

## Green Buildings Learning Portfolio Part 2

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## Part 2 - existing Learning Materials in 5 Categories (becom)

This Green Buildings learning portfolio includes **existing learning materials**, adapted in line with BeCom's methodology, incorporating NEB principles (Sustainability, Aesthetics, Inclusion), the Quintuple Helix Model (QHM), and Andragogy (Applicable, Accessible, Action-Centered):

## **Existing Learning Materials - Organized into 5 BeCom Categories (QHM)**

Each module corresponds to one of the QHM helices and is aligned with NEB values (Sustainability, Aesthetics, Inclusion).



## 1. "Passive House Principles"

https://passivehouse.com

Guide on ultra-low-energy building design

#### **Description:**

This platform provides comprehensive guidance on the Passive House standard – a globally recognized model for ultra-low-energy building. It explains how thermal insulation, airtightness, and heat recovery systems can drastically reduce energy needs. The site offers hands-on strategies for planners, builders, and learners aiming to implement sustainable building practices. The materials are scientifically grounded but accessible for various learning levels.

## **©** Learning Objective:

Learners will understand the core principles of energy-efficient building design following the Passive House standard.

#### **NEB Values:**

- Sustainability: Resource efficiency and energy saving
- Inclusion: Access to affordable, energy-efficient housing
- Aesthetics: Simplicity and clarity in architectural design

#### 2. "Green Roofs for Healthy Cities" Toolkit

https://greenroofs.org/resources

Interactive factsheets and benefits calculator

#### **Description:**

This resource collection explores the ecological, health, and social benefits of green roofs. It includes interactive fact sheets and a calculator that allows users to estimate environmental impacts based on real-world scenarios. The toolkit supports project-based learning and empowers users to imagine greener urban environments. It is suitable for schools, municipalities, or community groups.

#### **©** Learning Objective:

Learners will be able to explain the ecological functions of green roofs and draft simple green roof project proposals.

#### X NEB Values:

- Sustainability: Urban greening and rainwater management
- Inclusion: Improved urban livability for diverse communities
- Aesthetics: Nature integrated into architectural surfaces

#### 3. NASA Climate Kids – Eco-House Simulator

https://climatekids.nasa.gov/eco-house/
Game for exploring sustainable building features

#### **Description:**

This interactive simulation game developed by NASA allows learners to explore the climate impact of sustainable building features. Players make decisions about insulation, energy sources, and building materials to optimize an eco-house. It is especially engaging for younger learners and supports cross-generational education. The playful format makes abstract sustainability concepts tangible and fun.

## **©** Learning Objective:

Learners will understand how building design choices influence energy use and carbon emissions in residential buildings.

## **NEB Values:**

- Sustainability: Energy awareness and climate-conscious decisions
- Inclusion: Accessible environmental education for youth
- Aesthetics: Friendly design that balances learning and play

#### 4. Biodiversity in the Built Environment - Teaching Module

https://wwf.panda.org

Adapted worksheets to analyse local green habitats

#### **Description:**

This module raises awareness of how architecture and urban planning can support biodiversity. Through worksheets and local habitat analysis, learners explore ways to integrate green spaces, nesting sites, and native vegetation into built environments. It encourages ecological literacy and promotes nature-inclusive design strategies. The material is well-suited for both youth and adult education.

#### **©** Learning Objective:

Learners will be able to identify design strategies that enhance biodiversity in urban or architectural settings.

#### **NEB Values:**

- Sustainability: Conservation of local ecosystems
- Inclusion: Ecological access for communities and wildlife
- *Aesthetics:* Nature as a core element of built beauty

Focus: Ecological sustainability, biodiversity, energy efficiency, climate responsiveness

**Example of learning material**: energy efficiency - nearly Zero Energy Builings – ready to use frameworks for nZEB deplyment

https://nzebready.eu/

https://platform.nzebready.eu/training-programmes/

#### Description

NZEB, or Nearly Zero Energy Building, refers to buildings with very high energy performance, where the small amount of energy needed is largely covered by renewable sources, including on-site or nearby sources. The concept is closely linked to sustainability and efficiency, aiming to reduce environmental impact and operating costs. The nZEB Ready is an European Union funded project among partners from 5 different countries that will enhance market readiness for nZEB implementation. The platform provides Training programmes for professionals and other stakeholders. nZEB Ready foresees the development of a free access Knowledge Platform for skilled professionals and other stakeholders. The nZEB curricula will serve as the base to develop tools for the mutual recognition of energy skills and qualifications and for implementing passports for building professionals at European level.

