BUILDING LIFE CYCLE ASSESSMENTS: MARKET RESEARCH ON COSTS AND CAPACITIES IN GERMANY

CONTENTS

SHORT STUDY

Stuttgart/Berlin, 15 April 2025

Building life cycle assessments: market research on costs and capacities in Germany

Translated from the German original "Gebäudeökobilanzen: Marktdaten zu Relevanz und Kosten"

Summary

With the implementation of the EU's Energy Performance of Buildings Directive (EPBD), assessment of the life cycle Global Warming Potential (GWP) will become mandatory for large new buildings (useful floor area >1,000m²) from 2028 at the latest, and for all new buildings as of 2030. In preparation for this, the German Sustainable Building Council (DGNB e.V.), together with BPIE (Buildings Performance Institute Europe), has collected market data from Germany on the subject of building life cycle assessments (LCAs)[1]. Their analysis is based on market research into training programmes and LCA tools in Germany, as well as a survey of 62 persons offering building LCAs. This paper looks at all the building blocks needed to provide consultancy services on calculating and optimising building LCAs, necessary qualifications and building LCA tools themselves.

The evaluation shows that expertise in the field of building LCAs is growing rapidly in Germany, that a wide range of training programmes are available and that specialist training as an LCA expert is already relevant today and will become even more important in the future. There has been a sharp increase in the number of building LCA tools coming onto the market. There are currently no quality tests for these, but this will become an important consideration in view of the future obligation to disclose the results of life cycle emissions for new buildings. Market research shows that the costs of LCA tools vary greatly depending on the business model: basic versions cost between €700 and €1,800, and only one tool is available free of charge. The survey of consultants indicates that most not only calculate results but also offer advice on optimisation. The costs vary greatly, averaging between €7,000 and €15,000 per project. The respondents see opportunities to reduce costs, primarily through the use of digital planning.

In view of these findings, the DGNB and BPIE recommend that a regulation on the life cycle emissions of buildings (also referred to as *whole life carbon regulation*) be introduced in the near future, at least before the EPBD timeline requires it. Quality assurance mechanisms such as mandatory training, quality-tested LCA tools and a streamlined validation process should be considered and further developed. Planners and contractors would be advised to further expand their own expertise in building LCAs, while providers of LCA tools should guarantee quality assurance and make their tools simpler to use.

[1] While building LCAs can have a broader scope, including other environmental indicators, it mostly refers here to the scope of the EPBD provision of calculating whole life cycle emissions.

Background

The importance of the building sector for achieving climate goals has become the focus of decisions and activities among both policymakers and the majority of building sector stakeholders. While past efforts were heavily directed at improving energy efficiency in building operations, in other words, saving energy when heating and cooling, the perspective has increasingly shifted to a life cycle approach. This approach means that the way in which buildings are constructed or renovated, how products and materials are manufactured and transported, and what happens to them after use are also taken into account in the decision-making process

What is a building life cycle assessment (LCA)?

A building LCA makes it possible to analyse the environmental impact of a building over its entire life cycle and work out its life cycle GHG emissions.[2] The calculated values are made up of so-called embodied emissions[3] and operational emissions. They provide total values for CO_2 and other climate-impacting effects.

When performing calculations for a building LCA, a structured procedure must be followed that is defined in national and international standards. In Germany the DIN EN 15978 is authoritative for building LCAs and DIN EN 15804 for the underlying data relating to products and processes.[4] In order to conduct a building LCA, it is first necessary to define the objectives and the framework, i.e. the system limits. Data must then be collected representing the building model as well as its operation and use. With the help of LCA software, the life cycle is then modelled according to predefined rules. By linking the results with LCA data containing specific CO_2 parameters – as well as a large number of other environmental indicators for products and processes – environmental indicators can ultimately be calculated for the entire modelled life cycle.

Building LCAs help to identify the building components or life cycle phases with the greatest environmental impact (so-called hot-spot analysis) and to identify potential for improvement by comparing different variants. The results can also be compared with requirement or reference values.[5] Another application involves analysing whether renovations or new constructions are worthwhile in environmental terms (see DGNB short study: The impacts of renovations on our climate[6]).

The quality of a building LCA is primarily determined by the methodological compliance of the LCA software used, the correct representation of the building in the calculation model, the LCA data used, the competence of the individuals calculating the LCAs and plausibility checks through appropriate procedures or qualified persons.

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[2] For further information, see, for example, DGNB 2018: Leitfaden Gebäudeökobilanz (Guideline on building life cycle assessments (German))
[3] in Germany also referred to as grey emissions.
[4] DIN EN 15978: Sustainability of construction works – Assessment of environmental performance of buildings – Calculation method; DIN EN 15804 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
[5] For example, to demonstrate funding or financing criteria, in the context of certifications or – as already introduced in some European countries – for building approval.
[6] DGNB 2025: The impacts of renovations on our climate: a life cycle based assessment.

