

# LoRe-LCA

Low Resource consumption buildings and constructions by use of  
LCA in design and decision making



## D2.5 Recommendation for policymaking

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# 1 Introduction

One of the core objectives of the LoRe-LCA Project is to support policymaking activities concerning LCA issues on European and national level. Thematic areas are energy and resource consumption, pollution prevention, landfill and waste. As the LoRe project is a research coordination action the following recommendations for policy making are focusing mainly on these research issues. To complement the picture this document includes also some recommendations for further fields of policymaking.

Important fields of policymaking are related to the European Building regulation framework which is characterised by EU Directives and EU Regulations. Directives are legislative acts of the European Union, requiring member states to achieve particular results leaving implementation measures to the national member states. European Union Regulations are self-executing requiring no implementation measures for member states. EU Directives and Regulations in many cases refer to standards or even make compliance with them compulsory. Especially this is the case within the framework of the “New Approach”, where European standards are used to provide “Essential Requirements” of Directives. Recommendations for European Standardisation in the context of LCA can be found in the LoRe Deliverable “Recommendations for European Standardisation”.

Up till now strong market barriers for practical implementation of LCA aspects exist, asking for innovative strategies and instruments to overcome. EU initiatives forcing a broader implementation of sustainable construction, like the Lead Market Initiative for Europe – Sustainable Construction and the SCP-SIP Sustainable Consumption and Production and Sustainable Industrial Policy play an important role in a broad dissemination of LCA aspects and methodologies.

On the demand side procurement offers big opportunities to force sustainable construction in Europe. An implementation of LCA issues in the procurement process could contribute to reach sustainability targets. Main fields of activity are the provision of adequate instruments and strategies for all actors of the procurement process.

## 2 Recommendations

### 2.1 Building regulation framework

- *Harmonised strategy for integration of LCA aspects in building regulation framework*  
LCA issues can be found in various EU Directives and Regulations which have been adopted by different Directorate Generals (DGs). So, regulations and directives have different focus and approach concerning LCA issues. A harmonised strategy for the implementation of LCA aspects in the European Building framework is missing. So one of the main targets should be a harmonised strategy and methodology for all LCA issues in the different regulations and directives.
- *Coordinated action on European and national level*  
There is enormous need for coordinated action and coherence in a more logical and concerted approach on European and national level. The current situation hinders

transparent and clear communication of LCA issues to producers, building experts and consumers. On product level EU framework directives, like the Ecodesign Directive, offers good challenges to integrate LCA aspects (like scope, indicators, methodology, etc.) in a coordinated way.

- *Coherency of EU building directives/regulations to European Standardization*  
A coherency in terms of the core elements of a LCA, as stated by the international standard EN-ISO 14040 and in EN 15978 (e.g. choice of indicators, terminology and methodology), should be basis for European regulation activities.
- *National subsidies as driving force for integration of LCA*  
Some European member states have already integrated sustainability targets as requirements for the receipt of subsidies (like in the Austrian social housing sector). Setting of LCA requirements and the use of LCA methodologies for verification offers a good opportunity for broader implementation of LCA issues on national level. A pre-condition is the development of a method to set targets and to document the calculations. The stakeholders would not be interested to give credits for only performing a LCA calculation. Further suggestions have to go into details of each subsidy system.

## **2.2 Practical implementation**

- *Use of databases*  
The number of products that are included in LCI databases is still very limited. As a first step databases often contain generic information about “average products” or “average processes”. This is well justified for assessing buildings during the early design phase. As soon as the choice of materials and products is on the agenda (like in the tendering process) EPDs specific to individual manufacturers are needed.
- *From the energy certificate to the sustainability certificate*  
Member states have implemented the Energy Performance of Buildings Directive (EPBD) more or less successfully. The implementation of simplified LCA issues in the energy certificates as required by the EPBD should be a first step for broader implementation. Integration of health, comfort and safety aspects, embodied energy of construction materials and LCC (Life Cycle Costing) issues could be considered in a first step.
- *Incentives for manufacturers (and particularly SMEs) if providing EPDs*  
Manufacturers who are interested to develop EPDs of their products need additional support. This is specifically true for SMEs. Support actions could be financial (for consultancy expenses), providing generic data-sets of upstream/downstream processes and training for company experts on LCA methodology, etc. The latter includes better guidance on the standards (in specific EN 15804) and their interpretation. Detailed instructions on the national level and for each national context have to be given. Check EPDs with a third party.
- *Tool development – Simplification*  
LCA of buildings requires high effort and specialised expertise, furthermore LCA is

so far mostly performed in a late planning phase, where a lot of important sustainability and cost decisions already have been taken. There is a lack of instruments and procedures especially for early design phases and general strategies for the implementation of LCA are missing. These strategies have to be integrated along all phases of the construction process both on organisational and on technical level. The most important aspects to be considered for tool development are:

