



ASSET

Accounting for Sustainability,
Social and Environmental Transparency

STUDENTS MATERIAL TEACHING MODULE 4

Sustainability, taxation and strategic decision making

European Danubia University

A matrix game

Matrix Game - Introduction and Context

European Danubia University is operating in a changing European regulatory environment that increasingly links building performance, energy use and carbon emissions with financial costs and investment decisions.

The revised EU Energy Performance of Buildings Directive No. 2024/1275¹ requires Member States to improve the energy performance of their building stock and introduces minimum energy-performance standards for non-residential buildings, increasing pressure to renovate inefficient university properties. At the same time, the EU's Emissions Trading System 2 (ETS2) for buildings and road transport² will introduce carbon pricing for fuels used in buildings, creating an additional economic incentive to reduce fossil-fuel consumption and invest in energy-efficient buildings and cleaner heating. Energy costs are also influenced by the existing EU Energy Taxation Directive 200/96/EC³ and its proposed revision, which forms the EU framework for taxation of energy products and electricity. The OECD document treats **buildings as a separate sector** and shows that buildings are already exposed to carbon taxes and ETS mechanisms internationally.

Consequently, European Danubia University must consider not only the **initial cost of maintaining, renovating or replacing its buildings**, but also **future energy and carbon costs, regulatory requirements, and possible public financial support for sustainable investments**. The important point is that universities do not need to pay a tax explicitly labelled a “**university carbon tax**.” Carbon pricing can affect them through heating fuels, electricity prices and suppliers.

A successful green transition within a university involves a multifaceted approach that touches on everything from research practices to campus infrastructure, financial sustainability, and the welfare of students and staff. Universities must also navigate the demands of various stakeholders, including employees, students, the local community, suppliers, and government bodies—each with its interests and then, of course, resources are limited, and priorities must be set...

In terms of reporting, public universities are in principle outside the scope of the CSRD directive in its current form. However, the directive provides a comprehensive and standardised framework which universities can use on a voluntary basis. European University Association (EUA) promotes sustainability focus of the universities in all areas of their activities. A number of universities have already focused not only on providing sustainability reports, but also on following closely their carbon footprints. Politecnico di Milano pursues the improvement of the environmental quality of its campuses, starting with the regeneration of both outdoor and indoor spaces according to sustainability principles. Trinity College Dublin modelled the future operational expense (OpEx) shocks of the upcoming ETS2 building carbon penalties, issued green bonds and restructured its capital expenditure (CapEx), KTH Royal Institute of Technology integrated carbon accounting directly into its institutional ledger systems, tracks its Scope 1, 2, and 3 emissions, treating carbon data exactly like financial transactions.

¹ https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive_en

² https://climate.ec.europa.eu/areas-action/carbon-markets/ets2-buildings-road-transport-and-additional-sectors_en

³ <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-energy-taxation-directive>

European Danubia University wants to become net-zero by 2035. It also has to keep education affordable, support staff and students, and manage a limited budget. A major decision is now required: what should the university do with its old and energy-intensive buildings?

You will represent one stakeholder group. Your team will negotiate with the other groups and try to influence the university's decision. Sustainability taxes, energy costs, public support and building rules can change which option is best.

Central question

How should the university use its limited money to manage, renovate or replace its buildings while reducing emissions and protecting the interests of students, staff and the local community?

Learning goals

- ✓ Understand how sustainability policy can affect university costs and investment decisions.
- ✓ See how carbon costs and tax incentives can change the attractiveness of a building project.
- ✓ Compare short-term costs with long-term savings.
- ✓ Negotiate between stakeholders with different interests.
- ✓ Explain why the most sustainable option is not always the easiest option to implement.

Four concepts to know

Concept	Meaning
Carbon pricing	Using fossil fuels can become more expensive because emissions have a price.
Green incentive	Government can lower the cost of a green investment through a grant, tax benefit or other support.
Building rules	Poorly performing buildings may need to be renovated to meet energy standards.
Life-cycle cost	A cheap building today may be expensive over time because of energy, maintenance and carbon costs.

The policy measures used in the game are simplified for teaching. They are inspired by EU climate and building policy, but the game does not reproduce the tax law of any one country.

