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Life Cycle in Practice – Capacity building aiming European SME's

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Abstract

The application of life cycle approaches – including life cycle assessment, ecodesign and environmental labelling – is becoming an increasing reality for business, and a growing challenge in many economic sectors. Businesses are facing increasing legal and market requirements to enhance resource efficiency and reduce the environmental impact of their products & services. To significantly address this challenge, the Life Cycle in Practice (LCiP) project was conceived, aiming to promote the uptake of LC approaches particularly in SMEs. The LCiP project helps SMEs in France, Belgium, Portugal and Spain reduce the environmental impacts of their products and services across the entire Life Cycle in three sectors: Buildings & Construction, Waste Management and Energy Equipment. LCiP's specific objectives are to foster the widespread uptake of these approaches by SMEs beyond the duration of the project, by (i) Demonstrating the environmental and business benefits of applying LC Approaches through practical application in 32 businesses; (ii) Providing physical and online resource centres to support regional application of LC approaches; (iii) Building capacity for on-going implementation of LC approaches through a network of Life Cycle Champions and (iv) (Re)designing practical tools & methods tailored to the needs of the three industrial sectors. This paper presents the project's activities and expected results, as well as the conclusions of a maturity assessment on life cycle approaches that has been performed in the three sectors and four partner regions, as a means to identify needs and gaps that LCiP should fulfil.

1 Introduction

The adoption of a life cycle perspective in environmental management is a growing challenge in many economic sectors (UNEP/SETAC, 2009). Businesses are facing increasing legal and market requirements to enhance resource efficiency and reduce the environmental impact of their products and services. Life cycle approaches are also heavily embedded in European strategy, as can be seen in:

- **Towards a circular economy: A zero waste programme for Europe** (COM (2014) 398 final).
- The Commission's **Roadmap for moving to a competitive low carbon economy in 2050** (COM (2011) 112 final).
- The **Eco-Innovation Action Plan (Eco-AP)** (COM (2011) 899 final).

- The Commission's **Thematic Strategy on the Sustainable Use of Natural Resources** (COM (2005) 670 final).
- The **Thematic Strategy on the Prevention and Recycling of Waste** (COM (2005) 666).

Despite this, the take up of life cycle approaches in SMEs is still very low; as indeed the ability of SMEs to comply with environmental legislation in general as reflected in the need for the European Commission's Environmental Compliance Assistance Programme (ECAP). Often SMEs are unaware of the benefits of being green: new market opportunities and cost savings.

To significantly address this challenge, Cd2e created in 2009, the [avniR] platform supported by the Nord Pas de Calais (NPdC) Regional Council and the ADEME (French Environment and Energy Management Agency). [avniR] platform aims to foster mainstreaming Life Cycle Thinking in industrial sectors in North of France by using a collaborative approach with all kind of actors (Businesses, University, Research, Consultant ...). To do so, a sectorial methodology have been developed and implemented in several sectors (agro-industry, mechanic, packaging, seafood, textile, wood ...) supported by [avniR] resource center. The Life Cycle in Practice (LCiP) project was conceived based on those five years of feedback in north of France. It aims to promote the uptake of LC approaches particularly in SMEs in France, Belgium, Portugal and Spain to reduce the environmental impacts of their products and services across the entire Life Cycle in three sectors: Buildings & Construction, Waste Management and Energy Equipment.

This paper presents the project's activities and expected results, as well as the conclusions of a maturity assessment on life cycle approaches that has been performed in the three sectors and four partner regions, as a mean to identify needs and gaps that LCiP should fulfill.

2 LCiP Project

LCiP- Life Cycle in Practice is a project funded by the **LIFE+ Environment Policy and Governance Programme** of the EU supporting technological projects that offer significant environmental benefits. The project period is 2 September 2013 – 30 June 2016.

The application of **Life Cycle Approaches** – including Life Cycle Assessment, ecodesign and environmental labelling – is becoming an increasing reality for business, and a growing challenge in many economic sectors. Businesses are facing increasing legal and market requirements to enhance resource efficiency and reduce the environmental impact of their products & services.

LCiP's specific objectives are to foster the widespread uptake of these approaches by SMEs beyond the duration of the project, by:

- Demonstrating the environmental and business benefits of applying LC Approaches through practical application in 32 businesses,
- Providing physical and online resource centres to support regional application of LC approaches,
- Building capacity in the four project regions for on-going implementation of LC approaches through a network of Life Cycle Champions, composed of experts and organisations,
- (Re) designing practical tools & methods tailored to the needs of the three industrial sectors.

