

## TRAINING LESSON 5 - Part 2 (Wood sector)

<b>Title</b>	Circularity level in the furniture sector
<b>Part of the training course referred to in this lesson</b>	<ul style="list-style-type: none"> <li>○ Part 1 <input type="checkbox"/> General information about sustainability and CE</li> <li>Part 2 Specific Information about: <ul style="list-style-type: none"> <li>X Wood sector</li> <li><input type="checkbox"/> Plastic sector</li> <li><input type="checkbox"/> Agrifood sector</li> </ul> </li> </ul>
<b>EQF level</b>	Level 2
<b>Where the lesson was tested</b>	//
<b>General Learning objective(s) according to the Bloom Taxonomy</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Create</b> Produce new or original work (design, assemble, construct, investigate, formulate)</li> <li><input type="checkbox"/> <b>Evaluate</b> Justify a stand or decision (appraise, argue, defend, critique, select, support)</li> <li>X <b>Analyze</b> Draw connections among ideas (differentiate, organize, relate, compare, distinguish, test, experiment)</li> <li>X <b>Apply</b> Use information in new situations (execute, implement, solve, use, demonstrate, operate)</li> <li>X <b>Understand</b> Explain ideas or concepts (classify, discuss, describe, identify, locate, translate)</li> <li>X <b>Remember</b> Recall facts and basic concepts (define, duplicate, list, memorize, repeat)</li> </ul>
<b>Specific learning objective(s)</b>	<ul style="list-style-type: none"> <li>● <i>TO UNDERSTAND THE ENVIRONMENTAL IMPACT OF THE FURNITURE INDUSTRY.</i></li> <li>● <i>TO FIND OUT THE LEVEL OF CIRCULAR ECONOMY IN THE FURNITURE SECTOR.</i></li> <li>● <i>TO GET TO KNOW EXAMPLES OF GOOD PRACTICE.</i></li> </ul>
<b>Cognitive, socioemotional and behavioural outcomes</b>	<p><b>SDG 4 Quality education</b></p> <p><u>Cognitive learning objectives:</u></p>

