

Additional material

This is a list of educational materials on sustainability and circularity in construction. [If you are interested in reading more about the criteria for the mapping, you can find more information here.](#)

The list is last updated in august 2024.

Write to us if we are missing an educational material on the list: nordicsustainableconstruction@sbst.dk

International (in english)

Material	Source	Description
BUSGoCircular training materials	BUSGoCircular	<p>BusGoCircular is an educational platform that focuses on the development of a green energy skilled workforce within the construction sector.</p> <p>The platform offers a variety of assignments and training materials including e-learning modules. The material focuses on eg. multifunctional green roofs, façades, and interior elements.</p> <p>The platform is part of a 30-month-long project funded by the European Union's Horizon 2020 Research and Innovation Programme. It aims to increase the number of skilled workforce across the value chain by overcoming the challenges faced when implementing real change</p>
Decarbonized construction training package	eOppiva	<p>Educational material of eight training sessions about why and how construction is decarbonizing.</p> <p>The trainings are aimed at professionals and students in the construction and real estate industry. The material includes:</p> <ul style="list-style-type: none"> • Introduction to decarbonized construction (published) • Circular economy in construction (published) • Low-carbon steering throughout the building's life cycle (published) • Whole life carbon – How an assessment is conducted? (published) • Assessment of the building's climate benefits (coming in autumn 2024) • Circular economy methods and steering in new construction and existing buildings (coming in autumn 2024) • Low-carbon materials (coming in autumn 2024)

		<ul style="list-style-type: none"> • Procurement of low-carbon construction projects (coming in autumn 2024)
Opalis	Rotor	The Opalis documentation page provides a variety of resources aimed at promoting and facilitating the reuse of materials in construction and renovation projects. On the page, you can find videos, examples on reuse strategies, brochures, guides and case studies on topics such as: Reuse in practice, insurance, reclamation and reuse rates and material recovery.

Denmark

Material	Source	Description
VIGOT – Vidensbaseret Grøn Omstilling af Tømmeruddannelsen (Knowledge-based green transformation of the carpenter education)	BUILD	<p>The VIGOT project aims to accelerate the green transition and explores innovative and sustainable building materials such as straw and seaweed for insulation and hemp blocks as an alternative to gas concrete.</p> <p>The website contains text and data describing new building solutions to be used for educational or inspirational purposes.</p>
Grøn Spydspids – Bæredygtighed på byggepladsen , 2024	AMU	3-day course where the participant learns about selecting and documenting work processes and material selection in relation to LCA and climate impact, as well as to assess the sustainability of materials and find substitutes to optimize them. There is also a focus on documentation and recording of resource consumption, energy, electricity, fuel, etc.

Fuge fight	Danske Tegl	A digital learning platform in a game format developed by Danske Tegl for masonry apprentices in Denmark. It offers an engaging and fun introduction to "The 10 Commandments" of flawless masonry through interactive tasks inspired by classic video games. The platform aims to enhance technical knowledge and promote professional pride among apprentices.
Byggefilm and indeklimafilm	Bygherreforeningen and Chroma Film	Knowledge portal dedicated to showcasing traditional craftsmanship techniques. It features a collection of films that serve as hands-on training for craftsmen, ensuring the preservation of building heritage and promoting resource-conscious practices in the construction industry.
Byg Bæredygtigt (Build sustainably)	DI Byggeri & Naturvidenskabernes Hus	Teaching material for 7.-10. grade on how to build a sustainable house centering on a case-study and case-development with a visit at a cooperation. The material contains three small assignmentdescriptions with some information (1 page) on the topic and a practical assignemnt centering on sustainable construction: Design your sustainable house: the students have to read up on new sustainable building trends and apply these in their design. The lifecycle of materials: The students have to do their own LCA's on different construction materials. Don't let the heat out: The students get to know different isolation-materials and their abilities, and analyse how well they perform in the matter of sustainability.