Building LCAs and life cycle limit values are being introduced via EU regulations

The life cycle perspective has also found its way into the EU regulatory framework. With the new version of the EPBD issued in May 2024, the disclosure of life cycle GHG emissions for new buildings will be required from 2028. Member states are also required to develop national roadmaps outlining how limit values for the life cycle global warming potential (GWP)[7] will be introduced from 2030 onwards that follow a steady downward trend and are in line with EU carbon neutrality targets. The EU taxonomy, which defines environmentally sustainable economic activities, and the announced requirements for green public procurement of buildings also call for the disclosure and limitation of life cycle greenhouse gas emissions.

The environmental information required for building LCAs is currently provided voluntarily by many manufacturing companies in a structured and verified form by means of Environmental Product Declarations (EPDs). A review of the availability, costs and trends of EPDs has shown that the benefits are recognised and that many stakeholders are well prepared.[8] Under the new version of the Construction Products Regulation (CPR (EU) 2024/3110), the provision of environmental information will be mandatory for the 24 product categories.

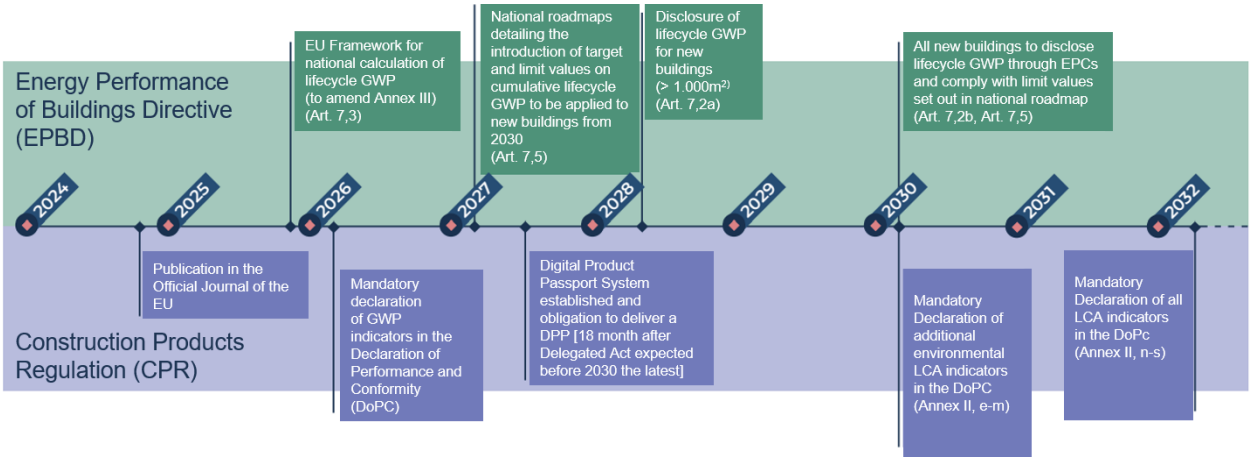

Figure 1: Overview of timetable for the Energy Performance of Buildings Directive (EPBD) and Construction Products Regulation (CPR). Source: translated and updated from BPIE 2024[9]

Building LCAs are being tried out in Germany, but not yet established in regulatory law

In Germany, it has been possible to calculate building LCAs for around 20 years. The first Ökobaudat database established for this purpose was published in 2006 and, from the time of their launch in 2008, this enabled the first certification systems for buildings (DGNB and BNB) to provide reference and target

[7] Global warming potential (GWP) indicates the potential of a substance to emit greenhouse gas. It is also expressed as CO_2 equivalent.
[8] DGNB / BPIE 2024: Environmental Product Declarations for Construction Products: An Overview of Availability, Costs, and Trends in Germany.
[9] BPIE 2024: How to establish WLC benchmarks? Insights and lessons learned from emerging approaches in Ireland, Czechia and Spain

values. Since 2022, in order to receive state subsidies under the Climate-friendly New Buildings funding programme, proof of a building LCA must be provided confirming that a building meets required limit values ('Anforderungswerte') of life cycle GHG emissions. In other EU member states, whole life carbon assessment of buildings is already established in law and must be submitted in order to obtain building approval. In Germany, introduction into regulatory law has so far only been announced, discussed and subjected to preparatory evaluation as part of research projects since 2019.[10]

