



Facilitator's Guide

The social dimension of sustainability workshop

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Ansys Software Used

This resource uses Ansys Granta EduPack™ teaching software for materials education and the Social Impact Audit Tool App.

1. Purpose

The main purpose of the Lecture Unit “How to teach social sustainability to engineering and design students” is to introduce a workflow, which brings together material selection methodology for engineering and product design, based on functional, environmental and social factors. The focus is on the newly released Social Impact Audit Tool Application (SIAT App), used for social impact assessment. We illustrate this workflow, using a case study of a wind turbine component.

Depending on the instructor’s goals, the allocated time for the workshop, and the profile of the participants, one can decide to cover only part or the whole case study, as the conclusion of each section feeds into the next section.

2. Learning Objectives

Expected Learning Outcomes by following the workflow:

1. Gain understanding of fundamental concepts of Social Life Cycle Assessment.
2. Explore scenarios with potential social impact of product-related decisions.
3. Learn how to read social hotspots’ heatmap with the help of Social Impact Audit Tool.
4. Follow a case study thread from materials selection to a streamlined E-LCA and Social Impact analysis.
5. Update your knowledge / learn about Granta EduPack software, EcoAudit Tool and Academic Social Impact Audit Tool App.
6. More broadly, practice perspective-taking, systems-thinking, building towards negotiating skills to incorporate multiple criteria and building consensus.

3. Format and tips to facilitate the session

The overall content (set of slides to use during the workshop), hands-on templates and discussion parts have been designed for a half-a-day workshop (3.5-4 hours). Bringing in the social dimension of sustainability to engineering & design, students will generate thought-provoking discussions. Some of the topics are discussed in the following resources: [Paper: Social Life-Cycle Assessment and Social Impact Audit Tool](#) and in a Webinar [How to teach social sustainability to engineering and design students](#).

SIAT App itself has an extensive Help function integrated and provides additional support to students.

Expect the following topics to emerge:

- What is the underlying meaning of a social hotspot, how it is different from social impact?
» Example answer:

Social Hotspots – points of contact between stakeholders and aspects of the manufacture, distribution and use of the product that may, potentially, be damaging or could be influenced in a positive way.

A Social Impact is one that alters the function of human lives, how we live, communicate and even work. Naturally, this can be positive or negative.

- What are the stakeholder groups*:
 - » Workers involved in producing and distributing the product.
 - » Consumers that use it and, often, dispose of it at end of life.
 - » The Local Community directly involved with these actions.
 - » The surrounding Society in providing the stage for these actions.
 - » “Any other interested party” – shareholders, NGOs or the State, referred to as Value chain.
- (*we don’t use “children” stakeholder category)

Task:

Prepare a convincing argument for a sustainable materials choice, note down assumptions you are making about trade-offs and synergies from a manufacturer's perspective at each stage of a workflow. To accomplish this task, you would need to have access to: Ansys Granta EduPack software Sustainability Databases (Materials; Nations of the world and elements table), EcoAudit Tool and Social Impact Audit Tool App.

As a group you are advising a manufacturer "WindNRG" to decide regarding materials purchasing to redesign wind turbine's component (tower), equipped with technical requirements and guided by the company's Environmental, Social and Governance (ESG) agenda, which is a framework for measuring and managing a company's impact on people and planet.



Important role of ESG strategy is to mitigate sustainability-related risks, impacts and leverage opportunities for the company. For that, it is essential to identify which sustainability matters are most material to the organization and its stakeholders.

This process is called a "double materiality assessment". It starts with the stakeholders' mapping exercise, corresponding to a stakeholder analysis step in Ashby's 5-step methodology. A mix of internal and external stakeholders to the company identify the 'material' (or the most significant impacts) by the company on people and the environment, which are also the most significant sustainability risks and opportunities for the organization (see an example on the other side).

WindNRG company has completed its double materiality assessment and identified three key areas that present material social impacts, risks or opportunities. These are related to the following key groups of stakeholders.

Workers - your company values the interests, views and rights of their work force. As such strategic decisions always try and integrate employee perspectives, e.g. fair wages, safe working conditions, and non-discriminatory policies.