## Cat 2: Education – Learning Through Design & Participation

- 5. Learning from the Built Environment RIBA Education Pack
  - https://www.architecture.com/education

Interactive student-led inquiry framework

## **Description:**

This educational pack developed by RIBA (Royal Institute of British Architects) promotes inquiry-based learning through the lens of architecture. It encourages students to observe, question, and analyze their everyday built environment. The framework is adaptable to different age groups and promotes active participation and design thinking. It serves as a foundation for critical engagement with sustainability, accessibility, and aesthetics in architecture.

#### **©** Learning Objective:

Learners will be able to critically assess architectural elements and propose improvements based on environmental and social criteria.

## **NEB Values:**

- Sustainability: Awareness of resource use in the built environment
- Inclusion: Encouraging student voice in shaping their surroundings
- Aesthetics: Observing and appreciating design quality in everyday spaces

#### 6. CoSpaces Edu: Virtual Sustainable Building Design

https://cospaces.io/edu

VR design space for student exploration

#### **Description:**

CoSpaces Edu provides an immersive digital platform where students can build and explore virtual sustainable buildings. It fosters creativity and systems thinking by allowing learners to test environmental features in a simulated 3D space. The tool supports coding integration, storytelling, and collaborative design. It is especially effective for promoting STEAM learning with a sustainability focus.

## **6** Learning Objective:

Learners will design a virtual sustainable building prototype that incorporates energy-efficient and eco-friendly features.

#### **NEB Values:**

- Sustainability: Simulated testing of green solutions
- Inclusion: Open-access learning through virtual environments
- Aesthetics: Digital expression of creative and sustainable design

#### 7. "Design for Change" School Toolkit

https://dfcworld.org

Empowerment tool for youth-led change projects

#### **Description:**

This toolkit empowers young people to become agents of change in their schools and communities through a structured design thinking process. Learners identify local issues, develop solutions, and implement their ideas with real-world impact. The toolkit includes planning templates, storytelling guidance, and project showcases to inspire action. It aligns well with civic education and youth empowerment goals.

## **©** Learning Objective:

Learners will identify a challenge in their community and co-create a solution using the design thinking framework.

## **NEB Values:**

- Sustainability: Youth-led responses to environmental or social challenges
- Inclusion: Empowerment of diverse learners to lead change
- Aesthetics: Design as a tool for community storytelling and transformation

Focus: Curriculum development, lifelong learning, interdisciplinary training

**Example of learning material:** Interdisciplinary competitions with mentoring from real-world architects and engineers.

https://solardecathlon.eu/information/

https://solardecathlon.eu/wp/wp-content/uploads/2024/12/hostingSDE25\_reasonswhy\_EEF.pdf

#### Description

The Solar Decathlon Europe (SDE) is an international university competition that challenges student teams to design, build, and operate highly energy-efficient and innovative buildings powered by renewable energy. The competition emphasizes sustainable urban living and aims to promote the energy transition and climate-neutral buildings by 2050. The competition follows the principle of "Design – Build – Operate," where teams not only design but also construct and run full-scale demonstrative solar houses. Solar Decathlon Europe thus provides a practical and educational platform for students to explore and demonstrate green building innovations in a real urban context, closely linked with sustainability and renewable energy principles.

## Cat 3: Social – Inclusion, Empowerment & Co-Creation

- 8. NEB Compass Tool (adapted for youth use)
  - https://new-european-bauhaus.europa.eu

Checklist and visual tool for evaluating inclusiveness and beauty

#### **Description:**

The NEB Compass is a self-assessment and reflection tool that helps evaluate projects based on the New European Bauhaus values of sustainability, inclusion, and aesthetics. The youth-adapted version simplifies the original criteria into accessible checklists and visual templates. It supports learners in recognizing the quality and impact of their own ideas or spaces. The tool promotes democratic thinking and collaborative evaluation.

## **©** Learning Objective:

Learners will assess a space or project using NEB criteria and suggest improvements aligned with sustainability, inclusion, and aesthetics.

## **NEB Values:**

- Sustainability: Holistic assessment of ecological impact
- Inclusion: Youth voices in project evaluation
- Aesthetics: Encouraging beauty and meaning in design choices

#### 9. Participatory Design Methods for Schools (IDEO Toolkit)

https://designthinkingforeducators.org

Templates for empathy-driven space redesigns

#### **Description:**

This toolkit introduces participatory design techniques adapted specifically for educational settings. It provides templates, exercises, and empathy tools to support co-creation of learning environments by students and teachers. The methods center on listening, testing, and iteration, encouraging inclusivity in space design. It strengthens learner identity and ownership of their physical and social spaces.