Doubts and concerns in connection with building LCAs

Due to factors such as higher construction prices and the recent jump in interest rates, the construction sector is raising serious concerns about declining orders in the building industry. Additional costs and administrative workloads – such as developing the necessary expertise for the life cycle assessment of buildings – are therefore difficult to explain and justify to clients and planners. Based on experience of the resistance encountered to the amendment of the 2023 Building Energy Act in Germany, political decisionmakers and market stakeholders have also repeatedly expressed fears that further requirements could only be implemented with a high level of bureaucracy. If mandatory life cycle assessments of GHGs are introduced, the argument is that the necessary administrative capacities needed to verify LCAs would overburden the approving authorities. These arguments and fears discourage clients, builders and manufacturers from taking a positive approach to the subject of building LCAs and their underlying principles.

Aim of this background paper and methodological approach

The purpose of this short study is to offer evidence for the debate on the costs and opportunities associated with calculating building LCAs. With this in mind, market research was carried out on LCA training programmes and tools in Germany. A survey of 62 DGNB auditors was also conducted on LCA consulting fees in Germany.[11] The results support evidence-based discussion on the costs of adopting a life cycle perspective in Germany, i.e. calculating a building LCA, and help inform recommendations. Another short study (published in May 2025) deals with the costs of life cycle-optimised construction.[12]

[10] BBSR 2019: Mögliche Optionen für eine Berücksichtigung von grauer Energie im Ordnungsrecht oder im Bereich der Förderung. Endbericht (Possible options for considering grey energy in regulatory law or in the context of funding. Final report (German)); BMWSB/BMWK 2023: Gemeinsamer Bericht über Forschungsergebnisse zu Methodiken zur ökobilanziellen Bewertung von Wohn- und Nichtwohngebäuden (Joint report on research results on methodologies for the life cycle assessment of residential and non-residential buildings (German)). Publication 20/8830; BBSR 2024: Klimafreundliche Wohnbauten. Erprobung und Weiterentwicklung von Grundlagen der Ökobilanzierung (Climate-friendly residential buildings. Testing and further development of life cycle assessment principles (German)).

[11] The survey was sent to 62 DGNB-certified life cycle assessment experts/auditors in September 2024.

[12] BPIE/DGNB 2025: Gebäudeökobilanzen: Marktdaten zu Relevanz und Kosten (Building life cycle assessments: market data concerning relevance and costs (German)).

Results of the evaluation

In general, the following components are essential in order to guarantee the quality of building LCAs:

1. Expertise of the LCA specialists who carry out data collection, calculations and evaluations
2. Quality of the tools and data used to determine building LCAs
3. External audits and validations of building LCAs (for building certifications by trained auditors and the certification bodies[13])

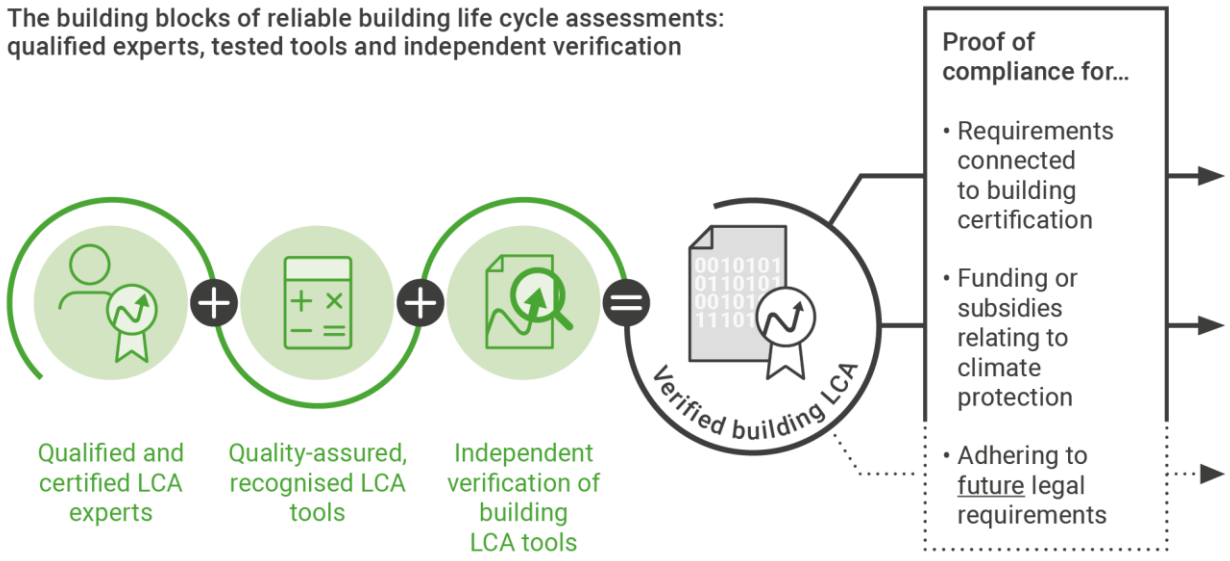

Figure 2: The building blocks of reliable building life cycle assessments: qualified experts, tested tools and independent verification