<p>Bæredygtigt byggeri (Sustainable construction) – 2021</p>	<p>Den almennyttige fond FØB i samarbejde med Egen Vinding og Datter, Envice og Roskilde Tekniske Skole</p>	<p>An online portal on sustainable construction for VET institutions. The site has information on a variety of topics in regards to sustainable construction: Construction materials (with information on sustainability and how to select them); themes, methods, certifications and concepts; vocabulary, regulation requirements, emissions from materials; cases and; educational material. The educational material includes:</p> <ul style="list-style-type: none"> - Six thematic educational courses with elements such as: 1) Introduction: Climate, construction and what is sustainability; 2) Production: Raw materials, transportation, resource and renewable resources; 3) Lifespan: Quality, repairs, abilities and life cycle costing assessments; 4) Reuse and waste: lifecycle, upcycle, downcycle and waste minimisation; 5) Indoor climate: How to get a good indoor climate in regards to humidity, noise, chemical substances etc; 6) Designprocess: renovate, climate-adaption, wastewater. <p>The site also has workshop-assignments: three for brick-layers, four for carpenters and two for painters. The assignments are practical oriented, and concentrate on learning sustainable practices in the profession. Furthermore there is a quiz on sustainable construction, four inspirations short films on sustainable construction practices, a booklet with descriptions of overall themes on sustainable construction, a 'material-box' and teachers guides with suggestions on how to execute the lessons.</p>
<p>Vinterakademi - cirkulær økonomi og fremtidens bæredygtige by (‘Winteracademy’ - Circular economy and the future of sustainable cities) – 2017</p>	<p>Stefan Frank Thor Straten, Sophie Louise Gladskov & Synnøve Kjærland - Concito</p>	<p>An interactive educational catalogue / iBook with five chapters: 1) introduction: climate change, sustainability and what it has to do with buildings and construction; 2) sustainable cities in the future: what are the challenges, what is a sustainable city and what are humans part in sustainability in the cities; 3) Circular economy: what is circular economy and how can you work with it - plus examples of practice; 4) Materials and buildings in a cycle: what challenges and possibilities are there in reuse, recycling and transformation of buildings; 5) Professions and process: multidisciplinary and the method of the quadrant model.</p> <p>The catalogue has links to further information, informational short films with experts on the</p>

		different subjects, methods and case-examples. There are no assignments in the material.
<p>Videnscenter for Håndværk og bæredygtighed (Knowledge Center for Handcraft and Sustainability)</p> <p>Eg:</p> <p><u>BÆREDYGTIGT BYGGERI – MATERIALER OG BYGGEPROCESSER</u></p> <p><u>Grundlæggende introduktion til bæredygtighed i EUD og byggefagene</u> (Basic introduction to sustainability in EUD and construction subjects)</p> <p><u>Bæredygtig byggeplads</u> (Sustainable construction site)</p> <p><u>De 17 verdensmål</u> (The 17 Sustainable Development Goals)</p> <p><u>ANVENDELSE AF LCA FOR HÅNDVÆRKERE I BYGGE OG ANLÆG</u> (Application of LCA for carpenters in 'Construction and Facility')</p>	<p>Videnscenter for håndværk og bæredygtighed</p>	<p>Knowledge Center for Handcraft and Sustainability has a big database (50+ modules) of educational material for vocational schools on sustainable construction practices</p>

<p><u>CIRKULÆR ØKONOMI – CIRKULÆRT BYGGERI</u> (Circular economy - Circular construction)</p> <p><u>Opgave i LCA med EPD'er for EUD, alle byggefag</u> (LCA assignment with EPD's for EUD, all construction professions) – 2022</p> <p><u>Introduktion til indeklima</u> (Introduction to indoor climate) – 2022</p> <p><u>Bæredygtighed og bæredygtigt byggeri</u> (Sustainability and sustainable construction)</p> <p><u>Den frivillige bæredygtighedsklasse</u> (The voluntary sustainability class) – 2022</p> <p><u>Murermaterialer og klimapåvirkning</u> (Building materials for bricklayers and the climate impact) – 2023</p> <p><u>Klogt byggeri</u> (Smart construction) – 2022</p> <p><u>Det sorte og grønne hus</u> (The black and green house) – 2022</p> <p><u>Små skridt til en bæredygtig verden</u> (Small steps towards sustainable world) – 2022</p> <p><u>Bæredygtig transformation</u> (Sustainable transformation) – 2022</p>		
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<p>Bæredygtige materialer og cirkulær økonomi (Sustainable materials and circular economy) – 2022</p> <p>Små opgaver i bæredygtighed (Small assignments regarding sustainability) – 2022</p> <p>Bæredygtige materialer og lang levetid (Sustainable materials and long lifespan) – 2022</p>		
<p>Bliv bedre til bæredygtighed (Become better at sustainability)</p>	<p>Videnscenter for Energibesparelser i Bygninger</p>	<p>The material 'Become better at sustainability' includes four parts:</p> <ul style="list-style-type: none"> - A guide which introduces the concept of sustainability in general and under five general principles. The guide's primary focus is materials, energy and indoor climate. - A case booklet with two examples of sustainable construction. Including which measures have contributed to sustainability, and which dilemmas have arisen along the way. - Teaching material, which is targeted at vocational training and universities, where theory and practice are mixed. - Supplementary teaching material with relevant Danish sources and literature on sustainability. <p>The material is a further development on the material 'Choose sustainable' that helps you to make sustainable material choices. This material is on the page as well and includes a guide for choosing materials and an informational catalogue on sustainable construction materials.</p>