2. European Danubia University

University facts	Data
Type	Public teaching and research university
Founded	1854
Campuses	4
Students	20,000
Faculty and staff	3,000
Annual budget	EUR 250 million
Annual research funding	EUR 75 million
Climate goal	Net-zero carbon emissions by 2035
Renewable energy today	30% of university energy needs

The university is well known for sustainability research and has strong links with the local community. However, government funding has been reduced and the university cannot finance every sustainability project at the same time.

The new problem: ageing buildings

Many Main Campus buildings are old. Several have poor insulation and use fossil-fuel heating. They are expensive to heat and maintain. European Danubia University must reduce the carbon footprint of its real-estate portfolio while maintaining financial sustainability, educational quality and social accessibility. This makes **real estate the decision arena** and **sustainability taxation one of the principal mechanisms changing stakeholder incentives**.

How should it allocate scarce capital between maintaining, renovating, replacing and consolidating its buildings when carbon taxation, energy prices, tax incentives and regulation are changing?

The university board must choose a 10-year real-estate strategy.

Starting situation

The buildings covered by the decision produce about 12,000 tonnes of CO₂ per year. The university currently spends about EUR 6 million per year on energy and EUR 2 million on maintenance for these buildings.

Three options

	Option A: Maintain	Option B: Deep renovation	Option C: New building + consolidation
What happens	Keep the buildings and make only necessary repairs	Renovate the least efficient buildings; improve insulation; install cleaner heating and solar panels	Build one highly efficient building and close/sell two inefficient buildings
Up-front cost	EUR 5mn	EUR 35mn	EUR 60mn
Annual energy cost	EUR 6.0mn	EUR 3.5mn	EUR 2.5mn
Annual maintenance	EUR 2.0mn	EUR 1.2mn	EUR 0.8mn
Annual CO ₂ emissions	12,000 t	6,000 t	3,000 t
Expected useful life	10 yrs	30 yrs	40 yrs
Space reduction	0%	5%	20%
Staff / student disruption	Low	High during renovation	Medium
Heritage impact	Heritage impact	Heritage impact	Heritage impact
Main risk	High future energy/carbon cost	Large investment now	Highest investment and loss of some existing space

Do not choose immediately. Tax policy, government support, staff needs, student needs and future events may change the best option.

3. Why taxation matters

The university does not need to pay a tax called a “university sustainability tax” for taxation to matter. Policy can change the price of energy, construction and investment.

Policy tool	How it can affect the university
Carbon cost on fossil fuels	Heating old buildings becomes more expensive.
Green renovation grant	Government pays part of the renovation cost.
Tax benefit for green investment	Some investors can reduce tax when they invest in green technology. A public university may not always benefit in the same way as a private company.
Construction and waste charges	Demolition and waste can become more expensive, which can make renovation more attractive.
Support for renewable energy	Solar panels, heat pumps or other clean technology can become cheaper to install.

A carbon-cost example

If the carbon cost is EUR 50 for each tonne of CO₂, the annual carbon-related cost of the three options can be compared as follows:

Option	Annual emissions	Illustrative carbon cost at EUR 50/t
A. Maintain	12,000 t	EUR 600,000
B. Renovate	6,000 t	EUR 300,000
C. New building	3,000 t	EUR 150,000

Key lesson

A policy change can make an investment more or less attractive even when the building itself has not changed.

EU context: current EU policy is increasing pressure to renovate poor-performing buildings. The revised Energy Performance of Buildings Directive introduces minimum energy-performance standards for non-residential buildings, while ETS2 creates a carbon-price signal for fuels used in buildings. For this game, these rules are simplified into policy and event cards.

4. Teams and roles

Students are divided into six teams. Each team represents a specific stakeholder group and has its own objectives. You may cooperate, make deals, oppose another group or offer a compromise.

Team (stakeholder)	Main interest in the building decision
University employees	Good working conditions, job security and flexible work.
University students	Good learning spaces, affordable study and sustainable campus life.
Local community and local government	Less traffic and pollution, good local services and responsible use of land.
University board	Financially realistic green transition and strong university performance.
Suppliers, contractors and transport providers	Profitable contracts and support for green investment.
National government	Meet climate goals, use public money well and maintain political support.