2.1 Building capacity

The LCiP project builds capacity by developing training materials for the training of both practitioners in the labour market and university, and thus contributing to build capacity in LC approaches. LCiP provides training of current and future professionals but also training of trainers, to ensure widespread and sustainable building of capacity in participating regions.

The project establishes two different types of networks which play a key role in the building of capacity. The “Life Cycle Champions” network is trained in life cycle thinking and the use of LC tools. This network remains active throughout the project and beyond and it is active in research, training and tools development, and practical application in SMEs. The network ensures as well the long term business support and dissemination of Life Cycle methodologies.

The establishment of local “LC trainers clubs” enable face-to-face exchanges between trainers to improve practices and develop collaborations at a local level. The clubs are composed of organisations dispensing LC related training and related services in the region.

2.2 Online and physical resource centres

Training materials, products and methods are made available for key stakeholders of the LCiP project through an open-access module in the online resource centre, as well as through the physical resource centres of each region.

The online resource centre brings together information on life cycle strategies (such as ecodesign, green purchasing, life cycle communication and life cycle management), available tools and information (including LCA software, LC related tools, guides, training modules, case studies, relevant sustainability information by sector, news related to LC related policies, other LC projects’ results, expert centres and consultants).

The four physical resource centres (one in each participating region) are the “hub” for SMEs seeking to integrate LC approaches into their businesses. Here they have access to selected LCA tools, reading material, expertise, training and advice.

2.3 Pilot projects

The LCiP project provides a monitoring tool tested by 32 SMEs to evaluate the environmental and socio-economic impact of the adoption of LC approaches. The activities in these 32 case studies (4 per region and sector) include coaching and direct support in LC methodologies, leading to tangible measures such as:

- Changes in raw material use and/or suppliers,
- Replacement of fossil resources (materials, energy) by renewable resources (bio-sourced or recycled from waste),
- Reduction of product weight,
- Modification/optimisation of in-house manufacturing process steps,
- Modification of product design to reduce energy/water consumption during the product use phase,
- Modification of product design to allow better end-of-life processing (e.g. product dismantling and recycling),
- Modification of packaging material or packaging system, and/or reduction of packaging weight,
- Modification of transportation methods and/or distribution channels,
- Valorisation of co-products and/or waste.

2.4 Expected results

Key to the success of LCiP is the achievement of results that will continue to spread beyond the end of the project, furthering the promotion and uptake of LC approaches among SMEs in covered sectors in participating regions but also extending to other regions.

In order to enable these further developments, the LCiP project results in the following:

- 1 online LC resource centre and 4 physical resource centres,
- Building training capacity in 4 European regions: Belgium, France, Portugal and Spain, through the training of trainers and practitioners, the establishment of trainer clubs to share and co-develop training capacity,
- Implementation of Life Cycle approaches in 32 SMEs,
- Evaluation tool adapted to the reality of SMEs to assess the environmental and socio-economic impact,
- Practical tools and methods tailored to the needs of SMEs in participating sectors,
- A network of Life Cycle Champions (influential regional players in their industrial sector) to provide guidance and training to SMEs during and after the project,
- Life Cycle Awards in each participating region,
- European and Global dissemination of LC approaches,
- A baseline analysis of the maturity of Life Cycle approaches in the 4 participating regions, including surveys and interviews of key actors, and a cartography of existing resources available to practitioners.

2.5 Partners

The project is being developed by an international partnership from France, Portugal, Belgium and Spain, adding up to 4 partners with proven expertise in the area of life cycle thinking and training. The project coordinator is CD2E- Creation Developpement des Eco-entreprises.

- **CD2E** (France) is the network of environment and business experts dedicated to supporting the environmental sector in Northern France and abroad.
- **GreenWin** (Belgium) is the competitiveness cluster dedicated for the economic and industrial development of Wallonia, with particular focus on eco-technologies.
- **LNEG** is the National Laboratory for Energy and Geology (Portugal) that in this project focuses on Life Cycle approaches in organizations from the building and energy equipment sectors.
- **PROSPEKTIKER** (Spain) is the European Institute for Future Studies and Strategic Planning, with particular focus on regional and local development, clean production and research related to the environment and is applying the project in the Basque Country.

2.6 Sectorial approach

The preparatory actions of the project are key to understanding the current capacity of business sectors and SMEs in each partner country to implement Life Cycle approaches. This was done through an assessment of the maturity of environmental practices, for which partners reached out to organisations representing and supporting SMEs including industry bodies such as clusters, industry associations, chambers of commerce, employers' associations, regional federations and sectorial associations (Adibi, N. et al, 2012).