<p>Bliv klog på bæredygtighed i byggebranchen (Sustainability in the construction industry) – 2016</p>	<p>Mikael Scheby, Maiken Rahbek og Peer Daugbjerg</p>	<p>An e-book with a short introduction to sustainability and assignments on sustainability in general and assignments on sustainability in the construction sector. The book has a teachers guide as well. The book centers around four subjects: A) Isolation; B) Innovative design; C) Cradle to cradle; D) Sustainability in the construction sector. The book has seven assignments on general sustainability and eight on sustainability in the construction sector. The assignments are theoretical and not practical.</p>
<p>Fremtidens Bæredygtige Byggeri (Sustainable construction of the future) - 2015</p>	<p>CONCITO/ Klimaambassaden med støtte fra Energifonden</p>	<p>Teaching material that gives the students a basic understanding of what sustainable construction is and why it's important. The material includes both explanations and information (text and short films), theoretical tasks, and guides for reflections and class discussions. The material is structured in 6 chapters: 1) Introduction; 2) The sustainable city: climate adaption, biodiversity/city nature, construction around the city, citystructure; 3) Materials; 4) Indoor environment; 5) Energy; 6) Certification. The material includes a game on 'sustainable construction', where the students investigates relevant subjects from new sustainable perspectives. Chapter 3) Materials, has a sub-chapter specifically on reuse with short videos, examples, information and an analysis assignment on sustainable materials - all together 7 p.</p>
<p>MATERIALEATLAS over byggematerialers genbrug- og genanvendelsespotentialer (Atlas of materials on the reuse and recycling potential of construction materials) – 2016</p>	<p>InnoBYG, Teknologisk Institut (TI) og CINARK – Center for Industriel Arkitektur på Kunstakademiets Arkitektskole</p>	<p>The catalogue Materialeatlas ('Material Atlas') is an overview of the reuse and recycling potentials of different building materials. The overview functions as a reference work, where it is possible to find information about which environmental problems that are linked to each specific building material.</p>

