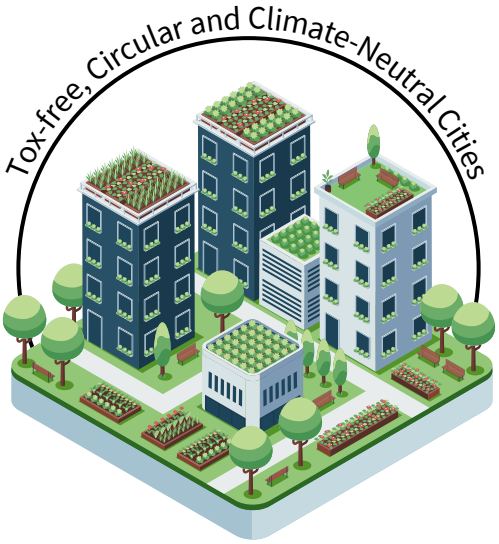
Policy Brief
for National Policymakers



For a Circular Construction Sector: Necessary Steps for Europe's Buildings

Lessons learned from the NonHazCity3 project for smarter construction policies

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NONHAZCITY

Challenges for circularity and a healthy environment

People spend around 90 % of their lives indoors and inhale 11,000 - 12,000 litres of air per day. That air should be healthy. But screenings of indoor dust from two Baltic cities under the NonHazCity3 project[1] ("Reducing hazardous substances in construction to safeguard the aquatic environment, protect human health and achieve more sustainable buildings") showed that significant amounts of organic pollutants, such as plasticisers, PFAS, and chlorinated paraffins are present in indoor air and dust[2].

While these emissions directly affect human health, stormwater acts as a protractor between buildings and the natural environment. Rain mobilises substances from exterior materials such as roofs, facades or pavements, transporting them via runoff and drainage systems into soil, rivers and the sea. Analyses of stormwater have revealed a wide spectrum of contaminants, including biocides, organophosphate esters, metals, and PFAS[2].

Hazardous substances in building materials and their release during deconstruction and aspired second product life cycle can hinder high-quality recycling. As Europe moves towards a circular economy, this becomes a critical barrier: about 50 % of all extracted materials and over 35 % of the total waste generation are linked to the built environment[3], making the construction sector a key player in the Circular Economy Act.

Summary

- **Indoor dust reflects what we build** - PFAS and plasticisers are released from construction materials into indoor air and the environment.
- **Hazardous substances in building materials and their release during de-construction and aspired second product life cycle hinder high-quality re-cycling.** Therefore tox-free materials are a precondition for circularity.
- **To select tox-free products** and to assess the reusability of materials **full chemical transparency is necessary**.

Interreg Baltic Sea Region
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SUSTAINABLE WATERS NonHazCity 3

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Awareness of these issues has grown, particularly in the Nordic countries, where emission control and sustainable building policies are well established. Yet across Member States, regulatory approaches remain fragmented and hazardous substances continue to leak into the environment over time, ultimately reaching sensitive ecosystems such as the Baltic Sea.

To address this shared challenge, public and private sector as well as civil society stakeholders of all eight EU countries bordering the Baltic Sea joined the NonHazCity3 (NHC3) project[1] to develop solutions for making construction materials and sites circular, tox-free and climate neutral (three-pillar approach).
Seven pilot studies in nine cities across the eight countries of the Baltic Sea tested the approach, assessed feasibility and identified regulatory and market barriers.
Their lessons form the basis for this brief and its five national-level policy recommendations.

NonHazCity3 (Interreg BSR Project, 2023–2025) unites 21 partners from all EU Baltic Sea countries to cut hazardous substances in construction and advance tox-free, circular and climate-friendly building practices.

The evidence base

To map the current occurrence of hazardous substances in buildings, the NHC3 project conducted a regional analysis across five Baltic cities: Tallinn (EE); Helsinki (FI), Turku (FI), Västerås (SE) and Stockholm (SE). The study screened the hazardous substances in construction materials and contact media (water, dust, air) to identify which products may emit hazardous substances into indoor air and the environment (findings are presented in the project publication "Occurrence of substances of concern in Baltic Sea Region buildings, construction materials and sites").

