Who certifies eTool LCA?

As a business eTool always aims to provide the highest of level of professionalism in both our consulting services and the development of eTool LCA software. The steps eTool take has taken to ensure this aim is met are outlined in the following document.

When released eTool was one of the first organisations internationally offering streamlined Life Cycle Assessments (LCA) for the built form. This put eTool at the forefront of developing the methodology for LCA of the built form. In lieu of international standards, eTool has periodically undertaken third party review processes to ensure our software can be relied apon to delivery environmental improvements to buildings.

These review processes, along with the development of international standards are summarised within the timeline presented in Figure 1. The key milestones within this timeline are also discussed further below.
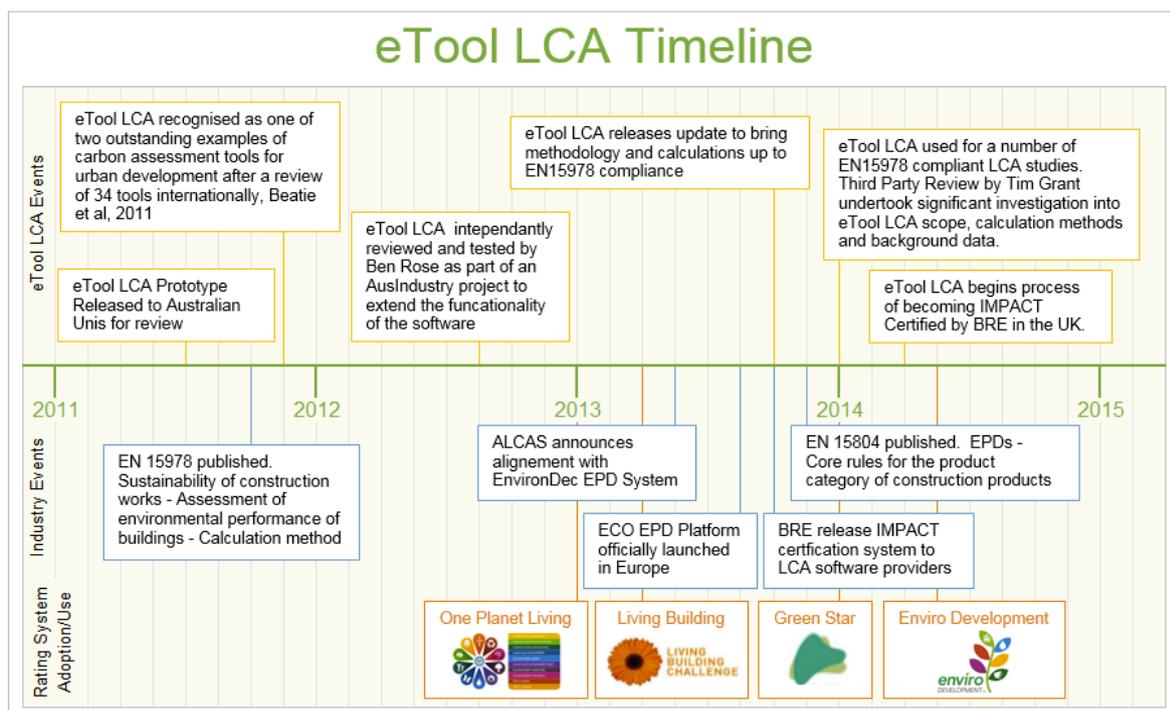

Figure 1: eTool LCA timeline. Yellow boxes denote third party verification or review processes. Blue boxes summarise key standards or industry body actions. Orange boxes summarise adoption or use by major rating systems.

Release to Australian Universities for Review

From an early stage of development we were acutely aware of the need to ensure our software was accurate, repeatable, transparent and auditable. At the time our release there were no available certification processes for LCA software. We

approached two universities in Western Australia with highly regarded schools focussing on environmental design to review the software and its algorithms:

- Curtin Universities Sustainable Policy Institute (CUSP)
- Murdoch University

Both groups of researchers were allowed free access to the prototype software as well as the algorithms and methodologies used behind the front end. The following testimonial from distinguished professor of sustainability, Peter Newman, confirms the findings of the researchers during this review process.

"Urban areas are responsible for the largest majority of the planet's carbon emissions. If we are to successfully reduce the threat of climate change we need to understand and improve the carbon impacts of urban developments. This is necessary to be competitive in the new green economy as well as saving money for ordinary householders and business people.

Our studies have found that there are only a limited number of tools currently available to measure and model carbon emissions and carbon consequences of design variations in urban settlements. eTool is highlighted as an outstanding example. eTool enables us to truly quantify, compare and then improve the carbon footprint of the built form in urban developments."

The researchers were impressed and included eTool LCA in a study to compare carbon assessment software packages and systems from around the world.

eTool LCA Recognised as Outstanding

One of the outcomes of the review by Curtin Universities Sustainable Policy Institute (CUSP) and Murdoch University was a paper published in the International Journal of Climate Change, Volume 4, Issue 4. The paper (Beatie et al, 2011) highlighted eTool as one of two outstanding examples for carbon assessment of urban developments. The paper included a review of more than 34 globally available tools applicable to this level of carbon accounting.

AusIndustry Grant and Third Party Review

In 2012 AusIndustry awarded eTool with a grant to complete a full commercial proof of concept solution for global release. Under this project eTool completed a second independent "third party" review process. This time internationally regarded carbon accounting practitioner Ben Rose, from "Greenhouse Gas Calculator" was commissioned to undertake the review. The scope of this review process was:

1. LCA Scope Verification
2. Formulas testing
3. Data Verification
4. Overall LCA Result Comparisons with other LCA reports
5. Assistance in improving accuracy of the above items

The testing was limited to greenhouse gas calculations, this being the area of expertise for the reviewer.