<p>Besparelsesmuligheder i klimaskærmen (Saving possibilities of the climate envelope)</p>	<p>Iben Østergaard, Kim Faurshou - videnscenter for håndværk og bæredygtighed</p>	<p>The teaching material has been developed by project manager Iben Østergaard from the Knowledge Center for energy savings in buildings, in collaboration with Kim Faurshou from the Knowledge Center for craftsmanship, sustainability, climate renovation and construction.</p> <p>The material can be used for renovation tasks, where savings must be calculated and export instructions are used. There are references to energy solutions, savings calculators, films on www.byggeriogenergi.dk, which the teacher can let the students immerse themselves in as needed. There are tasks during the presentation; the use of the above determines the length of the teaching time - which can be from ½ day to a week - but if the students are to acquire skills, at least 1 day is recommended - preferably two.</p> <p>Afterwards the students should: Be able to explain what the greenhouse effect is and how fossil fuels affect; Be aware of requirements in the building regulations regarding insulation thicknesses during renovation; Know about methods to check energy consumption and be able to calculate energy savings.</p>
<p>Quiz dig selv om kravene (Take a quiz on the requirements) – 2022</p>	<p>Videncenter om Bygningers Klimapåvirkninger</p>	<p>Three quizzes on the climate requirements in the Building Regulations per 2023 in three levels of difficulty: a beginners, an experienced, an expert.</p>
<p>Hvad er den frivillige bæredygtighedsklasse? (What is the voluntary sustainability class?) – 2020-2021</p>	<p>Videncenter for energibesparelser i bygninger</p>	<p>The knowledgecenter has developed five guides and a n online textbook centering on the nine demands in the Voluntary Sustainability Class. Each guide has a focus are:</p> <ul style="list-style-type: none"> - Ressources on the construction site - Plans for the preservation of indoor-climates - documentation of problematic substances - gasses in the indoor climate - smaller renovations <p>The book gives a more basic understanding of sustainable construction and an account of each of the nine demands.</p>
<p>Se tre korte film, og forstå LCA bedre (watch three short movies and get a better understanding of LCA) – 2023</p>	<p>Videncenter om Bygningers Klimapåvirkninger</p>	<p>Three movies between 1,5 and 3,5 minutes in lenght describing: 1) how you can use LCA calculations to achieve climate savings, 2) what the principles behind LCA are, 3) how you obtain data for the calculation.</p>

<p>Ni film om bæredygtighed til håndværkere (Nine videos on sustainability for people in the construction sector) – 2021</p>	<p>Bark rådgivning og Logik & Co</p>	<p>Nine videos on different aspects of sustainable construction. The videos are about five minutes long and display a case of the particular subject of the video and brief information/introduction to the subject. The videos are:</p> <ul style="list-style-type: none"> - Bæredygtig renovering af lejlighed - Bæredygtig byggeplads - Affaldssortering på byggepladsen - Bæredygtigt tag - Bæredygtig vinduesrenovering - Bæredygtig isolering med træfiber - Naturmaling baseret på vand - Bevar og forny - Bæredygtig indvendig efterisolering og pudsning af væg
<p>Byg genialt af genbrug (Build geniously with reused materials)</p> <p>Byg bæredygtigt og red verden (Build sustainably and save the world)</p>	<p>PraxisOnline</p>	<p>Two materialpackages on basic principles of reuse in construction. Each package of material includes a video, an introduction to the theme and the assignment, a practical project-assignment and theoretical knowledge and assignemnts on the subject as well as a teachers guide.</p> <p>Both materials covers the subjects:</p> <ul style="list-style-type: none"> - Method - Planning - Work environment - Materials - Tools - quality <p>There is a written assignment to each subject.</p> <p>The first material covers 14 days of project work in groups, and is targeted students at the beginning of their education (beginning of GF1), as an introduction to sustainable construction as a broader subject. The whole project period should result in the students working together in teams to build a product, large enough for them to stay inside.</p> <p>The second material is targeted students a bit further in their education, but still quite early on (ending of GF1) and over a longer period of time - nine weeks. It has two modules:</p> <ul style="list-style-type: none"> - Studying houses, that others has build, in order to learn about principles of sustainable construction. - Build sustainably: Build our own festival bar.

		<p>The students has to develop a portfolio and learn more about sustainability and sustainable construction. There are short introductions to relevant themes and concepts.</p>
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Finland

Material	Source	Description
<p>Circula - Kiertotalous- ja yrittäjyyspeli (Circula - The Circular Economy and Entrepreneurship Game)</p>	<p>SYKLI Environmental School of Finland in collaboration with Junior Achievement Finland, Savo Consortium for Education and Omnia, the Joint Authority of Education in the Espoo Region. Project</p>	<p>A boardgame offering a fun and creative introduction to the concept of Circular Economy as well as business idea development and entrepreneurship. The material includes a teachers guide to using the game for teaching in circular economy. The game takes 3-5 hours to complete all in all. Before playing the students get an introduction to circular economy in advance, then learn about companies already putting the circular economy into action. The purpose of the game is to come up with an idea for a company that is a</p>

