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## Life cycles in the real world

Once the sole preserve of the terminally academic, lifecycle assessment is poised to emerge as a key force for change in environmental practice in Australia.

The technique of lifecycle assessment (LCA) was hatched in the calm green waters of the mid-1970s when researchers first started to think about man's most rapidly depleting reserves – fossil fuels – and how these might be affected by the materials and products we are all consuming.

Its methodologies and disciplines were initially tuned to assess embodied energy. LCA evolved in the late 1980s and early 1990s as more studies were commissioned and more impact categories were added – climate change, land use change, resource depletion, ozone depletion, photochemical smog, human and eco-toxicity, loss of ecological diversity... and the list continues to grow.

In Europe, a proliferation of initiatives to develop ecolabels was progressing, most prominently the Blue Angel (Germany) and Nordic Swan and the EC Flower ecolabels. Many Asian and American countries have followed this model more recently.

In academic circles, Holland, Switzerland, Germany and Sweden are establishing substantial databases of LCA information. The Swiss Ecoinvent database is the largest.

Where LCA has fallen short is in determining how to weight different environmental impact categories, how to allocate them to multiple products from the same basic manufacturing process and how to compare products from different sectors but with the same functional performance.

This has proved particularly problematic in the construction sector where materials and products come from almost every industrial sector to be fabricated into the floors, walls, roofs, windows, floor and wall finishes, heating and cooling equipment, lighting and controls for buildings.

### Australia ramps up LCA

Australia has traditionally punched above its weight in contributing to the development of LCA in all sectors, but it has not sustained a consistent effort to engage industry and compile comprehensive data.

As a result, Australian product ecolabels and green building rating tools have adapted standards from other countries without grounding them in real Australian lifecycle data and relevant impact categories. The Green Star rating tools have no LCA-based credits for materials (or other impacts), while the NABERS building rating tool and the BASIX planning regulation in NSW do not yet address materials impacts directly.

This is all about to change. In 2007, CSIRO and the Australian Life Cycle Assessment Society (ALCAS) together with several state governments established the Australian Life Cycle Inventory project (AusLCI). It has developed a set of guidelines for the collection of lifecycle inventory (LCI) data for Australian average production of all materials, products, foodstuffs, services and the like.

LCI data is simply the data that each producer knows about

directly – the purchased feedstocks, wastes and pollution emitted from site and the quantities of product sold. If every producer gathers their own direct data (averaged across Australian production to overcome concerns about confidentiality) and then shares that data, any LCA can be made up from the sum of the contributing LCIs within the scope of the study.

Think of LCI as the jigsaw puzzle pieces that can be brought together to construct an LCA. But industry *must* share its data.

The Building Products Innovation Council (BPIC) is the national body representing Australia's building product associations. In conjunction with 10 member associations and the support of the Department of Innovation, Industry, Science and Research, BPIC has taken on the task of producing the industry's data.

The associations have worked hard to reconcile significant commercial competitive interests and agree a consensus methodology, and are now compiling their data. Work also continues on impact assessment and a protocol for use of the data in LCAs.

In addition, weightings workshops will be held around Australia to create a set of regional weighting factors that will ensure lifecycle results are localised – water resource issues need to be weighted more highly in water stressed areas, for example.

Regional weightings will ensure appropriate procurement, design and specification decisions are made for the location, climate and priorities of local stakeholders. Finally, the project will produce a database of building component maintenance and replacement data to inform this final area of inconsistency in the LCAs conducted for buildings.

The AusLCI and BPIC projects are not an end in themselves, but they should provide an essential foundation and toolkit of methodologies and data resources from which a series of practical design tools, building rating tools and material and product ecolabels can be produced.

They may also provide a vehicle for regulation and code compliance, as has happened for homes in the UK, with the method being extended to all buildings by 2016 and replicated in several other European countries.

Expect an exciting change toward a more sophisticated life cycle-based approach to materials assessment and carbon accounting. Get ready for lots of surprise results that challenge preconceptions and simplistic approaches to environmental assessment, for the recycled products with higher impacts than the non-recycled, the perceived toxic material that turns out no worse than the alternatives and the high impact materials that produce low impact products.

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