- Support development of eco-design tools to be integrated into the usual workflow of architects and planners.
- Integrate existing knowledge (e.g. ILCD guidelines, standards, state of the art documents).
- Justify possible differences between the tool and the ISO/CEN standards on Building LCA (the standards can be improved on many points, e.g. energy indicators not corresponding to EPBD, carbon storage in timber not following the ILCD recommendations, missing indicators for health and biodiversity etc.)
- Do not mix different data bases in one tool without checking consistency.
- Facilitate interpretation by making sensitivity analyses easier.
- Provide elements regarding validation of the tool, using e.g. the PRESCO inter-comparison exercise.

- *Normalisation and weighting*

Normalisation and weighting are important for communication of results to consumers since the overall environmental impact of a construction work considering several impact categories can be given as a single aggregated value helping the interpretation of results. However, the possibility of developing harmonized methods for both normalisation and weighting need further investigations.

- *Bias in competition among different techniques*

Check that LCA requirements do not introduce a bias in the competition among different techniques (e.g. requiring an LCA study for renewable energy systems but not for standard boilers and electric heating), or products from different countries (national format for EPD).

- *Dependency of certification bodies*

Ensure independency (e.g. no subsidiary) between certification bodies and organisations in charge of developing the methods.

- *Handling of high impact emissions*

High impact emissions (e.g. dioxins) should be accounted for separately in Life cycle inventories until eco- and human-toxicity indicators are integrated.

## **2.3 Awareness and training**

- *Communication of results on product level*

For consumers and non-LCA-experts a listing of LCA data (as provided by EPDs) in most cases enables no assessment of the sustainability performance of products. Besides normalisation and weighting best practice examples, labelling and benchmark systems could contribute to a better communication of results to consumers and non-LCA-experts.

- *Communication of benefits of LCA*  
 A strategy has to be developed that comprises information on benefits and tools to get useful results out of EPDs and to relate this to the business (i.e. money). Construction business representatives especially of small and medium sized enterprises today are struggling with several new requirements in their sector like REACH and CE-marking. EPDs are not high on their agenda. Only few manufacturers have experiences with eco-design or LCA, let alone with standardized EPDs. Branch organisations have an important role as intermediaries in the process towards the broader uptake of EPDs.
- *Taking into account future developments in the building sector*  
 Up till now energy consumption for the use stage is seen as one of the most important sustainability aspects of buildings. With the requirements of the new EPBD (“nearly zero energy buildings”) and the national implementation in 2020 this will change. In future impacts of other sustainability aspects (like embodied energy of construction materials) will become more important than today, as the energy demand for use stage will decrease towards zero. In case of this a more comprehensive LCA of all impacts is required to avoid sub-optimization in strategic decision-making. These issues have to be communicated to clients, stakeholders and actors of the construction sector.
- *Closing of knowledge gaps*  
 There is a huge knowledge gap concerning LCA between LCA experts and actors of the construction sector. Apart from energy issues, other LCA aspects (like environmental performance of construction materials) are often not seen as important. So the integration of LCA in education and training programmes for students and building experts has to be enforced.
- *Awareness raising activities for audience actor groups to highlight the importance of the life cycle of a building*  
 It is essential to show clearly the influence of the building design in the building energy consumption (and therefore the building operational costs) throughout the whole span life. The main audience groups are national institutions, local authorities, architects, building owners and building occupants (users). Campaigns have to be tailored to achieve an optimal impact. Force other awareness raising measurements like case studies. Many members of the mentioned actor or audience groups are not interested in the detailed numbers LCA is providing but want a simple guidance or solution that they can take over.
- *Awareness raising for public authorities*  
 The current implementation of LCA in the building and construction sectors is still low and almost entirely client-driven. Public institutions like local authorities and social housing associations can become drivers in public, green procurement (see procurement section) or in promoting the integration of environmental targets in their building programmes. However, there is also a potential for local authorities to drive implementation of LC thinking in construction in other ways, e.g. through publicly owned property companies and negotiations with developers. Procedures, definitions

on appropriate indicators and evaluation tools for this level needs to be communicated to this stakeholder group along with competence building in LCA issues.

- *Training for project managers*  
Project managers are a key target group for successful implementation of LCA throughout the whole process of building and construction projects. LCA training targeting this stakeholder group is therefore important and significant topics include communication of the benefits of using LCA and procedures for how to integrate LCA into the ordinary workflow processes.

