Policy Recommendations for the EU, National and Municipality Level

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Lessons learned from the NonHazCity3 project for smarter construction policies

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS
NonHazCity 3

Schriftstück bearbeiten

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Short Summary

People in Europe spend around 90% of their lives indoors. Yet screenings in the NonHazCity3 project show that hazardous substances such as PFAS, plasticisers and bisphenols can be found in indoor air, dust and stormwater, with construction products being a likely source.

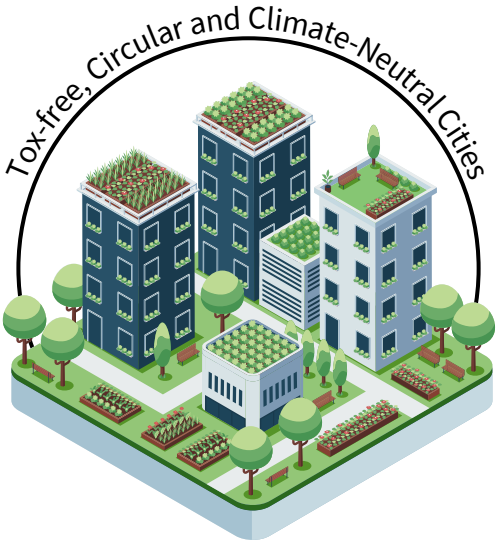
Current EU and national legislation does not yet systematically prevent these emissions or ensure a truly safe indoor environment. The NonHazCity3 project addressed this problem by providing strategic and practical solutions for all those who make decisions about the construction, renovation or purchase of buildings and facilities. Pilot projects have tested the NonHazCity3 solutions and demonstrated that tox-free, circular and climate-friendly construction is technically achievable today.

Decisions taken every day in Brussels, national ministries and city halls about building rules, product requirements, chemical content and public building projects determine which materials are used and therefore what ends up in our walls, floors, indoor air and the environment.

If these decisions consistently reward tox-free, circular and climate-friendly solutions, markets and practices can shift. This document brings together three policy briefs that translate evidence from the NonHazCity3 pilots into concrete policy recommendations.

Together, these briefs show that safer, greener buildings are technically feasible today and outline how policy can help to make them the norm.

Policy Brief
for EU Policymakers



Tox-free, Circular and Climate-Friendly: The Next Steps for Europe's Buildings

Lessons learned from the NonHazCity3 project for smarter EU construction policies

Anna Wieland & Outi Ilvonen

NONHAZCITY

State of the art

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 detected 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 nature.
- Pilots have shown that tox-free, circular and climate-friendly construction is possible today.
- To scale up, Europe needs transparent, easy-to-understand information on chemical content.
- Harmonised standards and strong public procurement are keys to market innovation and mainstreaming best practice.

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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 Europe, 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, all eight EU countries bordering the Baltic Sea joined the NonHazCity3 (NHC3) project to develop strategic and practical solutions for making construction materials and sites climate neutral, circular and tox-free (three-pillar approach). Seven pilot studies in nine cities across eight countries of the Baltic Sea region tested the solutions, assessed feasibility and identified regulatory and market barriers. Their lessons form the basis for this brief and its four EU-level policy recommendations.

The evidence base

To map 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, indoor dust and air, and stormwater to identify how pollutants move from products to people and the environment (findings are presented in the project publication "Occurrence of substances of concern in Baltic Sea Region buildings, construction materials and sites").

Construction materials: The source of pollutants

In the material screening, the NHC3 project found that numerous construction products contained hazardous substances such as

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.

- Biocides (such as iodocarb and diuron from roof felt, paints for exterior use, or wooden panels)
- Plasticizers (found in flooring materials; known to cause endocrine disruption)
- PFAS ('forever chemicals'; highly persistent in the environment and associated with immune effects and cancer risks)
- Metals (such as chromium, posing environmental and health risks)

Indoor environment mirrors materials in use

Indoor dust analyses revealed a complex mix of contaminants, reflecting the materials present inside buildings. PFAS were detected in almost all samples. Additionally, indoor air revealed plasticizers, 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).