#### **©** Learning Objective:

Learners will co-design improvements to their school or learning environment using empathydriven design methods.

#### **NEB Values:**

- Sustainability: Design aligned with real user needs and long-term use
- Inclusion: Learners as co-creators of meaningful environments
- Aesthetics: Human-centered, empathetic design with visual care

#### 10. Repair Café Starter Guide

https://repaircafe.org/en/start/

Manual for launching peer-led repair spaces

#### **Description:**

The Repair Café guide offers step-by-step support for starting a community-based repair initiative. It emphasizes peer learning, circularity, and social connection by bringing people together to fix household items. Participants not only reduce waste but also strengthen local skills and mutual support. The guide is ideal for activating youth and community groups around sustainability through action.

## **©** Learning Objective:

Learners will organize or simulate a Repair Café, practicing repair skills and community collaboration.

#### **NEB Values:**

- Sustainability: Waste reduction and extended product life
- Inclusion: Intergenerational and community-based learning
- Aesthetics: Care and creativity in reviving used objects

Focus: Accessibility, affordability, community empowerment, participatory design

Example of learning material: 6 principles for a Healty, Sustainable Built Environment

https://worldgbc.org/healthy-equity-resilience/health-framework/

#### Description

The World Green Building Council's Health & Wellbeing Framework, aligned with the UN Sustainable Development Goals, promotes healthy, equitable, and nature-aligned buildings. Developed through global consultation, it serves as a comprehensive education and advocacy tool, offering a holistic view of health across the building supply chain. Presented as both an executive report and interactive digital tool, the Framework brings together experts from multiple sectors to redefine health within the full lifecycle of buildings, cities, and communities.

## Cat 4: Economy – Circular, Local, and Shared Value

#### 11. Ellen MacArthur Foundation Circular Design Guide

https://circulardesignguide.com

Toolkit for sustainable product/service development

#### **Description:**

This toolkit introduces the core principles of circular design, encouraging users to rethink how

products and services are made, used, and regenerated. It includes methods, case studies, and templates to guide the transition from linear to circular thinking. The resource is adaptable for learners, entrepreneurs, and designers across sectors. It fosters innovation while prioritizing resource efficiency and long-term value.

## **6** Learning Objective:

Learners will apply circular design methods to rethink everyday products or systems through the "Make  $\rightarrow$  Use  $\rightarrow$  Regenerate" framework.

#### **NEB Values:**

- Sustainability: Waste avoidance, product life extension
- Inclusion: Open access to design tools for all users
- Aesthetics: Functional and beautiful circular solutions

#### 12. Circular Product Atelier — Local Upcycling Cooperative

https://circulardesignguide.com/case-studies/upcycling-cooperative
Interactive tool

#### **Description:**

This case study presents a Lisbon-based grassroots cooperative that transforms discarded materials—like wood pallets and textiles—into high-quality, market-ready products. The process is guided by circular design principles and involves marginalized artisans, informal workers, and local creatives. The cooperative illustrates how waste becomes a resource while creating jobs and reinforcing local economies. It's an excellent example of inclusive and aesthetic circularity.

### **©** Learning Objective:

Learners will analyze a real-world upcycling initiative and design a simple upcycled product using local waste materials.

#### **T NEB Values:**

- Sustainability: Resource circularity and material reuse
- Inclusion: Involvement of informal workers and underrepresented artisans
- Aesthetics: Locally rooted, creatively designed products

## Prepared as Lesson:

## Context (Real Case Study)

A grassroots cooperative in Lisbon transforms urban waste—such as old textiles, wood pallets, and shipping crates—into market-ready, circular-design products. Guided by the Ellen MacArthur Circular Design Guide, they collaborate with local artisans, informal waste collectors, and designers. Their mission: demonstrate circular product value, reduce waste, and strengthen community economy.

#### **©** Learning Objectives

Participants will:

- 1. **Understand circular product design principles** following the Ellen MacArthur methodology.
- 2. **Analyze local upcycling models** that create shared economic value.
- 3. **Design and prototype** a simple upcycled product using local waste resources.

## **Session Plan**

#### 1. Introduction to Circular Design (20 mins)

- Overview of the Ellen MacArthur Guide's phases: Make → Use → Regenerate
- Ouick ideation: What local waste streams could be circularly used?

