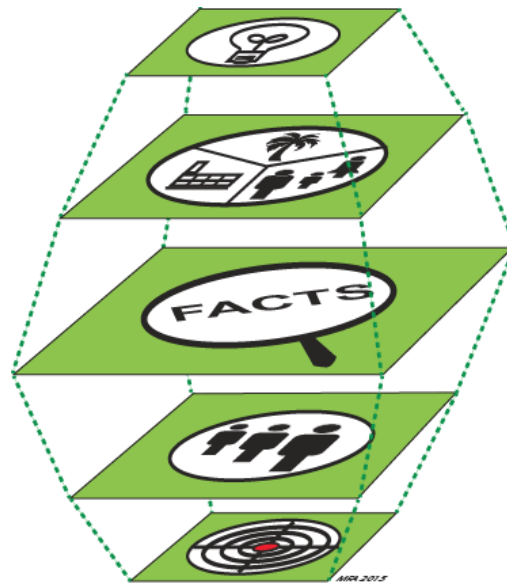




# Active-Learning Tool Kit – Sustainable Development

## A Granta Design Teaching Resource Package

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### Content

#### Introduction and content

#### Part 1. The assessment method (and pre-reading for Workshops)

#### Part 2. Handouts

1. *Summary of the method*
2. *Step 1: Unpacking the proposal*
3. *Step 2: Stakeholder analysis*
4. *Step 3: Fact-finding*
5. *Step 4: Forming a judgement*
6. *Step 5: Reflection*

#### Part 3. The CES EduPack Sustainability Database and Eco-audit tool

#### Part 4. Worked case studies

#### Part 5. Exercises and Micro-projects

#### Part 6. Instructors experience of Workshops and Master-classes

#### Part 7. Templates to act as prompts during group work

#### Part 8. PowerPoint presentations – the method, case studies, CES EduPack



# Assessing “sustainable” developments – a Tool Kit

## Introduction

### What’s the idea?

“Sustainability” is not a simple parameter that can be quantified and optimized in an engineering design. Even the simplest proposal for a “sustainable” technological development has many facets. What material and energy resources will it require? What impact will it have on the environment? What regulatory constraints must it observe? Is it socially acceptable and fair? Is it economically viable? Issues of sustainable development are intrinsically complex; their assessment requires acceptance of this complexity and the ability to work with it. Individual facets can be explored in a systematic way but the integration of the facets to give a final assessment requires debate, compromise and reflection.

This Package describes methods and provides a kit of tools to help students explore and form their own judgements about proposals of sustainable technological developments. The 5-step methodology on which it is based has been developed by Granta Design in collaboration with the University of Cambridge, Barcelona (UPC) and the University of Illinois at Urbana Champaign.

### The Mind-set

There is no completely “right” answer to questions of sustainable development, a situation unfamiliar to engineering students reared on exact analysis and digital precision. Instead, there is a thoughtful, well-researched response that explores the conflicting economic, legal and social drivers and consequences as well as the environmental legacy. There is a risk that computer-based tools (included in the resources) are seen as engines that can deliver a single metric – an Index of Sustainability, for instance. That is not the intent here. Rather it is to improve the quality of discussion by providing guided access to relevant data.

### What will you get from this Tool Kit?

- ✓ Learn about problem-based Sustainability Assessment of technological proposals and the 5-step methodology (for more see “Materials and Sustainable Development” (Ashby 2015);
- ✓ Case Studies, Exercises, PowerPoint Lecture Units, group work templates, and other teaching resources available for educators<sup>1</sup>.

### What’s in the Tool Kit?

Think of this as a Kit of parts for running a project or activity-based course or workshop on the sustainability assessment of proposed technological developments. The parts slot together but can be used in subsets or in isolation. The contents are listed on the cover.

That’s all you need to know to get started. The next section is Part 1. It explains how the method works.

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<sup>1</sup> The Granta’s teaching resources team has an extensive background in providing teaching resources for College and University teaching of Materials Science and Engineering at the Bachelors and Masters level. For more examples of Granta’s Teaching Resources go to [www.grantadesign.com/education](http://www.grantadesign.com/education)