

Title: Introducing Sustainable Development: “Engineers Cannot Be Neutral”

Background: The accompanying resource on [Introduction to Engineering for Sustainable Development](#)¹ introduces the concept that all engineering projects should be analysed using the three elements:

- **Economic:** What things cost and how to make a business out of providing infrastructure and goods
- **Environmental:** What impact those things have on nature and earth’s support systems
- **Social:** how those things serve the needs and quality of life of people and their communities.

Each of the topics presented in the ImpEE website addresses these issues in some way that is relevant to the various engineering disciplines and includes a numerical-based problem.

Overview and motivation for this topic: Most engineering courses will include some activity designed to improve students’ communication skills. Many of the topics involved with Engineering for Sustainable development are ideal for discussion and debate.

This exercise aims to develop communication skills, whilst at the same time raising the awareness of ‘Engineering for Sustainable Development’ as an issue.

General and Specific Resources: The ImpEE resource on [Introduction to Engineering for Sustainable Development](#)¹ provides a way of thinking about engineering projects that might be considered more suited to the concerns of the modern world, particularly through an increased awareness of the effects of technological change on society and resources. Economic factors need to be weighed against social and environmental issues and concerns.

This resource makes reference to the figure titled “[Engineering Choices](#)”² reproduced below as Figure 1 and freely available for download from the provided link.

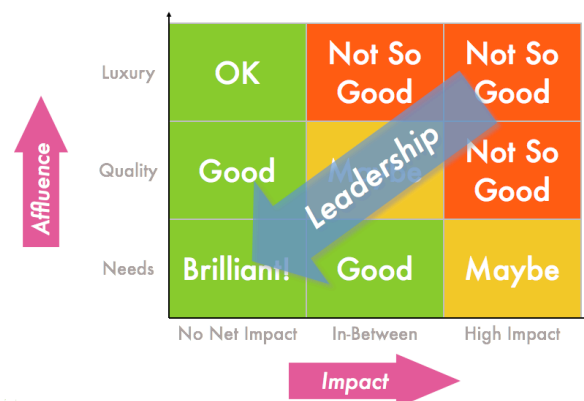


Figure 1: “Engineering Choices²” from the ImpEE resource on “Introduction to ESD”.

Links:

1. “Introduction to Engineering for Sustainable Development”, ImpEE Resource, <http://www-g.eng.cam.ac.uk/impee/?section=topics&topic=IntroToESD>

2. Engineering Choices figure from the ImpEE “Introduction to ESD” <http://www-g.eng.cam.ac.uk/impee/topics/IntroToESD/files/Engineering%20Choices.png>

Example Activity:

Ask each student to consider either a project they have worked on or a consumer product (e.g. mobile phone, television, washing machine, mp3 player, car) and consider the diagram presented in Figure 1 to assess where working on the development of this particular product will fall in terms of 'low or high environmental impact' and whether it is meeting 'a basic human need' or is a 'luxury item'.

This could form the basis of a brief presentation to justify the choices made, and whether this type of project is worthy of an engineer's efforts. A suitable context could be chosen.

Transferable Skills: *(The numbers after each transferable skill refer to the CDIO Syllabus available on-line at <http://www.cdio.org>)*

Professional Ethics, Integrity, Responsibility and Accountability (2.5.1) This type of analysis of a project/ product allows some reflection on one's ethical standards and principles whilst developing a personal vision for one's future engineering career, particularly through some consideration of the social and technical impact of new technologies and innovations.

Communication (3.2) This example activity would lead the student to practice their rhetorical and oral communication skills. Having an opinion or idea is in itself worthless if the engineer is not able to communicate it to others.

ESD Skills Developed:

Impact of Engineering on the Environment (4.1.2) The impact of engineering on the environment, social, knowledge and economic systems in modern culture i.e. How these things serve the needs and quality of life of people and their communities.

Developing a Global Perspective (4.1.6)

This exercise develops in the student an awareness that our society and its needs are by no means the world standard. Priorities that we might think are important are perhaps unnecessary luxuries from the perspective of people who are struggling with basic quality-of-life issues.

However, the global nature of our economies means that the decisions and choices we make in our society very easily spill over into the planet at large. Whether this impact is favourable or not, can be influenced by each engineer's personal choices.