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

While each of these substances is problematic on its own, the combined exposure risks remain largely unknown. In reality, people are rarely exposed to a single

substance in indoor air but rather to a chemical cocktail originating from multiple sources.

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.

From Evidence to Practice: the NHC3 Solutions

Building on the evidence of widespread hazardous substances in construction materials, the NHC3 project translated the scientific findings into strategic[4] and practical solutions for a tox-free, circular and climate-friendly construction sector. These solutions were tested within seven pilot studies, showing best practice cases and lessons learned[5]. A short summary of the pilots is shown in Figure 1.

The Strategic Solutions:

- Integrate tox-free, circular and climate-friendly principles into public procurement
- Use Green Building Certificates and ecolabels
- Enhance supply chain communication and market dialogue

Stockholm: "Miljöbyggnad certification turned political commitments into actionable specifications that even skeptical project partners could implement."

Practical solutions turning strategy into hands-on guides:

- Step-by-step guide
- Construction product assessment database (BVB)
- Fact sheets for professionals
- Do-it-yourself guide
- Consumer app "Check(ED)"

Lessons Learned: Insights from the NHC3 Pilots

The strategic and practical solutions tested by the seven pilots under real conditions revealed three key lessons:

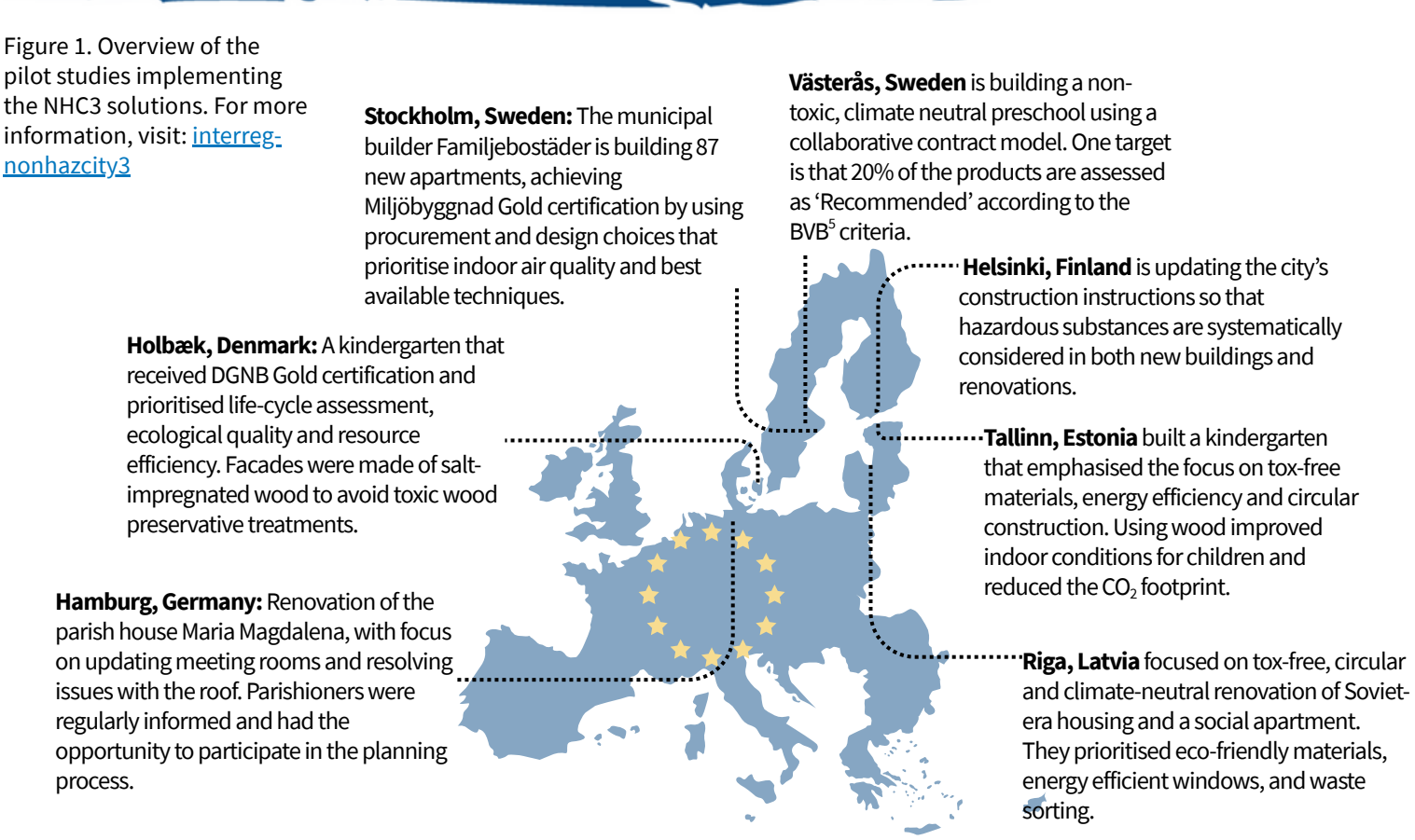
1. Data is the Bottleneck

Effective implementation of tox-free and circular construction depends on robust data management systems and transparent product information. Pilots repeatedly noted difficulties in obtaining complete chemical content information, which made it challenging to identify materials that are both environmentally safe and economically viable.

Västerås: "We log all products by weight in BVB[6], and aim towards 20% products assessed as Recommended in BVB and not more than 5% products assessed as To be avoided. With these goals we can reduce hazardous substances in our buildings."

2. Verification Matters

Certification schemes and material databases proved to be effective tools for reducing hazardous substances. They serve as an effective communication tool among project partners and with the market.



