

LCA in Green Star

Discussion Paper- **Our Response**

We welcome the discussion of introducing Life Cycle Assessment (LCA) into the Green Star process and have detailed our response to [selected] questions below.

Page 6- General GBCA:

Is it appropriate for the GBCA to undertake this project or would any other organisation be better placed to do it? If yes, which?

The GBCA is an appropriate body to introducing the LCA methodology into the construction industry and certainly for benchmarking quality of outcomes through its tools, but there are reasons to suggest the regulatory requirements and ownership of the certification process should lie with a public body (i.e. Department of Sustainability, Environment, Water, Population and Communities) that has national and international commitments to drive change in environmental impact disclosure. There are many ways to approach LCA and tools currently exist on the market that deliver credible outcomes, therefore one of the main risks the GBCA could face is simply creating another method that cannot be distinguished and is no more credible than the tools already on the market; when in fact that is what the market is looking for: a single straightforward LCA assessment process that can be applied to projects, can be benchmarked against each other and drive environmental impact disclosure. This is discussed further throughout our response.

Is the Australian market ready for LCA as a tool for assessing the environmental impact of materials? If not, in how many years time do you think the market would be ready?

In terms of ability to apply an LCA methodology to projects, the market has the resource and skills to do so- providing the most appropriate methodology is clearly communicated. With respect to the actual quantifying of material environmental impacts, the answer is different depending on the material types in question. Firstly though, we cannot work on the basis that all materials used in projects were either extracted or fabricated in Australia. LCA data or benchmarking will be heavily impacted by the level of disclosure and attention paid by material manufacturers in other countries.

Generally, material manufacturers operating in a traditionally competitive market sub-sector (e.g. masonry, flooring) have made efforts to demonstrate their LCA benefits as a means to offset upfront environmental impacts and so the burden on them to adopt LCA in product-certification is perhaps not too onerous. However, manufacturers working in an inverse environment to the above may be less driven and equally unable to adopt environmental LCA. This is particularly important to the future of environmental LCA, as the quality and quantity of available data has to largely come from the manufacturing sector.

What would you see as the main barriers to implementing LCA as an assessment methodology for materials in Green Star?

- a) **The business case and benefits of undertaking LCA.** We have to prepare a compelling case for undertaking an LCA that goes above the environmental need, particularly if LCA is introduced into the Green Star process as a credit only, rather than its own section or even standalone tool. The rewards for going through the LCA process have to reflect the work required.
- b) **Market agreement over assessment boundaries.** Page 11 response outlines the consideration of scope boundaries. What may be best from an environmental disclosure perspective may not be practical for the construction industry to work with.
- c) **Complexity of the task.** Undertaking an LCA, particularly for large scale projects could possibly supersede the resources required to undergo energy modelling. The credits available for performance

under energy reflect the level of work required for providing evidence, but it's not clear if the same would apply for an LCA.

- d) **Availability and credibility of data.** This is discussed throughout the response, but the availability of credible data for use in an LCA is a significant barrier.
- e) **Reporting Methodology.** The primary methodologies: process-based life cycle (PB-LCA) and environmental input output (EIO-LCA)- should be considered for their merits. The challenge however is that EIO-LCA typically over estimates and PB-LCA under-estimates environmental impacts. This issue hasn't really been addressed in this paper.

If the GBCA decided to introduce the methodology described in this paper, how much notice would you recommend the GBCA give to the market?

You could introduce an LCA requirement to the market now and you will receive a level of uptake that reflects the complexity of work required and timescales given. In our opinion, adopting a credible LCA requirement to the market (assuming the scope has been largely endorsed by key market stakeholders) would still require at least 6months notice to implement some kind of '1st level' disclosure requirement.

Page 8- Project Objectives:

The GBCA invites feedback from stakeholders on the objectives of the project

We fully support the objectives of the project and see a 'transparent and consistent methodology' as being the most difficult to achieve with a degree of credibility that also avoids disadvantaging any of the construction market sub-sectors.

The list of inclusions may be expanded in the future, is it appropriate to start with a limited scope of assessment in order to simplify the LCA?

A lot depends on the LCI(s) used for assessments, however we note the following:

- All materials are included on the basis that they represent >1% of material volume or cost.
- A tiered system is considered. For example- the inclusion of 'core structure', 'services' and fixtures & fittings' could award more rating points than just including 'core structure' materials. This allows flexibility for some market operators to demonstrate excellence in construction, while encouraging all to disclose some level of LCA. **The main barrier to adopting this approach however would be that projects disclosing a larger scope would show as having a greater environmental impact than those disclosing less.**
- In addition to the above point, you could also make LCA of the 'core structure' (or more) a conditional requirement before any points are awarded. You could then notify the market when you intend to increase the scope of mandatory elements. i.e. 'Fixtures and finishes' are mandatory for LCA within the next 1-2 years.

