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In the light of an ongoing urbanisation process sustainable solutions for future urban mobility are of high importance. The enhancement of biking comes into focus among researchers and practitioners and pedelecs seem to be one possible sustainable solution. Still, the assessment of sustainability impacts is challenging. Obstacles arise due to insufficient methods, lack of understanding and too narrow assessments, i.e. the look at emission reductions during the use phase only is too short handed.

This study presents a tool to select relevant sustainability indicators for manufacturing and to evaluate potential sustainability impacts at different levels. In addition, a scenario analysis as well as a multi-criteria decision making has been incorporated to show possible development corridors. Indicators are needed to be able to measure sustainable business development. The indicator selection is based on existing indicator schemes and sorted according to the DPSIR framework from the EEA. The category climate change at the impact level (I) correspond to greenhouse gas emission per unit produced at the inventory, hence at the pressure level (P). Indicators measuring the state (S) would then be the atmospheric GHG concentration. Responses (R) could be efficiency measures at company level or the European emission trading scheme to price the GHG emissions. The indicators are then ranked and selected by means of two newly developed methods: Tiered Approach and the Sustainability Safeguard Star, which are based on the life cycle sustainability assessment (LCSA) framework. Potential impacts of pedelecs during manufacturing, use and end of life phase have been assessed. Since LCSA only investigates the potential impacts at a given time, scenario planning has been used to predict broader development corridors for the future, e.g. one scenario predicts the substitution of cars through pedelecs for many inner city transportation tasks. This is made possible through large investments in infrastructure like bikeways, integration with public transportation and the electric infrastructure. Non-dominated solutions with respect to the different criteria are identified yielding the most promising development pathways. As research continues, relevant economic indicators will be identified and the DPSIR framework will be used to sort them accordingly, enabling the measurement of economic impacts in respect to sustainable development.

"Sustainable Solution Steering": BASF's portfolio segmentation methodology to monitor and steer the portfolio based on sustainability needs in the value chain

Talke Friederike Schaffrannek, Dr. Florian Feigs, Dr. Andreas Kicherer
BASF SE, Germany

Since decades, BASF creates new solutions that contribute to the sustainability needs of its customers (e.g. insulation materials for buildings, lightweight plastics for cars). However, to enhance the company´s success and to increase its contribution to sustainability, BASF assessed the sustainability performance of the entire portfolio and to actively steer offerings towards more sustainable solutions.

How was that done? In 2012, the company developed a systematic process to perform an extensive analysis of its portfolio regarding sustainability in order to actively steer its product portfolio towards increased sustainability contribution in a given application. Since then, the company has analyzed more than 50,000 solutions worldwide in their respective applications. BASF calls this evaluation methodology and steering tool "Sustainable Solution Steering".

It consists of three major steps:
- Analyzing sustainability needs and trends of value chains
- Checking product sustainability performance in the market segments, partially based on LCA information
- Developing and monitoring action plans for strategies, R&D and market approach.

The assessment is always done from the point of view of BASF's customer industries and the society in comparison to potential alternative solutions in the market, reflecting the requirements of different regions and industries. All solutions are evaluated in a value chain approach with a cradle-to-grave view by taking all three dimensions of sustainability into account. Experts from various functions, such as marketing, sales, technology, product stewardship, R&D and sustainability are involved. Based on this assessment the solutions are clustered into four sustainability categories: "Accelerator", "Performer", "Transitioner" and "Challenged".

The result of Sustainable Solution Steering is a fully transparent and a consistent evaluation of the sustainability performance of BASF's solutions. Over 150 workshops were carried out and approximately 1500 experts within the company consulted. It helped the many to get a much more tangible understanding of BASF's purpose "We create Chemistry for a sustainable future". This very interactive approach ensured the company to create numerous business and research opportunities. Sustainable Solution Steering therefore supports not only active portfolio steering, but also strategic decision making.

4:00pm - 5:30pm

Amphi C

A-VIII: Generating data: LCA databases and datasets quality, assurance and verification

Session Chair: **Andreas Ciroth**, GreenDelta, Germany
Session Chair: **Bruce Vigon**, SETAC, United States of America
Methods for creating data sets have been probably somewhat overlooked, also in current footprint concepts, although any Life Cycle Assessment (LCA) consists of hundreds to thousands of data sets, although created data sets are the building blocks of any LCA, their properties determining possibilities in the following modeling steps; and although...