## 2. Case Study Presentation (30 mins)

- o Walk-through of the Lisbon cooperative
- o Discuss supply chain: from waste pickup to product sales
- Highlight social impact: job creation and fair income sharing

#### 3. Group Workshop: "Design Your Own Upcycled Product" (50 mins)

- o Groups receive a local waste scenario (e.g., old jeans, timber offcuts)
- Sketch product concepts addressing durability, aesthetics, and end-of-life plans
- o Present prototypes and sustainability rationale

#### 4. Reflection & Scale Strategy (20 mins)

- o Identify local relevant policies or markets
- Explore training needs or cooperative governance models

## BeCom Mapping

#### NEB Values:

- Sustainability: Resource circularity, waste avoidance
- o Inclusion: Involvement of informal workers and marginalized artisans
- o **Aesthetics:** Creative and locally-rooted design

## • QHM Sectors:

- o **Economy:** Co-operative economic model, shared value
- Society: Community capacity building
- o **Politics:** Potential for public procurement or local SME support

Focus: Green jobs, circular economy, market innovation, cost-benefit analysis

**Example of learning material:** impactful circular economy strategies to reduce emissions from the built environment, circular buildings toolkit

https://www.ellenmacarthurfoundation.org/topics/built-environment/overviewhttps://www.ellenmacarthurfoundation.org/topics/built-environment/exampleshttps://www.ellenmacarthurfoundation.org/articles/circular-buildings-toolkit

#### Description

The Circular Buildings Toolkit by the Ellen MacArthur Foundation is part of the foundation's broader mission to accelerate the transition from a linear economy (take-make-waste) to a circular economy — one that is regenerative by design and keeps materials and resources in use for as long as possible.

The circular economy and green buildings intersect in powerful ways — both aim to minimize waste, maximize resource efficiency, and extend the life cycle of materials and systems. By redesigning buildings and infrastructure using circular principles, we can reduce CO<sub>2</sub> emissions, lower material demand, increase resilience, and prevent waste—while creating more sustainable and livable urban spaces. The Circular Buildings Toolkit is designed to help developers, architects, engineers, and urban planners embed circular economy principles into the design, construction, use, and deconstruction of buildings.

## **m** Cat 5: Politics – Governance & Policy Integration

### 13. Municipal Climate Action Plan Templates

https://climate-adapt.eea.europa.eu

Adapted checklists for youth to audit school/municipal climate actions

## **Description:**

These templates support cities and schools in drafting or auditing local climate action plans. Adapted for youth learning, the materials include simplified checklists, policy goals, and examples of successful municipal strategies. Learners are encouraged to analyze and co-develop realistic solutions within their local context. The templates make climate policy tangible and participatory.

#### **©** Learning Objective:

Learners will audit a local institution's climate practices and co-create action proposals aligned with municipal targets.

## X NEB Values:

- Sustainability: Climate resilience and reduction strategies
- Inclusion: Youth participation in local governance
- Aesthetics: Designing liveable, climate-responsible urban environments

The following uncategorized materials are adaptable to youth, adult learners, and mixed community settings and can be embedded in the **BeCom learning portfolios** (Green Buildings, Circular Economy, Community Gardening).

Focus: Governance, regulation, urban policy, incentives

Example of learning material: Overview of building codes, zoning laws, and sustainability certifications (e.g., LEED, BREEAM).

https://breeam.com/about/

https://bregroup.com/case-study/prologis-park-breeam-new-construction-outstanding-development

#### Description

BREEAM, which stands for Building Research Establishment Environmental Assessment Method, is a leading sustainability assessment method for the built environment. It's a framework used to evaluate and certify the environmental performance of buildings and infrastructure projects, ensuring they meet high standards of sustainability. BREEAM helps project owners achieve their sustainability goals by assessing and improving asset performance throughout a building's lifecycle, from design to construction, operation, and even refurbishment. It helps projects achieve net-zero carbon goals, improve whole-life performance, manage health and social impacts, promote circularity, resilience, and biodiversity, and support disclosures and reporting.



### uncategorized Learning Materials (with Links)

- 1. Sustainable Architecture 101
  - https://www.openlearn.ac.uk/sustainable-architecture-101

#### **Description:**

This OpenLearn course introduces the fundamentals of sustainable architecture, using real-life examples and case studies. It explains how buildings interact with the environment and how design choices influence energy use, materials, and well-being. The course is self-paced and suitable for beginners, making it accessible to a broad audience. It provides a clear entry point for those interested in green building.

#### **Learning Objective:**

Learners will identify key features of sustainable architecture and reflect on real-life examples of eco-conscious design.

