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THE CIRCULAR ECONOMY IN THE CONSTRUCTION SECTOR - OBJECTIVES, PRINCIPLES AND SPECIFIC MEASURES

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Materials management in the construction sector is estimated to account for 67% of total global greenhouse gas emissions.
One solution to reducing emissions associated with materials is to keep existing materials in use before they are discarded, thereby reducing the volume of materials entering and leaving the economy.

Due to growing concern about the climate crisis, the European Union and the European Commission published in December 2019 a Green Deal document outlining the EU's approach to achieving climate neutrality by 2050 and making the transition to a circular economy by decoupling economic growth from the use of resources.

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The actions that should be taken within the framework of the transition to a circular economy are defined as actions that:

1. Contribute to reducing the use of materials (material efficiency measures)

2. Replace materials with a strong impact on the environment with materials with a weaker one

3. Recycle products or materials and are considered “circular” (reuse/recycle actions)

That is why, more than ever before, EU Member States must start applying the principles of the circular economy and resource efficiency to buildings in order to reduce the use of resources in the future.

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Reducing waste and facilitating high-quality waste management: facilitating the future circular use of building elements, components and parts, with an emphasis on producing less waste and on the potential for re-use, or high-quality recycling of basic building elements after deconstruction. This includes efforts along the value chain to promote:

1) the reuse or recycling of resources (i.e. materials) in a way that allows most of the materials to retain their value and even be recovered at the end of their life cycle; the building;

2) the design of components and the use of various construction methods to facilitate their recovery for reuse or recycling

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The a forementioned objectives are aimed to a 7 groups:

1. Building users, building managers and owners
2. Design teams (engineers and architects)
3. Contractors and builders
4. Manufacturers of construction products
5. Demolition and Deconstruction Teams
6. Investors, developers and insurers
7. Government/ Regulators/ Local Authorities

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BASIC PRINCIPLES

Circular economy design principles and sustainable buildings are applicable to all actors along the value chain. All actors in the value chain must be engaged, including building users, investors and regulators. This can be achieved by promoting the understanding and use of existing standards, schemes and examples to enable a more holistic design and adjustment of business models to incorporate circularity in construction, as well as by implementing ISO standards for DfD/A (ISO20887), as well as pre-development audits and other guidelines.

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A sustainable choice must consider the total life cycle costs of the building, financial and non-financial returns on investment. Value chain actors respond primarily to financial incentives – and these must be tailored to each situation. To do this, the financial aspects should be considered through the whole life cycle perspective and then make a cost, taking into account costs, income and residual value. At the same time, scenarios should also be considered where the projected costs of new materials, furniture and waste elimination are significantly higher than actual and where certain items could be sold for reuse and/or recycling.

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Products and systems must be designed so that they can be easily reused, repaired, recycled or restored. When recycling, it is preferable that the products and systems are also recycled. For this purpose, easy-to-dismantle elements and products should be used. Requirements to separate waste on site to facilitate recycling should be introduced in public procurement contracts. It is necessary to switch to the use of simple and recyclable products

For this design, we distinguish 7 target groups of users as followed:

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Target group 1: Managers and owners of buildings and facilities Minimizing the total cost of ownership over time. Building owners and users have an interest in comprehensive and long-term horizons. In this regard, the reduction of the total price per square meter/comparative average, as well as the use of various tools to increase the value of the building, are of particular importance.

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Target group 2: Design teams (engineers and architects)It is important that design teams have knowledge of circular economy principles for designing buildings and materials. Architects and designers should be familiar with design requirements and strategies, the concept of life cycle assessment, the potential to increase the importance of using recycled materials in products, the potential for reuse (product, component and building), recycling capacity and transformation (the potential for reuse and reversible assessment for building design). Designers should be encouraged to adopt a life cycle assessment approach when designing new buildings. Existing DfD/A guidance can be used as well as feedback from previous examples of successful projects.

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Target group 3: Contractors and builders

Use of construction techniques that promote durability of buildings and sustainability of materials. In the process of construction of the building, at each stage it is good to carry out a simulation of different scenarios of durability of the building, comparing the corresponding costs. Resources can be included to prevent installation errors on the various systems. In order to increase the durability of the building, it is important to use construction techniques that facilitate the maintenance and repair of various parts of the building, including the building products and systems.

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Target group 4: Manufacturers of construction products
Attention should be focused on assessing the potential level of durability of materials throughout the life cycle of the building based on data from LCC (Life-cycle costing) or Product Life Cycle Costing. Life cycle costing and environmental assessment, integrated with additional information beyond the building life cycle, must find a place in the material production process. An important role is also played by the use of quality and sustainable products in the process of manufacturing construction products, which is of particular importance for their environmental and consumer characteristics.

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Target Group 5: Deconstruction and Demolition Team
Conditions for recycling (including infrastructure) and circular and value chains should be put in place for all potentially recyclable materials. Currently, the demolition site, recycling facilities, (re)manufacturing plants and the new construction site may be at long distances from each other, which will inevitably increase transportation costs. Deconstruction costs are also affected by the amount of construction waste, i.e. small amounts of waste have little or no value, therefore regional loops must be developed that include sorting and recycling facilities where inert waste is turned into recycled inert materials and where mixed waste is sorted. To promote these processes and optimize costs, it is appropriate to consider subsidies/rebates for building materials composed of recycled materials.

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Target group 6: Investors, developers and insurers

Increasing durability will reduce financial risk. The importance of the durability of products and materials should be promoted within the overall approach to buildings and products and how this can give the corresponding favorable financial impact for this target group.

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Target Group 7: Government / Regulators / Local Authorities
At different levels, governments can influence the conditions for a circular building sector through various incentives, policies, standards and regulations. This can be achieved by:

Regulation: adoption and enforcement of legislation in this area

Realizing the need to introduce circularity in construction: using mechanisms such as public procurement to drive change

Stimulation: by providing incentives and encouraging experimentation

Inspiration: by providing leadership, vision and spreading good practice

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MEASURES TO REDUCE CO2 EMISSIONS IN THE CONSTRUCTION SECTOR

In the construction sector, the focus is on the use of steel, cement and related concrete, as these materials represent the highest sources of greenhouse gas emissions of all construction materials.

Carbon dioxide emissions account from cement production is about 8% of global carbon dioxide emissions. Cement production processes release carbon dioxide both from the use of energy to produce the material and from the limestone calcination process, during which the limestone is heated and the carbon dioxide is released from the limestone to create calcium carbonate. Calcination is necessary to produce clinker, which is used as a binder in cement.

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Carbon dioxide emission's account from steel production is about 7% of global emissions. Global crude steel production is forecast to grow by 30% by 2050, with recycled secondary steel growing faster than primary production. Greenhouse gases from steel production are emitted both from energy used to process and produce steel and from chemical processes.

Due to the importance of steel and concrete in terms of greenhouse gas emissions, the construction industry is under pressure to find circular and efficient uses of these materials and to use more alternatives.

Reduce the use of steel and concrete to the bare minimum

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Conclusion:

CIRCULAR ECONOMY IN THE CONSTRUCTION SECTOR is a long-term strategy that requires synergy between politics, economics and the different sectors of the economy and science. We hope that the road has been laid out and the people of Europe are following this path set by the European Commission with the Green Deal!

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	**Vielen Dank für Ihre Aufmerksamkeit**
	**Спасибо за Ваше внимание**
	**Хвала на пажњи**
	**Ви благодариме за вниманието**
	**Благодаря за вниманието**