Most pilots used the Byggvarubedömningen (BVB[6]) system, which provides extensive product information and rates materials via a traffic-light system based on toxicity, circularity and climate impact.

3. 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 are clearly formulated, suppliers engage proactively, especially when future procurement opportunities are visible. However, several barriers remain:

- The lack of mandatory requirements for the reduction of hazardous substances means that municipalities depend on individual expertise.
- Financial constraints and lowest-bidder rules can act as a barrier to stricter sustainability criteria, as initial costs can appear higher.
- Uneven GPP frameworks across EU Member States create an unequal playing field, reducing suppliers' motivation to provide sustainable materials or transparent data.

To make Europe's built environment tox-free, circular and climate-friendly, transparent chemical content information is essential. Non-toxic materials must become the norm through clear limits, phase-outs of substances of concern and recognition of trusted ecolabels. Harmonised and mandatory Green Public Procurement can lead by example and drive market innovation.

Policy Recommendations

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

Full Chemical Declaration and Traceability

Transparent information on chemical content is a precondition for non-toxic and circular construction. Therefore, an EU-wide building product database, equivalent to the Swedish BVB[6] system, should be developed, covering all construction products and ensuring that detailed chemical content information is available and easily accessible. A traffic-light system that rates products by their toxicity, circularity and climate impact would further simplify decisions for designers and procurers while stimulating market transparency and innovation.

1. Policy Recommendation

Key actions for policymakers:

- Expand harmonised standards under the Construction Products Regulation (CPR) to require information on all substances of concern contained in the Declaration of Performance and Conformity.
- Integrate hazardous-substance information (e.g., PFAS, biocides, substances of very high concern and substances of equivalent concern) into the upcoming Digital Product Passport and Environmental Product Declarations.