Indoor environment mirrors materials in use

Indoor dust analyses revealed a complex mix of contaminants reflecting the materials present inside buildings. PFAS ('forever chemicals'; highly persistent in the environment and associated with immune effects and cancer risks) were detected in almost all samples. In addition to PFAS, indoor air analysis revealed presence of plasticisers (typically found in flooring materials; known to cause endocrine disruption), bisphenols (used in plastic materials, affecting hormone function), chlorinated paraffins (persistent flame retardants and plasticisers, likely carcinogenic) and organophosphate esters (persistent flame retardants and plasticisers, associated with harmful health effects).

While each of these substances is problematic on its own, the combined exposure risks remain largely unknown.

Dust serves as a carrier for a diverse number of hazardous substances, combined into a chemical cocktail in indoor air.

Figure 1. Construction materials release hazardous substances into indoor air and the environment.

Stormwater and Exterior Leaching

Outdoor sampling confirmed that rain mobilises hazardous substances from construction materials. Stormwater analyses showed chemical leaching from facades, roofs, and exterior paints with pollutants such as biocides, flame retardants, PFAS and metals. Biocides were found in all urban sampling areas, with higher levels in areas with new wooden buildings, likely sourced from wooden cladding, paints and varnishes used for extending the wood lifespan.

Lessons Learned: Insights from the NHC3 Pilots

Seven pilots implemented the three-pillar approach of the NHC3 project and revealed important lessons. Figure 3 provides an overview of the pilots.

1. Information is the Bottleneck

Circularity is only possible in a sustainable way if construction materials are safe for people and the environment. Using and reusing materials without knowing their chemical content means we risk putting hazardous substances into the material cycle, where they may continuously release pollutants.

Pilots aimed to reduce hazardous substances by using chemical information to support material choices and introduced a logbook system to preserve information of chemical content in products over time. However, they repeatedly noted difficulties in obtaining complete chemical content information, which made it challenging to identify materials that are both environmentally safe and economically viable. These experiences showed that without reliable data, tox-free material is difficult and onerous to define and circularity cannot be achieved in practice.

Hence, effective implementation of tox-free and circular construction depends on robust data systems and transparent product information.

For new products the EU Digital Product will hopefully be designed in a way to improve transparency in the future, but most of the building stock of the next decades is already built today. To enable the reuse and recycling of these materials efforts in deconstruction audits and secondary material certification are needed.

2. Green Public Procurement is a Powerful Tool

Pilots confirmed that the three-pillar approach in public procurement is socially accepted, transferable and a powerful driver for market transformation. When sustainability criteria like chemical transparency are clearly formulated, suppliers engage proactively, especially when future procurement opportunities are visible. However, the lack of mandatory requirements for the reduction of hazardous substances means that municipalities depend on individual expertise and the financial constraints and lowest-bidder rules can act as a barrier to stricter sustainability criteria.

Västerås pilot: the three-pillar approach in practice

Västerås as one of the NHC3 pilot studies, constructed a preschool that fully applies the

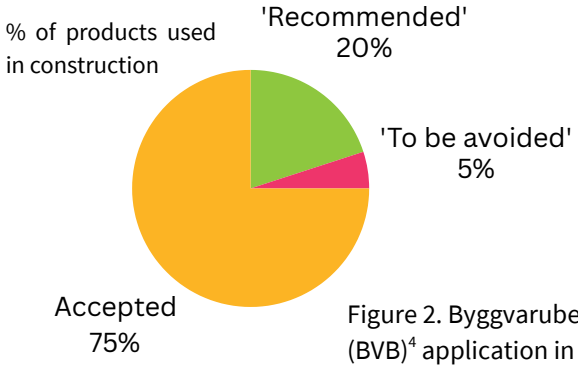


Figure 2. Byggvarubedömningen (BVB)[4] application in Västerås with defined material criteria.