The greater the expertise of the individuals involved, the higher the quality of the tools used, and the more reliable the upstream verification processes, the better and more accurately the results reflect actual environmental impacts. This also means a lower administrative workload and lower costs for the implementing authorities. The costs of the 'tools of the trade' are set out below.

Results of market research on training programmes and building LCA tools in Germany

New funding programmes are leading to greater expertise, more demand for qualifications and a wider range of market offerings in the field of building LCAs.

In recent years, building LCAs in Germany have been carried out in practice almost exclusively in accordance with the rules and as part of sustainability certifications or research projects. Qualifications for certifications have been and continue to be offered in the context of training for certification experts. Since the launch of the so-called *Climate-friendly New Buildings* federal funding programme and the

[13] QNG website: QNG criteria.

announcement of other funding initiatives such as the programme for climate-friendly newbuilds in the low-price segment, many people have attended special courses to become LCA experts.

Since the end of 2023, the German Energy Agency (dena) website has also listed life cycle experts in its Energy Efficiency Expert List.[14] From 1 July 2025, an additional qualification as life cycle assessor will be mandatory for state funding programmes. In other words: only experts who have successfully completed additional LCA training can support funding applications.[15] People trained in this way also gain visibility on the websites of the training organisations; the DGNB lists DGNB-certified experts for life cycle assessment.[16]

The costs for the relevant – typically two- or three-day – training courses from the various providers (e.g. architecture associations, the bki Building Costs Information Centre, the DGNB, Builtworld) range from €450 to around €1,000. Prices vary depending on membership of a body or student status, for example.

The number of usable building LCA tools is growing rapidly and requires careful quality assurance; costs for LCA tools vary greatly depending on the business model.

The number of LCA tools has multiplied in recent years. As of January 2025, more than 25 tools are available on the German market for calculating building LCAs. As the results depend on the calculation tools' compliance with standards and requirements, various bodies are currently working to develop quality assurance criteria for these software tools. An overview of LCA tools[17] compiled by the DGNB highlights the methodological differences and applications of the tools. For example, some tools only allow an environmental indicator analysis to be made of global warming potential, while others allow further environmental parameters to be calculated. Other differences relate to overlaps and interfaces, variations in parameters or the options for using EPDs.

To ensure not only the quality of software programs used to conduct standard-compliant life cycle assessments on buildings, but also the transparency and accuracy of the results obtained, in 2023 an association largely made up of experts in building LCAs was founded under the name called *Gütegemeinschaft LCA Werkzeuge* (Quality Association for LCA Tools)[18]. Another association with similar name, *Gütegemeinschaft Gebäudebilanzierung e.V.* (Quality Association for Building Life Cycle Assessment), which previously validated energy consultancy software, expanded the range of its activities to include LCA and validation of the QNG sustainable building certification scheme[19] in July 2023.[20] The DGNB also offers a validation service for building LCA tools with regard to their compliance with DGNB rules.

[14] Dena website: Neue Kategorie in der Energieeffizienz-Expertenliste (New category in the list of energy efficiency experts (German)).
[15] Energy efficiency experts for federal funding programmes. Neubau: Qualifikation zur LCA wird verpflichtend (New construction: LCA qualification becomes mandatory (German)). BMWK, BMWSB, BAFA, KfW, dena websites.
[16] DGNB website: DGNB-examined experts in life cycle assessment.
[17] The DGNB provides an overview of all tools (as of 24 November 2024), including an indication as to whether the tool is recognised by the "Gütegemeinschaft" (quality association). DGNB 2024: Übersicht der Ökobilanztools mit Angaben der Tool-Herstellenden (Overview of life cycle assessment tools with information about the tool providers (German))
[18] Gütegemeinschaft LCA Tools: https://guetegemeinschaft-lca.de/
[19] Complying with the limit values for life cycle GHG emissions of the QNG is necessary to receive state subsidies.
[20] Gütegemeinschaft Gebäudebilanzierung e.V.: http://www.18599siegel.de/

The tools for calculating building LCAs are based on different business models[21] and versions[22]. It is therefore difficult to offer a general overview of the costs of LCA tools. As a rule, though, on the German market a basic version of a quality-tested LCA tool costs between €700 and €1,800 per user. Complete versions with extended functions range in price from €1,500 to €2,500. A small number of tools cost up to €10,000 in other variants. On the other hand, the eLCA tool from the German Federal Institute for Building, Urban Affairs and Spatial Development (BBSR) at the Federal Office for Building and Regional Planning (BBR) is available free of charge.

