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WEB BASED TOOLS FOR LIFE-CYCLE ENVIRONMENTAL ANALYSIS SOME EXPERIENCES WITH PRIVATE COMPANIES AND BUSINESS ASSOCIATIONS

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ABSTRACT

Recently some companies and business/manufacturing associations have stimulated the development of innovative web based tools for the elaboration of ecoprofiles of products as well for CSR (company social responsibility) purposes when many plants participate to the direct data collection. TEA (Tool for Environmental Analysis) is a customized web based platform developed by Life Cycle Engineering to answer to these needs. The paper aims at illustrating two case studies of how LCA information has been used to support life-cycle-analysis and Environmental Product Declaration needs of a couple of associations operating at country level (CONAI, the Italian National Packaging Consortium) and at European level (BWA, Bitumen Water Proofing Association). The new web based tools have the purpose to support decision making at product and at plant level.

INTRODUCTION

In the last years environmental and sustainability issues are becoming important in the daily business practice. The increasing customers interest on environmental aspects of products and services has enhanced the use of EPDs as well as CSR. On the other hand the difficulties of companies and associations of managing sustainability related data are also grown up. Especially for associations the traditional LCA tools do not always fit needs from several actors. Moreover in some case the confidentiality issues could increase the difficulties of data collection. Indeed there is a gap between professional LCA software and customers needs of elaborating ecoprofile without spending excessive efforts in building internal system driving these processes.

The paper illustrates how TEA (Tool for Environmental Analysis), the customized web based platform developed by Life Cycle Engineering, has supported the life-cycle-analysis strategies of a national (CONAI) and European Associations (BWA), in which several participants have been involved in sustainability projects.



Eco Tool Conai

CONAI, promotes the adoption of an environmentally friendly oriented design for packaging solution at source by means of prevention incentives and leverage. The concept of prevention underlying CONAI's activities is also gathered to the general principles of sustainable development. The tool provides the possibility to benchmark the new versus and the existing packaging solution by means of a set of LCA indicators. CONAI associates have access to a wide database of materials and processes that are commonly used by this sector, including end of life scenarios that are monitored by CONAI on national scale.

The Eco Tool Conai is a web portal in which any producers and/or packaging fillers and seller can access to the system in order to assess the environmental potential benefits of ecodesign strategies applied on their packaging. The tool evaluate the overall packaging system starting from the unit retail to the tertiary packaging. The analysis is based on a streamlined LCA, commonly used in this field as decision making tool (*Varghese et al. 2010*), and the tool is able to elaborate three main indicators of potential impact that are, GWP (Global Warming Potential) Water Footprint and GER (Gross Energy Requirement). The selection of these indicator is twofold firstly they are able to identify impact on global aspect that are suitable in streamlined LCA, secondly they are easily understandable by a wide range of users. Ecodesign efficacy is elaborated as percentage delta between the previous and the new version of the same packaging solution. The aim is to evaluate if prevention actions, such as the increase of recycled material content or the change from a mono-use to a refill packaging, are able to reduce impact for all the indicators analyzed. The interfaces and the logical architecture were developed to ease users input data. The information required are the bill of material of the analyzed packaging, furthermore information on transport efficiency, logistic, direct processes consumption can easily added. Specific data such as electricity and thermal energy can be added. These features are included to allow also packaging producers to describe production process efficiency, even if the packaging characteristics are not changed.

The functional unit of LCA assessment is the quantity of product contained in the former packaging solution, therefore if the capacity of new version changes comparison is always consistent. The boundary are set as "cradle to grave" analysis and the open loop approach is set to elaborate *waste treatment* impact according to international EPD[®] system GRI (EPD 2008). This approach was also in line with the CONAI scope to promote the use of recycle materials. Significant efforts have been made to elaborate detailed Italian waste scenario for packaging. The waste scenario is not defined by users but automatically elaborated by the software basing on two variables which are the packaging typology and material. Since CONAI is the owner packaging waste management at national level, primary and comprehensive data were used to elaborate more than 100 dedicated scenarios e.g. PET Bottle are more recycled than a EPS tray for fruits and meats. As well as the tool is freely accessible for all Italian packaging fillers and seller as well for packaging producers, specific check on data entry have been developed in order to guarantee the consistency of data. LCA results are available to final users only after a CONAI verification to guarantee the reliability and the pertinence of the comparison.