Figure 3. Overview of the pilot studies implementing the NHC3 solutions. For more information, visit: interreg-nonhazcity3

Stockholm, Sweden: The municipal builder Familjebostäder is building 87 new apartments, achieving Miljöbyggnad Gold certification by using procurement and design choices that prioritise indoor air quality and best available techniques.

Västerås, Sweden is building a non-toxic, climate neutral preschool using a collaborative contract model. One target is that 20% of the products are assessed as 'Recommended' according to the BVB[5] criteria.

Holbæk, Denmark: A kindergarten that received DGNB Gold certification and prioritised life-cycle assessment, ecological quality and resource efficiency. Facades were made of salt-impregnated wood to avoid toxic wood preservative treatments.

Helsinki, Finland is updating the city's construction instructions so that hazardous substances are systematically considered in both new buildings and renovations.

Tallinn, Estonia built a kindergarten that emphasised the focus on tox-free materials, energy efficiency and circular construction. Using wood improved indoor conditions for children and reduced the CO_2 footprint.

Hamburg, Germany: Renovation of the parish house Maria Magdalena, with focus on updating meeting rooms and resolving issues with the roof. Parishioners were regularly informed and had the opportunity to participate in the planning process.

Riga, Latvia focused on tox-free, circular and climate-neutral renovation of Soviet-era housing and a social apartment. They prioritised eco-friendly materials, energy efficient windows, and waste sorting.

the three-pillar approach of circular, tox-free and climate-friendly construction. Already in the design phase, future reuse options of the construction were considered (easily repurposable to a municipal psychiatric accommodation, by simply adding a few walls and bathroom adjustments) and materials were selected using the Swedish Byggvarubedömningen (BVB[4]) database and ecolabel criteria. Minimum 20 % of the products should be rated as 'recommended' and less than 5 % as 'to be avoided' (Figure 2), whereas these products needed an individual approval before installation. All products are logged in the BVB[4] building logbook, ensuring long-term traceability of chemical content and reuse potential.

This pilot demonstrated that tox-free, circular and climate friendly construction is technically feasible today, but it also shows that clear national regulations are needed to make such approaches mainstream across the Baltic region.

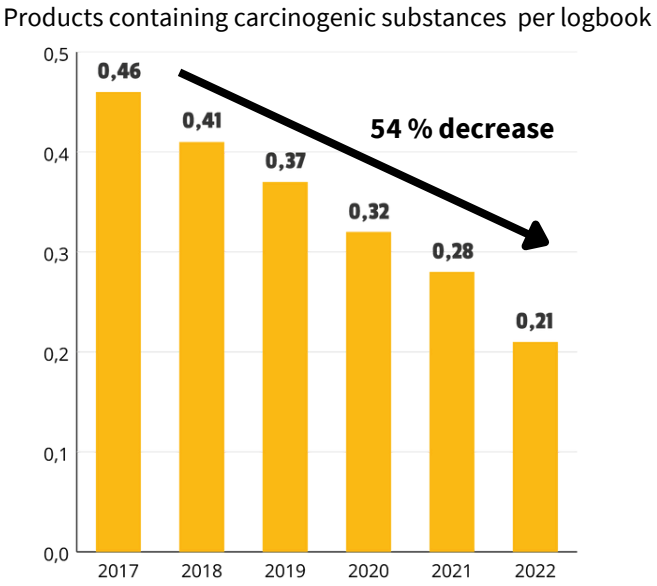


Figure 4. Example from the Swedish BVB[4] system showing the average number of products assessed as "To be avoided due to carcinogenicity" per logbooks (evaluation of 11,000 logbooks) (Byggvarubedömningen Industry Report 2024[5])

Policy Recommendations

Building on the results of the NHC3 project and its pilot studies, five key policy actions can accelerate the transition toward a tox-free, circular and climate-friendly construction sector.

