the sludge is considered as a product and no more as a waste, what are the consequences for the LCA performing ? Indeed, such a paradigm shift will affect the way to do LCA in the wastewater field. Several methodological questions arise as the wastewater treatment plant will provide several coproducts : the treated water and the sludge. How to allocate the impacts between these two coproducts? Which allocation factors choose to affect an environmental load to the sludge? As a consequence, such methodological developments will enable stakeholders and water compagnies to highlight (i) the environmental interest to produce renewable energy ressources (such as sludge-based biomethane) compared to non-renewable energy ressources (such as fossil methane) or sludge-based fertilisers compared to mineral ones, (ii) the impact of water treatment on the environmental load affected to the sludge and so improve the whole environmental impact of the wastewater treatment plant. This paper aims to present the methodological aspects faced by LCA when dealing with this paradigm shift.

WE329

Environmental implications in the substitution of non-renewable materials by renewable materials through their entire life-cycle: a case study of cork as thermal insulation in building sector

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Widespread environmental strategy of reducing the environmental impact is to minimize the use of non-renewable materials which involve important impacts to the environment at different stages of the life cycle. Generally the most important impacts of this type of materials are generated in the extraction and processing of raw materials and their processing in their end of life. However there are other phases of the life cycle, such as transport, which become important when the materials are geographically very concentrated and have a global market: e.g. aluminum or copper among others. The replacement of non-renewable materials by renewable materials implies a very important decreasing in the most life cycle phases. Nevertheless many natural materials, widely used, also have a high geographic concentration and the environmental implications of their distribution are highlighted. This is the case of cork, which concentrates its production is concentrated in the coastal regions of the western Mediterranean basin, mainly in the Iberian Peninsula, where 80% of its production is concentrated. The cork production occurs in rural areas, encouraging the establishment of new enterprises and the consequent employment opportunities; implying the economic development of these traditionally depressed areas. Cork has outstanding properties as thermal and acoustic insulation and good resistance to degradation by moisture. Currently, due to their intrinsic properties, cork is used in the construction industry as insulation, though in a limited way. Therefore, to understand the environmental implications of the widespread use of cork as an insulator in the construction sector, this study presents a comparative analysis with the main materials used as thermal insulation. This study was conducted following the LCA methodology in order to understand the environmental implications of the substitution of non-renewable materials for renewable materials such as cork on the thermal insulation of a building.

WE330

Life cycle assessment as a decision support tool guiding the development of bio-based products

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Demand for bio-based products substituting environmental harmful components strongly increased in recent years. Within the project "TEPHA – Technical Product Harvesting" the interdisciplinary consortium consisting of ecologists, botanists, mechanical engineers and architects aims at growing near net shape components from renewable resources. In a proof-of-concept study bamboo grown in Germany will be used as an exemplary plant species. In most cases bio-based products have less negative impacts on the environment and human health compared to their conventional equivalents made of, e. g., plastics. But it is not necessarily true that such products are also more sustainable than the conventional when considering the whole life cycle from raw material acquisition to recycling or disposal at the end of the product's life time. In fact due to possible hazardous impacts during plant growth a bio-based product is not per se the most sustainable alternative to a conventional one. Therefore the authors of this contribution aim to develop a framework for a comprehensive life cycle assessment (LCA) which will be exemplarily carried out on bamboo cultivation in Germany. After the investigation of the life cycle inventory the impact assessment will be performed to figure out the most important input and output impacts on the environment and human health. The LCA for the bamboo-derived product will be compared to the conventional one to identify the most environmentally friendly alternative. In case of severe negative impacts during the production of bio-based products these results will act as a trigger to optimize the production process and therefore the product's environmental performance considering its whole life cycle. The proofed harmlessness of a product via LCA can be used as a basis for consumer communication, in industry as an argument towards regulators as well as a unique selling point when introducing the bio-based product into the market. Within the TEPHA project a database consisting of mechanical, botanical and ecological information will be developed. Upon providing the data from LCA studies together with the technical requirements of mechanical engineering and architecture as well as the properties of plants the most suitable plant species can be easily selected from this database according to the intended use. This will facilitate an effective, reproducible production of sustainable products based on renewable materials.