	funded by the Finnish Innovation Fund Sitra.	response to a real need or problem, uses natural resources in an imaginative and sustainable manner and is a profitable business.
The Circular Classroom	Dr. Leyla Acaroglu. Sponsored by The Walki Group	An interactive educational toolkit for upper secondary high school educators and students to integrate circular thinking into the classroom. Including separate modules flexible for the teacher to decide what tasks, assignments or homeworks the students are to do. Modules are: LINEAR TO CIRCULAR ECONOMY, SYSTEMS & SUSTAINABILITY and DESIGN & CREATIVITY. Videos and workbooks for classroom activities support these modules, along with educator support materials as part of the complete Circular Classroom Toolkit. Through the first two modules the students learn about circular economy and sustainability - with a focus on sustainability in nature. The third module focusses on design and development processes, where the students have to create and develop sustainable ideas, designs and products.

Iceland

Material	Source	Description
EFNISGÆÐI Yfirlit yfir algeng bygginarefni, eiginleika þeirra og helstu umhverfisáhrif (MATERIAL QUALITY An overview of common building materials, their properties and main environmental effects) - 2017	Vistbyggðarráð	A summary of material quality of building materials in Iceland which reviews the composition and properties of materials with regard to environmental effects. This booklet introduces the various environmental labels that are used for building materials and the evaluations used for environmental impact. The booklet largely based on the "Grønn Materialguide", which was published by Grønn byggeallianse in Norway by Katharina Bramslev and Rolf Hagen (2015).
Kortlagning og leiðbeiningar um nýtingarmöguleika byggingarúrgangs (Mapping and guidelines for the utilization of construction waste) – 2022	Grænni byggð	Guidelines for the utilization of different possibilities of construction waste. Analysis of the main trends of construction waste with a guide on how to increase reuse, recycling and recovery; reduce disposal building materials and maintaining value in the value chain. The project is limited to construction and demolition waste that falls during construction, with the exception of soil and asphalt. In the continuation of the analysis, the future flow of waste is discussed in relation to reuse and recycling and presents examples and

		guidelines for the afterlife of the main categories of waste.
Staðan og framtíðaráskoranir í byggingariðnaði (The status and future challenges in the construction industry) – 2018	Bryndís Skúladóttir, Samtök iðnaðarins	Examples of upcoming changes regarding waste issues where more emphasis is placed on circular economy, designing and building in a way that is durable, easy to take apart and recycle raw materials.
Sex fræðslufundir um sjálfbærni í byggingariðnaði (Six educational sessions on sustainability in the construction industry) 2021	Iðan fræðslusetur & Grænni byggð	A series of streaming sessions in collaboration with the non-profit organization Grænni byggð. The aim of the meetings was to raise awareness and educate craftsmen about sustainability in the construction industry.

Norway

Material	Source	Description
Den naturlige skolesekken (The natural Schoolback)	Naturfagsenteret	The students examine four different varieties of apples that are produced in different countries and in different ways. The overarching aim is to give the pupils action skills for sustainable development on the basis of both ecological, economic and social conditions. Through this exercise, students can develop their awareness of making reflected consumer choices for sustainable development. This activity aims to make sustainable consumption choices concrete, and helps to give students opportunities to make sustainable choices in everyday life. The material includes teachers guides.
Bærekraft (Sustainability)	FN-Sambandet (United Nations Association of Norway)	A collection of teaching materials about The United Nations and sustainable development - as they describe it: "The world we live in". The material focusses on a wide spectrum of subjects concerning the SDG's and has short films, activities and teachers guides. Two of the collections of teaching materials on the site are partly relevant for this mapping: Resource bank "Sustainability" for vgs, and; Natural diversity and utilization of natural resources - a dilemma?. The ressourcebank has 17 tasks concerning the SDG's