Stringent Requirements for Non-Toxic Construction Materials

Circularity may only works if construction materials are predominantly free of hazardous substances and remaining products containing hazardous substances can be easily recognised. The NHC3 findings show that some 'replacement' substances still pose health and environmental risks, turning today's new products into tomorrow's waste rather than reusable resources.

An EU tox-free environment requirements framework should therefore: (i) exclude all substances of very high concern above 0.1 % from construction products, (ii) ensure that exterior materials (e.g., facades, roofs, paved areas) are biocide and PFAS free, and (iii) set emission limits for volatile organic compounds (VOCs, e.g., M1 certification). To ensure practical uptake by market actors and procurers, expand recognised ecolabels (e.g., EU Ecolabel, Blauer Engel, Nordic Swan) across the main building product groups.

2. Policy Recommendation

Key actions for policymakers:

- Establish an EU-wide declaration format for VOCs in indoor construction products under CPR and set VOC emission limits in harmonised GPP rules under the CPR.
- Establish an EU-wide declaration format for substances of concern under CPR and set Zero Pollution Ambition criteria for all construction products within harmonised GPP rules under the CPR.
- Further promote recognised ecolabels to support GPP and EU Taxonomy rules.

3. Policy Recommendation

Mandatory and Harmonised Green Public Procurement Criteria (GPP)

GPP is one of the most powerful instruments for transforming markets and operationalising the EU Green Deal, the Circular Economy Action Plan, and the Zero Pollution Action Plan. The NHC3 pilots found that non-harmonised GPP criteria across Member States reduce market innovation and suppliers' willingness to provide detailed product information. A harmonised and mandatory EU GPP framework would create a level playing field across Member States and speed up innovation.

Key actions for policymakers:

- Mandatory minimum GPP criteria within the CPR.
- Ensure that the information needed for GPP is available in the Declaration of Performance and Conformity and the Digital Product Passport.

4. Policy Recommendation

Circularity Targets

Recycling and reuse targets are an important step toward circularity. However, stringent end-of-waste criteria must ensure that hazardous substances in construction materials are identified, removed, and kept out of secondary flows. Mandatory pre-demolition audits should therefore list hazardous substances before any reuse. To make this workable, the EU should promote interoperable data systems (e.g. BVB[5]-style material logbooks) that give easy access to chemical content and reuse potential at the end of a building's life.

Key actions for policymakers:

- Support pre-demolition audits and platforms for the exchange of reusable construction products.
- Define end-of-waste criteria for pollutant content in recycled building materials under Circular Economy Act.
- Promote a standardised declaration of recycled content in construction products under CPR.
- Promote standardised information on future reusability and recyclability of construction products under CPR.

The NHC3 project has shown that safe, circular and climate-friendly construction is achievable today. Harmonised standards, transparent data and green public procurement with ambitious criteria will enable Europe to turn today's pilots into tomorrow's norm.

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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)

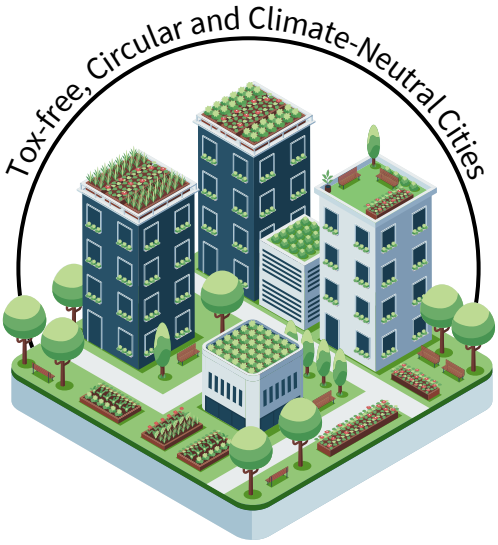
[4]Strategic solutions for managing procedures for construction materials and sites Download here

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

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

NonHazCity3 Building Material Catalogue for tox-free construction Download here

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

Anna Wieland & Outi Ilvonen

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**.