<p><b>based on</b></p>	<ul style="list-style-type: none"> <li>● The learner understands the important role of culture in achieving sustainability.</li> <li>● The learner understands that education can help create a more sustainable, equitable and peaceful world.</li> </ul> <p><u>Socio-emotional learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner is able through participatory methods to motivate and empower others to demand and use educational opportunities.</li> </ul> <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner is able to use all opportunities for their own education throughout their life, and to apply the acquired knowledge in everyday situations to promote sustainable development.</li> </ul> <p><b>SDG 9 Industry, Innovation and Infrastructure</b></p> <p><u>Cognitive learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner understands the concepts of sustainable infrastructure and industrialization and society's needs for a systemic approach to their development.</li> </ul> <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner is able to evaluate various forms of industrialization and compare their resilience.</li> </ul> <p><b>SDG 12 Responsible consumption and production</b></p> <p><u>Cognitive learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner understands how individual lifestyle choices influence social, economic and environmental development.</li> <li>● The learner understands production and consumption patterns and value chains and the interrelatedness of production and consumption (supply and demand, toxics, CO2 emissions, waste generation, health, working conditions, poverty, etc.).</li> <li>● The learner knows about strategies and practices of sustainable production and consumption.</li> </ul> <p><u>Socio-emotional learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner is able to communicate the need for sustainable practices in production and consumption.</li> <li>● The learner is able to encourage others to engage in sustainable practices in consumption and production.</li> <li>● The learner is able to envision sustainable lifestyles; the learner is able to feel responsible for the environmental and social impacts of their own individual behaviour as a producer or consumer.</li> </ul> <p><u>Behavioural learning objectives:</u></p> <ul style="list-style-type: none"> <li>● The learner is able to promote sustainable production patterns.</li> <li>● The learner is able to take on critically on their role as an active stakeholder in the market.</li> <li>● The learner is able to challenge cultural and societal orientations in consumption and production.</li> </ul>						
<p><b>Green skill(s) addressed</b></p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Creative problem-solving</td> <td style="width: 50%; border: none;"><input type="checkbox"/> Management skills</td> </tr> <tr> <td style="border: none;">X Forward-thinking</td> <td style="border: none;"><input type="checkbox"/> Impact quantification</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Monitoring skills</td> <td style="border: none;"><input type="checkbox"/> Life-cycle management</td> </tr> </table>	<input type="checkbox"/> Creative problem-solving	<input type="checkbox"/> Management skills	X Forward-thinking	<input type="checkbox"/> Impact quantification	<input type="checkbox"/> Monitoring skills	<input type="checkbox"/> Life-cycle management
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	<p>X Analytical skills <input type="checkbox"/> Science skills</p> <p><input type="checkbox"/> Lean production <input type="checkbox"/> Waste management</p> <p><input type="checkbox"/> Maintenance and repair skills X Environmental auditing</p> <p>X Pollution prevention <input type="checkbox"/> Ecosystem management</p> <p>X Eco-design <input type="checkbox"/> Other _____</p>
<p><b>Duration</b></p>	<p>20 minutes</p>
<p><b>Structure and content of the lesson</b></p>	<p><b>INTRODUCTION</b></p> <p>In the world, the furniture industry began to develop in the late 1950s and reached its peak in the early 1970s, adapting the product to the progress of new materials and technologies appearing on the market. The development of the furniture industry depends on the economic situation: production technologies, design, raw materials and their availability, and advertisement. According to CSIL, the furniture industry has doubled its volume from 2000 to 2021. Of all the world's furniture production, more than a third is for export. Over the past two decades, exports have grown at the same rate as production, and imports have continued to grow as well. In 2021, the international trade of furniture is back to double-digit growth<sup>1</sup>.</p> <p><sup>1</sup><a href="https://www.designdiffusion.com/en/2021/12/13/the-world-furniture-market-in-2022">https://www.designdiffusion.com/en/2021/12/13/the-world-furniture-market-in-2022</a></p> <p>On 12th May, 2021 The European Commission has adopted the EU Action Plan "<i>Towards zero pollution for air, water and soil</i>", which sets out a vision for zero pollution by 2050: reducing air, water and soil pollution to levels no longer considered harmful to health and natural ecosystems, within the limits of our planet, by creating a toxic free environment.</p> <p>The transition to a circular economy is one of the means by which the vision of zero pollution can be realized.</p> <p>In order to create a circular economy The European Commission envisages and implements new policies and directives that will particularly affect the furniture sector.</p> <p>Various circular strategies could be implemented in the furniture sector. This sector can become not only sustainable, but also as an engine of the circular economy (CE) worldwide.</p> <p><b>TOPIC 1. IMPACT ON THE ENVIRONMENT. LIFE CYCLE OF THE FURNITURE</b></p> <ul style="list-style-type: none"> <li>● Materials and components - maximum environmental impact.</li> <li>● Production</li> <li>● Packaging</li> <li>● Sales</li> <li>● Use - almost no impact on the environment</li> <li>● End of life cycle.</li> </ul> <p>According to the scientific literature, the following conclusions have been drawn regarding the impact of furniture on the environment during its entire life cycle:</p>

- Most of the environmental impact (80-90%) is related to furniture materials and/or its parts.
- Although metals and plastics have more embodied energy than wood, other important considerations are the materials' durability and recyclability. Choosing recycled materials can help reduce the impact on the environment.
- The production, assembly and/or processing of the components are the other most important environmental impact factors due to the use of chemical mixtures, heat and electricity during the drying and curing processes.
- The impact of packaging depends on the specific product, but after performing two life cycle analyzes (desks and wardrobes, respectively), the overall impact of packaging on the environment is estimated to be about 6%.
- It is difficult to study product distribution, because the global nature of the furniture market can make it very diverse. Many studies have used scenarios of average transport intensity, which do not reveal how the importance of this part of the furniture life cycle is changing.
- The impact of the usage phase on the environment is very small, but the usage phase to be longer, the factors of durability and possibility of repair are important.
- End-of-life cycle impacts can vary greatly depending on the materials used to make the piece of furniture. Recycling furniture parts or extracting energy from furniture waste is often a complex process because the components are difficult to separate<sup>2</sup>.