		for teaching sustainable development. The material on bio-diversity and natural resources has information on the two themes natural diversity and mining and seeks to make the students develop opinions on these matters.
Klimaskolen (The climate school) – 2019	Utdanningsetaten og Klimaetaten	A website with an overview of online teaching materials about climate, environment and sustainable development targeted primary school and high school/vocational educations (Videregående skole - VGS). The material is divided by level and by subject. There are six references to online sites with teaching materials relevant for practical subjects at VGS. The relevant sites will be described separately. Furthermore there is references to materials for nine other subjects, all in all 52 references to sites with teaching materials for VGS on climate, environment and sustainable development under the subjects: Biology, Climatepilots, English, Geography, KRLE (Christianity, Religion, Lifevision and Ethics), Math, Nature Sciences, Norwegian and Social Studies. The materials are categorized under more than one subject. Most of the references are categorized as relevant for Nature Sciences (51) and Social studies (47).
Loop Miljøskole (Loop environment school)	Loop Miljøskole	Loop Miljøskole has created a page with a collection of teaching materials for kindergarten up to high school / vocational educations (VGS). There is a mix of videos, teaching plans, texts and other resources. There are 34 different materials for VGS. Most of these concern everyday-life sustainability such as foodwaste, plastic pollution and electronics. The most relevant are 1) What is circular economy?, and; 2) What is sustainable development?. Both of these are on a general level, and do not specifically concern construction. They include a short movie and some related assignments.

Sweden

Material	Source	Description
Lektionstips (Lesson tips) Ex undervisningsmateriale om affaldshåndtering:	Sysav	Sysav is a company that receives, processes and recycles waste from households and industries. On their website they have teaching materials for primary school and high school. The material is described as 'tips' and is primarily made up of work questions and small assignments related to

		UN's goals for sustainable development to make students in high school familiar with life cycles, global supply chains etc. and make them reflect on questions such as: how do we reach a sustainable development? The page is for the teachers and includes short descriptions of some of the important subjects on the matter.
Skolverket - Hållbar utveckling på tekniskt inriktade yrkesprogram (Skolverket - Sustainable development for vocational schools)	Skolverket	The material is developed as supportive material for educators to teach in sustainable practises in technical oriented VET studies. The material is not in depth, but gives an overall understanding of the different subjects and includes: <ul style="list-style-type: none"> - Sustainable workspace: A short movie on sustainability in industrial engineering educations. - Decision-making processes: Descriptions on three methods to teach about decision making processes with thought for sustainability: LCA, Multi-criteria analysis and a short guide on how to make the students try to make sustainable decisions in regards to their profession. - Lifecycle thinking and analysis: This includes short descriptions of the life cycle analysis, the students' own flow chart – a task included in life cycle analyses, explanation of the concept of "functional unit" and explanations of the term "carbon dioxide equivalents". - Description on how to complete an assignment with the students, where they choose their own sustainability issue to examine more extensively. F12:F13
Skolverket - Lärportalen: Hållbar utveckling, gy (Skolverket - For teachers: Sustainable development, gy)	Skolverket	The material on 'lärportalen' is developed for teachers. The material concerns sustainability targeted teaching highschool /gymnasium students. The material is divided into themes: <ol style="list-style-type: none"> 1. Didactic perspectives on sustainable development 2. Representation – how we see the world 3. Living through democracy 4. Value conflicts and communicative starting points 5. Political or individual liability 6. Complexity and action 7. Global goals in teaching 8. The whole school for sustainable development The material contains for each theme: relevant literature with work-questions, short films on the subject and a educational program with 4 assignments on respectively: preparation; planning in cooperation; execution of lesson(s)

		with the students and; a follow up on the process and outcomes.
17 också! (17 too!) – 2022, book	Kalle Landegren, Karin Johansson; Anders Carlsson, Roland Arvidsson - Lärariket	A book on the UN 17 sustainable development goals for youth. The book is very paedagogical, with illustrations/cartoons and examples and has short descriptions and a couple of discussion-topics on each goal. A teachers guide on how to use the book '17 också!' in teachings - differentiated on the school-subjects, including VET. The guide also includes short didactical præsentations on good practises in education for sustainable development and recomendations on assignments to do with the students related to the book and the theme.
Sveriges Utbildningsradio (Swedens educational radio)	Sveriges Utbildningsradio AB	<p>There is a collection of educational movies and podcasts on sustainable development for children and youth. There is not specifically mention of vocational education students but broader sections of the educational system. The movies can not be watched outside of Sweden. There are also filmed lectures from different climate and environment konferences.</p> <p><u>Bygga för framtiden / Building tomorrow:</u> A series of seven movies on sustainable construction practices from all over the world concerning how to build practically and with consideration for environment and climate. The movies are each about an hour long and focusses on two contries and some exiting examples of different constructions and construction methods and - needs.</p>