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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-friendly (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

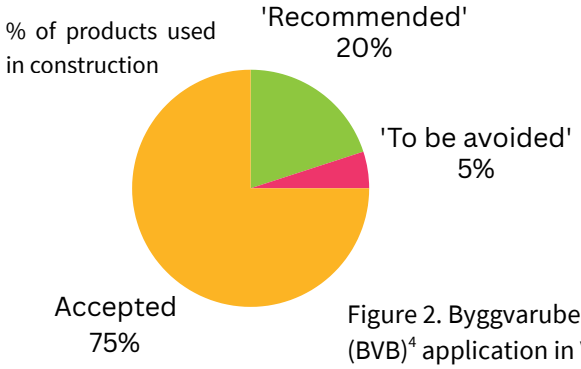


Figure 2. Byggvarubedömningen (BVB)[4] application in Västerås with defined material criteria.

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.

Products containing carcinogenic substances per logbook

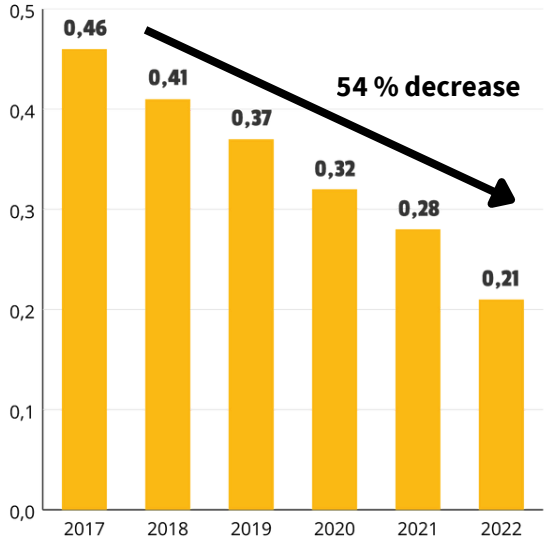


Figure 4. Example from the Swedish BVB[4] system showing the average number of products assessed as "To be avoided due to carcinogenicity" per logbooks (evaluation of 11,000 logbooks) (Byggvarubedömningen Industry Report 2024[5])

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.

Stringent Requirements for Non-Toxic Construction Materials

A circular economy in the building sector may only work 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.

2. Policy Recommendation

Key actions for policymakers:

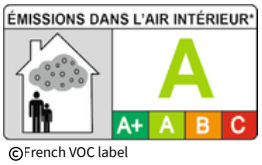
- Set national limits that exclude all substances of very high concern above 0.1 % from construction products.
- Ensure that exterior materials (e.g., facades, roofs, paved areas) are biocide and PFAS free.
- Set national emission limits for volatile organic compounds (VOCs) for all building products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

Policy Brief
for
Municipalities

For a Circular, Tox-free and Climate-neutral Construction Sector in Municipalities

Anna Wieland & Outi Ilvonen

People spend around 90 % of their lives indoors and inhale 11,000–12,000 litres of air per day. That air should be healthy. Yet screenings of indoor dust from preschools 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 hazardous substances such as plasticisers, bisphenols, PFAS and brominated flame retardants are present in indoor air and dust[2,3]. All of these chemicals are likely to pose health risks to children and educators. Bisphenols, for example, affect hormone function, and PFAS are associated with immune effects and cancer risks.

Construction materials and furniture in the indoor environment can be one important source of these hazardous substances. To reduce children's exposure to hazardous substances, the City of Stockholm launched the 'Chemical Smart Preschool' initiative, demonstrating how municipalities can act to provide a healthier environment for children. By following specific product-substitution rules and removing items with a high risk of hazardous substance content

16 December 2025

Summary

- **Indoor dust reflects what we build.** PFAS, plasticisers and other hazardous substances are released from construction materials into indoor air and the environment.
- Current **EU and national legislation** is **not strong enough to ensure a safe indoor environment.**
- **Municipalities** have the **power to close this gap** with green public procurement and local regulations that go beyond national standards.