The first step in the maturity assessment was the development of a common methodology based on models already in place among the partners. The Cd2e has already experimented with mapping existing life cycle activities (research, initiatives, tools...), undertaking surveys of businesses and support structures, benchmarking the maturity, and developing improvement strategies for four sectors regionally (textile, mechanic, packaging and seafood) and wishes to share and enrich its experience and methodology with contributions from the LCiP partners.

The agreed assessment methodology allowed project partners to undertake a mapping exercise of existing life cycle activities, in particular to identify research, training and business activities, with a particular focus on Life Cycle tools available to businesses, in particular SMEs: LCA software adapted to sectors, guides, case studies, training, expert centres... for each target sector in each region.

The partners undertook surveys of SMEs and SME support structures (federations, clusters...) on their knowledge and use of Life Cycle approaches. The surveys contain the same “base” questions in all regions and sectors, with a specific section for the sector/supply chain, to enable the partners to identify and account for regional and sectorial variations. A sub-group of the surveyed companies have accepted to be interviewed by project partners, in order to go more in depth on the questions asked. All in all, some 260 organisations were surveyed and 90 interviewed for the project.

Finally, these results of the maturity analysis will feed into many project activities. In particular, the mapping of LC resources in each region will help to construct the online and physical resources centers, and the challenges highlighted by companies and support structures will help us to begin to identify improvement strategies for the sector.

The maturity analysis will also be the basis for the definition of a strategic plan for large scale rollout of Life Cycle practices in business and higher education. In particular, towards the end of the project, we will undertake a strategic planning exercise, aimed at defining how to roll out life cycle practices at a large scale across the private sector. This will be achieved through our close collaboration also with support structures (through the LC Champions network), fostering the development of specialised expertise in LCA and other LC tools (consultants, research centres), and ensuring that life cycle thinking is understood by future decision makers in businesses (through higher education).

The elaboration of the strategic plan will rely on consultation of key stakeholders in each region, through workshops, discussion with project partners including LC Champions and LC Experts.

The strategic plan will include proposals for:

- Scope for the de-multiplication phase, including recommendations on in which industrial sectors and which regions (including but not necessarily limited to those sectors and regions covered by LCiP) efforts should be made to promote LC approaches.
- Recommendations as to where to find further expertise, knowledge and other relevant resources, including networks, and other relay organisations.
- Particular attention will be paid to strategies for mobilising funding for the rollout beyond the end of the project.
- Description of recommended de-multiplication processes and tools, such as the online LC platform and physical resource centres.
- Capacity building efforts, including training programmes for trainers, for individual SMEs and within higher education, coaching of individual SMEs, forums for exchange of best practices.
- Awareness-raising efforts such as Life Cycle Awards, conferences and other events.

The formal launch of the strategic plans for large-scale rollout of Life Cycle practices in business and higher education will take place during the final events to be held in each LCiP participating region. These events will bring together key stakeholders from the sectors worked on during the LCiP project, but also other sectors that are interested in the approach. Business support organisations, LC experts (consultants, researchers), higher learning

institutions and local authorities will also participate. We expect at least 100 stakeholders will be present at each event, and the LCiP beneficiaries will also be invited to participate at all 4 events.

We expect that the four strategic plans (one per sector) will be of substantial use to actors in the value chain in each sector and each region, and will strongly position LC Champions and project partners as key resource partners for further development of LC practices.

3 Maturity Analysis

3.1 Method

The maturity assessment performed and improved in LCiP project, is based on the methodology that had been developed of and tested with the support of [avniR] platform in four industrial sectors (mechanic, packaging, seafood, and textile) in Nord-Pas-de-Calais region, France. It consists on the development and application of questionnaires to be filled in online by companies from the value chain of the three LCiP sectors and questionnaires (also online) targeting support organizations, i.e. institutions that provide R&D, consulting or any other type of technical support to the companies.

The questionnaires were disseminated by e-mail through the partners' Life Cycle Champions and sectorial organizations' mailing lists, in order to reach the maximum possible number of respondents per country.

A quantitative assessment methodology was used for companies of the three LCiP sectors and is described below. In table 1, the questions from the online survey that were used for the maturity assessment are presented.