## **2.4 Procurement**

- *Integration of LCA issues in European procurement initiatives*  
Green Public Procurement offers a good challenge for public authorities to foster integration of LCA aspects. European policy actions like LMI Lead Market Initiative for Europe - Sustainable Construction and the SCP-SIP Sustainable Consumption and Production and Sustainable Industrial Policy are important activities to introduce LCA issues in the construction market.
- *Development of practical LCA instruments and strategies for the procurement process*  
In procurement up till now practicable instruments and strategies for tendering (like setting of sustainability targets, definition of sustainability specifications/indicators) and strategies for the evaluation of the sustainability quality of bids is seen as difficult. A stronger link between LCA experts and procurers is required to integrate existing LCA knowledge in a practical way into the whole procurement process.

## **2.5 Research**

- *Integration of LCA issues in future revisions of the Energy Performance of Buildings Directive (EPBD)*  
The aim should be to include LCA issues in the energy certification procedures. To be practical not more than 3 to max. 5 indicators should be considered. It has to be clarified which parts of the building will contribute to the calculation and which life cycle stages will be considered.  
As a first step we suggest a test on a broader scale. Further research is required about adequate settings and means (within a research action, which nations, test building(s) or case studies, barriers).
- *Simplification*  
There is a request for (additional) simpler assessment methodology for various specific purposes. Further research is needed to specify which aspects could be simplified: Is it the number of indicators (maybe not all of the indicators are relevant for all of the products)? Is it the databases? Is it the life cycle stages covered, thus the scenarios required?
- *Harmonisation*  
Harmonisation of methodology to get data (EPDs use different databases with differ-

ent LCA methodologies, than using these data in a EN standardised LCA, mixing of different data sources)

- *Methods to study the priority of indicators*  
A relevant group of decision makers and experts can be constituted in order to study the priority of indicators. Criteria can first be listed, e.g. the geographic scale of an impact (planetary, continental, regional, local), the importance of the effects (severity of damages on health, eco-systems...), their irreversibility, their duration (e. g. nuclear waste). Then each indicator can be analysed regarding these different criteria and priorities can be derived using a voting process.
- *Low environmental impact buildings*  
Reducing environmental impacts in the building sector is closely related to decisions made at early stages of a project, be it a new construction or retrofit. Life cycle assessment (LCA) can usefully contribute in the decision making process by allowing most impacts to be evaluated, and alternatives to be compared. Improving the reliability of Building LCA methods is still needed in order to provide a more robust evaluation, and contribute reaching environmental objectives at a European level.  
Funding scheme: Collaborative projects (small or medium-scale focused research projects)
- *Low environmental impact transport infrastructure*  
The construction, use and maintenance of roads and other transport infrastructures induce large environmental impacts related to the use of materials and energy as well as emissions into air, water and ground. Research is still rather unstructured in this field, and various approaches exist in the different member states regarding impact evaluation. A research coordination action would therefore be useful.  
Funding scheme: Coordination and support actions (coordinating type)
- *Low environmental impact cities*  
Models have been developed to evaluate environmental impacts of buildings, and help designers reducing these impacts. But the environmental performance of buildings is greatly influenced by decisions made at a more global level, e.g. designing streets and collective equipment like district heating, solid waste and wastewater treatment, transport systems. Studying models at the scale of an urban block and district would therefore be useful.  
Funding scheme: Collaborative projects (small or medium-scale focused research projects)

The following table gives an overview of recommendations concerning LCA issues to be dealt with in future European research programmes:



	Horizon 2020	CIP comp&innov (IEE)
short	To support a standardization of well-founded building scenarios which might facilitate a broader uptake of LCA in building assessment, sensitivity studies of crucial variables of scenario dimensions are necessary. Such studies need to be done for different/regions since there are contextual differences impacting the conclusions of such studies.	To become a more practical tool, adapted simplifications of the LCA methodology for specific purposes, are necessary. Further research is needed to specify which aspects could be simplified: Is it the number of indicators (maybe not all of the indicators are relevant for all of the products)? Is it the databases? Is it the life cycle stages covered, thus the scenarios required? Recommendations as provided by for example the LoRE-LCA (and ENSLIC) projects is a good start but needs further testing, refining and implementation work together with relevant stakeholders. Specific application purposes to start with include building design and architectural competitions.
long	When moving towards zero energy-buildings and low-impacting energy mixes, the proportional impact of the use-stage when making LCA studies of buildings, will decrease. The significance of accurate specifications and justifications of used scenario dimensions which affect other life cycle stages than the use stage will then increase in importance. Such scenario dimensions which then need further elaboration and justification include life time of both building and exchangeable building elements, renovation and end-of-life in particular.	In longer term, applications ought to be done for different aspects of policy-making and urban design.