How to prepare

- Choose your preferred real-estate option: A, B or C.
- Write down two reasons why it helps your stakeholder group.
- Identify one problem or cost created by your preferred option.
- Decide what you need from another stakeholder (team).
- Prepare one compromise you could accept.
- Use Team (stakeholder) action form to record your suggestions.

Proceed to game rounds 1-2-3.

4.1. Player - University employees

Your role

You represent academic and administrative staff. Employees want good working conditions, fair pay, job security and flexibility. Many staff move between campuses. Some would support hybrid work, but others do not want to lose offices or shared spaces.

Your main objectives

- Protect jobs and working conditions.
- Support comfortable, healthy and energy-efficient workplaces.
- Keep reasonable access to offices, laboratories and teaching rooms.
- Improve travel between campuses.
- Avoid using all available money on buildings if this harms staffing and teaching.

Possible actions

- Support renovation if it improves working conditions.
- Accept more hybrid working in exchange for better shared spaces.
- Oppose closing a building if it creates overcrowding.
- Ask the government to help finance renovation.

Important for this game

Closing or selling a building may save energy and money, but it can also reduce staff space. Decide what trade-off you can accept.

4.2. Player - University students

Your role

You represent undergraduate, postgraduate and international students. Students want good teaching spaces, affordable study, reliable transport and a sustainable campus.

Your main objectives

- Keep tuition and student costs affordable.
- Improve classrooms, study areas and social spaces.
- Support a lower-carbon university.
- Protect affordable student housing and transport.
- Avoid major disruption to teaching.

Possible actions

- Support renovation if teaching can continue during the works.
- Ask for part of any building savings to be used for student services.
- Oppose selling a building if it reduces affordable student accommodation.
- Support campus consolidation if transport and study-space problems are solved.

Important for this game

A green building strategy can still create social problems. Consider affordability, access and disruption as well as emissions.

4.3. Player - Local community and local government

Your role

You represent residents and the town government. The university brings jobs and spending, but it also adds traffic, waste and pressure on local services.

Your main objectives

- Reduce traffic and local pollution.
- Protect the town's character and useful green/public space.
- Support local jobs and businesses.
- Improve local services and transport.
- Make sure university property decisions also consider the community.

Possible actions

- Support planning permission for a new building if the university improves public transport or green space.
- Offer local support for reuse of an old building.
- Oppose demolition if it creates major waste or damages heritage.
- Negotiate a community benefit agreement with the university.

Important for this game

You can make planning support conditional on benefits for the town. You should not approve every project automatically.

4.4. Player - University board

Your role

You make the final university investment decision. You want to reach net-zero by 2035, protect the university's reputation and keep finances under control.

Your main objectives

- Choose a realistic 10-year real-estate strategy.
- Reduce energy use and carbon emissions.
- Protect education and research quality.
- Keep the university financially stable.
- Find government support and good agreements with other stakeholders.

Possible actions

- Choose Option A, B or C, or negotiate a modified version.
- Ask government for a grant or other support.
- Negotiate performance guarantees with contractors.
- Use hybrid working and better space use to reduce the amount of property needed.
- Introduce an internal carbon price for future investment decisions.

Important for this game

You must make the final decision, but you need enough political and stakeholder support to implement it.

4.5. Player - Suppliers, contractors and transport providers

Your role

You represent companies that sell goods and services to the university. This includes construction firms, energy-service companies and transport providers.

Your main objectives

- Win profitable university contracts.
- Keep the cost of the green transition manageable.
- Get public support for cleaner technology where possible.
- Maintain a long-term relationship with the university.

Possible actions

- Offer a lower-price conventional renovation.
- Offer a more expensive renovation with guaranteed energy savings.
- Offer recycled or lower-carbon construction materials.
- Ask government for support for electric transport or clean technology.
- Share some project risk in exchange for a longer contract.

Important for this game

Carbon and construction policies may increase some material and energy costs. Decide how much of the extra cost you pass on to the university.

4.6. Player - National government

Your role

You represent the national government. You want to reduce emissions, use public money responsibly, support the economy and remain popular with voters.