Survey results on consulting fees for building LCAs in Germany

Most of the LCA practitioners surveyed have extensive practical experience. Almost all of them offer calculations and advice on optimisation.

Well over half (57%) of the LCA practitioners surveyed had calculated between 50 and 100 or more than 100 building LCAs, 28% between 20 and 50 building LCAs, 6% between 5 and 20 and 9% fewer than 5 building LCAs. Almost all respondents also offer advice on optimisation (91%). All of them offer calculation of variants, while 60% advise on how to achieve a climate goal set by the client, for example. A quarter of respondents offer other options.[23]

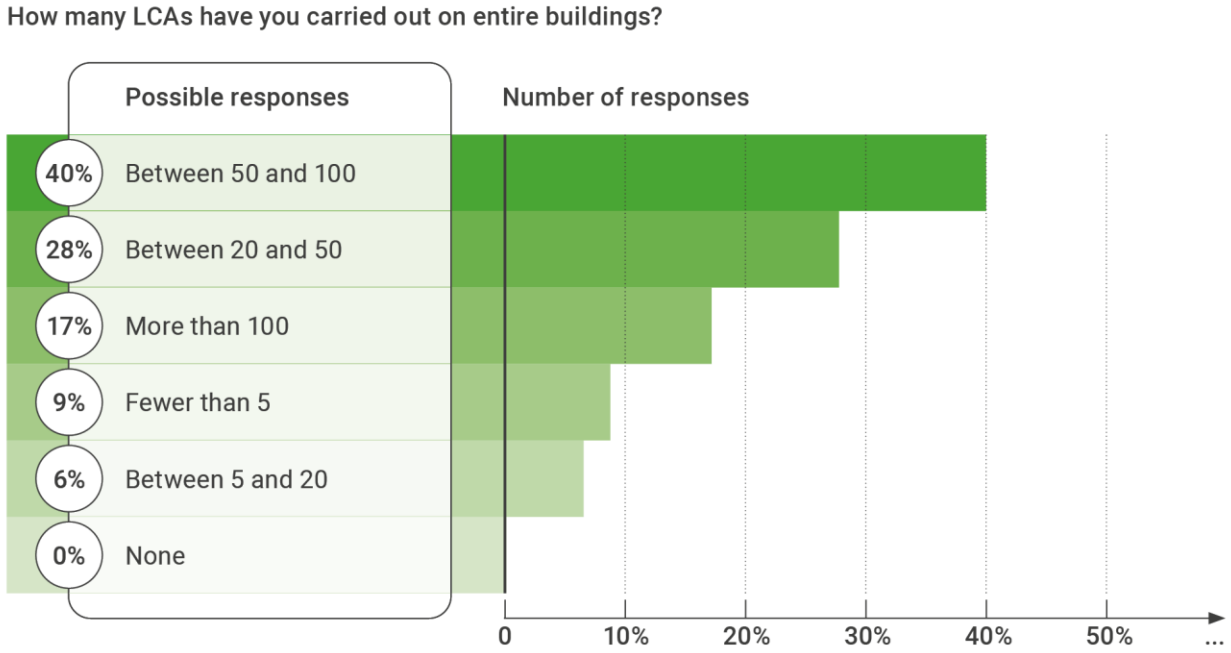

Figure 2: Own survey and evaluation of the practical experience of 62 providers of building LCAs, January 2025

[21] For example, there are one-off or annual licence fees, subscription-based models or usage-based payments, depending on the number of projects assessed or the number of employees in the company. Some providers also offer prices tailored to a specific project; students sometimes receive a discount.

[22] E.g. basic and complete versions. The latter usually offer more customer support or include additional functions (such as calculating the circular potential of the resources used).

[23] E.g. target value calculation with reference to science-based targets (SBTi), the Carbon Risk Real Estate Monitor (CRREM), the DGNB Climate Action Roadmap or detailed analyses of building materials or products if environmental product declarations (EPDs) are available.

Consulting fees in Germany for calculating a building LCA vary greatly

Respondents were able to indicate minimum and maximum fees, flat-rate fees or the average fee charged for a LCA. They were also asked about fees for advice on optimisation (e.g. comparing variants). The answers (see Figure 4) show a wide range of fees. The median lowest figure (minimum) is €7,000 and the median highest figure (maximum) is €15,000. For flat-rate arrangements, which are offered by 30% of respondents, the median is €7,000. The average price for a building LCA in Germany is a median figure (see cross in Figure 4) of €10,000. The respondents offer a wide range of consulting services relating to optimisation: from €400 to over €50,000. The median figure here is €3,000.