		0	100
1	Environmental strategy considers the life cycle of its products/services?	No	Yes
2	Knowledge of environmental impacts activities over the life cycle ?	No	Yes
3	Tools or systems used to manage environmental impacts ?	0	10
4	Years working on LC approaches?	<1	>5
5	Internal or external human resources to implement LC approaches?	External	Internal
6	What are the internal resources to implement LC approaches?	Indefinite	Department
7	Internal communication about LC actions?	No	Yes
8	External communication about LC actions?	No	Yes

Table 1: Maturity analysis criteria

Note 1: In question 3, the scoring shown on the right hand side corresponds to the sum of the number of tools and systems, multiplied by the level of understanding of the environmental impacts over the life cycle.

Note 2: The tools or systems in the inquiry included environmental management systems, life cycle assessment, environmental product declarations, labeling and footprints, ecodesign and green purchasing.

The sum of the values obtained with the eight parameters was then normalized so that a final classification between 0 (the lowest scoring in terms of LC maturity) and 100 (the maximum scoring) was obtained.

4 Results

After collecting all the results of the different sectors in the different regions, spider web charts were produced in order to provide an overview of each region's and sector's maturity.

The results are representative of the inquired businesses and a proxy to the current maturity of the sectors and regions. Nevertheless, due to the dimension on the sample, these results must not be used out of this context.

The comparison of the different sectors is presented below.

4.1 Building sector

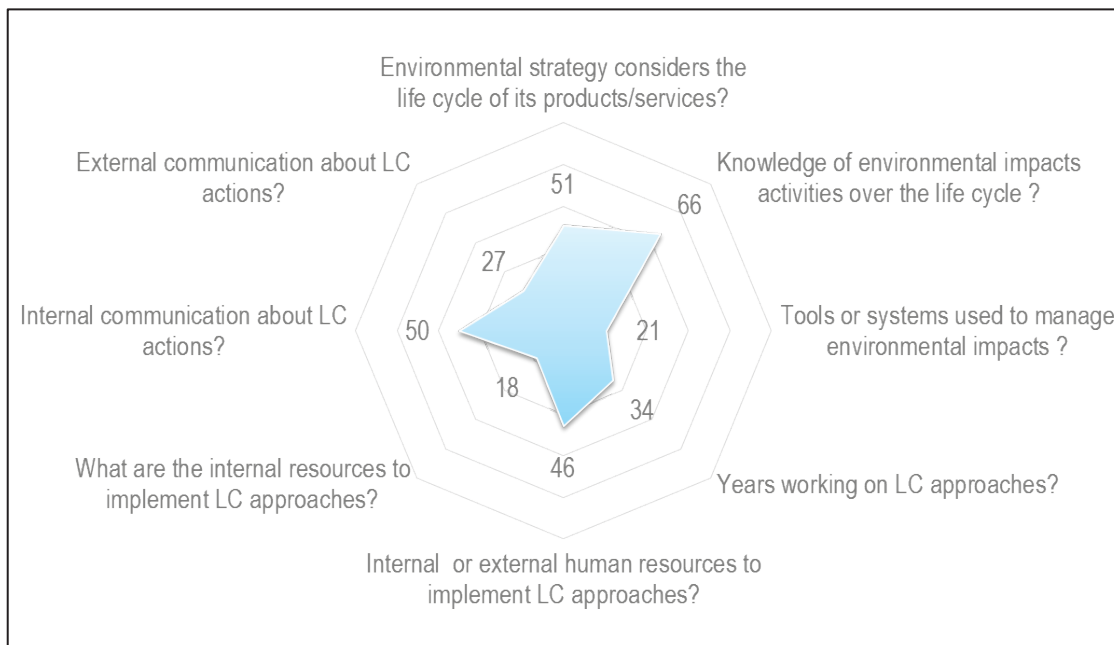


Figure 1: Global answers results of the life cycle maturity assessment in the building sector

This web chart represents the answers obtained for each of the questions in the building sector and it is not meant to represent the maturity of the sector.

As in the LCA methodology, this may be seen as a midpoint quantification of the maturity assessment, representing the results after the characterization and normalization steps. To evaluate the maturity in LC approaches, the endpoint quantification, it is necessary to apply a

weighting factor to balance the significance of the different inquired areas. The weighting step is an essential step to calculate the endpoint maturity score.

- In the building sector, 50% of the companies considers the life cycle of their products in the environmental strategy.
- Over 60% of the companies claim to have knowledge of the environmental impacts of their activities over the life cycle.
- The amount of tools used to manage the life cycle environmental impacts is scored at 20%, corresponding to the use of 2 tools/strategies per company.
- In average, the activities in life cycle approaches is relatively recent, scoring 1/3 of the maximum value, corresponding to 1 to 2 years of experience.
- About half of the companies have internal human resources to work in life cycle approaches. Although most of them don't have a specific person or department for this.
- Finally, half of the companies are communicating internally their activities of life cycle approaches, but few of them do this communication to the exterior.