<sup>2</sup>EU GPP criteria is applied to furniture.

<https://ec.europa.eu/environment/gpp/pdf/toolkit/ENV-2017-00602-02-00-LT-TRA-00.pdf>

## TOPIC 2. CIRCULAR STRATEGIES IN THE FURNITURE SECTOR

### Strategies:

- **Ecodesign** -the integration of environmental aspects into the product development process, by balancing ecological and economic requirements.
- **Material innovation** - process of meeting user needs through improvements in existing products or processes or creating and developing something completely new in order to achieve greater differentiation, a reduction in costs or sustainability.
- **Refurbishing** - corrective maintenance, redistributing products through a change in ownership, bringing it back into another life cycle.
- **Repurpose/upcycling** - change functionality of the product, to bring back a product into a new life cycle.
- **Recycling** - a resource recovery method involving the collection and treatment of a waste product for use as raw material in the manufacture of the same or a similar product.
- **Change in the distribution model** - As the furniture industry can be seen as part of a secondary economic sector (aiming for a transformation of raw materials into a more elaborate product), it can be used for services purposes.<sup>3</sup>

<sup>3</sup> [Twin-transition-in-the-manufacturing-sector\\_final-2.pdf](#)

	<p><b>TOPIC 3. BEST PRACTICES</b></p> <p><b>Material innovation:</b></p> <ul style="list-style-type: none"> <li>● Use of 3D printing, easily recycled materials</li> <li>● Use new ways of binding materials together</li> <li>● Replace mineral/animal product-based materials to biobased ones</li> <li>● Give biobased materials new properties</li> </ul> <p><b>Refurbishing:</b></p> <ul style="list-style-type: none"> <li>● Second hand furniture business models</li> </ul> <p><b>Repurpose/upcycling:</b></p> <ul style="list-style-type: none"> <li>● Use basic structures of pieces of furniture for a new different one (often used in individuals).</li> </ul> <p><b>Recycling:</b></p> <ul style="list-style-type: none"> <li>● Use multiple material waste to create a material that is more versatile.</li> </ul> <p><b>Change in the distribution model:</b></p> <ul style="list-style-type: none"> <li>● Start sharing/renting furniture network to avoid creating more waste (skatinti baldų dalijimąsi arba nuomą).</li> <li>● Create information/data flow instead of material/substance flows (more use of local raw materials, products and services).</li> </ul> <p><b>CONCLUSIONS</b></p> <p>People should be more responsible consumers:</p> <ul style="list-style-type: none"> <li>● Buy furniture that can be easily disassembled, repaired and recycled and that comes with a warranty</li> <li>● Purchase durable and serviceable furniture that meets the applicable EN standards</li> <li>● To give the furniture a new image, owner, function.</li> </ul>
<p><b>References</b></p>	<p>ES veiksmų planas. (2021). Siekiant nulinės oro, vandens ir dirvožemio taršos. <a href="https://eur-lex.europa.eu/legal-content/LT/TXT/?uri=CELEX%3A52021DC0400&amp;qid=1623311742827">https://eur-lex.europa.eu/legal-content/LT/TXT/?uri=CELEX%3A52021DC0400&amp;qid=1623311742827</a></p> <p>CSIL-Centre for Industrial Studies. (2021). The Word Furniture Outlook 2021 with the forecasts about the furniture market for 2022. <a href="https://www.designdiffusion.com/en/2021/12/13/the-world-furniture-market-in-2022">https://www.designdiffusion.com/en/2021/12/13/the-world-furniture-market-in-2022</a></p> <p>European Furniture Industries Confederation. (2020). The furniture sector and Circular Economy. <a href="https://9e2160bf-a0b5-460b-aec7-e9af818978ee.filesusr.com/ugd/a1d93b_48bd99599fc04853bd7bb96b9a280c29.pdf">https://9e2160bf-a0b5-460b-aec7-e9af818978ee.filesusr.com/ugd/a1d93b_48bd99599fc04853bd7bb96b9a280c29.pdf</a></p> <p>Europos Komisija. (2020). Baldams taikomi ES ŽVP kriterijai. <a href="https://ec.europa.eu/environment/gpp/pdf/toolkit/ENV-2017-00602-02-00-LT-TRA-00.pdf">https://ec.europa.eu/environment/gpp/pdf/toolkit/ENV-2017-00602-02-00-LT-TRA-00.pdf</a></p>
<p><b>Interactive questions for R3</b></p>	<p>1. Which stage of the furniture life cycle has the greatest impact on the environment?</p>