BWA

The Bitumen Waterproofing Association (BWA) provides an authoritative voice for the Bitumen roofing and waterproofing membrane manufacturing industry across Europe and sustainable and environmental issues are, quite rightly, matters of great importance to the association. In this context, in the last 10 years several LCA exercises at European level have been developed by a direct and deep involvement of six clusters and about 40 plants at European level. The new 2012 web based LCA tool has been designed to collect typical LCI data from all European sites with the scope to provide the average European life-cycle environmental burden for EPD purposes as well as a robust tool for R&D to be used by each member company, with a stringent guarantee to respect confidentiality of single companies data. The tool supported the elaboration of the first EPD of an European producers association registered in the international EPD[®] system (BWA 2013).

The software architecture is based on a hierarchical structure of user in which data flows are illustrate in fig. 1. The Plant user the core of the system, has to provide production information in order to elaborate products eco-profile. The Cluster has the mandate to select plants which comply with the highest level of data quality (reliability and consistency) and to build the “cradle to roof” average. The admin collect data from clusters in order to start "cradle to gate" elaborations. Users from upper lever can ask for data checking and feedbacks to lower level.

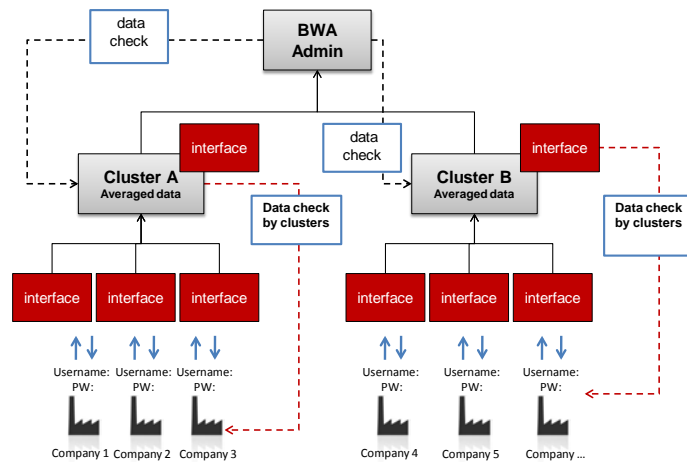


Fig.1 BWA architecture

Moreover, automatic checks were implemented in the tool itself and specific error messages were displayed to inform users in case of basic errors (e.g. insert text in place of a number to express an amount). To improve elaboration robustness, plant users are not allowed to delivery incomplete data to Cluster. The software calculates more than 32 LCA indicator and results are elaborated according to the UNI EN ISO 15804. The use of this software has also allowed to record in the DB thousands of LCI flow, assuring confidentiality among users, able to support the elaboration of several scenario analysis investigating strategy for environmental burden reduction. Moreover the tool is the basis to guarantee that all the



producers, at European level have been elaborated and delivered data in the same configuration. Currently the development of the project is to understand the feasibility of the access of the main suppliers in tool. It should allow to increase robustness of results and to involve the supply chain the environmental strategy of the association.

DISCUSSION

The two case studies are briefly reported to highlights how the LCA can be approached in different fields and for different scopes by innovating the elaboration tool. The software developed were based on LCA data, as well as all professional software. The improvement was made in the design of the elaboration structure and in the simplify of data entry in order to fit the customer needs. The potential of these approach is to wider the potential customer interested in include LCA and sustainability information in the production process and supply chain as well in the decision making.

CONCLUSIONS

In both cases, TEA has played the role to make the use of the LCA approach easier and faster also for practitioners with a limited knowledge of LCA principles and at the same time has stimulated new relations with suppliers to improve the environmental management of the cradle to gate productions.

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