Are there additional materials that should be addressed by the inclusions and exclusions?

This section asks of 'materials' inclusions and exclusions, when the paper is actually talking about 'components'. It is important to distinguish between the two, as quite often changes in component impacts more are difficult to track than in materials. They are also evaluated differently and this has an impact on the assessment outcomes.

If the overall intent for LCA in Green Star is to assess by 'component', then not every material needs to be considered and this may, to some degree, undermine the overall process.

Is the use of a cradle-constructed, sealed and serviced' building approach appropriate?

There are 6 main stages that can offer more than 2 options on approaching LCA: Cradle to (a).Gate, (b) Site, (c) Completion, (d) Operation, (e) Grave, (f) Cradle. **In order to decide on which to use we collectively have to understand and decide on who's responsible for each stage in the LCA process, their ability to report and how feasible it is to include each in the proposed methodology.** The 'cradle-constructed, sealed and serviced' approach presents a few challenges, particularly as each stage requires a different method of assessment within the overall methodology. For example, Cradle to:

- a. Factory gate- Places ownership on the manufacturer to assess and disclose impacts as well as the design specifier to choose the most appropriate product. **It is realistic to assume an increase in manufacturer disclosure.**
- b. Site- Places ownership on the supplier to disclose their transportation emissions. Also requires contractor and specifier to source materials as efficiently as possible. **Inclusion of this stage may place heavy penalties on inaccessible areas with a specific building need.**
- c. Completion- Requires the contractor to assess the intensity of its construction impacts during the project. This also includes sub-contractors of varied sizes as well as 3rd party leased equipment with varied performance. **Where do you draw the scope boundaries? Also how feasible is it, for example, to account for the energy intensity of the construction process on a large project?** Also, the 'inclusions and exclusions' list on page 8 doesn't mention the operation, efficiency depreciation and maintenance of construction equipment. Should this be included in the assessment? (Suggested not, but must still be recognised)
- d. Operation- Includes energy assessment/ modelling to determine operational environmental impact. Easy to apply though existing standards- i.e. NABERS. **This stage should always be included in an LCA, but this could be done using data from tools such as NABERS, rather than establishing another method to assess energy.**
- e. Grave- Includes building deconstruction. While important for LCA completeness, it's fair to assume that measuring this stage in the process is not practical through Green Star. The approach of setting targets for 'potential % of material disassembly (as an existing GS credit) while well intended, is likely to have little resemblance on the material actually disassembled for re-use at the end of a buildings life.
- f. Cradle- Places ownership on various parties and considers % of material used in new building that is re-used. **Follows on from the point above, which is that measuring this stage is not practical.**

Is it practical to make qualified assumptions about the origin and the distances that material must be transported in a Green Star design submission, i.e. at a tender stage when some of the specific materials are unknown?

Unfortunately it may not be practical for the very reason suggested above. Core structural materials (steel & concrete) could of course be easier to apply a 'transport factor' than system equipment and fixtures. Having said the above, it may be possible for the GBCA to determine a set of values for key building elements and apply different adjustment factors according to each State; but this will need to be updated annually and the same issues noted in Q3 response apply here. This could be managed by including a 'buy local' provision that gives an allowed cost for items if they are procured within a certain radius, however this could prove difficult to regulate.

Page 13- Environmental Impact Categories:

General Note:

Following review of this section there appears a need for LCA to be considered for introduction as its own tool into the market. There would of course be many implications, but we feel the detail required to sufficiently measure some of the impact categories alone (including the resultant costs) justifies considering this approach. For example, 'land transformation and use' is a great category to include in an LCA, but reporting this in m² would not address issues such as carbon release and sequestration, ecological value and composition. Waste (and diversion from landfill) is another important aspect that, while perhaps addressed to some degree through data output, is not explicitly recognised.

Page 15- Practice

Is it practical to establish a standard practice reference case for low-rise, mid-rise and high-rise buildings of different classes?

It would be practical to establish reference cases, but the type should be considered and whether these should be developed on a project basis or prepared by GBCA and tailored according to state. For example:

- Reference cases could be provided for different building types- Public Building, Office etc.
- Each reference case would have minimum performance requirements upon which individual projects would be measured against.

Having a reference case for each project is not practical for assessment. State performance minimums for each building type used for the Green Star tool would be more appropriate.