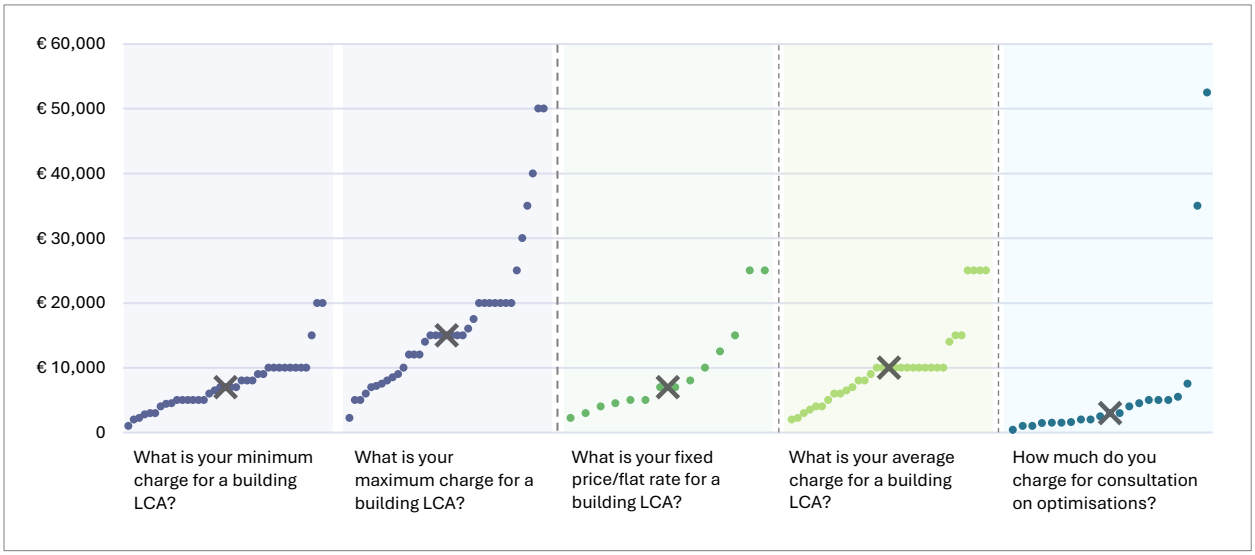

Figure 4: Own survey and evaluation of the consulting fees of 62 providers of building LCAs, January 2025

Consulting fees for calculating the LCA depend heavily on the amount of work involved in acquiring data, the size and type of building and the number of variants. Building information modelling (BIM) and digital twins are seen as ways to reduce costs.

Just under 80% of those surveyed stated that consulting fees depend on various factors. Those factors most frequently mentioned were data acquisition for the building model (74%), building size (over 65%) and building type (57%). Scope of documentation was stated as a decisive criterion by 40% of respondents while a further 40% said that the envisaged goal of the certification process had an influence on fees. More than half of those surveyed also commented on where they see opportunities to reduce costs and workload. Of these, half mentioned the use of BIM and digital twins as the most important way to reduce their consulting costs. The need to standardise underlying data, simplify software and provide digital bills of quantities was also pointed out.