#### **NEB Values:**

- Sustainability: Environmental responsibility in architecture
- Inclusion: Open-access education for all learning levels
- Aesthetics: Exploring the beauty of sustainable form and function

#### 2. Renewable Energy in Construction

https://learnx.eu/renewable-construction

#### **Description:**

This course explores how renewable energy technologies are integrated into construction processes and building systems. It covers solar, wind, geothermal, and other options, including practical simulations and scenario-based activities. Learners gain insight into the technical and economic factors behind energy transitions in the built environment. The material is actionoriented and grounded in real construction cases.

#### **©** Learning Objective:

Learners will evaluate and compare renewable energy options for different types of building projects.

#### **NEB Values:**

- Sustainability: Renewable energy application and transition
- Inclusion: Skills development for green jobs
- Aesthetics: Harmonizing technology with architectural design

#### 3. Inclusive Design Toolkit

https://www.inclusivedesigntoolkit.com

#### **Description:**

This toolkit provides practical methods for creating products, services, and spaces that are accessible to a wide range of users. Developed by the University of Cambridge, it includes personas, design guides, and inclusion checklists. It encourages thoughtful design that considers physical, cognitive, and cultural diversity. Ideal for projects involving accessibility, universal design, or equity in the built environment.

## **©** Learning Objective:

Learners will apply inclusive design principles to assess and improve the usability of a space or product.

## **NEB Values:**

- Sustainability: Design for long-term usability and adaptability
- Inclusion: Meeting diverse needs through accessible design
- Aesthetics: Beauty that reflects diversity and empathy

#### 4. Urban Biodiversity Planning Guide

https://biodiversity.europa.eu/urban-green

#### **Description:**

This EU resource helps urban planners and citizens understand how to foster biodiversity in cities. It provides strategies for green space connectivity, native species planting, and community involvement. Visual guides and action steps make it useful for education and grassroots projects. It supports eco-literacy and nature-based solutions in the urban context.

#### **©** Learning Objective:

Learners will propose urban biodiversity improvements based on site analysis and planning guidelines.

#### **X** NEB Values:

- Sustainability: Ecosystem support in built environments
- Inclusion: Community involvement in urban nature planning
- Aesthetics: Greening as a visual and ecological enhancement
- 5. Climate-Responsive Architecture Course (MIT OCW)
  - https://ocw.mit.edu/climate-responsive-architecture

#### **Description:**

This MIT OpenCourseWare course explores how buildings can respond to local climate conditions through passive and active design strategies. It covers thermal comfort, orientation, ventilation, and material choice, supported by scientific models and design case studies. The course encourages a systems-thinking approach to architecture. It's ideal for advanced learners or professionals seeking to deepen their environmental design skills.

## **©** Learning Objective:

Learners will analyze how climate-responsive design principles can improve building performance and occupant comfort.

**NEB Values:** 

- Sustainability: Climate-adapted building strategies
- Inclusion: Open access to high-level environmental design education
- Aesthetics: Functional beauty rooted in local context

#### 6. Green Roof Installation Basics

https://www.greenroofs.com/resources/installation-guide

#### **Description:**

This installation guide offers step-by-step instructions for planning and implementing green roofs. It covers structural requirements, drainage, substrate, and plant selection. The practical focus supports hands-on learning and community-based green infrastructure projects. It is particularly relevant for vocational training or school garden initiatives.

## **6** Learning Objective:

Learners will outline the technical steps and materials needed to install a basic green roof system.

#### **NEB Values:**

- Sustainability: Urban greening and stormwater control
- Inclusion: Skills development for green infrastructure
- Aesthetics: Living roofs as visual and functional assets

#### 7. Low-Carbon Building Materials Toolkit

https://www.materialspalette.org

#### **Description:**

This interactive toolkit helps users compare the environmental impacts of different construction materials. It emphasizes embodied carbon, toxicity, and durability, allowing users to make informed design choices. The tool supports lifecycle thinking and material literacy. It's useful for architects, students, and community builders alike.

#### **©** Learning Objective:

Learners will evaluate and select low-carbon materials based on environmental criteria and project context.

#### **NEB Values:**

- Sustainability: Material selection based on life-cycle emissions
- Inclusion: Access to technical tools for responsible design
- Aesthetics: Encouraging beautiful, healthy material choices

#### 8. Energy Efficiency for Public Buildings

https://energy.gov/eere/buildings/guide-public-efficiency

#### **Description:**

This U.S. Department of Energy guide outlines how to improve energy performance in public buildings, including schools and municipal facilities. It addresses retrofitting, behavior change, and monitoring. The guide supports institutional learning and stewardship of public resources. It is applicable in both local government and educational settings.