Your main objectives

- Support progress toward national climate goals.
- Encourage efficient buildings and cleaner energy.
- Keep public spending under control.
- Support jobs and economic activity.
- Design policies that are fair to different organisations.

Possible actions

- Introduce a carbon cost on fossil-fuel use.
- Offer a grant for deep renovation.
- Support renewable-energy investment.
- Create a tax benefit for green business investment.
- Use some environmental revenue to support public-sector renovation.

Important for this game

A tax benefit that works well for a private company may not help a public university in the same way. You may need to offer a direct grant or another form of support.

5. Game rounds

Round	What happens	Your task
1. Strategy	All teams see the starting data.	Choose a preferred option and prepare arguments. Take your action.
2. Policy	The National Government announces a sustainability policy package.	Reconsider your preferred option. Who wins and who loses? Take your action.
3. Negotiation	Teams negotiate with each other.	Make deals, request support and offer compromises. Take your action.
4. Event	The facilitator introduces one unexpected event.	Adapt your strategy quickly. Take your action.
5. Final decision	The University Board chooses the 10-year real-estate strategy.	Explain the financial, environmental and stakeholder effects.

Each turn each team must select one action that they would take during the turn and define what outcome they expect from it. Players must be as precise about actions and expected outcomes as they can be!

All teams must write down their actions and outcomes on paper simultaneously and secretly, so that they cannot change their actions during the turn.

During their turn a team announces their action and its intended result. This team then provides arguments about why their action should lead to the intended results. In the third step all other teams provide arguments about why the action proposed by the active team should either achieve the intended result or why they should fail. Then each player assesses the likelihood (from 0% to 100%) that the result will be achieved. The average assessment value is calculated, and two six-sided dice are rolled to see if the active team's action is successful. The result is announced and play proceeds to the next player.

Once each team has taken their turn, the round ends. The achieved results and failures are discussed and play advanced to the next round.

Rules for negotiation

- Every proposed action must include a reason.
- You may make agreements with other teams.
- A deal must say what each side gives and receives.
- You may change your position when new policy or event information appears.

Team (stakeholder) action form

Question	Your answer
What action do you propose?	
Which real-estate option does it support?	A / B / C / modified option
What does it cost or save?	
How does it affect emissions or sustainability?	
Which other team must agree?	
What are you offering in return?	

6. Final presentation

Each team has 3 minutes. Keep the presentation simple and answer the following questions:

- What did your team want at the start?
- Which building option did you support at the end?
- Which tax, policy or financial measure mattered most to your decision?
- What agreement or compromise did you make?
- Who benefited from the final decision and who carried the cost?
- What would you change if the game were played again?

How the final university strategy is assessed

Area	Points
Financial sustainability	20
CO2 reduction	20
Use of tax/fiscal policy	15
Real-estate efficiency	15
Student and staff welfare	15
Community impact	10
Ability to respond to change	5
TOTAL	100

There is no perfect answer

A strong strategy balances money, emissions, buildings and people. The lowest-carbon option may be too expensive. The cheapest option today may create higher costs later. The purpose of the game is to understand these trade-offs.

7. Short preparation readings

You do not need to read EU legislation in full. Use these short official pages to understand the background:

European Commission - Energy Performance of Buildings Directive,
https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive_en

Focus on why poor-performing non-residential buildings need renovation.

European Commission - Public buildings and energy efficiency,
https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/public-buildings_en

Focus on why public buildings are expected to lead by example.

European Commission - ETS2: buildings, road transport and additional sectors,
https://climate.ec.europa.eu/areas-action/carbon-markets/ets2-buildings-road-transport-and-additional-sectors_en

Focus on how carbon pricing can encourage building renovation.

European Commission - Energy renovation of buildings,
https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive/energy-renovation-buildings_en

Focus on examples of renovation: insulation, windows, heating systems, solar panels and digital controls.

Key words

Term	Meaning in this game
CAPEX	Money spent now on a building project.
Operating cost	Money spent each year to use and maintain the building.
Carbon cost	Extra cost linked to CO2 emissions.
Grant	Government money that reduces the cost of an investment.
Renovation	Improving an existing building.
Consolidation	Using fewer buildings or combining activities in fewer locations.