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Life cycle assessment of biobased chemical building blocks made from European waste streams

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Many drivers exist to persuade EU businesses to embrace the opportunities of the circular economy. However, the challenges faced by companies, particularly among SME's, in the drive for resource efficiency include access to funding, knowledge and capability, and ability to implement cost-effective technological solutions. It was these factors that inspired the creation of the ReNEW network. ReNEW, 'Resource innovation Network for European Waste', is a €5 million project funded by the Interreg IVB North West Europe scheme aiming to increase cooperation between research and business endeavors to create value from waste by optimizing novel technologies for extracting materials from waste and their reuse in the supply chain. Moreover, the network is seeking the views of industry through its stakeholder engagement process for future initiatives to stimulate innovation for product development. ReNEW can offer some support to develop locally tailored support for SMEs, and invites interested companies to apply for vouchers to cover 50% of research and innovation needs. Successful applicants will be paired with a research centre that best suits the project proposal in the UK, Ireland, Belgium or Germany. ReNEW also aims to inform local, national and European policy makers, and to share transnational best practice and improve specific support to meet the innovation needs of the waste sector. http://www.renew-network.eu Within the frame of this project, several technologies have been developed or optimized by partners to improve the valorization of organic wastes in chemical such as furfural, succinic acid or butanol. Theses processes include chemical or enzymatic hydrolysis of lignocellulosic biomass, its fermentation and the downstream processing. Life cycle assessments (LCA) of the new waste streams valorization routes are included in the project (WP3A12) in order to evaluate their environmental benefit. The aim of this study is to assess the environmental impacts of production of chemical building blocks from organic wastes (lignocellulosic wastes, dairy wastes, whey,...). On the basis of data collected amongst partners of the ReNEW network, LCA of the different processes on development are realized (lab scale or pilot scale), and the results are compared to the impacts of the usual routes currently used to produce the same components. Data are processed in SimaPro software with Ecoinvent database, and analyzed with the ReCiPe method.

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LCA-LCC optimization tool for selection of electricity generation technologies in residential buildings

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Reduction of energy consumption and use of energy from renewable sources in the building sector constitute important policy measures needed to reduce EU energy dependency and greenhouse gas (GHG) emissions. The recent 2010/31/EU directive requires all member states to set minimum energy performance requirements for new buildings occupied and owned by public authorities. It also introduces the concept of cost optimality, requesting that minimum energy performance requirements are set "with a view to achieving cost-optimal levels". Member states shall establish a long-term strategy for mobilising investment also for private buildings, where the role for the private sector can be to invest in co-financing at instrument level and project level, to identify and develop projects at regional and local level, and to be creative in facing these premises and perspectives. In response to this stimulation for private sector, the set-up of a simple tool dealing with optimization od economic and environmental performance, that can be used for setting targets and strategies in energy management of residential buildings is here proposed. Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) methodologies are combined for the formulation of a simplified tool that is able to identify the optimal set of electricity generation technologies from two alternative approaches, i.e. minimization of Global Warming Potential (GWP) with overall cost constraint and minimization of overall cost with GWP constraint. Both linear and non-linear optimization procedures are implemented with two alternative objective functions, on the basis of the assessment of installation, operation and maintenance costs and emissions of GHG along the life cycle of a set of various technologies, including different layouts of photovoltaic panels, small wind turbines, different sizes of natural gas micro-turbine (for cogeneration) and energy supply from the grid. In order to guarantee the dynamic alignment with the policy context, a threshold value of renewable share and a threshold value of auto-production share are taken into account as constraints of the model, besides the physical characteristics and limitations of the building and area. An Italian building