## **©** Learning Objective:

Learners will identify strategies to increase energy efficiency in public buildings and assess their potential impact.

#### **NEB Values:**

- Sustainability: Institutional commitment to energy reduction
- Inclusion: Public benefit from efficient infrastructure
- Aesthetics: Enhancing user comfort and spatial quality through retrofits

#### 9. Sustainable Procurement Guide (ICLEI Europe)

https://sustainable-procurement.org

#### **Description:**

This guide helps decision-makers integrate sustainability into public procurement processes. It includes legal guidance, criteria templates, and successful case studies across Europe. The content encourages governments and institutions to influence markets by prioritizing green and fair products and services. It links purchasing with long-term policy goals and community impact.

## **©** Learning Objective:

Learners will draft or analyze a procurement process and propose sustainability criteria for improvement.

## **NEB Values:**

- Sustainability: Long-term impact through green procurement
- Inclusion: Fairness and transparency in public spending
- Aesthetics: Procuring high-quality, well-designed public goods

#### 10. Community-Led Design Processes

https://communityplanning.net

#### **Description:**

This site offers resources for facilitating participatory design and planning processes with communities. It emphasizes dialogue, trust-building, and co-creation, with templates and real-world stories. The approach values lived experience and democratizes the design process. It's ideal for grassroots urbanism, social architecture, and civic engagement projects.

#### **©** Learning Objective:

Learners will plan or simulate a participatory design workshop with emphasis on inclusivity and local identity.

## **NEB Values:**

- Sustainability: Locally tailored, accepted solutions
- Inclusion: Co-design with underrepresented groups
- Aesthetics: Community-authored spatial design

#### 11. Circular Construction Practices (Ellen MacArthur Foundation)

https://www.ellenmacarthurfoundation.org

### **Description:**

This resource introduces principles and case studies of circular construction, with a focus on minimizing material waste, enabling reuse, and extending building life. It supports modular thinking and system integration. The site promotes a shift from linear to regenerative construction practices. It's ideal for introducing circularity into vocational or architectural education.

#### **©** Learning Objective:

Learners will describe the characteristics of circular construction and evaluate its benefits using real case examples.

#### **NEB Values:**

- Sustainability: Material cycles and waste minimization
- Inclusion: Sharing knowledge across sectors and disciplines
- Aesthetics: Design that supports adaptability and elegance

#### 12. Ecolabels & Green Certifications Explained

https://ec.europa.eu/ecolabel

#### **Description:**

This EU platform provides clear explanations of environmental labels and certification schemes relevant to buildings, products, and services. It helps learners and consumers understand how labels like the EU Ecolabel support sustainable purchasing. The resource includes case examples and labeling criteria. It fosters informed decision-making and accountability.

## **©** Learning Objective:

Learners will compare different ecolabels and apply criteria to select certified products or materials.

#### **T** NEB Values:

- Sustainability: Transparency in ecological impact
- Inclusion: Enabling responsible choices for all users
- Aesthetics: Trust and clarity in sustainable design language

Here is a sample list of learning materials with placeholder links, adapted for the Green Buildings Learning Portfolio. These resources can be replaced or verified with actual URLs from your project repository or trusted sources (like EU OER platforms, OpenLearn, or Erasmus+ partner content repositories).

#### **Adapted Learning Materials (BeCom Methodology)**

This Green Buildings learning portfolio includes **existing learning materials**, adapted in line with BeCom's methodology, incorporating NEB principles (Sustainability, Aesthetics, Inclusion), the Quintuple Helix Model (QHM), and Andragogy (Applicable, Accessible, Action-Centered):

- **Sustainable Architecture 101** Real-life case studies added (Applicable)
- Renewable Energy in Construction Scenario-based simulations (Action-Centered)
- Inclusive Design Guide Translated into 3 languages; accessibility checklists added
- **Urban Biodiversity Toolkit** Aesthetic and ecological lens applied (NEB)
- Climate-Responsive Design Linked to QHM Education & Environment sectors
- Green Roof Technologies Group reflection and mini-projects included
- Low-Carbon Materials Multimedia-infused (video, infographics)
- Energy Efficiency in Public Buildings Problem-solving exercises added
- Sustainable Procurement Guide Reframed through QHM Economic lens
- **Community-Led Design Processes** Emphasis on participatory inclusion (Society)
- **Circular Construction Practices** Modular micro-learning format (Andragogy)
- Ecolabels and Building Certifications Quizzes and case examples included

## **Sustainable Building and Sustainable Renovation (ACTeco)**

**Description:** Part of an EU-funded educational platform: short, **open-access courses** (~45 min) on sustainable building concepts and renovation of traditional houses. Also include modules on sustainable solar and tiny-house case studies.