The tailoring of minimum requirements for buildings according to State would have to consider the realities of construction practice and constraints by location (as per weighting adjustments made in existing GS tools). For example, it's feasible an LCA for an office building in NSW could give a better score than an identical built in WA on the basis of transportation and land use impacts. Therefore there would need to be reference case for building types for each BCA region.

Should the reference case distinguish between new building on a green field site, refurbishment or existing buildings and fitouts? How can an equitable system be developed which acknowledges the advantages of the options from an environmental impact perspective?

Ultimately, introduction of this credit/ tool will not dictate high level decision making on development (at least in the short-term). LCA's in themselves should present different bands of results based on the building types being assessed, but as noted previously, it would be useful to develop examples of different building types.

It may simply be possible to reward more environmentally sustainable development by stipulating minimum scope boundaries for an LCA. i.e. A cradle-completion approach for a new building would naturally produce a lower environmental result than an existing one of the same size being refurbished. Apportioning credit depending on the type of site is perhaps something that is better addressed using a precinct-wide tool. i.e. Green Star Communities.

Can LCA methodology in the Green Star Materials category operate without a reference case? If so, how do you see this working?

It could, but one of the principle values of the Green Star tools suite is to benchmark sustainability and compare design and construction performance. A reference case is required to help justify undertaking an LCA (if not mandatory).

Is it practical to conduct two iterations of the LCA with different inputs for the project? How much additional time would it take to do the second iteration of the LCA having completed the first one? Is it 25% more, 50% more, 100% more etc?

Without a specific reference case to review against it is difficult to comment. The practicalities of undertaking a 2-stage assessment are dependent on the nature of the project, which would also dictate the time required to complete the second stage. It really comes down to how accessible data sets are for input into calculations and software tools.

Page 17- The use of ISO 14025 EPD's"

Is it appropriate to nominate ISO 14025 as the reporting mechanism?

Yes. However, we would note that this would likely exclude projects from submitting un-verified LCA's. Assessments can still be comprehensive even if not conforming to ISO guidelines.

Page 18- Points Allocation:

Is percentage reduction in impact an appropriate way to award points for improvement?

Yes.

Is it appropriate to have separate credits for each of the environmental categories or should the total score be weighed together and assessed in one credit?

It would be more practical to weigh together the category scores and assess under one credit, however the individual category scores should still be reported on to inform development of the process.

Page 19- Data Inventory:

Should the Aus LCI Building Product inventory dataset be used in a LCA methodology within Green Star rating tools?

We would support the use of a national LCI being used (as noted below) however it would appear that the 'Aus LCI' still has some way to go before it becomes a 'user-friendly' LCI for industry. Furthermore, it's not clear to what extent the data groups cover construction materials and products, even though data set boundaries are clearly identified.

Should a European LCI be used?

EU LCI's have been in existence longer and mechanisms are in place to keep them up to date. Using more established inventories has its advantages and for certain manufacturing processes data will be similar irrespective of the source of production (and materials data input into tools here may be for products sourced from the EU). However, it would be more ideal to use and build upon the existing national LCI's as this will help inform the industry and increase the focus on how materials are sourced from for Australian projects. If this requires the initial scope of an LCA to be reduced to accommodate the limitations of national data sets, this is accepted, providing a roll-out is agreed for future expansion of the LCA scope. That said, we wouldn't object to an EU LCI being used if the above options are not practical.

Are penalties needed?

Having a penalty system rather than excluding non-approved LCA's appears a more pragmatic approach and should hopefully avoid discouraging LCA's being undertaken (however, the extent of the penalty should be carefully considered). We would support all LCA's being given recognition, providing they meet a core set of criteria. E.g. could include: no more than one data inventory is used for a single LCA, national data sets are used etc.

Page 21- Other Issues:

What constitutes an LCA practitioner, what qualifications should be required, and should the system ALCAS are developing be referenced?

An LCA practitioner will be responsible for making judgements based on available data and software limitations, therefore some base requirements should be in place that reflect the level of responsibility placed on reporting LCA. Ideally, an accredited LCA practitioner would [as a minimum] hold membership with an accredited environmental organisation such as ALCAS or the Society for Sustainability and Environmental Engineering (SSEE), and a sciences or engineering degree or equivalent practical experience in environmental design, engineering or disclosure.

Is the requirement to adhere to international standards necessary?

It's not necessary to drive the introduction of LCA into the Green Star process; however a common argument surrounding LCA is the credibility of assessment method and data. Therefore it would be responsible to ensure that any LCA process does adhere to international standards. i.e. ISO.

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