Interreg Baltic Sea Region
Co-funded by the European Union
SUSTAINABLE WATERS
NonHazCity 3

(eg., old polyvinyl chloride (PVC) items), Stockholm significantly reduced harmful chemicals in preschool indoor environments[4].

Municipalities' building stocks are large and diverse, ranging from educational buildings such as schools and kindergartens to apartment blocks, health-care and office buildings, canteens, museums and sports halls. People use these public buildings every day, and municipalities have a clear responsibility to ensure that these environments are as tox-free as possible and do not harm people or nature.
However, the preschool dust screenings show that current national and European legislation is not strong enough to ensure a truly tox-free indoor environment. Municipalities therefore need to adopt requirements that go beyond current EU and national laws if they want to make their public buildings safer.

The influence of pollutants from construction materials is not limited to indoor air. Rain mobilises chemicals from exterior materials such as roofs, facades or pavements, transporting them via runoff and drainage systems into soil, groundwater, rivers and the sea. Analyses of storm water within the NonHazCity3 (NHC3) project, for example, have detected a wide spectrum of contaminants, including biocides, organophosphate esters, metals, and PFAS[2].

Several municipalities, especially in the Nordic countries, have already introduced stricter building requirements to protect people and the environment. However, across cities in the EU 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.

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. It is aimed at all those who have to make decisions about the construction, renovation or purchase of buildings and facilities. This means residents buying or renovating their homes, companies building buildings, and local governments commissioning larger buildings.

To address this shared challenge, the public and private sector as well as civil society stakeholders of all eight EU countries bordering the Baltic Sea joined the NHC3 project to develop strategic and practical 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 these solutions and showed how municipalities can use their own regulations to create a safer environment for people and nature. Their lessons form the basis of this brief and its recommendations for municipalities.

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

Figure 2. The NonHazCity3 outputs for municipalities. Tested and refined practical and strategic solutions that help designers, public procurers, construction managers and private builders to realise tox-free, circular and climate-friendly constructions. The selection of resulting hands-on guides give municipalities concrete, ready-to-use approaches that they can directly apply in their own projects.

Case studies

Tox-free, circular and climate-friendly constructions in municipalities

Within the NHC3 project, seven pilots tested the NHC3 strategic and practical solutions (overview in Figure 3 and on the NonHazCity 3 homepage).

The following three municipal examples illustrate different entry points: Helsinki demonstrates how a municipality can integrate circularity into its overall approach to construction, while Holbæk and Västerås show how tox-free, circular and climate-friendly criteria can be implemented in concrete public building projects.

Helsinki, Finland (686,595 inhabitants, March 2025)**:** Next to the Carbon-neutral Helsinki 2035 Action Plan, the city adopted a Roadmap for Circular and Sharing Economy with a long-term goal of a carbon-neutral circular economy by 2050. Construction is thereby one of its key focus areas (Helsinki's Roadmap).

Within the NHC3 project, Helsinki updated the building material instructions to better address hazardous substances in public construction projects. The proposed revision included no further use of materials containing substances of very high concern (SVHC), mandatory M1-classified materials and a preference for eco-labelled materials. To ensure feasibility, the market availability and financial impacts were assessed.

Västerås, Sweden (156,838 inhabitants, end of 2023) designed a preschool that fully applies the three-pillar approach of circular, tox-free and climate-friendly construction. Already in the designing phase, future reuse options of the construction were considered (easily repurpose to a municipal psychiatric accommodation, by simply adding a few walls and bathroom adjustments) and materials were selected using the Byggvarubedömningen (BVB)[5] database with an implemented rating system. Minimum 20 % of the products should be rated in BVB as 'Recommended' and less than 5 % as 'To be

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 Miljöyggnad 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[4] criteria.

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

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.

