



Engineering Education
for a Sustainable Future

EESF Integration Guide for Students

How do you design something that works and still
protects people and planet?



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**How do you design something that works,
and still protects people and planet?**

Engineering Education for Sustainable Futures

**Helping learners understand sustainability competences and
apply them in engineering contexts.**

Use this guide to:

- see why sustainability matters in engineering study and careers
- use EESF activities in modules, projects and group work
- reflect on trade-offs, impacts and better engineering decisions

Quick link

Scan for the EESF website and resources





What is EESF?



EESF is an Erasmus+ project with free, ready-to-use resources that help engineers make better decisions for a sustainable future.

EESF helps you practise how real engineers make decisions when there is no perfect option: you compare choices, notice impacts and explain trade-offs clearly, linked to real-world challenges and the UN **Sustainable Development Goals (SDGs)**.

Most students will use EESF through activities in their modules, supported by lecturers. You can also use the materials independently, including Level 1 and Level 2 activities, when you want a quick way to strengthen an assignment, project decision or interview answer.



Scan the Link for How to Use the EESF OERs

Start small: one activity, one evidence note, real progress.

This is about your ability to explain decisions clearly, not only your technical answer.

In interviews and design reviews, you will be asked “why this option?” not only “does it work?”. Employers look for engineers who can explain trade-offs, show awareness of risk and talk clearly about long-term impact. EESF gives you language you can reuse in applications, presentations and interviews. Real engineering problems rarely have one perfect answer. You choose between options under time, cost and safety constraints. Your decision affects energy use, materials, waste, water and people. EESF helps you practise this kind of decision-making using realistic engineering contexts.



Start small: one activity, one evidence note, real progress.

Career relevance

- Employers increasingly expect engineers to think about sustainability, risk, ethics and long-term impact
- Interview questions often ask how you balance technical performance with cost, social value and environmental impact
- Being able to explain trade-offs gives you stronger language for applications and interviews

Real-world engineering problems

- Engineering decisions affect energy use, materials, waste, water, safety and communities
- Many problems do not have one perfect answer, so engineers need to compare options and justify choices
- EESF helps you practise this kind of thinking using realistic engineering contexts

The aim is not to add another subject. It is to help you think more clearly about engineering decisions and their wider impacts.



The Sustainable Development Goals (SDGs) matter in EESF because they give engineering students and educators a shared, practical frame for thinking beyond “does it work?” to “what impact will it have, who will it affect and will it still make sense in the long term?”

In EESF, the SDGs help connect everyday engineering choices to real-world challenges like clean energy, resilient infrastructure, responsible production and climate action, so learners can practise comparing options, explaining trade-offs and justifying decisions with wider consequences in mind.

SDGs also make the learning transferable across disciplines and industries, because the SDGs are a common language used by universities, employers and policy makers when they talk about sustainability and future skills.





What you already do well

You learn the technical content, follow standards and meet requirements. You can calculate, model, test and build solutions that perform.

What is often harder

Explaining your reasoning under pressure. Naming trade-offs clearly. Showing what evidence supports your choice. Describing impacts beyond performance and cost.

Choose three words that matter to you:
safe, reliable, fair,
efficient, low-waste,
low-carbon, user-
focused, resilient,
honest.



Write your 2–3 line mission statement

- **I want to be an engineer who...**
- **I will design solutions that work, and I will also consider...**
- **Even when time is short, I will not ignore...**

This is what “Engineering a Sustainable Future” means in practice.

Skills

- Systems thinking
- Working with evidence and trade-offs
- Problem framing and solution design
- Team discussion and reflection

Language for Interviews

- **Describe** the wider impact of your decisions
- **Explain** how you compared options
- **Show awareness** of ethics, risk and sustainability
- **Speak clearly** about value, not only technical performance

Project thinking

- **Define** the problem clearly
- **Map** who or what is affected
- **Propose and justify** a solution
- **Reflect** on what you would improve next time



What you can download

Each module includes a module document with practical activities. You can start quickly, then go deeper when you have time.

What you can use alongside it

Videos, practical exercises and quizzes. Ideas for group work and bigger integrative tasks. Prompts you can apply to your own project decisions.

Explore the EESF Teaching and Learning Resources



You do not need to do everything. Pick one useful piece and begin



Level 1 (Basic)

A quick start. Short activities to practise decision-making and trade-offs.

Level 2 (Advanced)

More depth. Stronger analysis, clearer justification, better evidence.

Level 3 (Integrative)

A bigger real-world task, often in a group. Apply what you learned to a realistic scenario.



Route A: Independent



Pick one Level 1 activity. Do it quickly. Write one evidence note. Save it to your project folder.