1. Policy Recommendation

Full Chemical Declaration and Traceability

Transparent information on chemical content is a precondition for circularity. *How can we decide whether a product is reusable if we have no information about its chemical composition?*
For an EU-wide harmonised implementation of chemical information in the Digital Product Passport and Declaration of Performance and Conformity under the Construction Products Regulation, national regulations are needed as a justification for EU level action. Therefore, Member States need to request information on all substances of concern that they wish to avoid in their buildings and document in their building logbooks.

To reflect the national market, a centralised database should be developed, covering all major construction products and ensuring that detailed chemical content information is available and easily accessible. A simple implemented traffic-light system that rates products by their toxicity, circularity and climate impact will further simplify decisions for designers and procurers while stimulating market transparency and innovation.

Key actions for policymakers:

- Establish a national product database with detailed information about available products and their chemical content (including all hazardous substances such as PFAS, biocides, substances of very high concern and substances of equivalent concern).
- Implement an evaluation system that rates the products by their toxicity, circularity and climate impact.

GOOD PRACTICE

The Swedish BVB[4] system

The Byggvarubedömningen® (BVB) is a simple toolset that helps to choose safer and more sustainable products. It offers a database of construction products. Materials are rated via a traffic light system based on their chemical content, emissions and circularity, entitled as 'recommended', 'accepted' or 'to be avoided'. Construction projects can use the implemented Logbook function to document every chosen product, enabling traceability for maintenance, renovation or demolition. How does it work: Suppliers provide detailed information about their products and BVB rates their impact on people and the environment.

2. Policy Recommendation

Stringent Requirements for Non-Toxic Construction Materials

A circular economy in the building sector may only works if construction materials are predominantly free of hazardous substances. The NHC3 studies showed that materials can release hazardous substances into indoor air and the environment over their whole life cycle. We therefore need to avoid hazardous substances in construction materials. However, in contrast, the NHC3 findings showed that some 'replacement' substances today still pose health and environmental risks, turning today's new products into tomorrow's waste rather than reusable resources.

Key actions for policymakers:

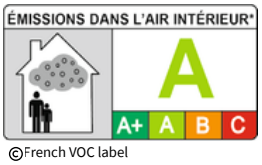
- Set national limits that exclude all substances of very high concern above 0.1 % from construction products.
- Ensure that exterior materials (e.g., facades, roofs, paved areas) are biocide and PFAS free.
- Set national emission limits for volatile organic compounds (VOCs) for all building products used in building interiors.
- Promote emission and tox-free classification labels on building materials.

GOOD PRACTICE:

The German QNG sustainable building certification sets regulated limits for SVHC, biocides and other substances of concern in construction materials.

Belgian VOC Regulation is a mandatory regulation with established thresholds for VOC emissions from flooring products. Any product that does not meet the requirements cannot be placed on the market. Emission testing is carried out in accordance with EN 16516 after 28 days.

The French VOC label is a good example of a consumer information label. Construction products, furnishings and equipment materials must be classified into one of the following emission classes: A+, A, B or C on the basis of an emission test. The label helps consumers to make informed choices about indoor air quality.



©French VOC label

Third-party recognised ecolabels
e.g., Finnish M1 certification, Blauer Engel, Nordic Swan, Danish Indoor Climate Labelling

Circularity Targets

The circular economy is a key pillar of Europe's competitiveness agenda and the Clean Industrial Deal. To become a world leader in the circular economy by 2030, Member States need stringent recycling and reuse targets in the building sector. Circularity in constructions cannot be an afterthought at demolition stage, it must be planned from the very beginning. From tox-free material choices and design for recyclability, through selective deconstructing, to the safe re-entry of reused materials into new buildings. A logbook system for construction materials can thereby ensure that chemical information remains available until the end of a building's life cycle.

Key actions for policymakers:

- Support the initiative EU Digital Logbook (DBL) or implement a national logbook system for construction materials (similar to the Swedish BVB[4] system).
- Establish mandatory pre-deconstruction audits (e.g., EDA Guidelines)
- Support the European initiative on end-of-waste criteria to ensure harmonised rules for the safe recycling of construction materials.
- Require selective deconstruction, materials must be sorted, separated and documented during dismantling.
- Develop a national reuse platform for the exchange of reclaimed building materials

GOOD PRACTICE:

In **Denmark, selective demolition is mandatory for buildings over 250 m²**. During dismantling, materials need to be mapped, separated and sorted for reuse or recycling. Any materials containing substances of concern must be identified and disposed of properly (for more information).