Developing a Quality Management System for LCA data sets – the case of the LCA-CIRAD platform for tropical products

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Since 2009, CIRAD (French Agricultural Research Centre for International Development) has been developing an ambitious LCA platform for analysing the life cycle of tropical agricultural products, involving a team of around 15 LCA practitioners, calculation tools and pooled databases. Implementing LCA in Mediterranean and tropical contexts raises specific challenges. In particular, data scarcity on foreground agricultural systems and the lack of LCI data sets for background processes in those contexts require significant resources to collect large amounts of LCI data on-site. Where primary data are not available, proxies must be found and adapted. Hence large data sets need to be compiled, changes tracked and experiences shared.

Creating high-quality shareable data sets based on high-quality data was the main ambition for the new LCA platform right from the start. To this end, data sets must be created with the greatest care and transparency, especially when they are implemented in a pooled database, where providers of data sets and potential users may be distinct. The best way to ensure that data sets can be properly reused is to develop an integrated quality management system (QMS) at practitioner level, based on common procedures for data collection, data and metadata implementation in LCA software and nomenclature for data set review processes.

The LCA-CIRAD team started to develop its QMS in 2012. The QMS is managed by a database engineer in charge of standardising and pooling the resources of the platform. The QMS is based on four activities:

1) LCA data quality management: corpus of procedures on data set quality (compulsory acceptance) and training for practitioners.

2) Data & tool management: mirroring of calculation tools, remote access to the platform, versioning control.

3) Intellectual Property management: licence development, specific training in database property rights, intellectual property policy and licensing.

4) Practitioner skill management: technical support, in-service training in advanced features of tools.

Since it has been deployed, the LCA-CIRAD QMS has followed an on-going improvement cycle, with regular feedback from practitioners, leading to regular updates of procedures. The implementation of QMS guidelines by permanent LCA scientists, interns and PhD students at CIRAD has markedly improved the quality of LCI metadata, data set transparency and reuse of LCA projects.

Simplifying data creation and use in large LCI databases

Gregor Wernet
ecoinvent, Switzerland
Creating and maintaining substantial amounts of LCI data is a complex task. Furthermore, LCI databases have demands on consistency and compatibility of data, so working with different data providers requires additional coordination. By simplifying and streamlining the processes of data creation and database management, more efforts can be spent on data collection and updating, increasing the value of the resulting data collection. Furthermore, with good approaches data exchange and interoperability can be facilitated. Several approaches will be presented, with examples from an application in a large LCI database.

Many datasets rely on underlying calculations that calculate LCI flows from raw data. In modern data formats such as ecospold2, such calculations can be stored and shown directly in the dataset. This allows simple modification and reuse of the data, e.g. in different regions, and it greatly facilitates future updating when the raw data change. ecospold2 also allows the creation of derivative datasets that start as a copy of an existing process, maintaining a link that implements all changes made to the “parent” dataset in the derivative as well. These datasets can then be expanded and individualized flow by flow, replacing linked data with new, more accurate data as they become available. In such a way, additional database projects have been built on the same underlying database while maintaining an easily upgraded structure. Such new database projects also benefit from the established data quality and structure of an existing database to build on. Making data accessible in a unit process format is essential for this adaptability and interchangeability of data within and also between data collection projects.

Working with ecospold2 is supported by the freely available EcoEditor software, which allows validation of datasets on e.g. their wet and dry mass balances as well as water and carbon balances. Such automated tests point out gaps and oversights in the data entry process efficiently. Dozens of further validation rules are implemented in the software.

Using modern, freely available data formats and software, relying on transparency and easy access to underlying calculations and assumptions greatly assists the creation and maintenance of data for a large LCI database. The structure also allows the easy integration with other data sources and data projects, exchange and reuse of data, as well as quality assurance in data and databases.

Transforming ecoinvent for fun and profit

Christopher L Mutel
Paul Scherrer Institute, Switzerland
Version 3 of the ecoinvent LCI database brings a number of new and powerful features. Unfortunately, it also comes with vastly increased complexity, and errors are still present. In this presentation, I visually and quantitatively investigate the structure of the three different flavors of ecoinvent 3.1, and describe a number of techniques to manipulate the database to increase consistency and clarity, as well as removing errors or other unwanted elements. These tools include:

* Visualizing the structure of the technosphere matrix after row and column reordering can nicely show areas of dense interconnection and areas of sparsity.