Local (affected) communities - You should aim to drive positive impacts on communities affected by your business operations, considering their views, interests and rights to mitigate any adverse impacts.

Value chain - when selecting materials and choosing suppliers you should ensure respect for human rights across the whole supply chain. Your company has a robust policy for value chain worker rights that you must align with. Specifically, this includes fair and equal rights among genders, human labor rights, avoidance of modern and child slavery as well as attention to potential impacts towards indigenous and vulnerable groups.

You have access to technical information about materials from Ansys Granta EduPack software and with the help of Eco Audit Tool. For the SIAT you will use the outputs from the latter and Sustainability Database for a more in-depth social impact analysis. EcoAudit and SIAT provide a lifecycle perspective. From an environmental perspective you will need to minimize CO2 emissions and energy consumed across product life cycle, looking how to keep this cost-effective, whilst increasing positive and minimizing negative social impact. You will analyze all three sustainability pillars, discuss trade-offs and synergies. You will receive data and prompts to support your thinking.

Case study Workflow

1. Material selection and environmental impact

1.1 Construct a plot for materials selection project to get a candidates' shortlist (see instructions 1), check main supply nations (Elements Database) and make a note of it

1.2 Explore scenarios with the help of Eco Audit in relation to energy, CO₂, costs (materials stage), and transport (see instructions 2)

- Which option(s) is/are preferable at this stage?
- Fill in the Table with your responses (template provided).

2. Explore life cycle scenarios in SIAT

- Discuss and fill-in prompts (template provided).
- Look for social impact across the key stakeholders' groups, cross-reference with company's Materiality brief

3. Discussion in group:

- Explore why with the Data from Nations of the World Granta EduPack software Sustainability Database
- Think of trade-offs and synergies among the sustainability pillars. See questions to help you with exploring alternatives.
- Fill-in the Table with your responses (template provided).

Questions to help with your discussions:

1. Where are the synergies and the conflicts between the findings of the three assessments?
2. Is the product chain environmentally/economically positive but socially questionable?
3. Is emphasis on social benefits damaging the environment or unbalancing the economy?
4. Does the product benefit the present generation at a cost to future generations?
5. Are there trade-offs between economic benefits and environmental or social burdens?
6. Which life cycle stages are the most critical and what about stakeholder groups?
7. What about short/medium and long-term impact: how it might change, depending on the timeframe?

Hands-on instructions 1

Materials Selection in Ansys Granta EduPack software Level 2 Sustainability Database

Materials selection

1. In Granta EduPack Level 2 sustainability, create a selection project; add limit stage with:
 - » Minimum stiffness of 20 GPa
 - » Fracture toughness higher than 10 Mpa.m^{1/2}
 - » Maximum service temperature >40°C and Minimum service temperature <-40°C
 - » Durability in Marine atmosphere acceptable or excellent and in UV radiation good or excellentRecyclable material only
 - » Create a chart with climate change driven indices and identify top ranked materials
2. Investigate main supply nations of selected materials (use Elements Database in EduPack)

Hands-on instructions 2

Eco-Audit streamlined LCA in Ansys Granta EduPack software Level 2 Sustainability Database

Eco-Audit:

Material for 10MW wind turbine tower (based on DTU reference turbine)

- All transport phases by sea container, Travel from supply nation to Denmark (manufacturing) and then to UK (wind plant installation) 980km
- Product life to be 25 years (but no energy consumption at use phase)

Stainless steel (reference)	Al wrought alloys	Oakwood
 typical recycled content, 605 tons	 typical recycled content, 351 tons	 0% recycled content, 251 tons
 Metal rolling and forging	 Metal rolling and forging	 Custom: LVL production 0.55 CO2 eq kg/kg; 16MJ/kg*
 Recycled at end of life	 Recycled at end of life	 Combust
 20 000 km (sourced from Australia)	 10 300 km (sourced from Brazil)	 300 km (sourced from Sweden)

Explore What if scenarios if time allows. What could explain wood not being used at a large scale?

Template Table

Assessment criteria	Material ranked #1	Material ranked #2	Material ranked #3	Notes/comments
Materials selection cost performance				
Materials selection climate change performance				
Eco-audit Results				
Social Impact Audit Tool Results (statement)				

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Document Information

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