Examples of **platforms for the exchange of reusable building materials**:

- Centrum för cirkulärt byggande - CCBuild
- Loopfront
- Restado

Climate Impact Calculation

Reused materials drastically reduce the environmental impact of buildings by lowering CO_2 emissions from both production and waste management. However, this positive effect is rarely reflected in current assessments. Mandatory life cycle assessment (LCA) and life cycle cost calculations should therefore be established to quantify and monetise the avoided emissions and environmental impacts that result from material reuse. Recognising this real environmental saving makes reuse more competitive.

Key actions for policymakers:

- Mandatory LCA calculation with maximum GWP values for new buildings, accompanied by mandatory shadow prices for building materials.

GOOD PRACTICE:

Denmark has mandatory LCA calculations with implemented limit values for new buildings, taking into account all the life cycle stages defined by European standards (EN 15978) (more information).

Mandatory Green Public Procurement Criteria (GPP)

GPP is one of the most powerful instruments for transforming markets and making sustainability operational. GPP serves as examples and pilots for innovative ideas and implementations. To use the full potential of GPP, mandatory minimum criteria and guidance are necessary.

Mandatory GPP criteria should already in the planning phase implement:

- Designing for deconstructability and building convertibility as an award criterion.
- Life-cycle cost calculation instead of lowest-bidder procurement.
- Hazardous-substance avoidance plan as part of the permitting process.
- Building logbooks to document installed products with their chemical content.

Construction materials should be:

- Third-party ecolabel certified.
- Free of all substances of very high concern (< 0.1 %) in alignment with EU Taxonomy rules.
- Biocide and PFAS free in exterior materials (e.g., facades, roofs, paved areas).

Tallinn: "Until national regulations catch up, our HS-free material requirements remain vulnerable to budget-first decision making."

For wide and easy implementation of GPP the following support should be provided:

- User friendly templates and guidance documents.
- Standardised procurement texts for procurers, designers and construction managers to streamline the process and reduce long-term financial costs.
- Adequate training for municipal employees to raise awareness of the benefits of toxic-free, circular and climate-friendly construction.

GOOD PRACTICE:

EU Publication Office: Practical guide for the use of the EU Ecolabel in the green public procurement of hard covering products Download here

Italy has made GPP Minimum Environmental Criteria (MEC) for public buildings mandatory. An overview of Italian MEC in different sectors can be found here: CAM vigenti - Ministero dell'Ambiente e della Sicurezza energetica

For a circular economy in the building sector, the full life cycle of materials must be considered. It starts with tox-free construction products, where choosing such materials requires full chemical declaration and stringent mandatory requirements. Only if we can make sure with stringent circularity targets that hazardous substances do not re-enter the economy's material cycle, circularity can be sustainably established, saving raw materials, production costs and avoiding environmental damages. When we talk about circularity we must therefore always include tox-free materials and traceability.

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References & Additional Information:

[1]NonHazCity3 Project Page

[2]Occurrence of substances of concern in Baltic Sea Region buildings, construction materials and sites Download here

[3]Buildings and construction (11.11.25; 1 pm)

[4]BVB: Byggvarubedömningen® is a simple toolset that helps to choose safer and more sustainable products

[5] Endocrine disruptors and carcinogens in building materials, Byggvarubedömningen Industry Report 2024

Strategic solutions for managing procedures for construction materials and sites Download here

Best practices of NonHazCity pilots on tox-free, circular and climate friendly buildings in BSR cities Download here

NonHazCity3 Building Material Catalogue for tox-free construction Download here

Step-by-step guide for the process management Download here

NHC3 Series of Fact Sheets for Professionals Download here

Do-it-yourself guide: How to Create a Toxfree Home Download here

Consumer app "Check(ED)"