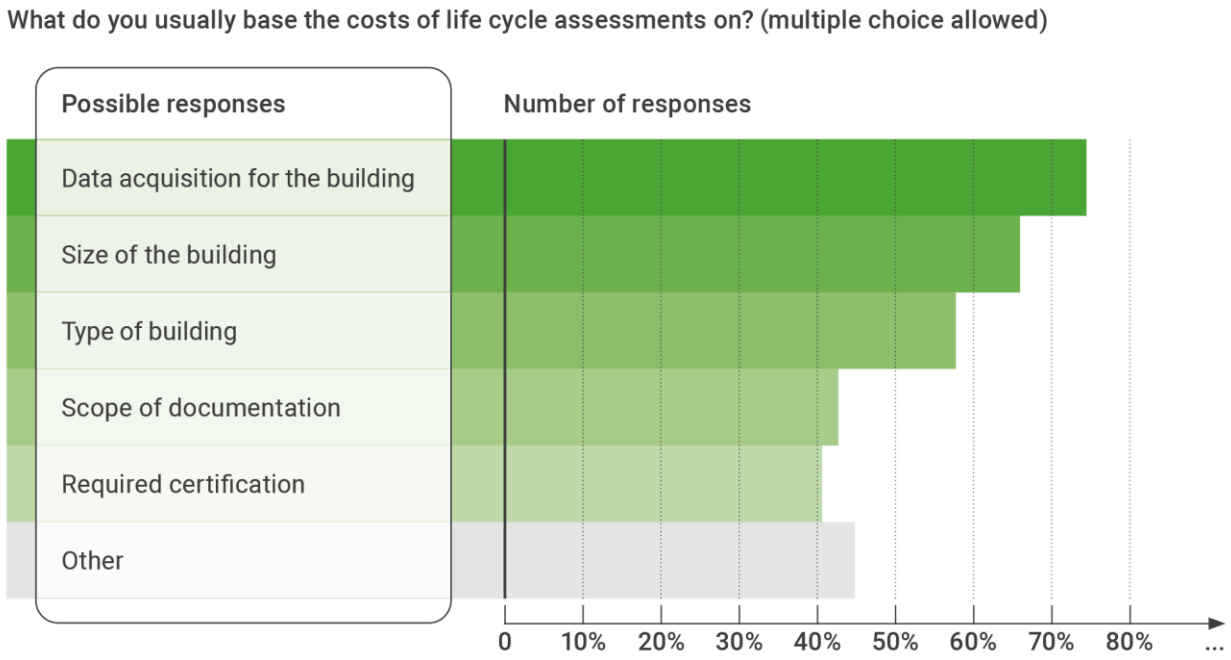

Figure 5: Own survey and evaluation of the cost drivers of 62 providers of building LCAs, January 2025

The fees charged for optimisation advice also depend heavily on the number of variants. Over half (54%) cite the status of information as a cost factor and 35% confirm that costs also depend on the envisaged goal. Some respondents indicated that the number of project meetings, the size of the team and responsibilities have an influence on the fees for project-related optimisation advice.

Standardisation and simplification of building LCAs are necessary – but more ambition is also required to achieve climate goals

Some respondents also had recommendations for policymakers. The recommendation most frequently mentioned (7 out of 18 responses) is standardisation of LCA rules between the various systems (certification, funding programmes), but also between Germany and Europe, for example regarding proof of compliance with the EU taxonomy criteria. The current differences have led to confusion among customers and hindered comparability. Another important recommendation is to simplify building LCAs (4 out of 17 responses). This would raise acceptance in the market. Interfaces with energy consulting programs could be used for this, so that the bill of quantities, energy consulting, building physics and life cycle assessment can come from a single source. Other recommendations include a stronger focus on using LCAs to optimise buildings, the provision of templates and changing the reference unit from area (per m^2 NFA) to users (per person).

Summary of findings and recommendations for Germany

The results of the market research and the survey of providers of life cycle assessments in Germany can be summarised as follows:

- The expertise and range of services in the field of building LCAs is growing steadily. Proof of qualification is expected to become even more important in the future (for state funding programmes, for example).
- The number of available building LCA tools is growing rapidly, therefore quality assurance of the tools is becoming increasingly important.
- The costs for providing training and qualifications vary from just under €500 to €1,000. The costs of LCA tools depend on the business models of the tool providers. Basic versions of tools are between €700 and €1,800 per user.
- The survey of 62 building LCA providers revealed a wide range of consultancy services and consulting fees for calculating a building LCA: the median minimum and maximum costs are €7,000 and €15,000 respectively per calculation. The costs depend heavily on the effort involved in acquiring the data, but also on the size and type of building and the number of variants to be calculated.
- The respondents see opportunities for cost reduction in the use of BIM and digital twins. They also point to the potential for standardising the methods for building LCAs and generally making them simpler to use.

The following recommendations can be derived from these findings:

Recommendations to German policymakers

1. **Introduce a life cycle regulation for buildings at an early stage and involve market stakeholders via participation initiatives:** Germany should resume the pioneering role it played in LCA only years ago with the early publication of a standardised and freely accessible database (ÖKOBAUDAT). Disclosure obligations and life cycle limit values should be legally defined at an early stage, i.e. before the deadlines for implementing the EPBD. Experience gained in frontrunner countries – that have led the way and do have a whole life carbon regulation already in place – shows that this encourages the development of expertise.[24] It is crucial to involve market participants and establish participation formats such as round tables for implementation as quickly as possible. The necessary steps for developing a national roadmap and introducing life cycle limit values – as set out in the EPBD (deadline: early 2027) – can then be taken jointly.
2. **Learn from other EU countries and drive harmonisation forward together:** Besides discussion with German stakeholders, it is recommended to hold in-depth dialogue with EU countries that have already introduced whole life carbon regulation. The Scandinavian countries,

[24] BPIE 2023: Regulierung der Lebenszyklus-THG-Emissionen von Gebäuden. Wie gehen andere EU Mitgliedsstaaten vor? Wo steht Deutschland? (Regulation of life cycle GHG emissions from buildings. What are other EU member states doing about it? Where does Germany stand? (German))

which cooperate through the Nordic Council, have institutionalised the process of learning from one another.