Route B: Supported

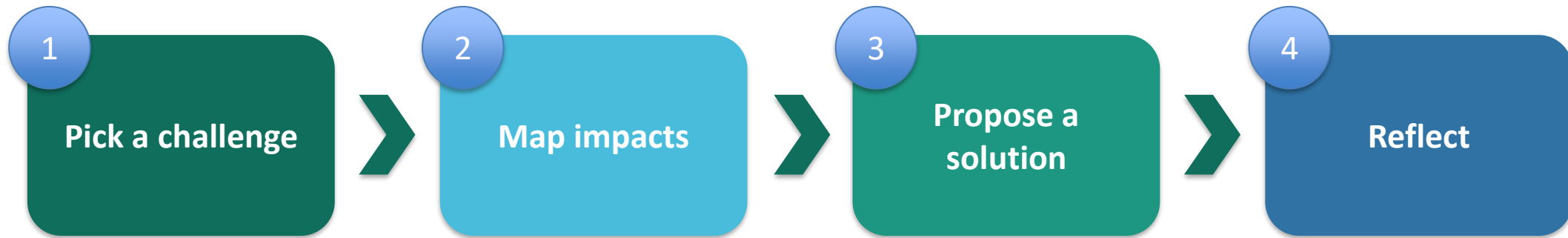


Do the same activity, then bring your note to a tutorial, lab or project meeting. Ask for feedback.

Both routes count. The supported route usually leads to stronger work



Pick a challenge → map impacts → propose a solution → reflect



- Choose one engineering challenge from a module, lab, case study or project.
- Identify technical, environmental and social impacts, then decide what matters most.
- Propose a solution and explain why it is the best option in that context.
- Reflect on what you learned, what trade-offs you made and what you would improve.

Product design

Choose a material or design feature for a product that must be safe, affordable and lower-impact.



Process improvement

Recommend a change that reduces energy use or waste without breaking safety, cost or downtime limits.



Infrastructure and energy

Choose an option that improves resilience or efficiency while balancing cost, maintenance and community impact.



Good challenges

Material choice, design feature, manufacturing method, energy option, process improvement, infrastructure choice, logistics choice.

Where to get one quickly

Use something you are already doing this week: a lab, a design brief, a project decision or a placement task.



Keep it small and real. You can scale up later.

Pick 3–5 impact areas

Energy, carbon, waste, water,
safety, maintenance, lifetime cost,
supply risk, community, resilience.

The starter sentence

If we choose this option, it may
increase or decrease...
Write one line per impact. You are
noticing, not writing an essay.



Simple impact notes make your reasoning clearer.

Create options

Write two or three realistic options. No perfect option needed. You are comparing choices.

Choose and justify

Choose one option and state your evidence. Evidence can be a requirement, constraint, calculation, standard, risk or data you already have.



choices.

The strength is in the justification, not the confidence.



Name your trade-off

What did you gain? What did you accept? What risk remains? What impact did you reduce or increase?

Improve next time

If you had more time or budget, what would you test, measure or change to strengthen your decision?



The strength is in the justification, not the confidence.



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Before you begin

- Understand the problem
- Check what the task is asking you to compare
- Know what evidence or data you can use

While you work

- Discuss options, not just one answer
- Notice impacts on people, systems and environment
- Keep a note of the trade-offs you are making

At the end

- Explain your final choice clearly
- Say what evidence supports it
- Reflect on what you would improve next time



Self-check prompts

- What is the engineering problem?
- Who or what is affected by this decision?
- What trade-offs am I making?
- What evidence supports my choice?

Reflection

- What did I learn about impacts?
- What would I do differently next time?
- What questions do I still have?
- How does this connect to my future career?

Group project use

- Use the prompts in group discussion
- Compare options before choosing a design
- Record why your group made its final decision
- Add a short reflection at the end of the project

You can use EESF in class tasks, design challenges, project work, placement reflection and independent study.



Weak answer



We chose option A because it is better. It is strong and it works.

Strong answer



We compared A, B and C. We chose A because it meets the requirement with lower weight and acceptable risk. The trade-off is higher production impact, so we would reduce this by specifying recycled input or designing for reuse. Next time we would validate with supplier data or a simple life cycle comparison.

or a simple life cycle comparison
Next time we would validate with supplier data

Options + evidence + trade-off + improvement.



Example of a strong response

- states the problem clearly
- shows who or what is affected
- compares at least two options
- uses evidence, not only opinion
- explains trade-offs honestly
- justifies the final choice clearly



Simple example

- **Challenge:** reduce energy use in a workshop or lab
- **Map impacts:** cost, carbon, safety, usability
- **Options:** equipment upgrade, behaviour change, scheduling change
- **Proposal:** choose the best option for the context and explain why
- **Reflection:** what would you test or improve next?

The goal is clear thinking and clear justification, not perfect answers.





Scan the code for our website

Your EESF Journey Begins

- Click a module topic that matches what you are studying now.
- Download the module document.
- Start with one Level 1 activity.

Go here

[Teaching and Learning Resources](#)

*What “done” looks like
after 20 minutes: one
Level 1 activity + one
evidence note saved as
“EESF Evidence Note 1”.*

