Comment regarding the impact on reuse and recycling of construction- and demolition waste

For several years, there has been a focus on promoting the circular agenda, including the reuse/recycling of construction and demolition waste. This focus can be seen globally, at the EU level, and nationally in Denmark, and the development supports the achievement of the United Nations' 17 Sustainable Development Goals (SDGs).

The Danish Government's Strategy on Circular Economy Strategy (2018)[1] states that the government's objective is to promote the circular economy, including better resource (re)use and waste prevention. The introduction of the strategy emphasizes that the circular economy is a broad agenda that crosses national borders. The importance of ensuring a common European approach with uniform conditions is emphasized. Therefore, the Danish government supports an aggressive EU approach to the circular economy, working towards harmonized framework conditions across EU country borders. The European Commission's action plan and legislative package for promoting the circular economy in the EU serve as an important basis in that connection[2]. It also highlights the significant EU focus on the circular economy, including the reuse/recycling of construction and demolition waste.

The focus on reuse and recycling is increasing due to a growing scarcity of resources, a worsening of the climate crisis, and increased difficulties in finding space for our waste. According to the UN, the construction industry accounts for over 30% of global resource consumption. The construction and demolition industry in Denmark accounts for approximately 30% of the country's total CO_2 emissions[3], and according to the Danish Environmental Protection Agency's *waste statistics*[4], construction and demolition waste accounts for about 40% of all waste in Denmark.

By implementing circular value chains in the construction industry, waste is transformed into resources, saving both scarce resources and cutting on the CO_2 emissions that contribute to climate change. Additionally, waste production is reduced. A sketch of the circular value chains can be seen in figure 1 below. Implementing the circular processes is a long-term process that has been ongoing for several years. It involves a transition from traditional production chains and approaches, requiring changes in regulations, updated knowledge, new collaborations, new economic drivers, etc. Changes and adjustments can and should occur at all stages of the value chain in the figure below. Therefore, there is also a time-consuming process involving many stakeholders.

[1] *Miljø- og Fødevareministeriet og Erhvervsministeriet (2018): Regeringen. Strategi for cirkulær økonomi. Mere værdi og bedre miljø gennem design, forbrug og genanvendelse. Miljø- og Fødevareministeriet og Erhvervsministeriet. September 2018*

[2] *https://commission.europa.eu/eu-regional-and-urban-development/topics/cities-and-urban-development/priority-themes-eu-cities/circular-economy-cities_da*

[3] *https://vcob.dk/vcob/om-coe/*

[4] *https://www2.mst.dk/Udgiv/publikationer/2022/12/978-87-7038-463-6.pdf*

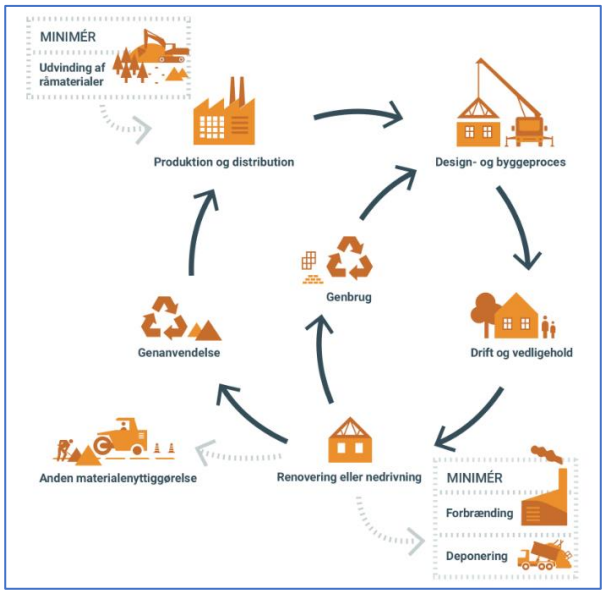

Figure 1: Illustration of the circular valuechain. A number of different parties and processes are involved in the different steps.

In Denmark, we are well underway with the circular transition, and when we reach our goal, we can potentially reduce waste volumes and resource consumption by up to 40% and 30% respectively, as well as significantly reduce CO_2 emissions. The circular transition is not only happening in Denmark, but also in the rest of Europe and other parts of the world.

One of the challenges of reuse and recycling of building materials is ensuring that any potentially harmfull substances are identified and sorted out, preferably during the demolition phase, so that these substances are not carried forward in the waste streams and into the materials and products produced through reuse/recycling.

Therefore, environmental surveys (in Danish: Miljøkortlægninger) are conducted in Denmark prior to demolitions. These surveys are a requirement according to §68 of the Danish Act on Waste (In Danish: Affaldsbekendtgørelsen)[5]. Samples of materials are collected in the surveys and analyzed to identify the presence of PCBs, asbestos, heavy metals, PAHs, hydrocarbons, and chlorinated paraffins (along with any site-specific substances) in the buildings prior to demolition. These environmental surveys form the basis for the environmental remediation carried out in the buildings immediately prior to demolition or renovation. In the remediation process, environmentally foreign substances are removed from the materials, such as grinding off paint from surfaces, removing PCB seals, sorting out thermo windows containing PCBs, etc. Additional samples are often taken after the remediation to ensure that the materials resulting from the demolition are, as far as possible, free from environmentally foreign substances. This ensures that materials such as wood, concrete, bricks, tiles, windows, lamps, etc. can be reused directly after remediation or recycled after processing the materials.