3. **Use experience gained from certification:** It is also recommended to seek closer coordination based on the many years of experience gained from more than 10,000 DGNB and BNB certifications, the latter being the federal certification scheme for public buildings. This could be helpful when discussing the pitfalls and opportunities involved in reviewing building LCAs.
4. **Further expand quality assurance mechanisms:** To enable the simple introduction of building LCAs as an approval requirement, interaction between the expertise of the people concerned, the quality of the tools and the review mechanisms must be continuously optimised. This entails mandatory training for those responsible for approvals (similar to that introduced for KfW programmes), the approval of quality-tested LCA tools and the establishment of an unbureaucratic validation process for individual building LCAs.
5. **Establish lean structures with built-in compliance checking mechanisms and reduce administrative obstacles:** A review mechanism should be established in order to conserve the resources of the reviewing authorities while ensuring quality. This should be designed so that the mechanism checks, for example, whether results are realistic and only require review in cases where building LCAs lie outside a certain confidence interval. Discussion and information sharing can then be used to jointly address and resolve concerns within administration or approving authorities.
6. **Adapt the requirements of building life cycle assessment:** It is important to ensure that the rules – i.e. the methodology, as well as the quality and review mechanisms described – are harmonised between the areas of funding, certification and any later building approval, so as to avoid duplicate submissions.
7. **Establish the use of quality-tested tools in building LCAs:** In the case of German state funding programmes that already include compliance with life cycle greenhouse gas limit values, proof of the building LCA should only be permitted using quality-assured LCA tools.

Recommendations to German market stakeholders

1. **Continue to expand building LCA expertise:** Capacities must be safeguarded in order to meet rising demand. It is therefore necessary not only to establish LCAs as a standard element of training within the existing programmes offered by training providers, such as the chambers of engineers and other established training institutions, but it is also important to make use of existing formats.
2. **Pay close attention to quality assurance and ease of use:** Providers of building LCA tools should not only endeavour to ensure validation and quality assurance, but also reduce workloads – and hence the costs – associated with data acquisition. This can be achieved by creating interfaces, for example with energy consulting or tendering software, and doing as much as possible to simplify processes.
3. **Increase the transparency of building LCA consulting services:** The associations should define standard services in order to counter the evident differences in consulting fees and thus make the scope of services more transparent (analogous to energy consulting, as per the

German Fee Structure for Architects and Engineers (HOAI), for example). This will allow customers to compare various cost items.

4. **Support the further evaluation of building LCAs:** Standardised data structures should be developed in order to facilitate the analysis of building LCAs in the future, thereby making it easier to gain insights. This is less about data derived from building LCAs and more about obtaining further information on buildings and capturing a good description of building characteristics, for example. Both forms of information (LCA results and building descriptions) should be submitted together.

Authors: Dr Anna Braune, Isa Raus, DGNB e.V.; Lisa Graaf, Zsolt Toth, BPIE

About the German Sustainable Building Council (DGNB)
Founded in 2007, the DGNB is now Europe's largest network for sustainable building with around 2,500 member organisations. The aim of the association is to promote sustainability in the construction and property industry and to anchor it in the consciousness of the general public. With the DGNB certification system, the independent non-profit organisation has developed a planning and optimisation tool for the evaluating sustainable buildings and districts that helps to increase real sustainability in construction projects. The DGNB system is based on a holistic understanding of sustainability that takes equal account of the environment, people and economic efficiency. In addition, more than 10,000 people in around 60 countries have already been qualified as experts in sustainable building via the DGNB Academy training and further education platform. Further information can be found at https://www.dgnb.de/en

About BPIE – Buildings Performance Institute Europe
BPIE (Buildings Performance Institute Europe) is a European non-profit think tank that uses independent analyses and data collection to make research contributions to a carbon-neutral building stock and feeds these into the political debate at EU level and in the European member states. BPIE's work focuses on the evaluation of policy instruments and programmes and the identification of technological solutions and social innovations to reduce energy consumption and promote renewable energy in the European building sector. BPIE also emphasises the importance of healthy homes and the need for a life cycle approach in order to embed sustainability along the entire value chain. In addition to its headquarters in Brussels, since 2014 the Institute has maintained a further office in Berlin, resulting in a particular focus on building-related policy development in Germany. Further information can be found at: www.bpie.eu

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