Although the software was found to require little or no improvement in the initial review, we undertook with the reviewer to identify and implement further improvements. The reviewers confirmation of this review process can be viewed at:

http://etool.net.au/wp-content/uploads/2013/02/Third-Party-Verification-of-eTool-LCA.pdf

More information about the reviewer is available here:

http://www.ghgenergycalc.com.au/authors.html

EN15978 Compliance

eTool released a product roadmap in late 2012. One of the first large future development projects for eTool LCA was alignment with international standards. This work was undertaken from August to November 2013. The release of EN15978 compliance late in 2013 also brought all remaining eTool LCA calculations into compliance with ISO14040 and ISO14044. This work was prompted by the uptake of LCA by the Green Building Council of Australia in their Green Star Rating tool. This additional market opportunity gave us the commercial confidence to proceed with this development project.

Work continues in this area, in particular on increasing the reporting ability of eTool LCA to enable more streamlined LCA studies of buildings.

EN15978 Compliance Tested Externally

In late 2013 and early 2014 the consulting arm of eTool conducted three EN15978 compliant LCA reports using the eTool LCA software. These studies were reviewed by Tim Grant from Life Cycle Strategies. Whilst the review process was not conducted on the software itself, during the review process the calculations, methodology and background data were all scrutinised. All three LCA studies were found to be compliant with EN15978 with the following exceptions:

- Impacts relating to life cycle phase B1 have not been quantified as the standards dictating their calculation are yet to be published (CEN TC 351). Presently impossible to strictly comply to this part of the EN15978.
- The reported environmental indicators are not all inclusive according to EN15978 recommendations. However, those indicators not reported are highlighted and reasons for not reporting are included in the report.
- The life cycle phases of B2-B5 (maintenance, repair, replacement and refurbishment) have been aggregated in report. All life cycle phases are however included in the scope of the report and hence the overall results are not affected by this deviation from the requirements of the standard.

eTool LCA has since been used successfully by our broader user group in a number of further studies that required EN15978 compliance. These construction projects are all private ventures, at the time of writing the LCA studies have not yet been published however we hope in due course they will be made public, or subsequent LCAs completed using eTool will be released.

BRE and the Path to IMPACT Compliance

BRE (UK) administer the IMPACT specification for building LCA tools which is understood to be the first software certification system by which eTool LCA could be externally assessed. The IMPACT compliance route was opened to developers in October 2013. In early 2014 eTool signed a non-disclosure agreement with BRE for the purpose of exchanging information and ultimately having eTool LCA tested for IMPACT compliance. This project is ongoing and we expect to undergo formal testing in mid-2014. No major technical hurdles for compliance with this standard have yet been identified.

Significant Commercial Agreements

eTool LCA's has been utilised in a number of applications requiring significant scrutiny and comprehensive testing of the validity of eTool LCA's outputs. For example, eTool was successfully used in the South Australia governments program to develop "Zero Carbon" houses. This project is being facilitated by the Land Management Corporation, the South Australia's government body for land development. More information about this project can be found at:

http://etool.net.au/articles/etool-joins-the-zero-carbon-challenge

Internal Quality Assurance

Internally eTool has a solid quality control process. This covers both the development of our software and the consulting services we provide through the use of the software.

The web based interface of eTool LCA enables real time updates and excellent version control. With this format comes a greater responsibility to ensure the higher number of smaller releases are robust. To help ensure our software remains bug free, every release of eTool LCA software must pass a comprehensive testing procedure. The testing procedure is a full end-to-end system test run through an automated web driver. This enables a very detailed, repeatable and efficient testing regime.

For delivery of our LCA services eTool has in place an internal review process with the eTool LCA software which cannot be circumnavigated. Hereby all assessments conducted by qualified assessors are then separately checked by a

second senior eTool staff member. Only once the LCA model has been certified can unmarked reports be generated by the software for delivery to the client. This ensures that all work is verified before being released.

External Quality Assurance

The ultimate goal of the eTool LCA software was to reduce the environmental impacts of buildings through quantifying, comparing and improving the performance of designs. The founder of eTool realised that proliferation of LCA was key to meet this goal. They consequently undertook to deliver a package that enabled accurate and also streamlined LCAs of buildings by non LCA professionals.

This last requirement posed some significant challenges as LCA is an implicitly complex practice, traditionally an academic discipline. Ensuring the accuracy and relevance of LCAs undertaken by software users who are relatively inexperienced in LCA was considered a key to the success of the project. The means of ensuring this was through a third party certification of the users inputs by an eTool staff member. The workflow within the eTool software was hence expanded to include a certification step (quantify, compare, improve and certify). Reports generated from designs that have not been certified are clearly labelled as uncertified, this marking cannot be removed without the certification process being undertaken. This is not something that users or eTool administrators can circumnavigate.

eTool also offer extensive help resources for all users through our web site. We also provide paid software subscriptions which include comprehensive training.

Bug Reporting and Feedback

The software links directly through to our help centre where users are able to report bugs and provide feedback on the software. Any design being certified at the time an unresolved bug is effecting the software is checked to ensure the outputs and conclusions drawn from the LCA model are not effected by the bug.

References

Beattie, C., Bunning, J., Stewart, J., Newman, P., Anda, M. *Measuring Carbon for Urban Development Planning.* The International Journal of Climate Change: Impacts and Responses. Volume 3 Issue 4. December 2011