Learning Objective: Learners will be able to articulate sustainable construction strategies and renovation methods that lower environmental impact while enhancing comfort and resource efficiency

acteco.eu.

These resources span natural materials, passive design, circular economy, and urban greening—with diverse European languages and open access. Let me know if you'd like direct enrollment links or formatted summaries (e.g. for syllabus or training plans).

## "Introduction to Green Buildings" – GreenED

#### **Description:**

A free online, bite-sized course offering a foundational overview of green buildings—covering site selection, energy and water efficiency, materials, indoor health, and an international certification case study <a href="eff-greenroof.eu+15greened.co.za+15Reddit+15">eff-greened.co.za+15Reddit+15</a>.

## **Learning Objective:**

Learners will be able to **define green building concepts**, **describe core components**, **discuss benefits**, and recognize key certification systems like LEED or Green Star.

#### Green Building Assessment & Certification – RiseUpp (L&T EduTech)

#### **Description:**

Video-based course (~7 hours) with assignments. Teaches life-cycle assessment, IGBC/GRIHA certification systems, sustainable material selection, green project management, and environmental impact evaluation. Certificate upon completion wizape.comriseupp.com+1lms.isds.org.in+1.

#### **Learning Objective:**

Learners will be able to assess green building certification systems (IGBC, GRIHA), conduct material LCA, and apply sustainability assessment tools in design and management.

#### **GreenGrowth MOOC** (EU Circular Economy Project)

**Description:** A free Massive Open Online Course covering circular economy and recycling in the construction sector across five thematic modules. Includes videos, readings, and links. Available in multiple European languages.

**Learning Objective:** Learners will be able to apply circular economy principles to building design and construction, reducing waste and enhancing resource efficiency

https://greengrowthproject.eu/en/courses/?utm\_source=chatgpt.com

#### **Green Roofs Training – NaturBuild (Erasmus+)**

Description: A modular 70-hour course teaching the benefits, installation, maintenance, and deconstruction of green roofs. Delivered in English, Spanish, Italian, Greek, and Portuguese via Moodle. Ideal for construction professionals seeking upskilling.

Learning Objective: Learners will be able to design, install, and maintain green roofs and understand their contribution to urban sustainability and building efficiency training.naturbuild.eu

https://training.naturbuild.eu/?utm\_source=chatgpt.com



#### Learning materials about green buildings

Learning materials about green buildings organized by the Quintuple Helix Model are structured to reflect collaboration among academia, industry, government, civil society, and the environment. These resources not only describe green technologies and sustainable development but also demonstrate how each helix can engage in and benefit from green building initiatives.



Other uncategorized Example (Research Romania)

#### Renovation and improvement of traditional (chirpici) houses

RO: Vă trimit câteva linkuri privitoare la case verzi sau ecologice.

Unele sunt mai ușor de construit, altele ca de exemplu căsuțele îngropate sau casele de hobbiți cum mai sunt cunoscute după apariția celebrei serii Stăpânul inelelor, necesită cunoștințe care nu sunt la îndemâna tuturor dar odată construite te transpun într-o lume de poveste.

https://www.atomico.ro/blogs/news/renovare-casa-de-chirpici-sfaturi-pentru-rezolvarea-problemelor-si-reconditionarea-casei

#### **EN: Description:**

These material guide adult learners through the **renovation and improvement of traditional chirpici (adobe) houses**, a sustainable and eco-friendly construction method. The first part focuses on identifying and solving structural or moisture-related issues in existing chirpici homes, while the second presents practical upgrades that enhance comfort, energy efficiency, and durability—demonstrating how traditional materials can be adapted for modern, sustainable living.

#### **Learning Objective:**

By the end of the videos, learners will be able to assess common issues in traditional chirpici houses, propose effective renovation strategies, and identify sustainable improvements that enhance indoor comfort and environmental performance.

https://www.reformex.ro/case-din-chirpici/

#### **Description:**

This article introduces adult learners to *chirpici*—a traditional, eco-friendly building material made from clay, straw, and water—used in constructing natural, low-impact homes. It provides a practical overview of how chirpici is prepared and applied in green building projects, including foundation techniques, wall construction, insulation, and natural finishes. The content emphasizes sustainability, affordability, and environmental performance, making it ideal for learners exploring alternative building methods within the green construction movement.

#### **Learning Objective:**

By the end of this article, learners will be able to **identify the environmental benefits of** chirpici as a green building material and describe the process of constructing a sustainable house using traditional earthen techniques.