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.

avoided', whereas these products needed to be individually approved before installation. All products are logged in the BVB[5] building logbook, ensuring long-term traceability of chemical content and reuse potential.

Holbæk, Denmark (74,935 inhabitants, end of 2025): In this pilot, a new kindergarten was built with a strong focus on life cycle assessment (LCA), social, economic and ecological quality and resource efficiency. The building received DGNB Gold certification (Deutsche Gesellschaft für Nachhaltiges Bauen), a German sustainability label for buildings. Large canopies both protect the building facade and the indoor environment from overheating. Shielding of windows and facades extends the lifespan of building materials, and salt-impregnated wood prevents the use of toxic wood preservatives. The roof is covered with roofing felt and grass, and indoor materials were selected for their natural and long-lasting properties, such as wood and linoleum. The BVB[5] system was used for material selection and logging.

The three examples demonstrate that tox-free, circular and climate-friendly construction is technically feasible today and that municipalities have the possibility to implement regulations stricter than the national laws to protect people's health and the environment.

The Power and Impact of Green Public Procurement (GPP)

Public procurement is directly and indirectly linked to around 15 % of global greenhouse gas emissions (about 7.5 billion tonnes annually)[6] and with over 250 000 public authorities about 2.5 trillion euros per year are spent on the purchase of services, works and supplies[7]. Hence GPP is one of the most powerful tools to shape an economy that is

more innovative, resource and energy efficient, and socially inclusive. Within the NHC3 project, the pilots showed that the three-pillar approach of tox-free, circular and climate-friendly construction 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.

Policy Recommendations

Municipalities that want to protect their citizens' health and local environment cannot rely on national and EU regulations alone. Hazardous substances in building materials, circular solutions and sufficient climate standards are still not systematically addressed in current legislation. If municipalities want tox-free indoor environments and lower emissions, they need to go beyond the minimum requirements. The good news: they already have a strong tool. Green public procurement can start with small, targeted improvements in existing buildings and grow into city-wide initiatives that cover the entire building stock.

Green Public Buildings

Municipal building projects should consistently aim to be tox-free, circular and climate-friendly. To achieve this:

- **Use a step-by-step process from concept to verification**

Apply a structured process, from the early phase to final verification, to plan and implement public construction projects (for example the 'Step-by-Step Guide of NHC3'). Complete the provided checklist in the step-by-step guide for each project phase and aim for an eco-certification for buildings. A shared overall goal helps to bring all construction stakeholders to the same level, simplifies communication and can already align design decisions with the final target (for example the preschool in Västerås adjusted the position of the building by 90° compared to the original plan, in order to optimise energy efficiency and sustainability).

Examples for building certifications include DGNB, BNB, QNG, Nordic Swan, Miljöbyggnad, BREEAM, LEED.

- **Set clear targets to reduce harmful materials in construction.**

Define targets for the amount of 'Recommended' and 'To be avoided' products already in the planning phase. Materials should be free of substances of very high concern, equivalent concern and biocides. For an easy implementation, use as many third-party certified materials such as: Blauer Engel, M1, Nordic Swan. In addition, the NHC3 Building Material Catalogue can support the selection of products and the Interreg project ReactiveCity gives advice for a biocide-free, proactive city.

Västerås, Sweden required that at least 20 % of products should be certified as 'Recommended' and less than 5 % as 'To be avoided' under the BVB[5] system. Such targets should be progressively strengthened in future projects (see exemplary in Figure 4).

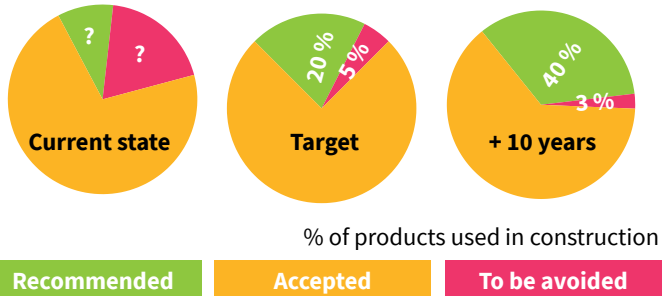


Figure 4: Integrated construction products in a building project, rated according to toxicity, circularity and climate-neutrality.

