Life Cycle Assessment
at the BioComposites Centre, Bangor University

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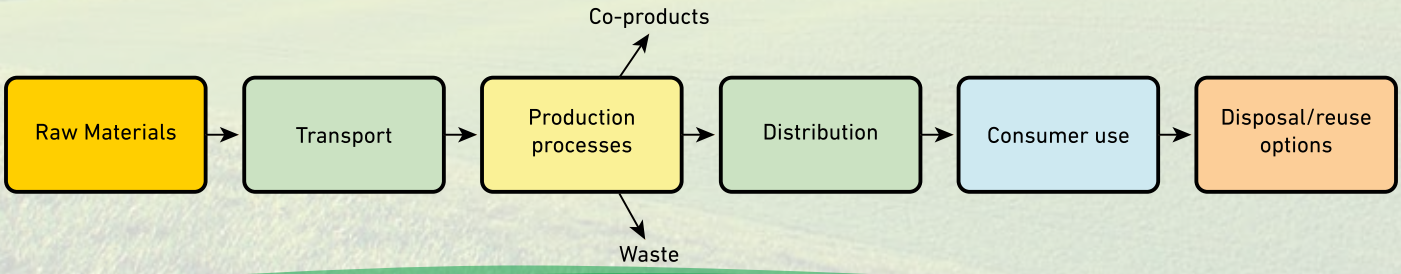
Much of the recent interest in bio-based products and green technologies stems from a growing focus on sustainability within production systems. Limited resources and growing global demands mean that environmental issues are moving up the agenda and, as such, industry increasingly recognises a commercial advantage from greener product development. A lowering of the carbon footprint, cleaner production processes, and sustainably-sourced components are all key indicators for sound environmental credentials and are becoming an essential part of the modern design process.

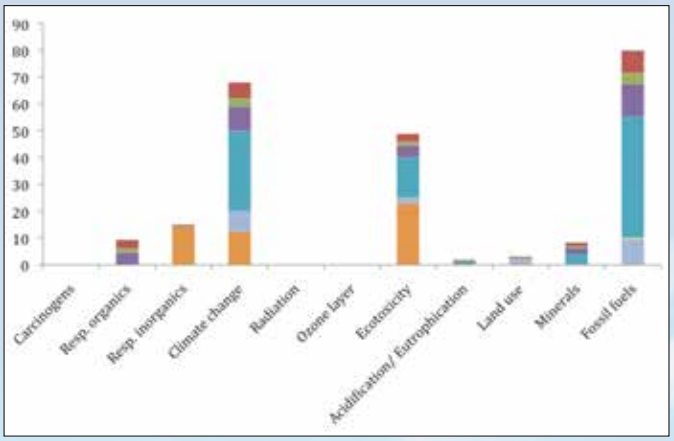
Benefits to your organisation:

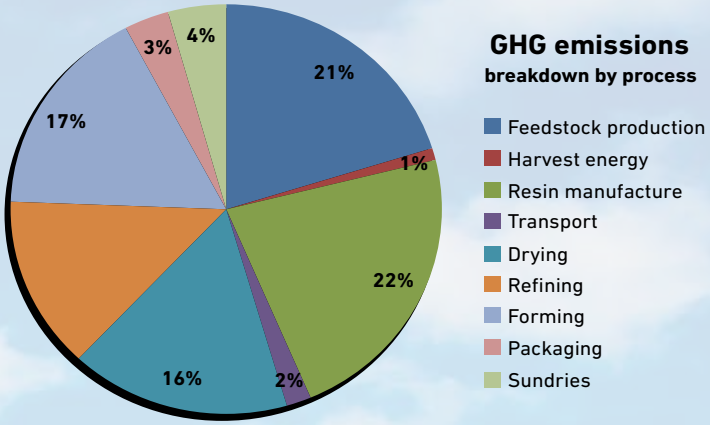
- Environmental product benchmarking
- Product improvement insights
- Identification of process & supply chain 'hotspots'
- Green marketing & communications opportunities
- Brand differentiation & enhancement
- Environmental management planning insights
- Transparent & credible environmental claims

Life Cycle Assessment (LCA) is a scientific approach for quantifying the environmental impact of a product or process across its entire lifecycle. From extraction or growth of raw materials, through processing, distribution, use and end-of-life disposal, the method accounts for all inputs and outputs across the product's lifetime. The resulting analysis covers a wide spectrum of environmental measures, including the carbon footprint, non-renewable energy use and a range of other environmental, human health and resource depletion metrics. As such, LCA is the most comprehensive environmental performance tool currently available.

LCA can help organisations and product designers by highlighting the materials and processes that represent environmental 'hotspots' – areas where environmental impact is most concentrated. These insights can be used to inform greener product design, more sustainable supply chain management, and environmental marketing campaigns. By covering such a broad range of environmental indicators, LCA (unlike single indicator measures such as carbon and water footprinting) can provide valuable insight into the environmental trade-offs in a given production process. Further to this, lifecycle costing (LCC) is a complimentary technique that can link life time cost of ownership with these environmental metrics.







At the Biocomposites Centre (BC) we have a comprehensive set of LCA and lifecycle costing tools and facilities. An energy monitoring capability is linked to all of the pilot scale equipment within the Centre, providing detailed data on energy requirements for key processes utilising this equipment. For secondary processes, the Centre has access to the world's largest database of peer-reviewed lifecycle inventory data. This along with SimaPro, the market-leading LCA analysis software, allows staff to carry out studies ranging from small-scale scoping reports – ideal for hotspot identification work – to full cradle-to-grave research-based analyses.

LCA capability at the BioComposites Centre:

- Energy monitoring capability at the individual machine level
- Access to the world's largest database of lifecycle inventory datasets
- Market-leading LCA analysis software
- Expertise in LCA and lifecycle costing approaches
- Unique set of laboratory and pilot-scale biomass processing equipment

Environmental indicators included in a Life Cycle Assessment:

Greenhouse gas emissions
Ozone depletion
Terrestrial eco-toxicity
Marine eco-toxicity
Acidification
Eutrophication
Human toxicity
Land occupation
Water usage
Mineral depletion
Fossil fuel use
Cumulative energy demand

Since 1989, The BioComposites Centre (BC) has been at the forefront of research, development and the commercial application of bio-based alternatives to synthetic materials in manufacturing and industry. Today, in a world where sustainability and the environment are moving to the top of the agenda, we offer businesses of all kinds the knowledge and technical alternatives to help them lower costs, increase productivity and make their activities more environmentally and socially responsible.

BC's services encompass all stages of the evaluation, research, product development, product trial and manufacturing process. Reflecting a client base drawn largely, but by no means exclusively, from the resins coatings and plastics, fine chemicals, composites and forest products industries, BC is structured into three service groups offering different expertise: BC Polymers, BC Chemistry and BC Materials. BC also operates the BioProducts and BioRefining Technology Transfer Centre and The CO_2 Lab. These specialist demonstration units focus on pilot-scale prototyping of various technologies, including plant fibre composite material applications, extrusion of biopolymers and the extraction of bioactive molecules from plant material using CO_2 as a green solvent.

To find out more about life-cycle analysis or the application of these technologies to your business or research area, please contact the BioComposites Centre.

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