a new method and, therefore, the amount of research financiers and possible customers, who already have an explicit demand for Social LCA is probably limited. On the other hand
the demand for expertise on understanding the social dimension of sustainability in general seems to be increasing and, thus, Social LCA can play an important role. We can identify at least two types of potential clients or partners: 1) Organizations that are already working with environmental LCA and can see the need of incorporating social aspects into their work, and 2) organizations that are already working with social issues, but would like to get a lifecycle view on things. Among these organizations, a potential market for Social LCA can be found.

However, if SP is to enter deeper into this field, the question is, in what way? Hopefully the different issues and recommendations that have been raised in this Green Paper can provide the basis for a discussion within SP on the subject.

On the basis of the outcome of this Green Paper, we invite the reader to take part in the discussions around Social LCA within SP. This can be done either by becoming involved in potential future activities arranged within SP or by commenting on the issues raised in this paper. The latter can be done by contacting:

Stefan Molnar, Sociologist
SP Energy Technology, Section for Systems Analysis
stefan.molnar@sp.se
+46 70 5385978
8 List of references


Appendix A. Actors involved in the workshop

In this appendix information about the actors that participated at the workshop is presented. The information is directly taken from presentations that each actor prepared in connection to the workshop, meaning that some details might have changed since then.

SP Wood Technology

Gustav Sandin Albertsson:


LCA/SOCIAL LCA projects:

- CelluNova & ForTex: LCA of textile fibers.
  Focus: traditional impact categories & water and land use/biodiversity.
  - Aim: An exercise in rating the importance of social aspects and to learn about the methodology.
  - Experiences & findings: Data collection took a lot of time.
  - Doubts about the usefulness of SOCIAL LCA for (early) technical R&D.

- Focus: traditional impact categories & end of life modeling. SOCIAL LCA on raw material extraction phase of coating and glue production.
- Experiences & findings: Used the Social Hotspots Database. This made data collection quick.
- Still hesitant about the usefulness of SOCIAL LCA for technical R&D

  - Focus: mapping impacts and exploring measures for impact reduction.
  - Aim: Social sustainability survey & (possibly) SOCIAL LCA on garments.

Future in SOCIAL LCA:

- Teaches about SOCIAL LCA at Chalmers: Experience with teaching some SOCIAL LCA methodology, discussion of general challenges and opportunities of assessing social

---

4 The Social Hotspot Data Base (SHDB) project was launched in 2009. It is a project of New Earth, a 501 c3 non-profit organization located in the Greater Boston area in the U.S. A first user portal was developed in 2010. It partners up with some large companies and organizations and aims ‘to foster greater collaboration in improving social conditions worldwide by providing the data and tools necessary for improved visibility of social hotspots in product supply chains’. A lot of the common names in Social LCA are members of the advisory board. Http://socialhotspot.org
- At the moment focused on the environmental dimension of sustainability. A future in social sustainability work/SOCIAL LCA is unsettled, partly due to uncertainty about methods and usefulness.

**SP Fire Research**

*LCA/SOCIAL LCA projects:*

- 1995-2001: Series of Fire-LCA projects resulting in numerous articles and SP reports including a set of Guidelines concerning how to perform an LCA
- Ca 2004: Fire-CBA work developed using the framework of the Fire-LCA but including costs and benefits associated with Flame retardants, e.g. the value of lives saved in fires
- Ca 2007: Assessment of the exposure risks for fire fighters from flame retarded and un-flame retarded material from fires. Based on the previous studies using Fire-LCA and Fire-LCA

*Present projects:*

- DEROCA – EU project where they are running Fire-LCA and developing screening tools (LCA based) to identify new fire safe and environmentally friendly materials
- Polygraph – EU project with many similarities to DEROCA

*Future in SOCIAL LCA:*

- There is a potential to offer this as an extension of previous work to our clients in the flame retardants industry. They are all very active with product stewardship, but it is unclear whether this has any relationship to social and ethical issues directly. Need to have a clearer idea of what SOCIAL LCA offers to determine whether to open this dialogue with the industry or not.

**SIK**

*Anna Aronsson:*

- Background: - 2009-2011: Post Doc. at Harper Adams University, Newport, Shropshire, United Kingdom – LCA of primary production systems, Carbon foot printing of farms and developing carbon management strategies for higher education institutions with extensive landholdings5.

5 http://www.harper-adams.ac.uk/sustainability/carbon-management-strategy.cfm
- 2011- current: Researcher at SIK.