	<p><b>a) Selection of materials and components</b> b) Use c) Packing</p> <p>2. Is it possible to apply a circular economy (CE) business model in the furniture sector? a) No <b>b) Yes</b></p> <p>3. Why should the furniture sector participate in the circular economy? <b>a) To reduce air, water and soil pollution</b> b) For marketing purposes c) For higher profit</p> <p>4. In what ways can the furniture sector contribute to zero air, water and soil pollution? a) Increase production from short-term raw materials b) Shift from products to services <b>c) Extended product life</b> <b>d) Choose safe &amp; circular materials</b> <b>e) Design with less</b> <b>f) Go modular</b></p>
<p><b>Keywords</b></p>	<p>circular economy, furniture, furniture sector</p>
<p><b>Questions for reflection</b></p>	<ul style="list-style-type: none"> <li>● How do you contribute to maximizing the lifespan of furniture?</li> <li>● Did you have to change the purpose of the product (furniture)?</li> <li>● How can furniture be used as secondary material in new products?</li> <li>● What new technologies do you know that would allow the furniture sector to participate in the circular economy?</li> </ul>
<p><b>Additional resources</b></p>	<p>The furniture sector and circular economy 2.0, <a href="https://circularfurniture-sawyer.eu/the-furniture-sector-and-circular-economy-2-0/">https://circularfurniture-sawyer.eu/the-furniture-sector-and-circular-economy-2-0/</a> <a href="https://9e2160bf-a0b5-460b-aec7-e9af818978ee.filesusr.com/ugd/a1d93b_48bd99599fc04853bd7bb96b9a280c29.pdf">https://9e2160bf-a0b5-460b-aec7-e9af818978ee.filesusr.com/ugd/a1d93b_48bd99599fc04853bd7bb96b9a280c29.pdf</a> Baldams taikomi ES ŽVP kriterijai. <a href="https://ec.europa.eu/environment/gpp/pdf/toolkit/ENV-2017-00602-02-00-LT-TRA-00.pdf">https://ec.europa.eu/environment/gpp/pdf/toolkit/ENV-2017-00602-02-00-LT-TRA-00.pdf</a> Twin-transition-in-the-manufacturing-sector_final-2.pdf <a href="file:///C:/Users/dalia/OneDrive/Stalinis%20kompiuteris/Projektas%20TREE/twin-transition-in-the-manufacturing-sector_final-2.pdf">file:///C:/Users/dalia/OneDrive/Stalinis%20kompiuteris/Projektas%20TREE/twin-transition-in-the-manufacturing-sector_final-2.pdf</a> Office Furniture Industry 2022 <a href="https://www.designdiffusion.com/en/2021/12/13/the-world-furniture-market-in-2022">https://www.designdiffusion.com/en/2021/12/13/the-world-furniture-market-in-2022</a></p>
<p><b>Icons &amp; related info for the hints of the PowerPoint presentation</b></p>	 <p>This hint is used to indicate that there's a link to other websites with additional information.</p>

	 <p>This is used within the PPT to indicate that something important is written/ to invite the reader to pay attention to essential information.</p>  <p>This hint indicates a question/task for reflection.</p>
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