 $\underline{https://adevarul.ro/stiri-locale/cluj-napoca/casa-de-vis-facuta-din-materiale-naturale-2234808.html}$ 

https://www.youtube.com/watch?v=XLIqx2IeppQ

#### **Description:**

This video offers a clear and engaging introduction to **green buildings**, made from Natural CLAY plaster and Hazelnut Wreath Panels, focusing on sustainable design, energy efficiency, and environmentally responsible construction. Directed at adult learners—professionals, enthusiasts, or lifelong learners—it covers principles like resource conservation, renewable energy integration, eco-friendly materials, and indoor environmental quality. The presentation combines real-world case examples, visual explanations, and practical insights to support self-directed learning and critical thinking.

#### **Learning Objective:**

By the end of the video, learners will be able to explain the core principles of green building

design—such as energy efficiency, use of sustainable materials, water conservation, and certification systems—and assess how incorporating these elements can improve a building's environmental and human health performance.

https://www.youtube.com/watch?v=bVRDhQ5stng

#### **Description:**

This video report follows journalist **Anna Smolniţchi** as she builds an **eco-friendly house in** Scandinavian style, using natural and sustainable materials. Aimed at adult learners interested in green construction, the video explores both the benefits and challenges of eco-building such as cost, insulation, environmental impact, and long-term durability—through a real-life example.

### **Learning Objective:**

By the end of the video, learners will be able to identify the key benefits and challenges of building an eco-friendly home and explain how Scandinavian design principles and natural materials support sustainable living.

https://www.facebook.com/boierulilie/

RO: Dacă este ceva ce ar mai trebui să caut vă rog să îmi spuneți.



Other uncategorized Example (Research Greece)

**Climate Interactive - En-ROADS** 

https://en-roads.climateinteractive.org/scenario.html?v=25.6.0

The En-ROADS, Climate Solutions Simulator is a fast, powerful climate solutions scenario tool for understanding how we can achieve our climate goals through changes in energy, land use, consumption, agriculture, and other policies. The simulator focuses on how changes in global GDP, energy efficiency, technological innovation, and carbon price influence carbon emissions, global temperature, and other factors. It is designed to provide a synthesis of the best available science on climate solutions and make these available for groups in policy workshops and roleplaying games. These experiences enable people to explore the long-term climate impacts of global policy and investment decisions.

En-ROADS is being developed by a wide variety of stakeholders from business and public sector such as Ventana Systems, UML Climate Change Initiative, and MIT Sloan.

This guide provides background on the tips for using the simulator, general descriptions, realworld examples, slider settings, and model structure notes for the different sliders in En-ROADS.

In addition to this User Guide there is:

- A general support knowledge base at support.climateinteractive.org with frequently asked questions and a contact form
- An in-depth online training on using En-ROADS that can be taken at anytime
- An extensive En-ROADS Technical Reference that covers model assumptions and structure, as well as references for data sources.

#### **En-ROADS Online Course**

## https://learn.climateinteractive.org/course/mastering-en-roads

*En-ROADS* online course, enhanced with live sessions, group activities, and peer learning—blending climate science, systems thinking, and facilitation skills to help the students to engage any audience.

For more information about En-ROADS from EU Climate Action Academy:

https://climate-pact.europa.eu/eu-climate-action-academy/resources/en-roads-climate-solution-simulator\_en

# 1) **Energy Policy Simulator (Energy Innovation):** https://energypolicy.solutions/simulator/eu/en

The European Union Energy Policy Simulator is an open-source modeling tool developed by Energy Innovation and adapted for the EU in partnership with a thinktank from Germany on clean energy. It helps users explore how different climate and energy policies can reduce greenhouse gas emissions, improve public health, and stimulate economic growth.

For using the simulator, users can compare different scenarios that are from different EU Climate Legislation Scenarios, such as "business-as-usual" a baseline scenario as well as a "Fit for 55" scenario aligned with EU climate legislation from 2019 to 2024.

As the users interact with different sliders they can explore the effects of policies across power, industry, transport, buildings, and agriculture. By adjusting levers users can stimulate the impact of carbon pricing, clean vehicle mandates, energy efficiency retrofits, renewable energy targets, and more.

#### **Disclaimer / Copyright Notice**

Parts of this material were created and structured with the support of ChatGPT (OpenAI, GPT-5); other parts were searched and created using CoPilot. The content was created to support analysis and reporting and was adapted and reviewed by the project team. Research was conducted using Bing and/or Google searches.

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4.9.25 Germany, Project Team







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