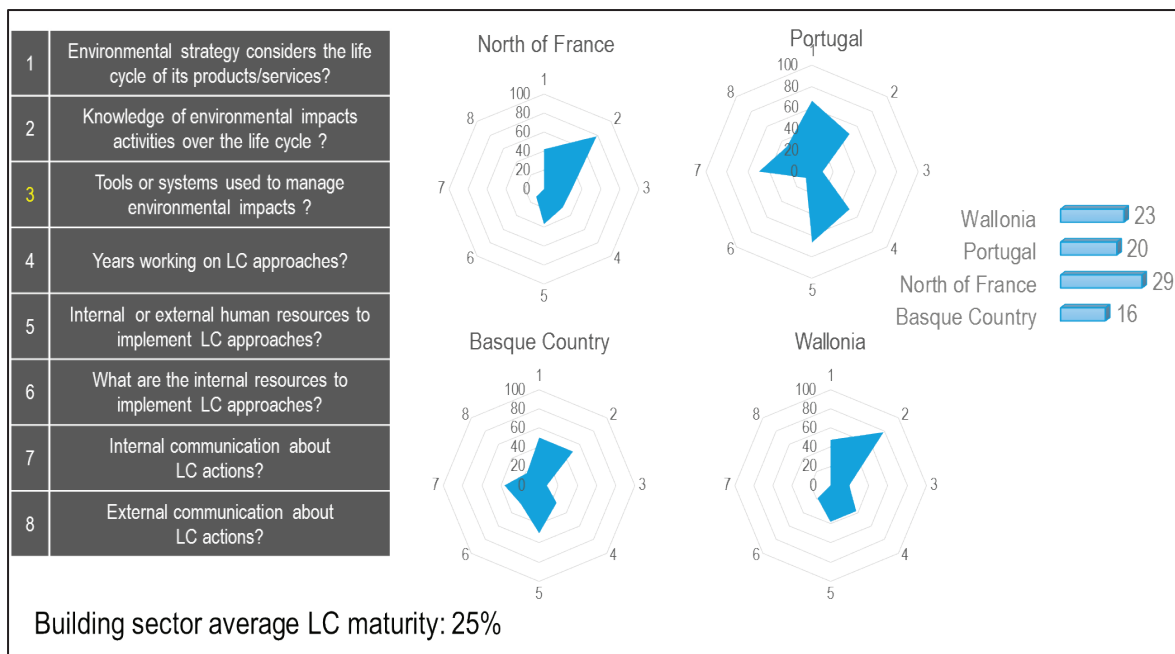


Figure 2: Disaggregation by region of the results of the life cycle maturity assessment in the building sector

Note: North of France and Wallonia maturity do not include communication criteria. This is the reason of their zero score.

Web charts are very different from one region to another. This is mainly due to the diversity of players in this industry: public project owners, private project owners, prime contractors, architects, engineering firms, industrialists, manufacturers of building materials, etc. These actors do not address the life cycle thinking in the same way. For example, project owners pay close attention to the integration of environmental criteria in their specifications but do not use LCA tool. Instead, engineering firms may use some LCA tools: simplified ones or integrated in their sector specific software.

Regarding all the regions, the life cycle is considered in businesses strategy, (minimum average 40% of the businesses asked in each region). Indeed, the regulations in the building

sector are numerous and the project owners are aware of these issues for a long time in the 4 regions.

Besides the Basque Country and Wallonia, few dedicated tools are integrated by the actors. LCA tools are new and still relatively unknown for building actors.

We note the building sector in Portugal seems to have started actions in life cycle approaches earlier than the remaining regions. And, also, there are more internal human resources working on LC approaches. Although in the final score, Portugal is only the second lowest value, because the parameter with the highest weight is related to quantity of LC tools used and here Portugal has a low score.