The substances analyzed in the environmental surveys have been established over a long period of time based on knowledge of the substances originally used in products and materials, combined with more than 10 years of sampling materials prior to demolition. Furthermore, there has been an ongoing dialogue over the years regarding threshold values for when materials can be considered uncontaminated. This dialogue has involved the authorities (the Environmental Protection Agency and municipalities) but has also involved a number of other relevant parties. The substances that need to be sampled and the significance of the results for remediation and reuse/recycling are part of an ongoing dialogue and process, running in parallel to efforts to increase reuse and recycling in other parts of the circular value chain.

[5] *BEK nr 2512 af 10/12/2021 (https://www.retsinformation.dk/eli/lta/2021/2512*

As the content of the background reports for the *Proposal for Restriction of PFAS* shows[6], and as supported by the Environmental Protection Agency's publication on *Mapping of Industries that Use PFAS*[7], PFAS has been used/is used in a range of building materials. This includes everything from floor coverings (linoleum and carpets) to coatings on window panes, as well as painted and varnished surfaces, etc.

Since authorities and the industry only became aware in recent years that there may be PFAS in buildings and structures being demolished or renovated, there has been no requirement from the authorities for environmental surveys to include PFAS, nor for PFAS to be sampled in other parts of the circular value chain. Therefore, we simply lack knowledge and experience regarding the extent of the PFAS issue in our materials for reuse and recycling.

The background material for the *Proposal for Restriction of PFAS*[6] explains that PFAS has been used in a wide range of building materials. The same is explained in the publication on *Mapping of Industries that Use PFAS*[7]. A small number of individual samples taken on the initiative of parties involved have shown that PFAS may be present in up to 80% of the samples taken in connection with environmental surveys, such as in paints and floor coverings. Additionally, some unpublished results indicate that there may be exceedances in several samples if other PFAS compounds are included in addition to PFAS4[8] or PFAS22[9].

The apparent extensive use of PFAS in building materials, as well as the preliminary tests, indicate that we potentially face a major problem with PFAS in the materials we recycle and reuse. But fundamentally, we do not know much, and we lack knowledge at all stages of the circular value chain to address the issue correctly so that we as a society can continue to recycle and reuse, but in a way that ensures we do not compromise environmental considerations

The following is a list of some of the missing knowledge:

- Where in the buildings and in our construction waste are PFAS found in practice?
- Which PFAS substances should we expect to find, and therefore which substances should we look for?
- What do we do if we find PFAS?
- Who could technically and within the framework of the law receive and treat materials with PFAS?
- How do we remediate materials containing PFAS? Some of the PFAS compounds may be removed in the environmental remediation we already perform on buildings today before demolition and renovation, where, for example, we sandblast painted heavy walls. But there will definitely be a need to develop new methods for environmental remediation?
- Do some of the PFAS substances migrate from, for example, the paint into the adjacent materials? And thus, what should we target the environmental remediation towards?
- What threshold values should be set for the different PFAS compounds? Should the PFAS content be documented at the source or in the product made from the recycled/reused materials?
- Are some PFAS substances a greater environmental problem than others? PFAS is a complex group of substances that have different physica/chemical properties and therefore also have different environmental/ health properties. Therefore, it would be relevant to investigate the toxicity, mobility, and persistence of the substances more closely and based on that determine which PFAS substances should be included in a ban on recycling/reuse.
- Does the difference in toxicity, mobility, and persistence mean that it might be possible to allow recycling/reuse of materials with some substances under different conditions (e.g., there is a difference between outdoor and indoor environments, or whether it is under a solid coating or not)?

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[6] *https://echa.europa.eu/da/restrictions-under-consideration/-/substance-rev/72301/term*
7 https://www2.mst.dk/Udgiv/publikationer/2016/12/978-87-93529-43-4.pdf
8 PFAS4 covers PFOA, PFOS, PFNA, PFHxS
9 PFAS22 dækker over PFBS, PFPeS, PFHxS, PFHpS, PFOS, PFNS, PFDS, PFUnDS, PFDoDS, PFTrDS, PFOSA, 6:2 FTS, PFBeA, PFPA, PFHxA, PFHpA, PFOA, PFNA, PFDA, PFUnDA, PFDoDA og PFTrDA

It is obvious that PFAS should not uncritically be carried forwards into material cycles when construction waste is transformed into resources. However, with a proposed ban as restrictive as the one currently proposed, there is a risk that rules will be adopted based on very limited knowledge, with far-reaching consequences for the circular agenda.

Therefore, there is a need to collect more data, which will form the basis for knowledge about how the circular agenda within the recycling and reuse of construction and demolition waste can be maintained while taking the necessary health and environmental considerations. The time to collect data and experiences can be achieved through a time-limited derogation with a duration of 5 years.

As a final remark, it should be noted that although this consultation response concerns the recycling and reuse of construction and demolition waste, the issue will not only apply to construction and demolition waste but also to other materials that are recycled or reused. PFAS, for example, is also widely found in textiles, plastics, paper, etc.