- **Calculate life-cycle costs instead of focusing on lowest-bidder procurement.**

As the initial costs of tox-free, circular and climate-friendly materials can appear higher, life-cycle assessment (LCA) and life-cycle costs should be integrated into selection criteria. Several pilots found that sustainable buildings can have lower operational costs (e.g., higher energy efficiency) and better, longer material performance. Therefore, environmental impact and life cycle costs should be a key element in public tenders.

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) (Find out more).

- **Require a building logbook for all new constructions and renovations.**

All used materials and their chemical compounds should be logged in a building logbook (such as BVB[5] or Baubook) to provide information to all relevant stakeholders throughout the building life-cycle. Use the logbook to identify recyclable and reusable products and high-risk materials at the end of the building life-cycle.

- **Develop and share a criteria bank for public procurement.**

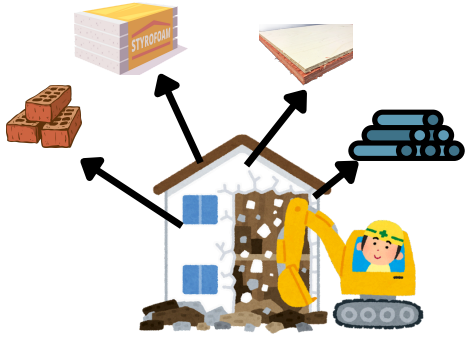
A criteria bank with standardised tender texts and requirements for tox-free, circular and climate-friendly construction helps different departments and other municipalities to reuse and adapt tested procurement wordings instead of starting from scratch each time. Example: Helsinki criteria bank

Establish mandatory pre-deconstruction audits and services

If buildings cannot be renovated or retrofitted, they should be selectively deconstructed rather than demolished in a conventional way. Pre-deconstruction audits help to identify components and materials with reuse or recycling potential.

- **Make pre-deconstruction audits mandatory** for all buildings or larger renovations. As a reference, municipalities can use existing guidance such as the EDA guidelines.
- **Provide guidance for private owners**. Offer a municipal helpline that explains to private owners which steps to take after a pre-deconstruction audit.
- **Promote platforms for reusable building materials**, such as Centrum för cirkulärt byggande – CCBuild, Loopfront, Restado.

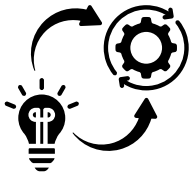
In Denmark all properties over 250 m² need to be resource-mapped prior to deconstruction. During dismantling, materials need to be mapped, separated and sorted for reuse or recycling. Any materials containing substances of concern must be identified and disposed of properly (Find out more).



Selective deconstruction instead of demolition.

Invest in capacity building and structured stakeholder interaction

- Train municipal staff and construction professionals. It is particularly important that the construction workforce has the skills and know-how to deliver tox-free, circular and climate-friendly construction projects.
- Support and join regional, national and European networks between cities to implement climate and circular measures. Joint initiatives can help municipalities to develop criteria together, share tender texts and exchange lessons learned.
- Join existing forums where municipalities can share their needs and experiences with EU institutions, helping to align local practice with the policy framework.



Dublin City Council piloted a passive house project and required the contractor to complete a Passive House Tradesperson's training course to ensure sufficient expertise[8].

Brussels offers skills development programmes with various circular construction training modules for companies to support broad and effective implementation of circular buildings (Homepage - Build Circular).

Within the NHC3 project, proactive municipal initiatives showed that tox-free, circular and climate-friendly constructions are achievable today. Municipalities have the potential to set their own stricter regulations to safeguard their citizens and environment.

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