4.2 Energy sector

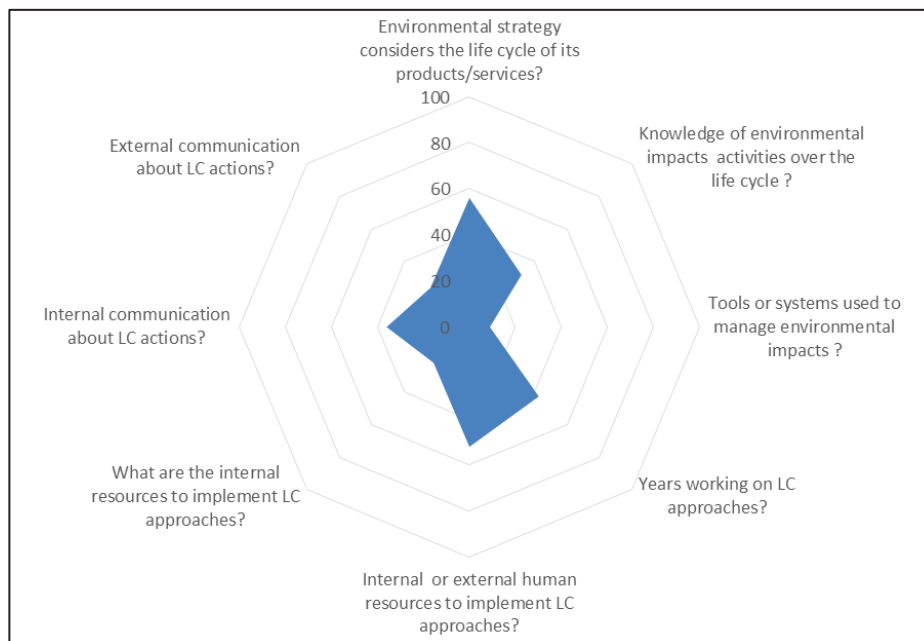


Figure 3: Global answers results of the life cycle maturity assessment in the energy sector

- In the energy sector, over 50% of the companies considers the life cycle of their products in the environmental strategy.
- Although, only 30% of the companies claim to have knowledge of the environmental impacts of their activities over the life cycle.
- The amount of tools used to manage the life cycle environmental impacts is scored at 10%, corresponding to the use of only 1 tool/strategy per company.
- In average, the performance of life cycle approaches is relatively recent, scoring over 1/3 of the maximum value, which correspond to 2 to 3 years of experience.
- About half of the companies have internal human resources to work in life cycle approaches. Although most of them don't have a specific person or department for this.
- Finally, 36% of the companies are communicating internally their activities of life cycle approaches, and 24% of them do this communication to the exterior.

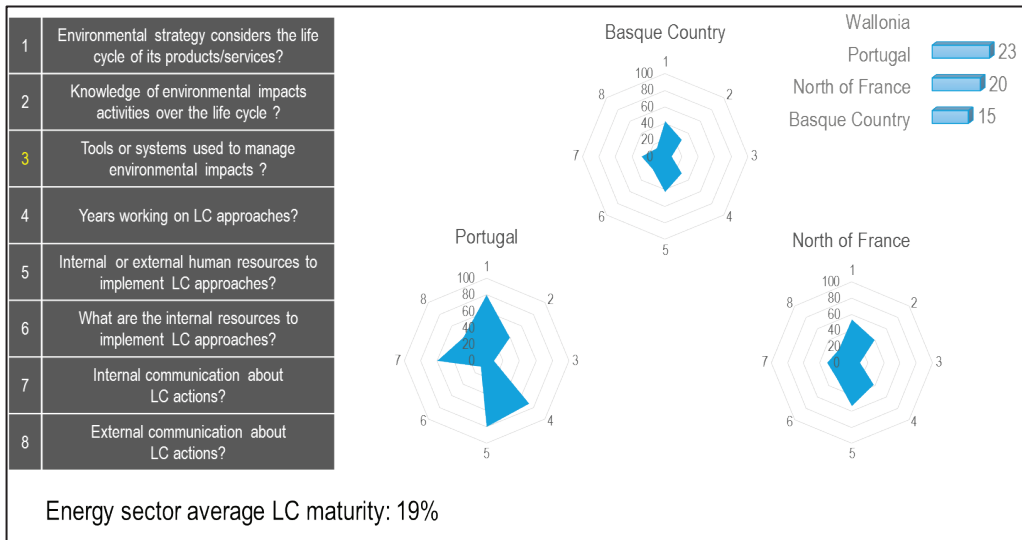


Figure 4: Disaggregation by region of the results of the life cycle maturity assessment in the energy sector

The web chart of the companies in energy sector are similar for all three regions. As in the building sector, the company global strategy considers the life cycle of products and services (minimum average 40 % of the businesses). Indeed, the energy companies, especially those specific to renewable energy have long understood the environmental challenges of energy management.

Most technologies of this sector are still in development but have not been ecodesigned in a concrete way. For example, recycling technologies for wind turbines or photovoltaic solar panels are the subject of research, but not the ecodesign of these systems as such.