*LCA/SOCIAL LCA projects:*

- LCA of primary production systems, e.g. chicken, spinach, peas.
- Evaluation of environmental sustainability of certification schemes.
- SENSE (Harmonized Environmental Sustainability in the European food & drink chain),
- FP7 project (2013, ongoing): Developing standard key environmental performance indicators (KEPI) and harmonized methodology for environmental impact assessment. Integration of social and ethical issues to obtain a set of sustainability performance indicators. Some key socio-economic aspects concerning food chains will be proposed to be included in a characterization model (i.e.: fair salary index, local unemployment), according to a framework provided by the “Guidelines for Social Life Cycle Assessment of Products”, as developed by a UNEP/SETAC Working Group. The simplified characterization model to be proposed will aim to assign a score representing the adequacy of selected socio-economical categories for the countries or regions involved in the global life cycle of a product.
- PRESERF (Processing Raw Materials into Excellent and Sustainable End products while Remaining Fresh), FP7 project (2013, ongoing): LCA of process lines and supply chain for new food preservation technologies.

*Experiences & findings:*

- Currently not incorporating social aspects in projects and as of yet little experience with using SOCIAL LCA methodology.

*Future in SOCIAL LCA:*

Aiming at applying SOCIAL LCA in the PRESERF project.

*Christoffer Krewer:*

Background: Outside SIK: LCA on packaging.

- Master thesis - LCA on utilizing novel food processes for producing novel products from cabbage trimmings.

*LCA/SOCIAL LCA projects:*

- Nafispack - Novel packagings that preserve food with active ingredients.
- EcoBioCap - Biobased packagings that are biodegradable.
- PRESERF - Novel food processing technologies.
- WhiteFish – Development of a batch based sustainability tool for assessing cod and haddock food chain actors.
- Berte Qvarn - Cultivation of grains and milling
- Vegetable oils.
- Various transport logistics projects
- Responsible for SimaPro
- Responsible for interactive LCA report platform

Experiences & findings:

- Currently not incorporating social aspects in projects and as of yet little experience with using SOCIAL LCA methodology.

Future in SOCIAL LCA:

Interested, but not sure if and where SOCIAL LCA could be applied.

SP Energy Technology

Stefan Molnar:

- Background: Sociologist at SP Energy Technology, section for Systems Analysis. Stefan has experience of working with social impact analysis, especially with connections to the public and non-profit sectors in Sweden.

LCA/SOCIAL LCA projects at SP Energiteknik:

Stefan is part of a newly formed group on Social LCA at the Swedish Lifecycle Center. He also works with the project Renobuild within which Social LCA is being developed in connection to renovation of houses. Furthermore, he will spend the upcoming years with the project MobileFlip within which a Social LCA analysis will be conducted in connection to portable biorefineries in Europe.

Experiences & findings:

Stefan has experience on studying social impact within different sectors of society. A general conclusion is that in order to capture social impact in all its complexity, one needs to adapt methods and theories according to the specific context that is being studied.

Future in SOCIAL LCA:

Intends to develop Social LCA within renovation projects but also in other areas, such as biofuels, farming and new technologies.
JTI

Pernilla Tidåker and Ola Palm:

LCA/SOCIAL LCA projects at JTI:

- Environmental system analysis of organic waste management on different levels; municipalities, regions and country (ORWARE-model – ORganic WAste REsearch)

- Environmental system analysis of different ways to treat municipal wastewater, including management of sewage sludge (URWARE-model – URban WAsetwater REsearch)

- Energy-material flow and economy analysis of different agro-energy production systems (salix and straw to combustion, ley-crops to biogas, etc.)

- Environmental system analysis of different manure management systems (normal land use, concentration, incineration, extraction of phosphorus and nitrogen etc.)

Experiences & findings:

So far have not applied SOCIAL LCA in any project, but recognize the need to include social aspects more in systems analyses. In a recently submitted paper together with social scientists, options for bioenergy from farmland were analyzed and discussed both in terms of their environmental performance in a life cycle perspective and their impact on rural development, collaboration and local economic diversification. Another ongoing project identifies environmental impacts using LCA and effects on social and rural development when farmers collaborate in existing farm-based biogas production.

Future in SOCIAL LCA:

Identified future areas of interest for JTI:

- Evaluating the greening of EU RDP (Rural Development Policy) using social and environmental LCA.

- Evaluating the roles of different actors and how cooperation, motives and drivers affect the environmental outcome.