For communication, as few actions were put in practice, it remains low in the four regions. As mentioned in building sector, Portuguese companies that answered have developed actions in life cycle approaches for more years than the other regions, and have a higher degree of internalization of human resources with LC approaches competences.

4.3 Recycling sector

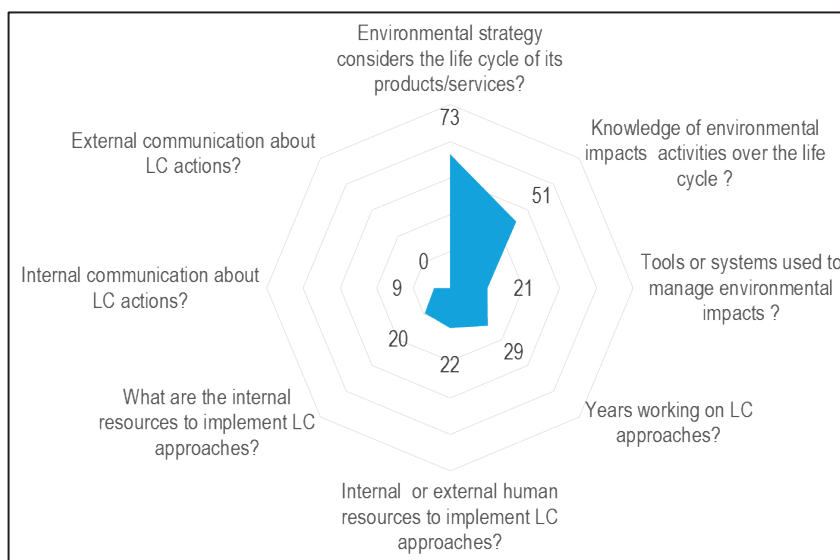
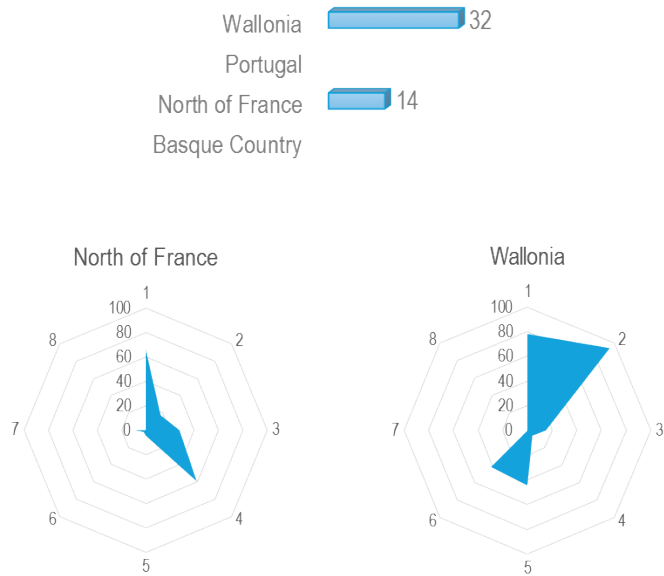


Figure 5: Global answers results of the life cycle maturity assessment in the recycling sector

- In the recycling sector, 73% of the companies considers the life cycle of their products in the environmental strategy.
- About 50% of the companies claim to have knowledge of the environmental impacts of their activities over the life cycle.
- The amount of tools used to manage the life cycle environmental impacts is scored at 20%, corresponding to the use of 2 tools/strategies per company.
- In average, the activities in life cycle approaches is relatively recent, scoring under 1/3 of the maximum value, corresponding to 1 to 2 years of experience.
- Only 20% of the companies have internal human resources to work in life cycle approaches, and generally don't have a specific person or department for this.
- Finally, only 9% of the companies are communicating internally their activities of life cycle approaches, and none of them performed this communication to the exterior.

1	Environmental strategy considers the life cycle of its products/services?
2	Knowledge of environmental impacts activities over the life cycle ?
3	Tools or systems used to manage environmental impacts ?
4	Years working on LC approaches?
5	Internal or external human resources to implement LC approaches?
6	What are the internal resources to implement LC approaches?
7	Internal communication about LC actions?
8	External communication about LC actions?



Recycling sector average LC maturity: 22%

Figure 6: Disaggregation by region of the results of the life cycle maturity assessment in the recycling sector

Note: Wallonia’s maturity does not include communication criteria. This is the reason, of their zero score.

Regarding the recycling sector, the environment is central in the business model of these companies and, as we can see in the figure, they have integrated LC in their strategies and have knowledge of the LC impacts of their products, but they don’t implement or use LC tools internally. Thus, they don’t have human resources with LC approaches competences, and they don’t have LC related communication actions.

4.4 Maturity scoring by region and sector

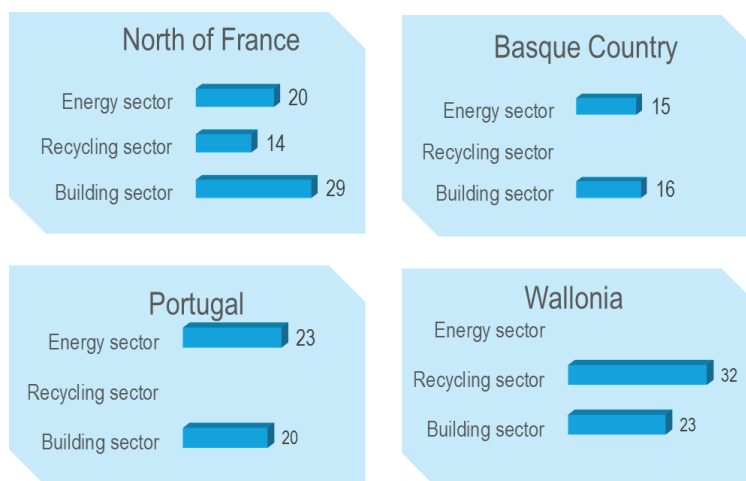


Figure 7: Sector maturity scoring by region

- When comparing the maturity of each sector by region, the results show that the building sector has the best score in the North of France and in the Basque Country (with a very similar value to the energy sector).

- In Portugal the best classified sector is the renewable energy, but close to the building sector result.
- In Wallonia region, the recycling sector has the overall best result with a 32% score.

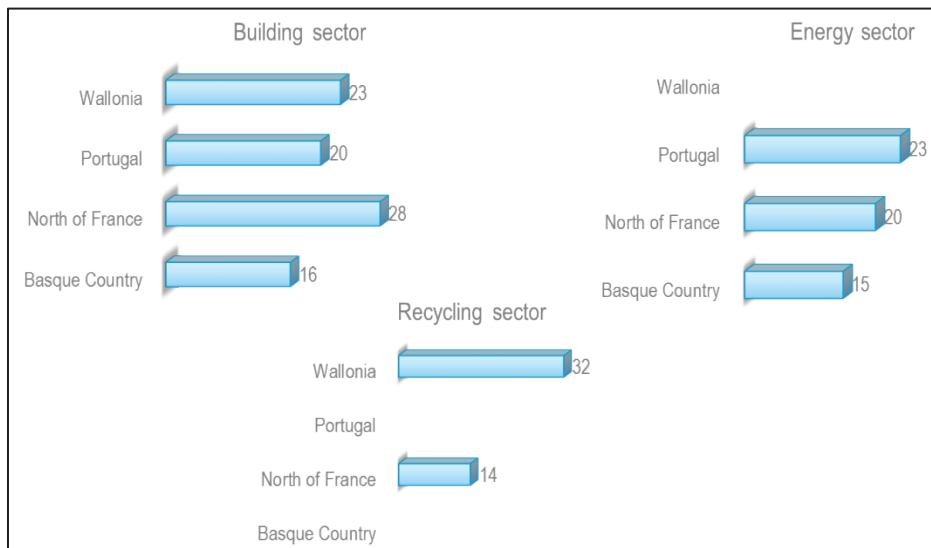


Figure 8: Regional maturity scoring by sector

- Analysing the results by sector, the results show that in the building sector the final maturity scores are between 16 and 28%, with the best score for France and the lowest to Spain. In the energy sector, the values are between 15 and 23%, and Portugal has the highest value and Spain the lowest.
- In the recycling sector, the difference between regions is significant, as Belgium has the best overall result of 32%, and France has the lowest overall result with 14%.

5 Conclusion

The maturity on life cycle approaches is low in all regions and sectors. In the endpoint evaluation, it is considered that there are no significant differences between the sectors and regions. Businesses claim to be aware of their environmental impacts through the life cycle, and that their environmental strategy include life cycle thinking. Companies have reduced and recently implemented life cycle instruments and tools. Internal human resources are typically non dedicated staff member(s). Communication actions of life cycle related issues, concerns internal dissemination activities rather than external ones.

This assessment of the maturity does not intend to be a definitive and final characterization of the maturity of the studied sectors regarding their integration of life cycle approaches, as complementary studies through stakeholders consultation is planned within LCiP project. Nevertheless, it helps to understand the advances and shortcomings of the players in each region and contribute to the development of specific action plans for each sector in the four regions.

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